AUSTRALIAN ENERGY MARKET COMMISSION

RULE

Rule determination

National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024

Proponents

Hydro Tasmania
Delta Electricity

28 March 2024

Inquiries

Australian Energy Market Commission
Level 15, 60 Castlereagh Street
Sydney NSW 2000

E aemc@aemc.gov.au
T (02) 8296 7800

Reference: ERC0290

About the AEMC

The AEMC reports to the energy ministers. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the energy ministers.

Acknowledgement of Country

The AEMC acknowledges and shows respect for the traditional custodians of the many different lands across Australia on which we all live and work. We pay respect to all Elders past and present and the continuing connection of Aboriginal and Torres Strait Islander peoples to Country. The AEMC office is located on the land traditionally owned by the Gadigal people of the Eora nation.

Copyright

Citation

To cite this document, please use the following:
AEMC, Improving security frameworks for the energy transition, Rule determination, 28 March 2024

Summary

1 The Australian Energy Market Commission (AEMC or Commission) has made a final determination and a more preferable final rule (the 'final rule') for the *Improving security frameworks for the energy transition* rule change. Informed by stakeholder feedback, the final rule contributes to the National Electricity Objective (NEO) by efficiently and proactively addressing system security issues through the energy transition.

2 The final rule builds on existing tools in the power system to enhance system security procurement frameworks. This will address system security issues through the transition, reduce the regular and inefficient use of directions, and provide better incentives for participants to invest in providing system security in the longer-term. It also increases transparency on current system security needs and understanding, and how the Australian Energy Market Operator (AEMO) plans to manage system security as we transition to a low- or zero-emissions power system.

3 Specifically, the final 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. It also ensures AEMO can procure necessary security services that fall outside these frameworks, and 'enable' security services in operational timeframes to ensure that the power system is secure day-to-day. AEMO will be able to trial new methods of delivering security, and will be required to report on how it plans to manage security through the transition. All of these improvements aim to support a secure power system and reduce reliance on directions through the transition.

4 The final rule is made in response to two rule change requests from Hydro Tasmania and Delta Electricity, which each proposed operational procurement mechanisms to value, procure and schedule essential system services (ESS) to help keep the system secure. The final rule addresses the issues identified in the requests by ensuring that sufficient security services are operationally available and scheduled, so that we can maintain security without necessitating market interventions.

5 The Commission considers these improvements are necessary — indeed essential — to implement now, even though we are still evolving our understanding of how to manage and deliver power system security in a very different system.

6 System security is becoming more challenging to manage as we transition. In the future we will likely have sufficient resources and services to provide system security and these will be plentiful as new technologies emerge, however, during the transition, system security may be scarce as synchronous plant retires, and as we learn about, and test, the capabilities of new technology.[1] Given the importance of system security to the integrity of the grid, we consider it necessary to give AEMO additional tools to manage this.

7 The Commission considers that the tools provided in this rule change are the most effective and efficient way to address the immediate and medium-term transitional issues we are facing in managing security. However, although we need to be able to meet the challenges of operating a transitioning system right now, we are still building the knowledge and operational experience to understand the best methods to manage security in the longer-term. As we build this knowledge and the system continues to evolve, further changes to market design may be justified.

8 The Commission still considers that the ultimate goal — if both technically feasible and economically justifiable — remains the independent procurement and valuing of security services

1 Discussed further in chapter 4 of the directions paper.

(or 'unbundling'). We recognise that this could provide investment and scarcity signals for participants to deliver these services at least cost to consumers.

9 As the Commission has previously set out, we have received advice from AEMO that notes that unbundling system security services in real time is not possible at the current time. AEMO's view is that further understanding and knowledge is required first.

10 While AEMO continues to develop its understanding of the power system, it is essential that the current arrangements are enhanced to support the most efficient and transparent procurement of these system needs. The final rule is designed as a step along the way — to deliver the best approach based on the information that we know today, while also building our understanding to prepare us to meet the system needs of the future.

11 The final rule will be implemented in stages:

- **3 June 2024:** the transitional services framework will commence. However, AEMO will only be able to procure transitional services subject to the publication of the transitional services guideline (which must be published by **1 December 2024**).
- **4 July 2024:** the improvements to directions reporting will commence.
- **1 December 2024:**
  - the new inertia framework will commence — including the adjusted NSCAS arrangements — to determine system inertia needs and trigger TNSP procurement.
  - the revisions to TNSP cost recovery for non-network system security costs will commence, including the new AER ex-ante determination process for large non-network security contracts.
  - AEMO must publish the first *transition plan for system security* ("transition plan") by this date.
- **2 December 2025**: the full enablement obligations on AEMO will commence, which is the date by which system strength service providers must meet the new system strength standard.

The rule lays the foundation for a secure decarbonisation of the system

12 The National Electricity Market (NEM) is going through a significant transformation, with the generation mix changing due to decarbonisation, changing technology costs, and consumer preferences. The NEM's regulatory and market frameworks were originally designed around a power system made of primarily synchronous generation which inherently provide an abundance of security services as a by-product of energy generation.

13 However, fewer of these services are being provided as the generation mix changes to inverter based resources, which connect to the power system through power electronics, and do not automatically provide all types of security services as a by-product of generation.

14 Current engineering understanding means that AEMO is not able to individually identify the specific services that synchronous units provide in operational timeframes. This means that AEMO is managing system security in the grid through unit configurations. These are specific configurations of the power system that represent a secure technical operating envelope. In practice, this means that AEMO has needed to use directions to require certain combinations of units to be online in order to maintain the security of the system.

15 Over time AEMO will increase its understanding of the security capabilities of the new generation mix, allowing it to implement new ways of ensuring system security. This is crucial in the transition to net zero, which will require the power system at times to operate with 100% instantaneous IBR,

as the current methods of ensuring system security are largely reliant on synchronous generators. To achieve this, AEMO will most likely need to analyse and progressively test new operating states of the power system, and new technologies and their capabilities. Throughout this transitional period, security services will continue to be scarce at times.

16 It is important to address this scarcity by providing the right incentives for participants to provide security services through the transition. There are existing frameworks that currently provide some incentives by enabling procurement of security services in planning timeframes, such as inertia, system strength and network support and control ancillary services (NSCAS) frameworks. System security in operational timeframes is largely managed through AEMO's management of the system, including interventions. Due to the current engineering understanding set out above, it is not possible to have security services individually managed in operational timeframes — aside from frequency. This final rule builds and evolves these arrangements.

The ISF final rule improves long-term procurement frameworks to address the future needs of the power system

17 The final rule change has leveraged existing procurement frameworks to ensure sufficient security services are available to maintain power system security irrespective of the energy market commitments of synchronous generators. The final rule:

- aligns the existing inertia and system strength frameworks procurement timeframes
- removes the exclusion to procuring inertia network services and system strength in the NSCAS framework
- adjusts TNSP cost recovery procedures for non-network security options to support efficient arrangements
- creates a new transitional non-market ancillary services (NMAS) framework for AEMO to procure security services necessary for the energy transition and to trial new sources of security services
- empowers AEMO to enable (or 'schedule') security services with a whole-of-NEM perspective
- improves directions transparency
- introduces a new annual reporting requirement on AEMO, known as the 'transition plan for system security' (or transition plan), in which AEMO will report annually on the steps it will take to manage security through the transition.

18 Considered together, these solutions focus on addressing the needs of the power system today and supporting power system security during the transition to net zero, which will require the power system at times to operate with 100% instantaneous inverter-based resources (IBR). The solutions also focus on building and informing our understanding of the future needs of the power system.

The Commission has made improvements to the existing inertia and system strength system security frameworks

19 The final rule has made three main changes to the existing inertia framework:

- introducing a NEM-wide inertia floor for interconnected operation, alongside a modified framework to ensure security under islanded conditions
- aligning procurement timeframes with the system strength framework, and
- removing restrictions on the procurement of synthetic inertia.

20 Aligning the inertia and system strength frameworks allow transmission network service providers (TNSPs) to more efficiently distribute and coordinate investment opportunities, while enabling the procurement of synthetic inertia will promote system security and economic efficiency.

21 The final rule also removes the exclusion on inertia network services and system strength under the NSCAS framework to ensure there is a backstop procurement arrangement in place to procure these services where a shortfall emerges in the near term before the primary frameworks can address it.

22 These changes aim to address issues and promote opportunities in the current frameworks to create proactive, forward-looking, frameworks to help ensure system security and reduce the use of directions.

23 The changes aligning the inertia and system strength procurement timeframes commence on **1 December 2024**, meaning that binding procurement obligations for the revised levels (the floor and modified islanding arrangements) commence on **1 December 2027**.

The final rule revises TNSP cost recovery arrangements for non-network system security contracts

24 The final rule introduces a common approach for TNSP cost recovery of system strength, inertia and NSCAS non-network costs, to address cashflow concerns raised by the ENA and minimise volatility for electricity consumers.

25 TNSP allowances for recovery of non-network system security costs will no longer have to be forecast and included in five-year revenue determinations. Instead, TNSPs will adopt an annual process for forecasting and recovery of system security costs for non-network solutions to minimise the magnitude of expected true up payments to variations to forecasts only.

26 The AER will now:

- provide guidance for how TNSPs set their expected annual system security network support payments.
- make a determination on whether expenditure under a TNSP's proposed system security network support contract is consistent with the operational expenditure objectives, criteria, and factors to promote economic efficiency in advance when requested.

27 The AER will continue to review the expenditure against the operational expenditure objectives once incurred to ensure that only efficient costs are passed through to customers.

28 The changes to TNSP cost recovery commence on **1 December 2024**.

A new transitional services NMAS framework will help keep the system secure through the transition and trial how new technologies can support security in a net-zero future

29 The Commission has introduced a new NMAS framework for 'transitional services'. The objective of the framework is to allow AEMO to procure transitional services (see below), with the aim to transition to a low- or zero-emissions power system where AEMO can maintain power system security. To achieve this, AEMO can procure two types of transitional services:

- **Type 1 contracts** can be procured where security services are not able to be procured through an existing framework, for example, a contract with a generator to come online when its

presence is needed to complete a unit configuration that is critical to maintaining system security.

- **Type 2 contracts** are to support AEMO in building its understanding and confidence in managing security in a low- or zero-emissions system. AEMO will be able to trial either *new technologies* or the *new application* of existing technologies to manage power system security in a low- or zero-emissions power system.

30 Type 1 contracts can only be used to procure for system security needs that are not captured in existing frameworks. AEMO will be required to outline its reasons for procuring these needs in the framework and would be required to outline the ongoing cost and services of the new framework each year. These contracts can be up to three years, and will only be able to run until 1 December 2029.

31 Type 2 contracts for conducting trials will be able to run for up to ten years, with the new framework sunsetting after 15 years.

32 The AEMC will review of the effectiveness of the framework after seven years.

33 Under the final rule, AEMO will be able to procure for security services under the new NMAS framework as soon as AEMO has published a procurement guideline.

34 The transitional services framework will commence on **3 June 2024**. However, AEMO will only be able to procure transitional services subject to the publication of the transitional services guideline (which must be published by **1 December 2024**).

AEMO will be empowered to schedule long-term contracts for security

35 To capture the full benefits of the proposed changes to long-term planning frameworks, the final rule empowers AEMO to enable (or 'schedule') planning timeframe contracts for system security. AEMO will:

- only enable contracts where there is a gap between the security outcomes of projected dispatch and the required levels for each security need
- not enable contracts to meet the entire volume of system security needs
- publish an enablement guideline that would outline how AEMO forecasts system security requirements, how it makes and communicates enablement decisions, and the timing of its enablement decisions.

36 An arrangement for allowing AEMO to operationally enable long-term contracts for system strength, inertia, NSCAS and the new NMAS will promote efficiencies by considering a whole-of-NEM perspective.

37 The Commission considers enablement decisions should support the policy intent of the long term frameworks for managing system security. This means contracts will be enabled to meet minimum and transitional security requirements, as well as host projected IBR online, as per the respective security requirements of each framework.

38 These arrangements commence on **2 December 2025**, which is when system strength obligations under the new system strength framework commence.

The Commission has made improvements to directions transparency

39 The reforms to system strength, inertia, NSCAS and the addition of a new NMAS framework are, in part, intended to help reduce the number of security directions that are issued by AEMO.

40 The Commission maintains that directions are a last-resort mechanism in AEMO's toolkit, and should not be relied upon as a primary mechanism to procure services or system needs. However, as the system transitions and each region undergoes changes in its generation mix, directions may be used at times to manage security as they have been in jurisdictions such as South Australia.

41 As such, the Commission has made improvements to real-time and post-fact directions reporting providing more transparency to stakeholders.

42 The final rule:

- codifies AEMO's obligation to publish a market notice when issuing a direction and prescribes the level of detail required, such as the identity of the directed participant
- clarifies the timing for directions reporting will follow a 40 calendar week cadence, and include further information, such as greater detail about the *total* amount of compensation paid to each directed and affected participant
- requires AEMO to report on direction trends in the transition plan.

43 The Commission considers that these improvements complement the other reforms in this final rule that are, in part, aimed at reducing the continued reliance on directions. It streamlines AEMO's existing processes and minimises the administrative burden experienced by AEMO in reporting on direction events. Further, the final rule will allow more opportunities for stakeholders to understand how AEMO is managing the power system during the decarbonisation and transition of the NEM.

44 These arrangements commence on **4 July 2024**.

45 The previously proposed revisions to directions compensation have not been implemented by the final rule. Instead, the consideration of appropriate compensation for directed market participants will be left to the AEMC's holistic review into electricity compensation frameworks.

The transition plan for system security requires AEMO to outline the steps required to maintain security through the transition

46 The transition plan for system security, coupled with type 2 contracts, provides AEMO with the necessary tools to manage security in the near-term, and inform our understanding of the best ways to manage security as we transition to a low or zero-emissions power system. It will also ensure industry is well-informed throughout this process.

47 This plan requires AEMO to outline the steps it will take to manage system security through the transition, supporting industry understanding of:

- how AEMO is planning to meet the security needs of the power system through the transition to a low- or zero-emissions system, and
- the current technical understanding of system security and work to improve this understanding and specify services.

48 The rules specify the content AEMO must address in the transition plan, including:

- AEMO's current understanding of, and work on refining, security services and any operational metrics AEMO uses, or is developing, to manage security.
- a detailed description of AEMO's long-term plan to manage security and the work it is doing to address system security challenges as we transition

- the required capabilities or new entrant resources that could participate in managing system security
- a plan for how AEMO intends to move away from using the transitional services framework
- the outcomes and learnings from the trials conducted through type 2 contracts, and how this is contributing to long-term security management.

49 The Reliability Panel (the Panel) has the opportunity to provide input on the annual transition plan, with input due six months after the transition plan is published. AEMO will then address this input in its next publication. This could include clarifying comments, questions or targeted input.

50 AEMO must publish the first transition plan for system security by **1 December 2024**.

The Commission has considered stakeholder feedback in making its decision

51 The Commission values the widespread involvement and collaboration of stakeholders throughout this rule change. Stakeholders made immensely valuable contributions which actively shaped the development of the final rule.

52 Most notably, the rule change took a different direction based on feedback to the 2022 draft determination, leading to the direction now outlined in this final rule. Given the status of current engineering understanding, the final rule offers a simpler solution, building on our current arrangements to ensure a more adaptable and efficient approach for maintaining system security in the near-term and as we transition to a low- or zero-emissions power system.

53 Generally we have heard two key stakeholder concerns.

54 The first is the desire for the unbundling of services, that is, the individual specification, valuation, and procurement of services through spot market arrangements. However, given that it is not currently possible to specify individual services in operational timeframes, it is not possible to move to a framework based on operational procurement of individual services at this time. It is important that engineering knowledge and understanding of future technologies be developed further before this is possible. Given this, the rule focuses on evolving the existing long-term procurement framework to more proactively meet system security needs and avoid the use of directions. Looking to the future, however, the rule also creates incentives to improve understanding and specification of system needs and services and thus move in this direction, including through the transitional services framework, the transition plan and the inertia specification.

55 The Commission considers that the tools provided in this rule change are the most effective and efficient way to address the immediate and near-term transitional issues we are facing in managing security. However, it does not preclude further changes to market design. Although we need to be able to meet the challenges of operating a transitioning system right now, we are still building the knowledge and operational experience to understand the best methods to manage security in the longer-term. As we build this knowledge, further changes to market design may be justified.

56 The second concern we heard is the need for more transparency and understanding of system security needs. The final rule seeks to enhance industry understanding of existing security needs and how AEMO plans to manage system security as we transition. This is the objective of the transition plan for system security, which has several specific information provisions AEMO must meet.

57 In addition, we have made several specific changes between the second directions paper and the final determination, driven by stakeholder feedback. The details of these changes, and how they

contribute to meeting the NEO and the assessment criteria, are explored in more detail throughout this determination.

We assessed our rule against five assessment criteria using regulatory impact analysis and stakeholder feedback

58 The Commission has considered the NEO[2] and the issues raised in the rule change request and assessed the final rule against five assessment criteria outlined below. The Commission also considered emissions reduction in line with the revision to the NEO. We gathered stakeholder feedback and undertook regulatory impact analysis in relation to these criteria.

59 The more preferable final rule will contribute to achieving the NEO by:

- **Safety, security and reliability** — the final rule will drive procurement of sufficient security services to meet system needs through the transition, particularly through the changes to the inertia framework to make it more proactive and aligned with system strength. The final rule also requires AEMO to implement operational enablement of long-term contracts to ensure the power system remains within pre-defined limits for technical parameters such as voltage and frequency.
- **Emissions reduction** — the final rule contributes to the achievement of government targets for reducing, or that are likely to reduce, Australia's greenhouse gas emissions. It does this by ensuring AEMO and TNSPs take emissions into account in their security procurement decisions and encouraging the adoption of new technologies, including zero-carbon technologies, to meet security needs without relying on synchronous generation.
- **Principles of market efficiency** — the final rule creates more proactive and efficient long-term security frameworks, and allows TNSPs to take both system strength and inertia benefits into account when procuring for security. The enablement arrangements also promote efficiency by ensuring AEMO has a tool to manage security operationally without relying on directions, and requiring AEMO to enable units to meet minimum security needs at lowest cost.
- **Implementation considerations** — the final rule leverages existing frameworks, systems and understandings of the power system to keep costs and complexity as low as possible. Incremental procurement and implementation costs from this evolution to the long-term system security frameworks are not expected to be significant; and the benefits of more proactively procuring for security and efficiently enabling services are expected to result in better long-term outcomes for consumers. We also consider the benefits of the transition plan in increasing industry knowledge and awareness of security management and providing more certainty outweigh potential costs for AEMO in developing the plan.
- **Principles of good regulatory practice** — the final rule makes a number of improvements to promote transparency and predictability of system security needs and the frameworks to meet these needs. The transition plan for system security will improve industry understanding of how AEMO is planning to meet future security needs, and reporting and reporting arrangements throughout the rule will promote transparency and predictability. In addition, the changes introduced are flexible to changing market and external conditions, thereby remaining effective in achieving security outcomes over time.

2 Section 7 of the NEL.

Contents

1 The Commission has made a final determination 1
1.1 The Commission has made a final determination to improve system security frameworks 1
1.2 The final determination improves security frameworks to help meet the security challenges of the energy transition 3
1.3 The Commission's final determination has been shaped by stakeholder feedback and an emphasis on a simple yet efficient and effective approach 5
1.4 The final rule will support system security through the transition to net zero 8
1.5 Further changes to market design for security services may be needed over time as the system evolves 9

2 The final rule contributes to the energy objectives 10
2.1 The Commission must act in the long-term interests of energy consumers 10
2.2 The Commission has made a more preferable final rule 11
2.3 The Commission has made a more preferable final rule against the assessment criteria 12
2.4 The final rule better meets the NEO than the rule change proposals and the draft determination 16

3 Improvements to existing security frameworks that will more proactively meet security needs 18
3.1 The Commission has evolved the inertia and NSCAS frameworks 20
3.2 The changes to long-term procurement address the need to plan ahead to manage declining inertia in the system 22
3.3 A new inertia floor, alongside the continuation of islanding arrangements, will better meet system inertia needs 28
3.4 Aligning system strength and inertia procurement timelines makes inertia procurement more proactive and allows for greater TNSP investment coordination 32
3.5 Synthetic inertia is now eligible to meet minimum security needs, promoting security and efficiency 33
3.6 Inertia and system strength can now be procured through NSCAS if unforeseen needs arise in the near-term 35
3.7 The new inertia procurement framework and NSCAS arrangements commence on 1 December 2024 37
3.8 These revisions will promote power system security, align with emissions reduction targets and reduce reliance on directions 38

4 Improvements to TNSP cost recovery arrangements for non-network security contracts 41
4.1 The Commission has revised TNSP cost recovery arrangements for non-network security costs 43
4.2 Issues with the current TNSP cost recovery arrangements for non-network system security solutions 43
4.3 Stakeholder submissions raised significant concerns with the existing cost recovery arrangements 47
4.4 We investigated three options to resolve TNSPs' concerns 47
4.5 The Commission has improved TNSP recovery processes for non-network system security contracts 49
4.6 The use of non-network options is changing in the context of the energy transition 53
4.7 The changes to cost recovery promote the long-term interests of consumers. 54

5 The rule introduces a new NMAS framework to address security needs arising from the system transition 56
5.1 The Commission has introduced the 'transitional services framework' to support power system security 58
5.2 The framework meets two key needs of the transition: meeting current security gaps arising due

to the transition; and building understanding of how we can use new resources maintain security 59
5.3 Stakeholder feedback has shaped the final determination 61
5.4 The new rule introduces two contract types that allow AEMO to procure services that meet security needs of the power system 63
5.5 AEMO must publish the transitional services guideline and a statement of security needs before it can procure transitional services 67
5.6 AEMO must set out its strategy for procuring transitional services and participants can request to be considered 69
5.7 AEMO will need to consider emissions in its procurement decisions and provide transparency on emissions outcomes 71
5.8 Transparency arrangements will increase information provision on how AEMO currently maintains system security and will also shed light on the emission considerations of transitional services 72
5.9 The framework will be used as a transitional tool, with a set expiry date 73
5.10 The Commission considers that the transitional services NMAS framework aligns with, and promotes, the assessment criteria 76

6 AEMO's operational enablement of planning timeframe security contracts 78
6.1 The final rule requires AEMO operational enablement of planning timeframe contracts to promote security, efficiency and transparency 80
6.2 The final rule streamlines enablement responsibilities for system strength, inertia, NSCAS, and transitional services contracts 81
6.3 AEMO will enable security services to meet security requirements at least cost for consumers, guided by principles in the rules 83
6.4 The full enablement arrangements commence on 2 December 2025 97
6.5 AEMO enablement of security contracts aligns with the assessment criteria, promotes the NEO, and benefits power system security 98

7 The rule makes changes to the directions reporting framework to improve transparency 100
7.1 The final rule requires AEMO to provide greater transparency in market notices and direction reports 102
7.2 We have made improvements to the level of detail required in market notices for directions 104
7.3 We have improved the timing and level of detail required in AEMO's directions reporting 108
7.4 Reporting on directions trends will be included in the transition plan for system security 112
7.5 The Commission considers that changes to directions transparency align with, and promote, the assessment criteria 114

8 The rule introduces a transition plan for system security 115
8.1 The Commission is introducing a new report that outlines AEMO's transition plan for system security 117
8.2 Why the Commission considers an additional reporting requirement is needed 118
8.3 AEMO will report annually on its transition plan for system security 119
8.4 AEMO will engage with the Reliability Panel on the transition plan for system security 124
8.5 The AEMC will review whether the transition plan is achieving its intended outcomes 126
8.6 The Commission's policy proposals complement AEMO's broader work on security 128
8.7 The Commission considers that the transition plan for system security aligns with, and promotes, the assessment criteria 129

Appendices

A Summary of other issues raised in submissions 131

B Rule making process 134
B.1 Hydro Tasmania's rule change request 134
B.2 Delta Electricity's rule change request 136
B.3 The rule change process 139

C Regulatory impact analysis 140
C.1 Our regulatory impact analysis methodology 140

D Legal requirements to make a rule 145
D.1 Final rule determination and final rule 145
D.2 Power to make the rule 145
D.3 Commission's considerations 145
D.4 Making a more preferable rule 145
D.5 Making a differential rule 146
D.6 Civil penalty provisions and conduct provisions 146

Abbreviations and defined terms 149

Tables

Table 6.1: Security service enablement level 86
Table 6.2: Hypothetical contracts available for AEMO to enable in NSW 94
Table 6.3: Summary of contracts enabled to meet security requirements and dispatch additional IBR 94
Table 6.4: Contract enablement reasons 95
Table A.1: Summary of other issues raised in submissions 131
Table C.1: Regulatory impact analysis methodology 141
Table D.1: Civil penalty recommendation 147
Table D.2: Recommended amendments to existing clauses to civil penalty provisions 148

Figures

Figure 3.1: Distribution of mainland inertia in Q4 2023 23
Figure 3.2: 2023 Inertia review outcomes for the NEM, for the five-year period to December 2028 25
Figure 3.3: System security procurement timelines before the final rule 26
Figure 3.4: Investments with the inertia floor will be in regions not at risk of islanding 29
Figure 3.5: How to determine TNSP inertia procurement levels for a sub-network 31
Figure 3.6: TNSP inertia procurement targets would be set 3 years in advance on a rolling basis 33
Figure 3.7: Revised procurement timelines: inertia, system strength, and NSCAS 36
Figure 3.8: Interactions between system strength, inertia, and NSCAS frameworks 37
Figure 4.1: Cost recovery arrangements for system security frameworks 46
Figure 4.2: Assessment of current arrangements and proposals 49
Figure 5.1: Timeline of transitional services 67
Figure 7.1: The new market notice framework 107
Figure 7.2: Example of system security directions included in AEMO's new reporting method 112
Figure 8.1: Timeline of the transition plan for system security 126

1 The Commission has made a final determination

The Commission has made a final determination and more preferable rule for the *Improving security frameworks for the energy transition* rule change. The rule contributes to the National Electricity Objective (NEO) by efficiently and proactively addressing system security issues through the energy transition, aiming to reduce the regular and inefficient use of directions that exists today, and providing clearer incentives for participants to invest in providing system security. In doing so, the rule not only addresses immediate concerns but also establishes the foundation for actively promoting the learning of security needs. This, in turn, aims to support the evolution and adaptability of security frameworks, ensuring their alignment with the dynamic landscape of the energy sector.

This section provides context on, and gives a brief overview of, the more preferable final rule (the 'final rule'), including:

- Section 1.1 — The Commission has made a final determination to improve system security frameworks
- Section 1.2 — The final determination improves security frameworks to help meet the security challenges of the energy transition
- Section 1.3 — The Commission's final determination has been shaped by stakeholder feedback and an emphasis on a simple yet efficient and effective approach
- Section 1.4 — The final rule will support system security through the transition to net zero.

1.1 The Commission has made a final determination to improve system security frameworks

The Australian Energy Market Commission (AEMC or Commission) has made a final determination and rule to enhance existing frameworks in the National Electricity Rules (NER) to efficiently and proactively address power system security issues through the transition.

The final rule builds on existing tools in the power system to enhance system security procurement frameworks. This will address system security issues through the transition, reduce the regular and inefficient use of directions, and provide better incentives for participants to invest in providing system security in the longer-term. It also increases transparency on current system security needs and understanding, and how the Australian Energy Market Operator (AEMO) plans to manage system security as we transition to a low- or zero-emissions power system.

Specifically, the final 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. It also ensures AEMO can procure necessary security services that fall outside these frameworks, and 'enable' security services in operational timeframes to ensure that the power system is secure day-to-day. AEMO will be able to trial new methods of delivering security, and will be required to report on how it plans to manage security through the transition. All of these improvements aim to support a secure power system and reduce reliance on directions through the transition.

The Commission considers that the tools provided in this rule change are the most effective and efficient way to address the immediate and medium-term transitional issues we are facing in managing security. However, although we need to be able to meet the challenges of operating a transitioning system right now, we are still building the knowledge and operational experience to

understand the best methods to manage security in the longer-term. As we build this knowledge and the system continues to evolve, further changes to market design may be justified.

The rule:

- introduces a more proactive and balanced approach to procuring for inertia needs, and aligns the existing inertia and system strength frameworks (Chapter 3)
- adjusts TNSP cost recovery processes for non-network solutions for security, to avoid TNSP cashflow risks flowing through in adverse ways to consumers (Chapter 4)
- removes the exclusion to procuring inertia network services and system strength in the NSCAS framework, ensuring security requirements can be met if a near-term gap emerges (Chapter 3)
- creates a new transitional non-market ancillary services (NMAS) framework for AEMO to procure security services necessary for the energy transition (Chapter 5). Two types of contracts under this framework will allow AEMO to procure for existing and critical security needs, and conduct trials to determine how new technology (or new application of existing technology) can support security in a low- or zero-emissions system.
- requires AEMO to enable (or 'schedule') security services with a whole-of-NEM perspective (Chapter 6)
- improves the transparency of directions reporting (Chapter 7), and
- introduces a new transition plan for system security, which will be an annual reporting requirement on AEMO (Chapter 8). This requires AEMO to outline the steps it will take to manage security through the transition.

Together these solutions focus on addressing the needs of the power system today and supporting power system security during the transition to net zero, which will require the power system at times to operate with 100% instantaneous inverter-based resources (IBR). The solutions also focus on building and informing our understanding of the future needs of the power system, helping us to better consider how it may need to evolve over time.

The Commission has conducted five formal consultation processes throughout this rule change (section 1.3). Most recently, the Commission consulted on the proposals above through a directions paper in August 2023, followed by an update paper in December 2023 which focused on the new transitional NMAS framework and the transition plan for system security. Compared with the proposals set out in the directions and update papers, the final rule:

- maintains the previously proposed changes to the inertia and NSCAS frameworks, with no significant changes since the directions paper.
- includes new adjustments to TNSP cost recovery processes for non-network solutions for security — these were not proposed in the directions or update papers. They were introduced in response to feedback on the directions paper, and aim to avoid adverse outcomes on consumers which would likely arise due to the volatility and magnitude of non-network costs and the associated TNSP cashflow risks.
- maintains the transitional NMAS framework as proposed in the update paper, however with:
  - adjusted timeframes for both type 1 contracts (which now cannot be in place after 2028) and type 2 contracts (the framework will now sunset at 15 years, rather than 10 years) to better meet the objectives of the framework, and
  - clarified eligibility for types 1 and 2 contracts.
- simplifies the enablement principles compared with those we proposed in the directions paper. The simplifications aim to ensure that AEMO is capable of implementing a tool in time

for the commencement of the full system strength framework on 2 December 2025, and to better accommodate the current engineering understanding of the complex relationship between system strength and IBR hosting capacity.

- includes improvements to directions reporting, but does not make any of the changes to directions compensation which were discussed in the directions paper. This is because directions compensation is now being considered in the Review into electricity compensation frameworks which was initiated in November 2023[3]
- maintains the introduction of a new reporting requirement with the 'transition plan for system security' as proposed in the update paper, but changes the cadence from a two-year draft/final to an annual report. We also add a clearer role for the Reliability Panel to provide input to AEMO on the plan, along with an obligation for AEMO to respond to this input in its next plan.

1.2 The final determination improves security frameworks to help meet the security challenges of the energy transition

The final rule responds to the challenge of managing security through the energy transition. Synchronous generators are retiring, and our generation is increasingly being provided by inverter based plant (such as solar, wind and batteries). We are still understanding how these new resources can best support system security. In the short-term, we are experiencing security shortages (as identified in the rule change requests) with AEMO needing to direct plan to be online. We need to make sure there are efficient frameworks to incentivise the provision of security services without relying on inefficient market interventions. The final rule enhances existing security frameworks to more proactively meet security needs through the transition, provides tools to allow AEMO to better understand the capabilities of new technologies and information to the market to help encourage investment in system security.

1.2.1 The final rule responds to two proposals to more efficiently manage power system security

In this project the Commission consolidated its consideration of two rule change requests, one from Hydro Tasmania[4] and the other from Delta Electricity.[5] The rule change requests proposed operational procurement mechanisms to better value, procure and schedule essential system services (ESS) to help keep the system secure. These are detailed in Appendix B, with the two different proposed approaches to scheduling and provision of ESS:

- Hydro Tasmania proposed an approach to address the shortage of "inertia and related services" in the national electricity market (NEM) by explicitly valuing the provision of services in real-time, in much the same way that energy is valued.[6] The pre-dispatch and dispatch engines, which currently provide forecast and actual dispatch targets and prices for energy and market ancillary services, would be altered so that they also determine forecast and actual dispatch targets and prices for other essential system services.[7]
- Delta Electricity proposed to introduce an ex-ante, day-ahead "capacity commitment mechanism" and payment system so that generators or demand response providers remain available to offer operational reserve and any other system security or reliability services that the Australian Energy Market Operator (AEMO) may require to meet its security and reliability

3 AEMC, Review into electricity compensation frameworks, https://www.aemc.gov.au/market-reviews-advice/review-electricity-compensation-frameworks.

4 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019.

5 Delta Electricity, Capacity commitment mechanism for operational reserve and other system services, Rule change request, 4 June 2020.

6 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p 2.

7 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p 2

objectives. AEMO would determine system service requirements and, through a market operating ahead of real-time, procure these services from market participants.[8]

1.2.2 The energy transition presents significant security challenges for the NEM

The rule change requests identify that the NEM is going through a significant transformation with the generation mix changing, driven by decarbonisation, changing technology costs, and consumer preferences. This significant transformation is testing the limits of current system security and operational experience. With declining synchronous generators online, AEMO has relied on directions in recent years to keep the NEM secure.

The NEM's regulatory and market frameworks were originally designed for a power system made up primarily of synchronous generation (coal-fired, gas-fired, and hydro-powered generators) that are electromagnetically coupled to the power system. These generators inherently provide an abundance of ESS as a by-product of energy generation.

In contrast, inverter based plant (such as solar, wind, and batteries), connect to the power system through power electronics. While they can be configured to provide some security services, they do not do this automatically as a by-product of generation. This means less of these services are being provided as the generation mix shifts, with few, if any, investment signals to encourage these services.

Current engineering understanding means that AEMO is not able to individually identify the specific services that synchronous units provide in operational timeframes. This means that AEMO is managing system security in the grid through unit configurations. These are specific configurations of the power system that represent a secure technical operating envelope. In practice, this means that AEMO has needed to use directions to require certain combinations of units to be online in order to maintain the security of the system. This has limitations for what arrangements can be implemented in operational timeframes to improve and evolve system security arrangements. For example, individual markets to procure a specific system service cannot currently be introduced given that the services cannot be specified in operational timeframes.

In this context, AEMO is increasingly directing generators to be online, when they would otherwise have not been, to provide these services. Reliance on directions, which are meant to be used as a last resort mechanism, increases security risks on the power system because of inadequate transparency, increased administrative burden, not providing certainty to participants, and not supporting trials of new technologies to support power system security.

Over time, AEMO will increase its understanding of the security capabilities of the new generation mix, allowing it to implement new ways of ensuring system security. This is crucial for the transition to net zero, which will require the power system at times to operate with 100% instantaneous IBR, as the current methods of ensuring system security are reliant on synchronous generators. To achieve this, AEMO will most likely need to analyse and progressively test new operating states of the power system. Throughout the transition, security services will likely continue to be scarce at times.

8 Delta Electricity, Capacity commitment mechanism for operational reserve and other system services, Rule change request, 4 June 2020.

1.3 The Commission's final determination has been shaped by stakeholder feedback and an emphasis on a simple yet efficient and effective approach

Stakeholder input and feedback helped to shape our final determination. We have conducted five formal consultation processes and convened many discussions and forums over the course of the rule change to understand and consider stakeholder views and input.

We have taken stakeholder feedback on our second directions paper and update paper into account in the final rule. Previously, feedback on the draft determination, along with the Commission's consideration of key issues, informed the Commission's decision to revise the direction of the rule change from the 'Operational security mechanism' as proposed in the draft determination to the simpler, less costly approach in the final rule, which builds on existing long-term procurement frameworks rather than introducing a new, more complex operational procurement and scheduling mechanism.

1.3.1 Stakeholder feedback to the second directions paper and update paper has shaped the final rule

The final rule incorporates stakeholder feedback on the second directions paper and update paper.

Stakeholders supported our proposed revisions to the long-term inertia procurement framework, NSCAS and revisions to directions transparency. We have carried these through to the final rule with no major changes.

On the new transitional NMAS framework, stakeholders broadly accepted the need for the framework, but there was concern about its design, particularly that the expiry period for type 1 contracts was too long, the sunset period for type 2 contracts was too short, and there was a lack of incentives for AEMO to use the trial aspect of the framework. We have adjusted the contract expiry and sunset periods and included a requirement for AEMO to outline its forward priorities and intended contracting activities for type 1 and type 2 in the transition plan, which the Reliability Panel can comment on.

Stakeholders consistently requested more transparency on system security needs, and a forward-looking plan for how these would be managed through the transition. We therefore proposed a new reporting requirement — the transition plan for system security — in the update paper, which stakeholders strongly supported. In response to feedback, we changed the cadence of the report from a 2 year draft/final process to an annual cadence in response to a desire for timely information. Many called for a more defined role for the Panel to engage with the transition plan than we proposed in the update paper, and we have included the ability for the Panel to provide input, which AEMO must respond to.

We also adjusted the enablement principles in response to stakeholder feedback that they may not provide AEMO with the flexibility it needs to implement an enablement approach in time for the start of the new system strength requirements in December 2025. The revised principles articulate the same outcomes — including meeting security requirements at lowest cost — but do this in a simpler, less prescriptive way.

The ENA and TNSPs also raised strong concerns about cashflow volatility and forecasting difficulties for non-network solutions to meet their security procurement obligations. In response, the final rule introduces a common approach for TNSP cost recovery of system strength, inertia and NSCAS non-network costs, where TNSPs would be able to forecast costs every year for inclusion in their transmission pricing, instead of every five years in their revenue determination.

To ensure AER oversight of the efficiency of these costs, the final rule also includes a role for the AER to provide ex-ante views on the efficiency of non-network solutions above defined thresholds.

1.3.2 Stakeholder feedback to the draft determination and further consideration of key issues helped inform a revised direction — from the OSM to a simpler, less costly approach

Following stakeholder feedback from the 2021 directions paper, the AEMC proposed a draft rule to introduce a mechanism called the 'operational security mechanism' (OSM). While the detailed design is outlined in the OSM draft determination, key design features of the OSM included:

- AEMO would be responsible for defining the system security needs and accrediting market participants to supply system services
- accredited market participants would bid to provide system services into the OSM close to real-time
- OSM schedules would be published to enable participants to position their units, accordingly
- providers of services through contracted arrangements with networks, such as system strength or inertia, could be incorporated into the OSM.

While submissions to the draft determination showed stakeholders broadly supported taking action to ensure a more efficient and transparent approach, other than directions, to manage system security, there were a number of fundamental questions and concerns raised. These concerns included:

- whether operational procurement of services that are difficult to define would provide clear and predictable long-term investment signals
- whether the proposed 'pay as bid' arrangements would provide incentives in an economically efficient way
- whether the proposed operational procurement and scheduling arrangements would significantly interact with the energy spot market
- market power concerns.

After carefully considering the submissions to the draft determination, the Commission determined the OSM would be too costly and complex to develop and implement and would be unlikely to deliver the intended outcomes.

Given that it is not currently possible to specify individual services in operational timeframes, it is not possible to move from an asset-based framework to a service-based framework at this time. It is important that engineering knowledge and understanding of future technologies be developed further before this is possible.

The Commission decided that instead, a simpler solution was required that can be implemented within a shorter timeframe and can meet the needs of the system during the transition. The Commission therefore set out the directions paper proposals, which build on existing arrangements to meet security needs through the transition.

1.3.3 The overall journey of this rule change has been shaped by five formal consultation processes

The Commission has consulted through five formal processes on this rule change, as well as through a Technical Working Group. Throughout the rule change, the security challenges presented by the energy system transition described in section 1.2.2 have remained the central focus and problem to solve.

Each stage of the consultation on this project contributed to the Commission refining our overall direction and then the details of the final rule. Stakeholder submissions to these papers can be found on our website, and are responded to throughout this determination.

1. We released a consultation paper in July 2020

The rule changes were initiated by the AEMC in a consultation paper in July 2020,[9] as part of a set of seven "system services" rule changes, all of which relate to the provision of services that are necessary for the secure operation of the power system. We received 43 submissions in response to the consultation paper with diverse views. The majority were committed to an approach where system security services were explicitly unbundled. Most were also generally supportive of the Commission's approach to analysing the rule changes. However, there were mixed views on the proposals themselves. Many stakeholders emphasised the need for technology neutrality, including accommodating future technologies, and noted the complexity of a mechanism to value synchronous services.

2. We released a directions paper in September 2021 seeking feedback on two different approaches to operational procurement

In September 2021, the Commission considered both proposals further in a directions paper informed by this initial consultation.[10] We considered the cases for different forms of operational procurement and scheduling of security services (an 'NMAS' approach outside of NEMDE — the central dispatch engine — or a 'MAS' approach which co-optimised security services with energy and FCAS within NEMDE). We proposed an NMAS approach. We received 22 submissions to this paper. Stakeholders expressed a variety of viewpoints on what should be done in the interim period while we transition to the long-term vision, and, indeed, whether there was a problem in the interim.

Despite the varying viewpoints on the need and approach, the Commission received a near-unanimous agreement on the long-term vision for unbundling system services. Stakeholders agreed that procuring system services individually, through market-based mechanisms where possible, would deliver an efficient system in the best interest of consumers. The Commission — along with the Australian Energy Regulator (AER) and AEMO — all agree with this long-term vision and as set out above, this is what the Commission is moving towards with this final determination.

3. We released a draft determination in September 2022 proposing the Operational security mechanism

Following stakeholder feedback to the 2021 directions paper, the draft determination proposed a mechanism to operationally procure and schedule security services in close to real time, building on the NMAS approach in the directions paper.[11] The draft determination also progressed one of the Energy Security Board's (ESB) recommendations from the essential system services workstream from its post 2025 market design advice, to progress the development of such an operational procurement mechanism.[12] The Commission received 21 submissions on the determination. While submissions to the draft determination showed stakeholders broadly supported taking action to ensure a more efficient and transparent approach, other than directions, to manage system security, there were a number of fundamental questions and concerns raised.

9 AEMC, System services rule changes, Consultation paper, 2 July 2020.

10 AEMC, Capacity commitment mechanism and synchronous services markets, Directions paper, 9 September 2021.

11 AEMC, Operational security mechanism, Draft rule determination, 21 September 2022.

12 ESB, Post-2025 Market Design: Final Advice to Ministers, Part A, 2021, https://www.datocms-assets.com/32572/1629944958-post-2025-market-design-final-advice-to-energy-ministers-part-a.pdf.

4. We released a second directions paper in August 2023 proposing a revised approach focused on long-term procurement

After carefully considering stakeholder feedback on the draft determination and the issues raised, the Commission considered that the OSM — and its arrangements for operational procurement and scheduling of security services — would be too costly and complex to implement. Section 1.3.2 describes the reasons for this pivotal decision in more detail.

The Commission considered there was still an important problem to address (section 1.2.2), however, a simpler solution was required that could be implemented within a shorter timeframe and can meet the needs of the system during the transition. The Commission therefore released a second directions paper with proposed rules drafting setting out the proposals described in this final determination. We received 22 submissions to the directions paper, largely supporting the proposals but with significant feedback on the transitional services framework. We have addressed these in the final rule and this determination.

5. We released an update paper in December 2023 outlining refinements to the transitional services framework and proposing the transition plan

Given feedback on the transitional services framework, and a continued request for services more transparency and work on 'unbundling' of services, we released an update paper to the second directions paper in December 2023. In this, we proposed refinements to the transitional NMAS framework and outlined a new reporting obligation — the transitional system services plan — to address concerns on transparency and unbundling. We received 11 submissions to the update paper which we have addressed in the final rule and this determination.

In addition to these formal consultation stages, the Commission has held technical working group (TWG) meetings throughout the rule change process. The TWG comprises industry stakeholders across generators, retailers, networks, consumer groups, market bodies and government organisations. The Commission thanks these participants for their constructive input and time in the course of the process.

1.4 The final rule will support system security through the transition to net zero

The final rule builds on existing tools in the power system to enhance system security procurement frameworks. This will address system security issues through the transition, reduce the regular and inefficient use of directions, and provide better incentives for participants to invest in providing system security in the longer-term. It also increases transparency on current system security needs and understanding, and how the Australian Energy Market Operator (AEMO) plans to manage system security as we transition to a low- or zero-emissions power system.

The final rule will drive procurement of sufficient security services to meet system needs through the transition, particularly through the changes to the inertia framework to make it more proactive and aligned with system strength. The final rule also requires AEMO to implement operational enablement of long-term contracts to ensure the power system remains within pre-defined limits for technical parameters such as voltage and frequency.

The arrangements set out in the final rule have been deliberately designed to ensure the reforms support emissions reductions that contribute to the achievement of government emissions targets, in accordance with the recently updated National Energy Objectives. Therefore, the rule not only addresses the current decline in services provided by synchronous generators, but also encourages and incentivises the provision of security services by new technologies that are likely

to be present in a net-zero system. We will need to deliver security entirely with these new technologies and approaches eventually, so the final rule includes:

- an ability for AEMO to trial new technologies and approaches for delivering security
- an ability for TNSPs to procure 'synthetic inertia' (likely to be provided by zero-carbon sources) to meet the entirety of their inertia requirements, and
- the transition plan for system security, in which AEMO will need to outline how it will progress towards managing security in a zero-emissions system.

1.5 Further changes to market design for security services may be needed over time as the system evolves

The Commission considers that the tools provided in this rule change are the most effective and efficient way to address the immediate and medium-term transitional issues we are facing in managing security. However, although we need to be able to meet the challenges of operating a transitioning system right now, we are still building the knowledge and operational experience to understand the best methods to manage security in the longer-term. As we build this knowledge and the system continues to evolve, further changes to market design may be justified.

The Commission still considers that the ultimate goal — if both technically feasible and economically justifiable — remains the independent procurement and valuing of security services (or 'unbundling'). We recognise that this could provide investment and scarcity signals for participants to deliver these services at least cost to consumers.

As the Commission has previously set out, we have received advice from AEMO that notes that unbundling system security services in real time is not possible at the current time. AEMO's view is that further understanding and knowledge is required first.

While AEMO continues to develop its understanding of the power system, it is essential that the current arrangements are enhanced to support the most efficient and transparent procurement of these system needs. The final rule is designed as a step along the way — to deliver the best approach based on the information that we know today, while also building our understanding to prepare us to meet the system needs of the future.

2 The final rule contributes to the energy objectives

This final determination is to make a final more preferable rule (hereafter 'final rule') in response to rule change requests submitted by Hydro Tasmania and Delta Electricity which each proposed mechanisms to value, procure and schedule essential system services to help keep the system secure as thermal generators continue to retire. The final rule promotes the NEO by:

- addressing issues and promoting opportunities in the current investment timeframe security frameworks to create proactive and forward-looking frameworks to facilitate the secure decabonisation of the NEM and minimise reliance on directions through the transition
- introducing a new transitional services NMAS framework, which will complement existing frameworks by allowing AEMO to procure services necessary to securely transition the power system and trial new technologies that will play a crucial role in securely operating a fully decarbonised power system
- introducing a new reporting requirement on AEMO to produce an annual transition plan for system security
- requiring AEMO to operationally schedule any long-term contracts entered into for system strength, inertia, NSCAS and transitional NMAS services to improve economic efficiency, security and transparency
- introducing obligations on AEMO to improve and streamline directions transparency.

This section sets out why the Commission has made its final determination and final more preferable rule. It outlines:

- Section 2.1 — The Commission must act in the long-term interests of energy consumers
- Section 2.2 — The Commission has made a more preferable final rule
- Section 2.3 — The Commission has made a more preferable final rule against the assessment criteria
- Section 2.4 — The final rule better meets the NEO than the rule change proposals and the draft determination.

2.1 The Commission must act in the long-term interests of energy consumers

The Commission can only make a rule if it is satisfied that the rule will or is likely to contribute to the achievement of the relevant energy objectives.[13]

For this rule change, the relevant energy objective is the NEO.[14] The NEO is:[15]

> 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—

13 Section 88(1) of the NEL.

14 Section 7 of the NEL.

15 Section 7 of the NEL. The NEO was updated on 21 September 2023 with the introduction of the Statutes Amendment (National Energy Laws)(Emissions Reduction Objectives) Act 2023. We have applied the updated NEO in this final determination. This is consistent with the second directions paper, which also referenced the revisions to the NEO.

(i) for reducing Australia's greenhouse gas emissions; or

(ii) that are likely to contribute to reducing Australia's greenhouse gas emissions.

The targets statement, available on the AEMC website, lists the emissions reduction targets to be considered, as a minimum, in having regard to the NEO.[16]

2.1.1 System services objective for considering issues related to system services

The system services objective has been developed by the Commission to assess whether system services rule changes contribute to the NEO, including the emissions reduction component. It reflects the trade-offs that are expected when considering issues related to the provision of system services and it is outlined in Box 1 below.

Box 1: The system services objective

Establish arrangements to optimise the reliable, secure and safe provision of electricity in the NEM, to assist the transition to a net zero system, such that electricity is provided at efficient cost to consumers over the long-term. 'Efficient cost' implies the arrangements must promote efficient:

- short-run operation of,
- short-run use of, and
- longer-term investment in,

generation facilities, load, storage, networks (i.e. the power system) and other system service capability.

Efficient short-run operation refers providing services at the lowest cost (productive efficiency) — that is, for a given level of demand for a particular system service, achieving an optimal combination of inputs to produce the demanded level of the service at least cost. This means that for a given level of output, the value of those resources (inputs) for this output are minimised. This includes considering the value of emissions reductions, other than for real-time dispatch.

Efficient short-run use refers to allocating services to those who value them most (allocative efficiency) — that is, allocating limited resources to deliver a service, or the right combination of services, according to consumer preferences or system need, including the need to contribute to meeting emissions reduction targets.

Efficient longer-term investment refers to adapting to changing circumstances to maintain these efficiencies in the long term — that is, the ability of an option to continue to achieve allocative and productive efficiencies over time. This means developing flexible market and regulatory frameworks, that can adapt to future changes and that assist in meeting emissions reduction targets.

Source: AEMC, How the national energy objectives shape our decisions, September 2023, p 5.

2.2 The Commission has made a more preferable final rule

The Commission may make a rule that is different, including materially different, to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the

16 Section 32A(5) of the NEL.

rule change request, the more preferable rule is likely to better contribute to the achievement of the NEO.[17]

For this rule change, the Commission has made a more preferable final rule. The reasons are set out in section 2.3 below.

2.3 The Commission has made a more preferable final rule against the assessment criteria

The Commission has identified the following criteria to assess whether the proposed rule change, no change to the rules (business-as-usual), or other viable, rule-based options are likely to better contribute to achieving the NEO:

- **Safety, security and reliability** — the operational security of the power system relates to the maintenance of the system within pre-defined limits for technical parameters such as voltage and frequency. System security underpins the operation of the energy market and the supply of electricity to consumers.
- **Emissions reduction** — the market and regulatory arrangements for system security should efficiently contribute to the achievement of government targets for reducing, or that are likely to reduce, Australia's greenhouse gas emissions.
- **Principles of market efficiency** — the market and regulatory arrangements should create more appropriate arrangements than directions for those participants whose presence is needed to maintain a secure operating envelope.
- **Implementation considerations** — regulatory change typically comes with some implementation costs for regulators, the market operator and/or market participants. These costs are ultimately borne by consumers. The cost of implementation relative to the benefits of the change should be factored in to the overall assessment of any change.
- **Principles of good regulatory practice** — the market and regulatory arrangements for system security should promote transparency and be predictable, so that market participants can make informed and efficient investment and operational decisions. Regulatory arrangements must also be flexible to changing market and external conditions, to remain effective in achieving security outcomes over the long-term. Where practical, regulatory or policy changes should not be implemented to address issues that arise at a specific point in time.

These assessment criteria reflect the key potential impacts — costs and benefits — of the rule change requests, for impacts within the scope of the NEO. The criteria have been updated recently to ensure consistency with the new NEO.

The Commission has undertaken regulatory impact analysis to evaluate the impacts of the various policy options against the assessment criteria (see appendix C). The rest of this section explains why the final rule best promotes the long-term interests of consumers when compared to other options including those proposed in the rule change requests and assessed against the criteria.

2.3.1 The final rule promotes safety, security and reliability by ensuring sufficient security services are proactively procured to meet system needs through the transition

The final rule promotes power system security through the transition by ensuring proactive, effective and efficient procurement of security services. It also provides AEMO with the tools it needs to manage system security. Rather than continued reliance on directions, enhancing the existing procurement frameworks for system services and expanding them to include the

17 Section 91A of the NEL.

transitional NMAS services framework, combined with AEMO's operational enablement will ensure that the right services are online to maintain power system security. This will benefit consumers by providing better assurance that power system security needs will continue to be met through the transition.

Specifically, the following elements of the rule promote power system security:

- the evolved inertia arrangements which aim to make sure that sufficient inertia is available in future for both NEM-wide and islanded operation
- the revised NSCAS arrangements to cover near-term, unforeseen gaps in inertia and system strength
- the new transitional services NMAS framework, which allows AEMO to procure for known system security needs which could previously not be procured under existing framework, and trial new technologies and approaches to deliver security in the future system
- AEMO's ability to enable security services to support power system needs on the day
- the new annual reporting obligation of a transition plan for system security, which supports building a future understanding of system security needs, and technological capabilities, in a low- or zero-emissions power system.

2.3.2 The final rule promotes emissions reductions in procurement decisions, enablement decisions, and future delivery of security services

The final rule promotes emissions reduction in a number of ways.

Both AEMO and TNSPs will take emissions into account in their procurement decisions made under the final rule. TNSPs continue to be primarily responsible for procuring security services over the long-term. Under changes made recently by the AEMC, TNSPs will be required to consider changes to Australia's greenhouse gas emissions as a class of market benefit when undergoing the regulatory investment test for transmission (RIT-T) to procure the most efficient portfolio of assets to meet security needs as thermal generators continue to retire.[18] When AEMO procures services under the transitional services NMAS framework, it will need to articulate upfront how it will take emissions into account in its procurement decisions in the Transitional Services Guideline.

In operational timeframes, the enablement principles aim to minimise curtailment of zero-emissions IBR generation by ensuring sufficient system strength is online to maintain voltage waveform stability at projected levels of IBR. However, AEMO must also use reasonable endeavours to avoid adverse emissions outcomes when enabling units for the stable voltage waveform.

The final rule also encourages the adoption of new technologies to provide security services. In the inertia framework, allowing synthetic inertia to be used to meet minimum threshold levels will promote emissions reductions. This change will allow for a broader range of technologies, including zero-carbon technologies, to be considered in meeting security needs, rather than relying on synchronous plant. Through the trials function in the transitional services NMAS framework, AEMO will be able to use transitional service contracts to trial new technologies that will likely play a crucial role in the secure operation of a decarbonised generation fleet as we transition.

18 See: https://www.aemc.gov.au/rule-changes/harmonising-national-energy-rules-updated-national-energy-objectives-electricity.

2.3.3 The final rule creates more efficient and appropriate arrangements than directions for maintaining security

The final rule's evolution of the existing long-term procurement and enablement arrangements will promote proactive and efficient provision of security in both the planning and operational timeframes. Together the arrangements seek to minimise reliance on costly and distortionary market interventions to maintain system security, as well as promoting certainty and transparency for plants that are providing these services. Consumers will benefit through more efficient and proactive investment in security services in the planning timeframe, and more efficient decisions to activate resources for security in the operational timeframe.

Specifically, the following elements of the final rule support efficiency:

- the proactive nature of the evolved inertia framework
- the distribution of the inertia floor across regions of the NEM to avoid inefficient under-investment in regions of the NEM which are not at risk of islanding
- the timings of the inertia framework now align with the timings of the system strength framework, allowing TNSPs to capture efficiencies when they consider solutions that provide both services — for example, a synchronous condenser with a flywheel
- placing enablement responsibility on AEMO, which has a whole-of-NEM view and can optimise contract activation to come to a NEM-wide lowest cost solution.
- the enablement principles, which require AEMO to enable contracts to meet security needs at lowest cost, and to avoid inefficient outcomes when enabling system strength contracts to support the projected level of IBR online as opposed to maximising the value of trade (the approach proposed in the draft determination), resulting in less distortion of the energy market.
- the sunset and expiry arrangements in the transitional services NMAS framework, which ensure that procurement under the framework only lasts as long as necessary
- the annual reporting obligation for AEMO to produce a transition plan for system security and trials under the transitional services framework will give industry more insight into the future technologies and settings that are likely to be able to support system security, contributing to more efficient investment signals and greater investment certainty.

The following elements are especially likely to reduce reliance on directions for maintaining security:

- amendments to NSCAS and the introduction of 'type 1' transitional services contracts ensure any gaps in security needs can be procured through contracts rather than relying on inefficient market interventions
- the enablement arrangements, which ensure that AEMO can 'enable' units with long-term contracts to provide security services as they are required operationally.

2.3.4 The final rule considers implementation costs and complexity

The final rule leverages existing frameworks, systems and understandings of the power system to keep costs and complexity as low as possible. However, the Commission recognises that while this framework delivers the best approach based on the information we know today, our understanding of the power system and its needs are likely to transform over the longer-term. As such, adapting market arrangements may warrant greater cost and complexity in future as our understandings evolve.

Incremental procurement and implementation costs from this evolution to the long-term system security frameworks are not expected to be significant. Instead, the greater optimisation of system strength and inertia procurement facilitated by the changes are expected to result in more efficient procurement and better long-term outcomes for consumers.

The enablement arrangements in the final rule provide AEMO with flexibility and discretion in how exactly to operationalise long-term contracts in real-time to ensure that implementation is possible in time for the commencement of the system strength rule in December 2025. The Commission has taken a principles-based approach to enablement to ensure that outcomes support security and are efficient, but allow flexibility for AEMO to develop its detailed approach.

The final rule also introduces a less complex tool when compared to the solution proposed in the draft determination. The Commission considers that the final rule strikes the right balance between efficiently meeting system security needs and avoiding the complexity and potential unintended consequences of the original OSM design, allowing it to be implemented faster and at a lower cost.

The Commission has designed the transitional services NMAS framework to be as simple as possible, in line with existing frameworks, which will help curb implementation costs. There will be some implementation costs for AEMO in developing the transitional services guideline, conducting procurement of resources under these contracts and managing trials, however we consider that the benefits of the framework outweigh these costs.

We also recognise that there will likely be some costs for AEMO to develop and publish the new reporting requirement of a transition plan for system security. However, we consider the benefits of the report in increasing industry knowledge and awareness of security management and providing more certainty outweigh these potential costs. AEMO also has the flexibility to draw on its existing work program when developing this report, which we consider will help curb some of the implementation costs.

The proposed revisions to directions transparency align with efforts already in progress at AEMO to improve directions reporting. The revisions in the final rule seek to minimise the cost of implementation for AEMO by streamlining and consolidating reporting obligations.

2.3.5 The final rule promotes transparency on system security needs, costs and provision, and predictability and simplicity in meeting these needs

The final rule has been developed according to principles of good regulatory practice. The rule makes a number of improvements to promote transparency and predictability of system security needs and the frameworks to meet these needs.

The Commission expects a number of the measures in the rule will improve the transparency of AEMO's current technical understanding of system security and work to improve this understanding — including services and operational standards, and how AEMO is planning to meet future security needs. These measures are important to increase predictability of system security management in the short term, and provide clear investment signals for the required security capabilities in the longer term. These measures include:

- the transition plan for system security
- the statement of security needs, published for each procurement exercise under the transitional services NMAS framework
- reporting on the outcomes of trials AEMO conducts under the transitional services framework
- AEMO's new specification of the capabilities of synchronous and synthetic inertia

- improvements to directions transparency, which will give market participants more detailed insights into the reasons for directions and a breakdown of their costs.

The rule includes further measures across the evolved frameworks to ensure that processes and outcomes are transparent and predictable, including:

- the transitional services guideline, which will outline AEMO's procurement process for transitional services contracts
- annual reporting on the services procured through the transitional services framework
- requirements for AEMO to set out how it sets and allocates the mainland inertia floor in its *inertia requirements methodology*
- continued annual reporting on inertia sub-networks and inertia requirements
- AEMO's enablement procedures, which will give industry clarity on how AEMO will make enablement decisions
- AEMO's daily and annual reporting on enablement outcomes.

The final rule also implements solutions that are flexible to accommodate changing security needs and solutions. Aligning the inertia framework with the new system strength framework provides the NEM with a flexible and consistent set of approaches to planning and procuring security services during the energy transition.

2.4 The final rule better meets the NEO than the rule change proposals and the draft determination

The final rule better meets the NEO, as compared to the rule change proposals and our draft determination. The Commission makes this assessment based on current understandings of system security needs and how these will be managed as we transition to a low or zero-emissions power system. We also consider that this framework sets us up well to evolve and adapt to new challenges and opportunities that may arise as the transition occurs.

2.4.1 The final rule better meets the NEO than the rule change proposals

The Hydro Tasmania and Delta Electricity rule change requests proposed solutions to operationally procure security services to maintain power system security to minimise reliance on directions as the generator fleet decarbonises. The final rule seeks to resolve the same issues through:

- simpler, quicker, and proactive solutions driven by TNSP procurement
- easier to implement AEMO operational enablement of security services to ensure real-time needs are met
- new transitional services arrangements to trial new security technologies, or to procure services not included in other procurement frameworks to minimise reliance on directions, and new reporting requirements associated with this
- improvements to directions transparency to provide signals as to where security services are required to maintain power system security and identify alternative procurement solutions
- the Commission considers that the solution contained in the final rule better meets the NEO compared to the two rule change proposals because it better meets the current engineering understanding and is lower cost.

2.4.2 The final rule better meets the NEO than the draft determination

Following stakeholder feedback from the 2021 directions paper, the AEMC proposed a draft rule to introduce a mechanism called the OSM. While the detailed design is outlined in the OSM draft determination, key design features of the OSM included:

- AEMO would be responsible for defining the system security needs and accrediting market participants to supply system services
- accredited market participants would bid to provide system services into the OSM close to real-time
- the OSM would schedule security services to meet minimum security needs and host the projected level of IBR while seeking to maximise the value of trade
- OSM schedules would be published to enable participants to position their units accordingly
- providers of services through contracted arrangements with networks, such as system strength or inertia, could be incorporated into the OSM.

After carefully considering the submissions to the draft determination, the Commission determined the OSM would be too costly and complex to develop and implement and would be unlikely to deliver the intended outcomes.

The Commission decided that instead, a simpler solution is required that can be implemented within a shorter timeframe and can meet the needs of the system during the transition. The Commission considers this approach has greater benefits than implementing the proposed operational procurement and scheduling mechanism. It is necessary to establish a greater understanding of the engineering and technical capabilities of the system before introducing complex market changes. In the meantime, we already have comprehensive security frameworks that procure security services such as system strength, inertia, and NSCAS, which have been built on in the final rule.

3 Improvements to existing security frameworks that will more proactively meet security needs

Box 2: Key points in this chapter

The Commission has made several improvements to the inertia and NSCAS frameworks to prepare the NEM for a fully decarbonised generation fleet, better support system security, improve economic efficiency and reduce the need for market interventions such as directions.

The rule introduces a mainland inertia floor

- The current inertia framework that was put in place on 1 July 2018 has ensured to date that security-critical inertia levels are available when regions are at risk of 'islanding' from the rest of the NEM.
- However, the existing framework does not include procurement arrangements for the inertia levels required during interconnected operation to manage system rate of change of frequency (RoCoF) and transient stability. This has the potential to result in an unbalanced procurement which would mean some regions of the NEM under-invest while others bear a disproportionate burden of the investment and so cost.
- To address this, the final rule introduces a mainland inertia floor (the 'system-wide inertia level') for interconnected operation to promote distributed inertia procurement across the NEM.
- AEMO will set the inertia floor with regard to:
  - the Rate of Change of Frequency (RoCoF) limit for credible contingency events in the Frequency Operating Standard (FOS)
  - the level of inertia required to maintain security without relying on market interventions
  - and any other matters as AEMO sees fit.
- AEMO will allocate proportions of the inertia floor across the regions of the mainland NEM to promote balanced procurement, taking into account any regional inertia needs.
- The rule also retains a modified version of the islanding framework, to ensures that inertia sub-networks at risk of separation continue to have sufficient inertia (the 'secure level') continuously available to operate as an island if required.

The rule aligns inertia and system strength procurement timelines

- The final rule requires AEMO to project inertia needs for all sub-networks over 10 years, including projecting the inertia floor for interconnected operation and the secure operating level for islanded operation.
- TNSPs will be required to procure inertia three years ahead of time, and make sure that sufficient inertia is continuously available. This will have the effect of making inertia provision more proactive than the previous framework, aligning with the evolved system strength obligations that will fully commence in December 2025.
- TNSPs will be required to procure either the floor or the higher secure level. The secure level requirement will be triggered for sub-networks that are at risk of islanding and have a projected a 'shortfall' of inertia in three years' time.

- Shortfalls that AEMO has already declared under the new framework will remain valid and TNSPs will continue to be required to meet these shortfalls. Going forward, from 1 December 2024:
  - TNSPs will be required to procure to meet the new binding inertia levels from 1 December 2027.
  - NSCAS gaps can be declared by AEMO to meet any previously undeclared inertia shortfalls in the intervening years.
  - Existing shortfalls — declared prior to 1 December 2024 — remain valid and TNSPs continue to be required to meet those levels up until 1 December 2027. AEMO can continue to adjust the existing shortfalls up or down.

TNSPs are able to procure synthetic inertia to meet the minimum threshold level

- The 2017 *Managing the rate of change of power system frequency rule* defined the minimum threshold of inertia as the minimum level required to operate the sub-network in a satisfactory operating condition when the sub-network is islanded. Under the framework only synchronous condensers and synchronous generators were eligible to meet the minimum level.
- As part of this final rule, the Commission has widened the eligibility of units capable of meeting the minimum threshold level of inertia beyond synchronous sources thereby promoting economic efficiency and system security. This will expand the number of eligible providers, as well as providing important learnings for how synthetic inertia operates and contributes to the system.
- TNSPs will be able to procure synthetic inertia to meet the minimum threshold level, as well as the higher secure level if applicable. Sources of synthetic inertia will be subject to AEMO approval.
- AEMO will be required to consult on and publish a detailed specification of the required capabilities of synchronous and synthetic inertia providers.

The rule allows inertia and system strength to be procured through NSCAS to address near-term gaps

- The alignment of the system strength and inertia procurement timelines results in a gap for which there is no backstop procurement mechanism, as TNSPs will be required to meet inertia and system strength needs three years in the future on a rolling basis. If there is insufficient inertia or system strength within the three-year compliance window, TNSPs are not required to resolve this under the aligned frameworks.
- To address this gap, the final rule will allow inertia and system strength services to be procured through the NSCAS framework if minimum security requirements are not projected to be met in this three-year period.
- The inertia and system strength frameworks remain the primary mechanisms for the procurement of those services — the NSCAS framework would only be used as a backstop procurement mechanism.
- The final rule also provides an exemption for an NSP from undertaking the RIT-T if the inertia or system strength services are required within 18 months of the NSCAS gap being declared.

Changes to the inertia framework and NSCAS commence on 1 December 2024

- AEMO will begin projecting and allocating the inertia floor and the modified islanding requirements on **1 December 2024.**

- TNSPs would be required to start providing the relevant levels of inertia for their sub-networks three years after this date — from **1 December 2027**.
- The widened eligibility of synthetic inertia and the changes to the NSCAS framework will also commence on **1 December 2024**.

How we have incorporated stakeholder feedback and updated the arrangements since the second directions paper

- Stakeholders provided valuable feedback in submissions to the second directions paper. In summary:
  - stakeholders strongly supported the proposed introduction of a mainland inertia floor
  - stakeholders strongly supported the alignment of system strength and inertia procurement timelines
  - stakeholders very strongly supported allowing TNSP procurement of synthetic inertia to meet minimum security needs
  - stakeholders strongly supported removing the exclusion on inertia and system strength from the NSCAS framework to meet short-term minimum security needs.

This chapter covers the Commission's improvements to existing planning timeframe system security frameworks to facilitate the secure transition of the power system to an inverter based battery and renewable dominated grid, including:

- Section 3.1 — The Commission has evolved the inertia and NSCAS frameworks
- Section 3.2 — The changes to long-term procurement address the need to plan ahead to manage declining inertia in the system
- Section 3.3 — A new inertia floor, alongside the continuation of islanding arrangements, will better meet system inertia needs
- Section 3.4 — Aligning system strength and inertia procurement timelines allows for greater TNSP investment coordination
- Section 3.5 — Synthetic inertia is now eligible to meet minimum security needs, promoting security and efficiency
- Section 3.6 — Inertia and system strength can now be procured through NSCAS if unforeseen needs arise in the near-term
- Section 3.7 — The new inertia procurement framework and NSCAS arrangements commence on 1 December 2024
- Section 3.8 — These revisions will promote power system security, align with emission reduction targets and reduce reliance on directions.

3.1 The Commission has evolved the inertia and NSCAS frameworks

An important focus of this rule change has been to improve the suite of long-term security frameworks that are currently in the NER to make them better able to meet the challenges posed to system security by the energy transition.

In 2018 two new frameworks were introduced in the NEM to provide system strength[19] and inertia.[20] These frameworks mirrored each other. The Commission significantly evolved the system strength framework in 2021[21] to ensure the procurement of system strength was more efficient and proactive. However, the inertia framework had not yet been brought in line with this new approach. Further, there are gaps in AEMO's ability to procure security services where those services were not able to be defined in terms of the services procured under the existing frameworks — system strength, inertia and NSCAS.

To improve alignment of security frameworks and address these gaps, this rule makes improvements to the inertia and NSCAS frameworks, and introduces a new NMAS framework (the 'transitional services framework') allowing AEMO to procure security services that cannot be procured through other frameworks, and to trial new security services. These revisions seek to reduce the reliance on market interventions to manage system security, resulting in a more secure power system and cost-effective outcomes for consumers.

This chapter outlines changes to inertia and NSCAS, and chapter 4 outlines improvements to supporting TNSP cost recovery arrangements for security services. The new NMAS framework is outlined in chapter 5.

The Commission has made three main changes to the inertia framework:

1. **Introduction of a mainland inertia floor (**section 3.3**)** — the rule introduces a new mainland inertia floor (the 'system-wide inertia level') to ensure that minimum system needs for interconnected operation would be proactively met through balanced procurement in all mainland regions of the NEM. This operates alongside a modified version of the islanding framework, to ensure that inertia sub-networks at risk of separation continue to have sufficient inertia (the 'secure level') continuously available to operate as an island if required.
2. **Alignment of procurement timeframes (**section 3.4**)** — the rule aligns the forecasting and procurement timeframes of the system strength and inertia frameworks, allowing for transmission network service providers to more efficiently coordinate system strength and inertia needs when considering network or non-network solutions.
3. **Removing restrictions on the procurement of synthetic inertia (**section 3.5**)** — the rule makes synthetic sources of inertia eligible to provide the minimum threshold level of inertia (subject to AEMO's approval), encouraging greater investment in zero carbon sources of security services to meet system needs as synchronous units continue to retire.

This final rule also removes the exclusion of inertia and system strength from the **NSCAS framework**, to ensure that there is a procurement mechanism for any security needs that arise in the short-term, sooner than the new compliance period for the forward-looking inertia and system strength frameworks.

The Commission notes that the changes made through this final rule focus on improving the long-term procurement framework for inertia. We will consider operational procurement of inertia through the *Efficient provision of inertia* rule change.[22]

19 See: https://www.aemc.gov.au/rule-changes/managing-power-system-fault-levels.
20 See: https://www.aemc.gov.au/rule-changes/managing-the-rate-of-change-of-power-system-frequency.
21 See: https://www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system.
22 See: https://www.aemc.gov.au/rule-changes/efficient-provision-inertia.

3.2 The changes to long-term procurement address the need to plan ahead to manage declining inertia in the system

System inertia is declining as the generation mix changes. This poses future security risks, which were identified in the rule change requests. Through the transition, we will need to ensure sufficient inertia is available to meet security requirements and evolve how we meet inertia requirements.

3.2.1 Declining inertia in the NEM could compromise system security through the transition

The NEM is at the forefront of the energy transition globally. It has one of the highest penetrations of inverter-based resources worldwide, which is rapidly displacing the dispatch of synchronous generation.

Inertia in the power system has historically been provided by synchronous generators, such as coal, gas, and hydro. Inertia is important in the power system as this resistance to change helps to maintain frequency and voltage within the technical limits of a secure and stable power system (Box 3).

As the energy transition progresses and the power system decarbonises, these historical sources of inertia are expected to retire at an increasing rate, leading to declining inertia. Therefore, the way we meet the power system's requirement for inertia will need to evolve as the generation mix changes.

Box 3: What is inertia?

Inertia can be defined as an object's resistance to any change in its momentum. Inertia is important in the power system as this resistance to change helps to maintain frequency and voltage within the technical limits of a secure and stable power system. The greater the inertia on the power system, the less vulnerable it is to disturbances, all else kept equal.

For example, inertia limits the rate of change of power system frequency following a sudden change in the balance of generation and load on the power system, such as caused by a large generator disconnecting from the power system. The NEM operates at a frequency range as close to 50 Hertz (Hz) as possible, meaning the power system safely and securely transmits power from generators to consumers. When there is more inertia on the power system, frequency changes more slowly. This allows more time for frequency control services, such as primary frequency response and FCAS, to address the energy imbalance and arrest the change in frequency.

In a similar manner, inertia also supports a stable voltage waveform by dampening oscillations in active power and so can contribute to system strength.

A synchronous inertial response is the electromechanical inertial response from stored kinetic energy in the rotating mass of a machine that is electromagnetically coupled to the power system's voltage waveform at 50 Hz. Generators with large spinning turbines (such as coal, gas or hydro plants) or a synchronous condenser can provide synchronous inertial responses, and are called 'synchronous generators' or 'synchronous machines'.

A synthetic inertial response is the emulated inertial response from an inverter-based resource that is inherently initiated in response to a power system disturbance. It is sufficiently fast and large enough to help manage the rate of change of frequency. Some grid forming inverters and systems are capable of providing synthetic inertia.

Note: The material in this box has been adapted from AEMO's 'Inertia in the NEM explained' document.

As the generation mix shifts and system inertia decreases, there is an expectation that post-contingency rate of change of frequency (RoCoF) will likely increase. This could test the existing operational practices of the power system by compromising the:

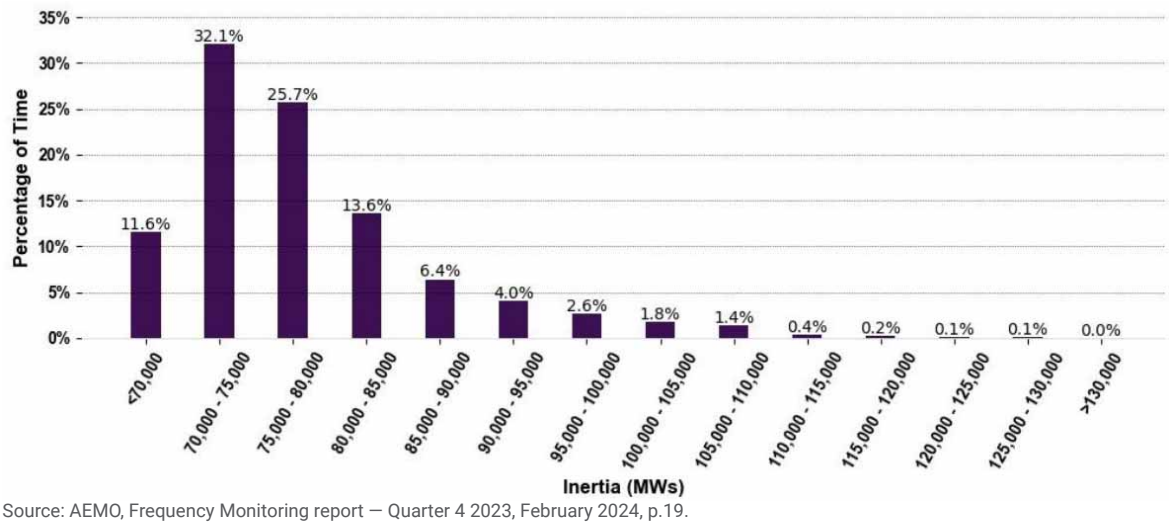
- time for FCAS to respond and recover the frequency to normal operating levels
- time for emergency frequency control schemes to operate effectively[23]
- probability that generators remain online following a contingency event.

AEMO has also noted in its 2022 *Engineering Roadmap to 100% Renewables* that a precondition for the first 100% renewable period is the:[24]

> Ability to keep system frequency within defined limits following credible and non-credible events, including RoCoF containment and effective emergency frequency control arrangements.

To date and in the immediate future (see Figure 3.1 below), the mainland NEM has generally had sufficient inertia when intact to maintain security.[25] However, mainland inertia will decline as synchronous generators retire and this may threaten security in interconnected operations.[26] This may happen faster than expected if synchronous generator retirements continue to occur earlier than expected.

Figure 3.1: Distribution of mainland inertia in Q4 2023



Source: AEMO, Frequency Monitoring report — Quarter 4 2023, February 2024, p.19.

23 In rare circumstances following unlikely, or non-credible contingency events, the frequency deviation can be large. If this happens, emergency frequency control schemes may be activated. Under-frequency load shedding (UFLS) is one such scheme implemented to manage a large drop in frequency following an unexpected event that results in too little electricity supply to meet demand.

24 AEMO, Engineering Roadmap to 100% Renewables, December 2022, p 73.

25 AEMO, Advice for the Reliability Panel's review of the frequency operating standard, December 2022, p 40.

26 Ibid.

3.2.2 The existing inertia framework needs to evolve to meet the challenges presented by the system transition

The existing inertia framework is not well-suited to address the challenges presented by the system transition. The existing framework is described in Box 4. There are a number of issues with the existing framework.

1. The existing framework does not proactively provide sufficient inertia for a secure transition

There are two reasons the existing framework (prior to the commencement of this final rule) did not proactively provide sufficient inertia. Firstly, the procurement trigger was reactive, rather than proactive. The framework procured inertia reactively to address gaps (or 'shortfalls'), rather than proactively to address future system needs in a context where inertia is declining. This increases risks of costly interventions in the operation of the wholesale electricity market.

Secondly, the existing framework only required the procurement of inertia in any regions at risk of separation ('islanding') from the rest of the NEM with an inertia shortfall below secure levels — allowing the region to continue operating securely as an island following a separation event. This approach does not recognise that even when intact, the NEM has minimum inertia requirements during interconnected operation — an inertia 'floor' — to manage system RoCoF, transitory stability and oscillations. As such, restricting procurement of inertia solely to regions at risk of islanding potentially compromised the long-term security of the NEM.

The shortfall approach also results in inertia investment being unbalanced across the NEM, with investment only occurring in sub-networks with shortfalls. This distributes costs unevenly and ultimately may mean some regions of the NEM under-invest in inertia over time while others bear a disproportionate burden. For example, in its 2022 inertia report (see Figure 3.2 below), AEMO did not declare an inertia shortfall in NSW despite the projected level of inertia falling below the secure operating level, because AEMO did not consider the islanding of NSW from the rest of the NEM to be credible.[27] This increases the inertia procurement burden on Queensland because Queensland cannot benefit from any additional investment inertia in NSW. It also means that NSW is more likely to under-invest in inertia solutions while Queensland over-invests, resulting in a sub-optimal inertia distribution with potentially higher costs in the long-term.

27 AEMO, 2023 Inertia Report, December 2023, pp 11-12.

Figure 3.2: 2023 Inertia review outcomes for the NEM, for the five-year period to December 2028

Region	Inertia shortfall
New South Wales 	**AEMO has not identified any inertia shortfalls in New South Wales.** Inertia levels are expected to decline, however strong interconnection makes this region unlikely to island. **No shortfalls were identified in a combined New South Wales and Queensland region.** While available inertia declines over the horizon, typical levels remain sufficient to meet secure operating requirements across the five-year outlook period.
Queensland 	**The existing inertia shortfall in Queensland has been deferred by one year**. AEMO is now declaring a shortfall of up to 1,660 megawatts seconds (MWs) from 2027-28. This delay reflects changes to the delivery timing of several major generation, transmission and renewable energy zone (REZ) projects which have combined to increase synchronous generation in the short term.
South Australia 	**Support contracts are in place to address South Australian shortfalls until July 2024.** This reflects approximately 360 megawatts (MW) of Fast Frequency Response (FFR) contracts to in place to address a shortfall declared in the 2022 *Inertia Report*. **A 500 MWs shortfall emerges from 1 July 2024 until Project EnergyConnect (PEC) Stage 2 is operational.** This shortfall could be met by an equivalent quantity of FFR contracts. AEMO does not consider South Australia sufficiently likely to island once PEC Stage 2 is commissioned, and protection is in place to manage a non-credible loss of interconnection.
Tasmania 	**Support contracts are in place to address Tasmanian shortfalls until April 2024.** This reflects 2,350 MWs of support contracts in place to address a previously declared shortfall. **A 1,880 MWs shortfall emerges from 1 April 2024** and climbs to 2,500 MWs across the five-year study period. TasNetworks is progressing further arrangements to cover the period until at least December 2025, while long-term options are being considered.
Victoria 	**AEMO has not identified any inertia shortfalls in Victoria.** Inertia levels are expected to decline, however strong interconnection means Victoria is not sufficiently likely to island. **No shortfalls were identified in a combined Victoria and South Australia region.** The previously identified shortfall for this grouping is no longer expected, following joint planning to better reflect separation modes and their associated network configuration at the border.

Source: AEMO, 2023 Inertia Report, December 2023, p.3.

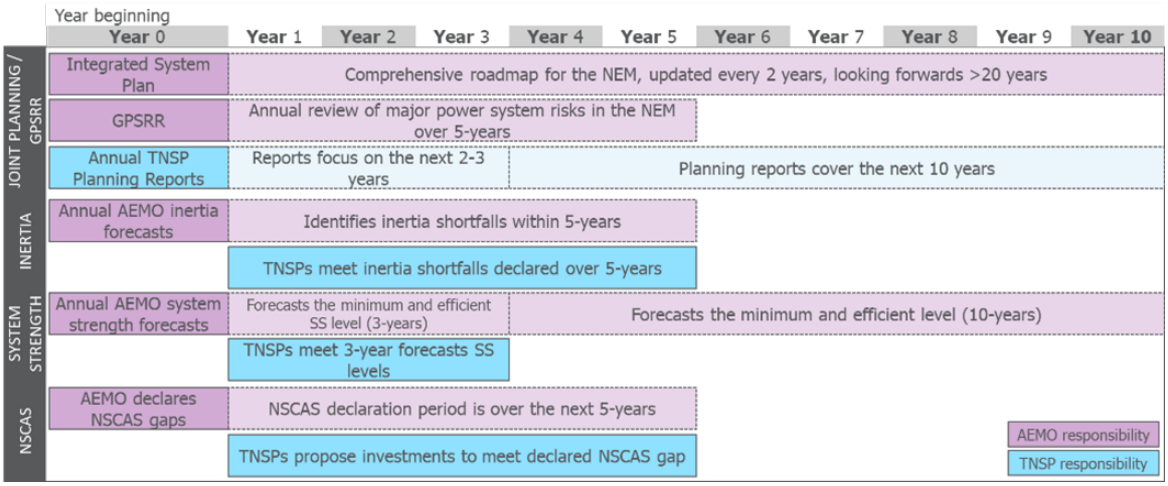
2. The existing inertia framework misses efficiencies in procurement

Under the existing framework, TNSPs procured for inertia and system strength needs according to separate timelines and triggers (see Figure 3.3 below). TNSPs only procured inertia if a shortfall was forecast — with inertia projected 5 years into the future[28] — while they are required to procure system strength up to an 'efficient level', with needs projected over 10 years.[29]

28 NER, clause 5.20.5, prior to the final rule, requires AEMO to forecast inertia shortfalls arising anytime within a planning horizon of at least 5 years.

29 Under the system strength framework, System Strength Service Providers are required to meet 10-year forward projections, with compliance based on meeting rolling 3-year forward projections.

Figure 3.3: System security procurement timelines before the final rule



System strength solutions are often able to contribute to providing inertia and vice versa — for example, when a synchronous condenser is installed to provide system strength, it can also include a high-inertia flywheel to provide inertia services. However, the misalignment of procurement triggers and forecast timeframes mean that TNSPs are not always able to take the benefits of both system strength and inertia into account when assessing their options under either framework. This could result in increased costs for consumers, as TNSPs potentially forego incremental investments (like flywheels on synchronous condensers) that could provide significant inertia benefit for little added cost. For example, the installation of high inertia variant synchronous condensers in South Australia provided a total of 4,400 MWs of inertia at an incremental cost of $1m per unit.[30]

3. The existing framework does not allow new 'synthetic' inertia to be procured to meet minimum levels

Under the existing framework, for any declared shortfall, TNSPs were required to entirely rely on synchronous inertia to meet the minimum threshold level, and could not source 'synthetic inertia' from inverter-based resources to meet these requirements. This approach reduces incentives to invest in technologies that provide synthetic inertia, and limits competition for providers of the minimum threshold level of inertia, likely increasing costs for consumers.

Although synthetic inertia is still being understood, it is expected that the NEM's future RoCoF needs can be met by a combination of synchronous and synthetic inertial responses.[31] Stakeholder submissions have identified the restriction on the procurement of synthetic inertia to not be in the long-term interests of consumers.[32]

30 ElectraNet, Addressing the System Strength Gap in SA – Economic Evaluation Report, 18 February 2019, p 25.

31 AEMO, Inertia in the NEM explained, March 2023, p 4.

32 Submissions to the *Efficient provision of inertia* consultation paper: Goldwind, p 5; Tilt Renewables, p 5.

Box 4: Inertia shortfall framework commenced in 2018 following the 2017 *Managing the rate of change of power system frequency rule*

Under the pre-existing framework (prior to the final rule):

- **AEMO declared inertia sub-networks** — taking into account synchronous connections with surrounding sub-networks, the likelihood of islanding, the criticality of maintaining the sub-network in a secure operating state.
- **AEMO determined the inertia requirements for each sub-network for the coming five years** — including the minimum threshold of inertia and secure operating level of inertia.
- **TNSPs were required to make continuously available the full secure operating level of inertia to meet any shortfalls —** TNSPs needed to meet the entire secure operating level of inertia, not procure the shortfall amount.

TNSPs could only meet the minimum threshold level using synchronous inertia provided by the rotating masses of synchronous condensers or generators. The remaining inertia (to meet the secure operating level) could be provided by either synchronous inertia or other 'inertia support activities' (for example, through procuring fast frequency response).

3.2.3 The rule change request identified the need to value security services and ensure sufficient services are available to minimise reliance on directions

The rule change request[33] identified that the changing generation mix and increase in inverter-based resources has led to a scarcity of security services like inertia and system strength. In recent years, this has led to an increase in directions to keep these synchronous units online to provide security services. To address this problem, the rule change requests proposed operational mechanisms to procure security services closer to real-time.

As discussed in section 3.2.1, declining inertia levels — as well as other security services — over time could compromise the stability of the power system and its resilience in the face of contingency events.

The Commission has implemented a different approach to address these same issues identified in the rule change requests. The final rule focuses on enhancing the existing frameworks rather than introducing a new operational procurement approach. The Commission decided that this direction for the rule change better meets the NEO after identifying issues with the ability of the previously proposed operational security mechanism to meet its objectives and efficiently support system security.

The approach in the final rule should mitigate any operational shortfalls in security services by ensuring that TNSPs are responsible for continuously making available sufficient security services (either through network build or non-network contracts) and giving AEMO the capability of enabling the contracts in real-time. As such, AEMO should not be required to rely on market interventions like directions to maintain system security.

Because they proposed a new operational solution, the rule change requests did not specifically identify the other issues identified with the existing long-term framework — that is, the misalignment of the system strength and inertia procurement timeframes and the restriction on synthetic inertia in meeting minimum security requirements. The Commission considers that

33 Rule change requests to the AEMC: Hydro Tasmania, p 3; Delta Electricity p 3.

these issues also need to be addressed to ensure the security frameworks are efficient and support the development of new ways of providing and managing inertia.

3.3 A new inertia floor, alongside the continuation of islanding arrangements, will better meet system inertia needs

3.3.1 AEMO will set an inertia floor for the mainland NEM to maintain security during interconnected operation

The final rule introduces a mainland inertia 'floor' (the 'system-wide inertia level'), which aims to ensure that sufficient levels of inertia are available to support secure interconnected operation in the mainland NEM. This will help ensure that the NEM's interconnected security needs are met, even during periods of 100% IBR penetration, which will likely occur as we transition to net zero.

AEMO will forecast inertia floor requirements for the mainland NEM (that is, across all regions except Tasmania) over 10 years, to align with the timeframes for the system strength framework (see section 3.4).[34] As Tasmania is only connected to the mainland through the Basslink undersea DC cable, it is subject to different frequency operating standards to the mainland and mostly operates as a synchronous island. Therefore, the minimum mainland NEM inertia floor does not include Tasmania.

In setting the floor, AEMO will take into account:[35]

- the level of inertia required on the mainland during interconnected operation to meet the RoCoF limit for credible contingency events in the frequency operating standard (FOS)[36]
- any other matters that AEMO reasonably considers to be relevant.

AEMO will need to consider the Reliability Panel's rate of change of frequency (RoCoF) standard for credible contingency events in the FOS. This standard encapsulates system needs during normal operation and the ride-through capabilities of connected plant. Linking the setting of the inertia floor to the FOS ensures that system inertia needs are independently and regularly reassessed by the Reliability Panel, protecting consumers against potentially unjustifiable ancillary service costs.

3.3.2 AEMO will allocate proportions of the floor across the mainland NEM to promote balanced procurement and manage locational inertia requirements

AEMO will be required to allocate the inertia floor among mainland inertia sub-networks in a way that considers both balanced procurement and any regional or sub-regional inertia needs critical to maintaining system security, such as transient stability after small or large disturbances.[37] AEMO will continue to be able to define inertia sub-networks under NER clause 5.20B.1. To facilitate the inertia floor arrangements, AEMO will no longer be required to consider the likelihood of proposed inertia sub-network being islanded when determining sub-networks.

In determining the allocation of the floor for each inertia sub-network, AEMO will consider:[38]

- a balanced distribution of inertia throughout the mainland NEM
- any other matters that AEMO considers to be appropriate.

---

34 Final rule, clause 5.20B.2(b)(1).

35 Final rule, clause 5.20.4(d1).

36 Following a credible contingency event, mainland RoCoF must not be greater than ±1Hz/s (measured over any 500ms period).

37 The spatial distribution of inertia affects the maximum time (or critical fault clearing time) required for protection systems to avoid rotor angle or transient instability after a disturbance. For example, two similar regions with the same total inertia volumes but different inertial distributions can have significantly different critical fault clearing times, which could cause security issues.

38 Clause 5.20B.2(c) of the final rule.

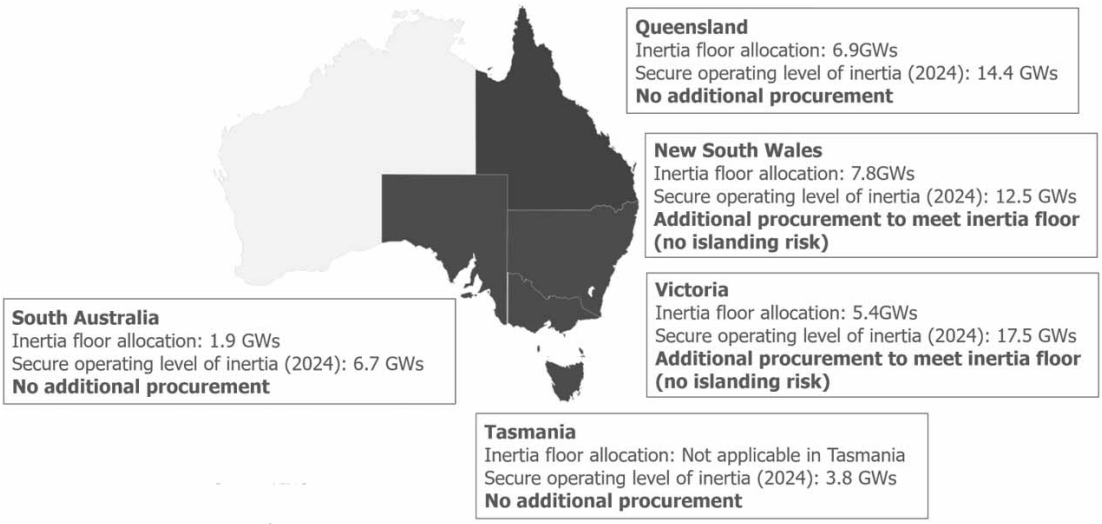
AEMO will not be required to consider costs when setting the floor. This is because:

- While AEMO may be capable of allocating the inertia floor across the NEM to minimise the costs of procurement in the short-term, the security benefits of a wide distribution of inertia would likely outweigh any short-term cost savings if security problems are dealt with proactively, rather than reactively as they materialise.
- There are likely to be efficiencies when TNSPs optimise their procurement across both the system strength and inertia frameworks now that they are aligned (see section 3.4), as the same technologies can often provide both services. The Commission considers that TNSPs are best placed to assess the most efficient allocation of resources to meet the combined inertia and system strength needs.

Box 5: The inertia floor will promote balanced and proactive inertia procurement while mitigating risks of over-procurement

An illustrative example of how the new inertia floor could interact with the existing shortfall framework is provided in Figure 3.4 below.

Figure 3.4: Investments with the inertia floor will be in regions not at risk of islanding



Source: Secure operating levels from AEMO, 2023 Inertia Report, December 2023, p.3.

Note: This illustrative example assumes a mainland inertia floor for interconnected operation of 22 GW.s with proportions of the floor allocated based on ISP generation capacity size. AEMO's implementation of the proposed inertia floor could operate differently in practice.

The example shows that the introduction of a mainland inertia floor will likely only result in increased procurement in regions without existing shortfalls (previously NSW, but now also including Victoria). Such an approach:

- would provide for more balanced inertia procurement, with better distributed cost allocation
- could result in a recalculation of minimum inertia levels in regions at risk of islanding. By considering inertia available in adjacent regions, existing and future requirements could be reduced.

3.3.3 TNSPs will be required to procure either the floor or the higher secure level

TNSPs will, by default, be required to procure the inertia floor for each sub-network. However, they will be required to procure a higher 'secure' level of inertia if a sub-network is at risk of islanding and is projected to have insufficient inertia to maintain security under islanding conditions.

These 'secure' levels are necessary because inertia sub-networks may still be at risk of separation and therefore require higher levels of local inertia than the 'floor' to maintain system security when operating as an island. As such, the inertia floor will be complemented by a modified version of the previous islanding arrangements (referred to as the 'shortfall' framework) and require higher levels of inertia to be continuously available in sub-networks at risk of separation. The islanding arrangements will include Tasmania, even though the floor does not, because inertia levels in Tasmania need to be sufficient to maintain system security while operating as an island.

There are a number of steps in determining the inertia procurement levels for a sub-network.

1. AEMO forecasts inertia needs over 10 years

AEMO will be required to project inertia needs for all sub-networks over 10 years, including the inertia floor for interconnected operation ('system-wide inertia level'), each sub-network's allocation of the inertia floor, and the satisfactory and secure operating levels for islanded operation.[39]

As part of the inertia requirements, AEMO will also determine the 'sub-network islanding risk' for each sub-network. This consists of two conditions:[40]

- the sub-network is at risk of separation ('islanding'), and
- there is, or is likely to be, insufficient inertia in the sub-network to meet the secure level if it was to become islanded.

AEMO must publish the inertia requirements in the inertia report by 1 December each year, and must update them if there is an unforeseen and material change.[41]

2. TNSPs are required to procure inertia three years ahead

The relevant TNSP for each sub-network (the 'Inertia Service Provider') will be required to ensure sufficient inertia is continuously available to meet the projection, for the year that is three years into the future.[42]

3. The level of inertia procured depends on the risk of islanding

Under the new arrangements, a higher level of inertia procurement will be triggered where the 'sub-network islanding risk' is triggered — otherwise, inertia will be procured to the binding inertia sub-network allocation.

If AEMO determines that there is insufficient inertia **in year 3** in a sub-network at risk of islanding, the relevant TNSP will be required to use reasonable endeavours to make the entire binding secure level of inertia continuously available, three years into the future.[43] If the conditions are not met, the TNSP will still be required to procure sufficient inertia to make their floor allocation continuously available and maintain system security during interconnected operation.[44] These arrangements are outlined in Figure 3.8 below.

39 Final rule, clause 5.20B.2(b).

40 Final rule, clauses 5.20B.2(b)(5) and 5.20.B.2(d).

41 Final rule, clauses 5.20.5, 5.20B.2(e) and 5.20B.2(f).

42 Final rule, clauses 5.20B.2(g), 5.20B.4(a1), 5.20B.4(b).

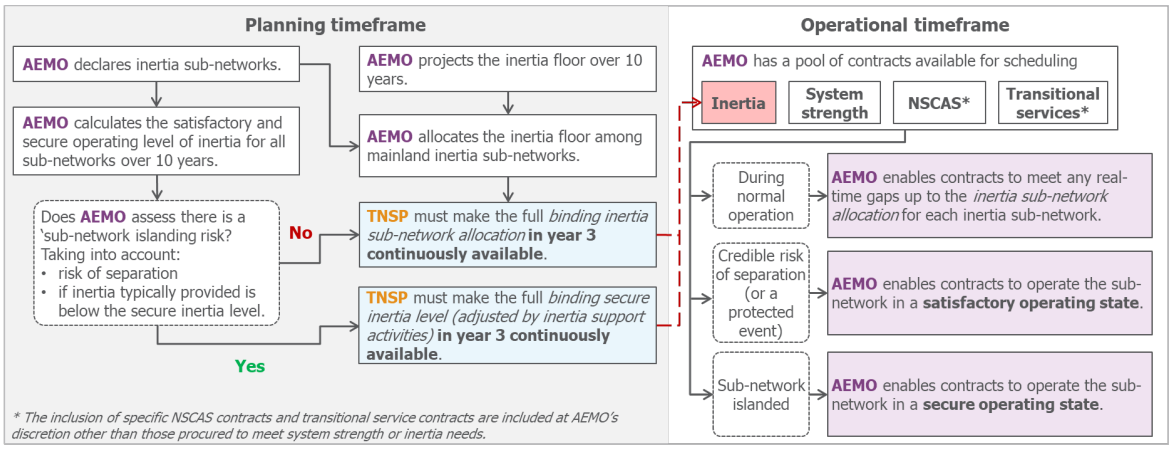
43 Final rule, clause 5.20B.4(b). Note: TNSPs need to meet the entire binding secure level of inertia, not only meet gaps. As explained in the *Managing the rate of change of power system frequency* final determination, the procurement requirement accounts for secondary effects on the merit order of bringing online units to provide inertia.

44 Final rule, clause 5.20B.4(a1).

TNSPs are required to make the relevant level of inertia continuously available.[45] This does not mean that the services must always be enabled by AEMO, or even that each provider must always be *available* to be enabled. TNSPs must simply manage their overall procurement so that in total, sufficient inertia can be enabled to the required level. This approach seeks to manage costs for consumers but also to ensure that based on real-time system needs and in response to separation events, sufficient inertia can be enabled to keep the system and sub-network secure.

The obligation to make inertia network services available to meet the inertia floor and secure operating level where applicable will be a regulatory obligation imposed on the relevant TNSP in connection with the provision of prescribed transmission services. TNSPs will be liable to provide the required level or face civil penalties under the NER.[46] TNSPs will be able to meet the secure level through network or non-network solutions.

Figure 3.5: How to determine TNSP inertia procurement levels for a sub-network



3.3.4 Stakeholder submissions to the second directions paper supported introducing an inertia floor and continuing the islanding arrangements

Stakeholder submissions to the directions paper strongly supported introducing a mainland inertia floor for interconnected operation.[47] CS Energy specifically noted an inertia floor tied to the RoCoF is an efficient long-term approach.

Many stakeholders, for example SnowyHydro, supported a continued obligation to provide inertia to the secure level in sub-networks at risk of islanding with a shortfall, with NSPs being obliged to make this level continuously available mirroring the system strength obligations.[48]

AEMO's submission suggested increasing inertia procurement to the secure level in all regions, regardless of islanding risk

AEMO's submission to the second directions paper suggested that the introduction of the inertia floor would not result in sufficient incremental inertia investment. Instead, AEMO's submission

45 Final rule, clauses 5.20B.4(a2) and 5.20B.4(c).

46 Clauses 5.20B.4(a1) and (b) of the final rule.

47 Submissions to the second directions paper: EnergyAustralia, p 10; Alinta Energy, p 2; AEC, p 2; CS Energy, p 2; CEC, p 4; ENA, p 3; Delta Electricity, p 1; AGL, p 1.

48 Submission to the second directions paper: SnowyHydro, pp 5-6.

suggested increasing inertia procurement to the secure level in all regions, regardless of islanding risk.[49]

The Commission has concluded that this would not be in the best long-term interests of consumers as it would result in materially increased costs with marginal security benefits. Instead, the Commission considers that the inertia floor, complemented by the existing islanding arrangements, efficiently balances the need for distributed procurement and the cost of doing so.

Stakeholders requested improved transparency on the process for defining inertia sub-networks

The AER and AEC's submissions to the second directions paper considered there was a need for more transparency on the declaration of inertia sub-networks and the determination that the sub-network is at risk of islanding, for example, the AEC suggested a methodology or process document is needed.[50]

We note that AEMO must comply with the rules consultation procedures when determining and adjusting the boundaries of inertia sub-networks.[51] AEMO must also publish the boundaries and any adjustments as part of its regular inertia reports.[52] If AEMO were to declare new sub-networks in the future, it would be required to consult with stakeholders, thereby providing the requested transparency.

Some stakeholders continue to strongly support an inertia spot market

Several stakeholders reiterated their preference for a discrete inertia spot market, based on a view that a spot market is the most efficient long-term method of procuring inertia.[53] The Commission can confirm that the introduction of the mainland inertia floor, and the continuation of a modified procurement approach for islanded operation, does not preclude or otherwise the implementation of an inertia spot market over the longer-term. The benefits and costs of a co-optimised inertia market above and beyond the minimum levels to be satisfied through TNSP procurement are being considered through the *Efficient provision of inertia* rule change project.[54]

3.4 Aligning system strength and inertia procurement timelines makes inertia procurement more proactive and allows for greater TNSP investment coordination

The Commission has aligned the procurement timeframes for system strength and inertia. Under the revised arrangements:

- AEMO will be required to project inertia needs for all sub-networks over 10 years, including the minimum inertia floor for interconnected operation, and the minimum and secure operating levels for islanded operation.
- TNSPs will be required to ensure sufficient inertia is continuously available to meet the projection, for the year that is three years into the future. This procurement timeline aligns with the current system strength framework and is illustrated in Figure 3.6.

49 Submission to the second directions paper: AEMO, pp 3-4.

50 Submission to the second directions paper: AEC, p 2.

51 NER, Clause 5.20B.1(e).

52 NER, Clause 5.20B.1(f).

53 Submissions to the second directions paper: SnowyHydro, p 5; Alinta Energy, p 2; CEC, p 2; Origin Energy, pp 1-2; Stanwell, pp 1-2; EnergyAustralia, p 7; Engie, p 1; CS Energy, p 4; AEC, p 2; AGL, p 1; Tesla, p 1.

54 See: https://www.aemc.gov.au/rule-changes/efficient-provision-inertia.

The final rule better supports system security needs as thermal generators retire, by projecting inertia needs over a longer timeframe, improving efficiency, and lowering costs for consumers by allowing TNSPs to better coordinate system strength and inertia investment over the same timeframes. The rolling 3-year procurement requirement and 10 year forecasting makes the framework more proactive, helping to prepare for a lower-inertia system. The three-year ahead procurement obligation also mirrors the compliance arrangements under the current system strength obligations, and provides for more forward-looking and proactive procurement.

The Commission recognises that these revised timeframes will create a gap where shortfalls before the 3-year compliance period cannot be addressed. To address unexpected needs arising within this period, the Commission has made minor amendments to the NSCAS framework. System strength and inertia can now be procured through NSCAS to meet minimum system security requirements that arise within the 12 – 36 month period.[55] Further details on the changes to NSCAS are in section 3.6.

Figure 3.6: TNSP inertia procurement targets would be set 3 years in advance on a rolling basis

Year		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Binding sub-network inertia needs (MWs)	Minimum inertia floor allocation	N/A	N/A	**3,000**	**3,500**	3,500	3,500	3,000	3,000	3,000	3,000
	Secure operating level	N/A	N/A	**6,500**	**7,500**	7,500	7,750	8,000	8,250	8,500	8,500
2024 inertia report forecasts	Minimum inertia floor allocation	2,750	3,000	**3,000**	3,000	3,000	3,000	3,000	3,000	3,000	3,000
	Secure operating level	6,000	6,250	**6,500**	6,750	7,000	7,250	7,500	7,750	8,000	8,000
2025 inertia report forecasts	Minimum inertia floor allocation		3,000	**3,500**	**3,500**	3,500	3,500	3,500	3,500	3,500	3,500
	Secure operating level		6,250	**7,500**	**7,500**	7,500	7,750	8,000	8,250	8,500	8,500
2026 inertia report forecasts	Minimum inertia floor allocation			3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
	Secure operating level			7,500	7,500	7,500	7,750	8,000	8,250	8,500	8,500
2027 inertia report forecasts	Minimum inertia floor allocation				3,500	3,500	3,500	3,500	3,500	3,500	3,500
	Secure operating level				7,500	7,500	7,750	8,000	8,250	8,500	8,500

Unexpected changes of inertia needs does not change TNSP procurement until the compliance

Note: Forecast inertia requirements are shown in generic units for illustrative purposes only. Each year AEMO would publish a forecast of inertia requirements over a 10-year horizon. The above figure cuts off at 2034 for illustrative purposes only.

3.5 Synthetic inertia is now eligible to meet minimum security needs, promoting security and efficiency

The Commission has widened the eligibility of units capable of meeting the minimum threshold level of inertia beyond synchronous sources.[56] Under the changes:

- TNSPs will be able to procure synthetic inertia to meet the binding satisfactory inertia level, as well as the binding secure inertia level — from sources that AEMO has approved[57]
- AEMO will be required to consult on and publish a detailed specification of synchronous and synthetic inertia, providing detailed guidance on the capabilities of approved sources of synthetic inertia.[58] [59] Having clear and transparent requirements for providing synthetic inertia will help original equipment manufacturers (OEMs) and market participants better understand the expected technical capabilities of their equipment to get AEMO's approval. The Commission understands that AEMO intends to introduce the specification as part of a revision of its inertia methodology.

This will provide clear investment signals of what is required, and encourage providers to invest in technologies that would do so. This change could also increase investment in new zero-carbon

55 Definition of NSCAS need, final rule.

56 The inertia framework defines the secure level as two separate levels: the binding satisfactory inertia level which is the minimum level of inertia to operate in a satisfactory operating state when islanded; the binding secure inertia level which is the minimum level of inertia to operate the sub-network in a secure operating state when islanded. Clause 5.20B.2(b) of the final rule.

57 Clauses 5.20.4(f) and 5.20.4(h) of the final rule.

58 Clause 5.20.4(a) of the NER and 5.20.4(f) of the final rule.

59 The inertia specifications could be included in a future iteration of the Inertia requirements and methodology document.

technologies by providing long-term investment signals to market participants — for example, to justify adopting grid-forming inverters.

TNSPs may seek approval from AEMO for non-synchronous equipment to provide inertia network services.[60] The final rule empowers AEMO to approve non-synchronous sources of inertia on an individual unit basis, by technology class, or by any other distinction AEMO chooses, however, AEMO must have regard to the inertia network service specification.[61] The Commission does not intend for AEMO to be required to approve alternative sources of inertia if it is not satisfied that it will adequately contribute to meeting system security needs.

Changes to allow synthetic inertia to contribute to the minimum threshold level will commence on **1 December 2024**.

3.5.1 Stakeholders universally supported allowing synthetic inertia to meet minimum needs

Submissions to the directions paper universally supported the Commission's proposal to widen the eligibility of synthetic inertia and recognise the technical capabilities of grid-forming inverters.[62]

Submissions also supported that AEMO be required to provide detailed synthetic inertia specifications, subject to stakeholder consultation, to guide the procurement of the technology and provide insights as to what AEMO will require as part of the compliance and approvals process:[63]

Several stakeholder submissions requested a description of synthetic inertia be included in the NER.[64] The Commission appreciates the desire to provide more certainty by codifying a definition in the rules. However, given the early stages of development and understanding, the Commission considers that introducing a strict definition of inertia in the rules would not be sufficiently flexible as our understanding of the technology develops. Instead, the Commission has sought to provide AEMO with the flexibility to update the inertia specification as engineering understanding grows and to continue to approve sources of inertia as it becomes confident in the technology's capabilities. A flexible approach with one all-encompassing definition for inertia was supported by Tesla in its submission to the second directions paper, because:[65]

> [T]he risk of separate definitions is it may still create regulatory loopholes for selecting "inertia" or "synthetic inertia" for different services.

AEMO sought reassurance that it will have discretion in assessing synthetic sources of inertia, expressing concern:[66]

> That the drafting may not allow it sufficient discretion to control the proportions of synthetic inertia eligible to contribute to different inertia requirement thresholds. Even though there is no agreed technical definition of synthetic inertia at this stage, the drafting appears to assume that AEMO-approved service definitions of synthetic inertia are equivalent to synchronous inertia.

60 Final rule, clauses 5.20.4(h) and 5.20.4(i)

61 Clause 5.20.4(j) of the final rule.

62 Submissions to the second directions paper: EnergyAustralia, p 10; Alinta Energy, p 2; AEC, p 3; Stanwell, p 3; CS Energy, p 5; Origin Energy, p 1; Transgrid, p 6; AEMO, p 5; AER, p 2; CEC, p 5; ENA, p 3; Delta Electricity, p 1; Tesla, p 3; AGL, p 3.

63 e.g. submission to the second directions paper AEC, p 3.

64 e.g. submission to the second directions paper: CEC, p 5.

65 Submission to the second directions paper: Tesla, p 3.

66 Submission to the second directions paper: AEMO, p 5.

Given the relatively nascent nature of the understanding of how synthetic inertia can be provided and contribute to security, the Commission has designed the arrangements so that AEMO has discretion to approve or reject TNSP proposals to procure synthetic inertia to meet system security needs.

3.6 Inertia and system strength can now be procured through NSCAS if unforeseen needs arise in the near-term

The new three-year timeframes for inertia are more forward-looking and align the framework with the existing planning framework for system strength. However, should unforeseen short-term security needs arise within the next three years, they cannot be procured under the forward-looking frameworks. Previously, the inertia procurement timeframes allowed AEMO to declare inertia shortfalls starting 12 months from the publication of the annual inertia report.

Unexpected security gaps could result from:

- the sudden retirement or failure of a synchronous generator
- the failure of a piece of network equipment,
- unexpected delays with longer-term solutions, or
- other unforeseen circumstances.

To address a potential gap where a shortfall emerges or materialises earlier than originally forecast and within the three years, the Commission has removed the exclusion of inertia and system strength services from the NSCAS framework for this three-year period.[67] This provides another avenue by which imminent security needs can be quickly resolved, and directions avoided. As explained in chapter 6, any NSCAS contracts procured to meet inertia or system strength needs must be enabled through AEMO's centralised enablement process alongside other inertia and system strength contracts.[68]

The NSCAS exemption allows inertia and system strength to be procured up to minimum levels required for security. This means that, under NSCAS:

- inertia can be procured up to the relevant level — the floor or the secure level — that applies to the inertia sub-network (see section 3.3.3)
- system strength can **only** be procured up to the three-phase fault level, which is the minimum required for security. NSCAS cannot be used to procure up to the higher 'efficient' level to support the stable voltage waveform, as this is not a minimum security requirement.

The Commission notes that TNSPs could choose to meet any gaps identified within three years in AEMO's updated forecasting. However, they are not obliged to do this; their obligation is to meet the level identified three years ahead. Therefore, the Commission considers that the NSCAS backstop is necessary. For completeness, the Commission also notes that inertia or system strength requirements identified beyond three years can be met through the respective planning timeframe frameworks without requiring NSCAS as a backstop mechanism.

The NSCAS arrangements provide a RIT-T exemption for any NSCAS gaps arising within the next 18 months — reflecting a similar exemption in the previous inertia shortfall framework.[69] The RIT-T exemption for NSCAS procured within 18 months will extend to the procurement of system

67 Definition of NSCAS need under the final rule.

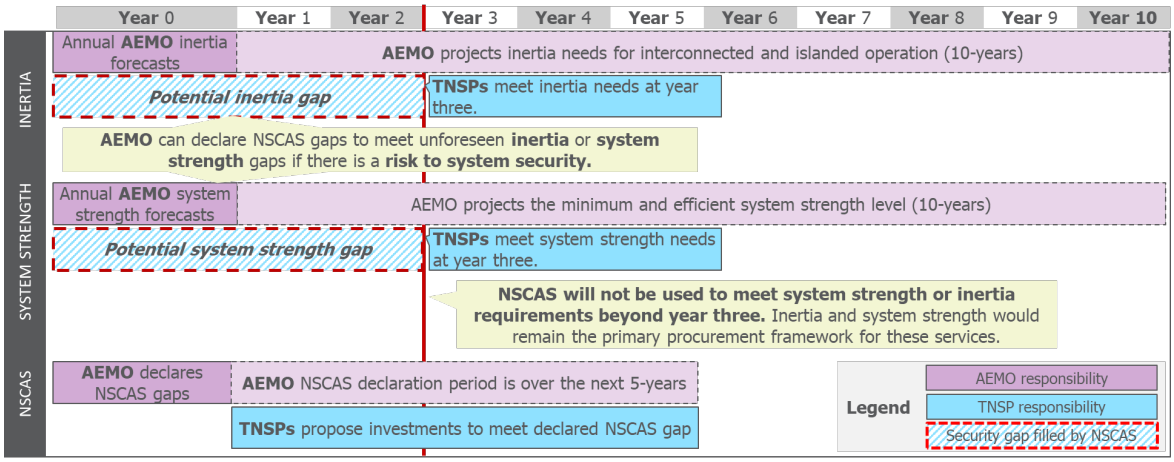
68 Note: The changes to NSCAS procurement to meet system strength and inertia minimum security needs commence on 1 December 2024. Given that the AEMO enablement provisions enter force on 2 December 2025, under clause 5.20C.4(b2), TNSPs must ensure that any NSCAS contract entered into prior to December 2025 to meet inertia or system strength needs must be capable of being enabled by AEMO from 2 December 2025.

69 Clause 5.16.3(a)(10) of the final rule.

strength and inertia under NSCAS. In this way, the Commission is seeking to ensure that any minimum security needs can be met by TNSPs without unnecessary delays that may necessitate dependence on costly market interventions.

The changes to the NSCAS framework under this final rule commence on **1 December 2024**.

Figure 3.7: Revised procurement timelines: inertia, system strength, and NSCAS



The inertia and system strength frameworks remain the primary frameworks for procurement

Under the final rule, the inertia and system strength frameworks remain the primary mechanism for the procurement of these services. The NSCAS framework is only intended as a backstop mechanism where more flexible procurement is required to meet a security gap that was not originally forecast.

Inertia and system strength were previously removed from the NSCAS framework to allow their respective frameworks to be the primary tool of procurement and because the shortfalls, at the time, applied after 12 months which did not create a multi-year compliance gap. Since the decision to exclude inertia and system strength from the NSCAS framework, the compliance date to meet system strength requirements has been extended to three years[70], and this rule similarly extends inertia procurement timeframes.

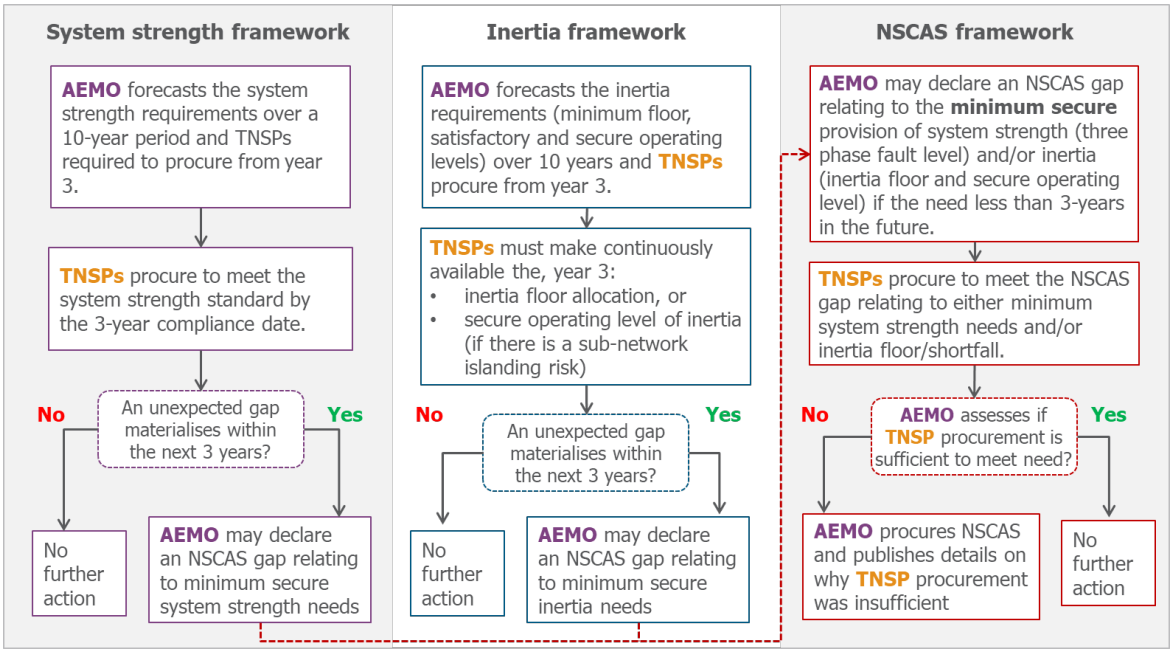
Inertia and system strength were removed from the NSCAS framework because of concerns that dual procurers in the investment timeframe (as AEMO can act as a procurer of last resort) may have some perverse outcomes.[71] The Commission did not consider that the NSCAS framework was suitable for the evolved system strength framework. The Commission continues to recognise the risks of dual procurers, however, we consider that these risks are mitigated because:

- the inertia and system strength frameworks remain the primary procurement frameworks for these services. The NSCAS framework is not intended to be a proactive mechanism for the procurement of inertia or system strength. It would only be used as a backstop in unexpected situations.
- TNSPs remain the primary procurer under both frameworks.

70 The Efficient management of system strength on the power system extended the compliance to three years for the SSSP to meet the system strength standard specifications. Setting the standard three years in advance was intended to provide investment certainty for the SSSP given the changing nature of forecasts. NER, clause S5.1.14.

71 See: https://www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system.

Figure 3.8: Interactions between system strength, inertia, and NSCAS frameworks



3.6.1 Stakeholders broadly supported removing the exclusion of inertia and system strength from the NSCAS framework

In submissions to the directions paper, most stakeholders supported the proposal to allow inertia and system strength procurement through NSCAS as a backstop.[72]

Stakeholders generally supported the introduction of a RIT-T exemption if services need to be provided within 18 months as a practical measure.[73]

Several stakeholders noted the importance of the AER retaining some oversight of any transmission investment.[74] The Commission agrees that the AER should retain some oversight of TNSP NSCAS investments even when the need is within 18 months. This forms part of the justification for the TNSP cost recovery reforms this rule introduces to manage cashflow and volatility risks stemming from unpredictable non-network costs (see chapter 4).

3.7 The new inertia procurement framework and NSCAS arrangements commence on 1 December 2024

The revisions to the inertia framework, including the introduction of the new inertia floor for interconnected operation, will commence on **1 December 2024**. This means that the requirement for TNSPs to procure the required level of inertia to meet their allocated proportion of the floor will commence on **1 December 2027**. This allows time for TNSPs to adequately consider procurement options and undertake RIT-Ts to address any identified needs.

72 Submissions to the second directions paper: Delta Electricity, p 1; EnergyAustralia, p 6; SnowyHydro, p 2; CEC, p 6; Alinta Energy, p 2; AEC, p 3; CS Energy, p 4; ENA, p 11; AGL, p 2.

73 Submissions to the second directions paper: EnergyAustralia, p 12, Delta Electricity, pp 1-2; SnowyHydro, p 2; CEC, p 6; AEC, p 3; AGL, p 2.

74 Submission to the second directions paper: AEC, p 3.

The changes to the NSCAS framework under this final rule also commence on **1 December 2024**, meaning AEMO can also declare an NSCAS gap for inertia in the intervening years before TNSP inertia procurement obligations commence on **1 December 2027** if necessary.

The final rule includes transitional arrangements for the previous shortfall framework. Any inertia shortfalls declared prior to 1 December 2024 remain valid and TNSPs continue to be required to meet those levels until the new procurement requirements start on 1 December 2027.[75] AEMO can continue to adjust the existing shortfalls up or down, or notify TNSPs that shortfalls have been remedied.[76] In making any adjustments, AEMO can take into account its inertia forecasts under the new framework.[77] The final rule also preserves pass through arrangements for previously declared shortfalls.[78]

3.7.1 Stakeholders strongly supported the alignment of inertia and system strength procurement timeframes

Stakeholder submissions to the second directions paper[79] and the *Efficient provision of inertia rule change* consultation paper[80], strongly supported the proposed alignment of the system strength and inertia procurement timeframes to enable optimised procurement.

Transgrid's and the ENA's submission to the second directions paper noted their view that the current three-year compliance period is insufficient to allow them to credibly consider the full range of network and non-network solutions, instead proposing a six year compliance period.[81] Extending the compliance period to six years would require the Commission to reverse the view expressed in the *Efficient management of system strength* final determination that the:[82]

> forward-looking approach of the final rule is achieved through AEMO forecasting the system strength standard specification three years in advance of the SSS Provider having to meet them. Three years is considered sufficient time for the SSS Provider to plan and procure the necessary solutions as required under the standard.

The Commission does not consider this proposal to be in the best long term interests of consumers as it would:

- severely affect the current implementation date of 2 December 2025 of the system strength framework
- likely result in materially increased forecasting uncertainty, thereby compromising economic efficiency.

3.8 These revisions will promote power system security, align with emissions reduction targets and reduce reliance on directions

The Commission considers the revisions to the planning timeframe frameworks promote the NEO, as they are consistent with the system services objective and assessment criteria. The reasons are summarised below.

75 Final rule, clause 11.168.9(b).
76 Final rule, clause 11.168.9(d).
77 Final rule, clause 11.168.9(e).
78 Final rule, clause 11.168.9(f).
79 Submissions to the second directions paper: EnergyAustralia, p 5; Alinta Energy, p 2; AEC, p 3; SnowyHydro, p 6; Global Power Energy, p 2; Stanwell, p 3; CS Energy, p 4; Origin Energy, p 1; Transgrid, p 4; AEMO, p 3; AER, p 2; ENA, p 10; Delta Electricity, p 1; Tesla Energy, p 2; Iberdrola, p 4; AGL, p 2.
80 Submissions to the efficient provision of inertia consultation paper: AEMO, p 3; AER, p 1; Transgrid, p 2; ENA, p 2; TasNetwork, p 2, Iberdrola, pp 5-6;
81 Submissions to the second directions paper: Transgrid, p 5; ENA, p10.
82 AEMC, Efficient management of system strength — final determination, 21 October 2021, p 42.

3.8.1 The final rule promotes power system security

The amendments to the long-term procurement frameworks support power system security as the generation fleet continues to decarbonise. The final rule promote power system security by:

- ensuring that minimum inertia needs for interconnected operation are procured proactively and on time to prepare for the retirement of synchronous generators
- requiring AEMO to project inertia needs for all sub-networks over 10 years to proactively ensure that inertia needs to be met in the planning timeframe in line with the retirement scheduled of thermal generators in response to emissions reduction expectations
- increasing the pool of resources capable of meeting inertia needs by widening the eligibility of synthetic inertia sources to meet the minimum threshold level
- allowing inertia and system strength procurement through NSCAS to address short-term security gaps if they arise, in a way that complements the main frameworks and without reliance on directions.

3.8.2 The final rule contributes to the emissions reduction of the power system

As noted in chapter 2 we have considered emissions reduction as part of the assessment framework for this rule change following the update to the NEO.[83]

The amendments to the long-term procurement frameworks contribute to emissions reduction by:

- avoiding the continuing reliance on thermal generators by providing the tool with which TNSPs are capable of procuring the services required to operate an IBR-dominated grid
- retaining security procurement responsibility largely with TNSPs, which will mean the RIT-T process applies. This means TNSPs must account for emissions reduction as a class of market benefit when considering their investment options to meet security needs
- allowing procurement of synthetic inertia, which is provided by zero-carbon sources, to meet minimum threshold levels.

3.8.3 The final rule supports principles of market efficiency

The revisions to the long-term planning frameworks will provide appropriate incentives and risk allocation by centralising the procurement responsibility on TNSPs to meet system security needs. TNSPs will be capable of finding the most efficient portfolio of network and non-network solutions that minimise the cost of procurement across system strength, inertia and NSCAS.

Moreover, by widening the eligibility of synthetic sources of inertia, the pool of resources available to meet system security needs will further increase beyond synchronous sources. The increase in competition should drive down the costs of meeting security needs for consumers.

3.8.4 The revisions to planning timeframe frameworks have considered implementation costs

The Commission has designed the revisions to the planning timeframe frameworks to be as simple as possible to minimise implementation costs. By leveraging the existing frameworks, and seeking to manage procurement levels, the incremental increase in costs is expected to be minimal.

83 The NEO was updated on 21 September 2023 with the introduction of the Statutes Amendment (National Electricity Laws) (Emissions Reduction Objectives) Act 2023. We have applied the updated NEO in this final determination in line with the Act.

3.8.5 This final rule is underpinned by principles of good regulatory practice

The revisions to the planning timeframe frameworks promote the principles of good regulatory practice by:

- leveraging existing transparency that outline the long-term security needs of the power system
- building on existing frameworks, thereby not requiring any major changes to existing processes
- ensuring the frameworks are sufficiently flexible to account for the continuing retirement of thermal generators over the coming years as they are progressively replaced by inverter-based resources.

4 Improvements to TNSP cost recovery arrangements for non-network security contracts

Box 6: Key points in this section

- The Commission has improved the cost recovery arrangements for TNSP non-network security contracts to provide certainty and support efficient contracting.
- The final rule implements annual processes for projecting and recovering costs under these contracts, and a process for the AER to consider ex-ante whether expenditure under selected, more significant, contracts meets criteria indicating efficient and prudent expenditure.
- These changes aim to minimise TNSP cashflow volatility and forecasting challenges for non-network security costs.

The rule adjusts TNSP cost recovery processes to address cashflow issues and minimise volatility for consumers

- The final rule introduces a common approach for TNSP cost recovery of system strength, inertia and NSCAS non-network costs, to address cashflow and price volatility concerns raised by the ENA and TNSPs.
- The final rule provides that network support payments related to system strength service payments, inertia service payments or NSCAS payments (system security network support payments) no longer need to be included in the five year forecast of network support allowances.
- Instead, TNSPs can forecast their expected annual system security network payments for the coming regulatory year and recover these expected payments through transmission prices for that year.
- This will help minimise the magnitude of expected true up payments, and address cashflow concerns for TNSPs and reduce price volatility for customers.
- Costs related to system security non-network contracts will be recovered through transmission pricing for prescribed common transmission services. Arrangements for the system strength charge payable by generators and large inverter-based loads have not changed, and any revenue from this charge will still reduce transmission prices payable by consumers.
- The AER will have the power to provide guidance for how TNSPs set their expected annual system security network support payments, and will continue to review total system security payments to retain the incentive for TNSPs to meet security requirements at lowest cost.
- The changes to TNSP cost recovery provisions commence on **1 December 2024**. This means the amendments to the pricing provisions in Part J of Chapter 6A will apply to prices that are set in March 2025 for the 2025-26 regulatory year. Therefore, TNSPs will not be able to seek a network support pass through determination until July 2026 in respect of a regulatory year commencing from 1 July 2025.

The rule also provides for AER ex-ante review of system security contracts

- The AER will now be able to make a determination on whether expenditure — or a methodology for a payment — under a TNSP's proposed system security network support contract is

consistent with the operational expenditure objectives, criteria, and factors that are outlined in rules 6A.6 and 6A.7 of the NER.

- This only applies to TNSP contracts that meet any thresholds or criteria that are set by the AER in its new system security network support payment guidelines.
- It is voluntary — TNSPs can choose to apply for a determination for contracts that meet the thresholds, but this is not mandatory.
- If the AER makes a determination under this new provision, the determination would be a relevant factor the AER takes into account in future revenue determination or pass through decisions.
- Similar to a Contingent Project Application for large capital investments, this allows an option for AER review of the efficiency of the proposed expenditure under the agreement before the TNSP enters into the contract and makes payments under the agreement, rather than only doing so two years after payments are made under the pass-through provisions.
- This process is likely to improve TNSPs' confidence in their ability to recover efficient operational costs, and therefore work to level the playing field between network and non-network solutions.
- These arrangements commence on **1 December 2024**. The AER will be required to publish its guidelines by this date.

How we have incorporated stakeholder feedback and updated the arrangements since the second directions paper

- The ENA and TNSPs expressed strong and consistent concerns throughout consultation on this rule change about their cashflow risks due to exposure to variable payments under system security contracts. The changes in the final rule are informed by this ENA and TNSP feedback.
- Stakeholders generally have perceived a preference for TNSPs investing in network solutions as opposed to potentially more cost-effective non-network options. The improved certainty that TNSPs will be able to recover efficient opex intends to level the playing field between the options and incentivise the procurement of the lowest-cost portfolio of assets needed to maintain the power system within its secure operating envelope.

This section covers the Commission's improvements to the cost recovery arrangements for TNSP recovery of non-network system security costs, including:

- Section 4.1 — The Commission has revised TNSP cost recovery arrangements for non-network security costs
- Section 4.2 — Issues with the current TNSP cost recovery arrangements for non-network system security solutions
- Section 4.3 — Stakeholder submissions raised significant concerns with the existing cost recovery arrangements
- Section 4.4 — We investigated three options to resolve TNSPs' concerns
- Section 4.5 — The Commission has improved TNSP recovery processes for non-network system security contracts
- Section 4.6 — The use of non-network options is changing in the context of the energy transition
- Section 4.7 — The changes to cost recovery promote the long-term interests of consumers.

4.1 The Commission has revised TNSP cost recovery arrangements for non-network security costs

The Commission has introduced a new approach for TNSPs to recover costs incurred from non-network system security contracts. These could be system strength services agreements, inertia services agreement and a network support agreement for NSCAS. The final rule introduces an annual process for forecasting and recovery of system security related network support costs incurred by TNSPs and a new optional function for the AER to assess the efficiency of TNSP cost recovery of selected contracts. The improvements promote economic efficiency and simplicity by:

- minimising TNSP cashflow risk by significantly reducing the likelihood that their cost projections materially differ from actual expenditures
- minimising price volatility for customers by allowing TNSPs to make annual cost projections and recover costs closer to when they are incurred
- ensuring costs are allocated through appropriate transmission pricing mechanisms.

This change does not affect:

- the recovery of capital expenditure incurred by TNSPs for procuring synchronous condensers or other network solutions for security, or
- the system strength charge paid by generators and large inverter-based loads that elect to pay the charge instead of self-remediating.

The revisions to TNSP cost recovery commence on **1 December 2024**.

4.2 Issues with the current TNSP cost recovery arrangements for non-network system security solutions

4.2.1 TNSPs are likely to incur material, variable and unpredictable costs when entering into system security contracts with non-network providers

TNSPs are likely to incur significant costs to procure system strength, inertia and NSCAS. These costs will likely include payments under contracts with synchronous generators and battery providers as 'non-network options' to help meet their obligations under security frameworks.

Payments under these contracts could be structured in a variety of ways, for example, they could include a fixed availability payment, an enablement payment and a variable payment. The variable payment could be linked to the spot price, fuel costs or other metrics.[84]

The size of the payments TNSPs will incur is unclear and will vary between TNSPs, but are likely to be far larger than any amounts previously recovered through these provisions — with estimates running up to hundreds of millions a year.[85] The changes to TNSPs cost recovery made in this final rule do not result in any increase in system security costs. This determination focuses on revising the process under which TNSPs recover costs from consumers, not the quantum itself. The evolved system strength framework that seeks to more efficiently supply system strength when compared to the previous 'do no harm' arrangements, made changes that impacted the quantum of costs associated with system security that may be accrued, for the benefits of a more secure system. The evolved framework minimises the need for costly market interventions, will shorten IBR connection delays and will lower long-term costs for consumers by reducing curtailment of lower-cost renewable energy.[86]

84 noting that AEMO has the ability to set out any required contracting parameters — see chapter 6.

85 Submission to the second directions paper: ENA Endgame Economics, p 7.

86 AEMC, Efficient management of system strength on the power system — final determination, 21 October 2021, pp i-ii.

The costs arising from these system security contracts are likely to be not only significant but also highly variable and therefore difficult to forecast. This variability arises from several factors but primarily from the likely inclusion of variable enablement payments in these contracts — that is, a payment each time the security provider is enabled. Enablement payments will make the total cost of these contracts inherently uncertain and very difficult to predict, due to:

- uncertainty in how often a contract will be enabled by AEMO — this depends on future security requirements, which are evolving over the transition
- the potential linkages of the enablement price to the electricity spot price or other variable metrics.

4.2.2 Current network support provisions have historically only been used for relatively small network support payments with easier to forecast prices

The current NER cost recovery arrangements for these payments use the network support pass through provisions in clause 6A.7.2 and the transmission pricing provisions in rules 6A.22 and 6A.23. The network support provisions have traditionally only been used for relatively small network support payments under contracts that generally have a fixed or relatively easy to forecast price. They are likely to be unsuitable for large, difficult to forecast and highly variable costs of the nature of system strength or inertia payments.

In particular, under the existing rules, TNSPs recover costs for these contracts through a network support payment allowance and/or a network support pass through.

Recovery of costs through a network support payment allowance in the revenue determination

A TNSP may propose a network support allowance in its revenue proposal to the AER. If the AER approves such an allowance, it is included as part of the TNSP's forecast operating expenditure (opex) and its revenue allowance for the coming five-year regulatory control period.[87] These costs are included in the TNSP's maximum allowed revenue (MAR) that it can recover under its revenue determination and its aggregate annual revenue requirement (AARR) that is used to set its annual prices for prescribed transmission services. [88]

These costs are currently recovered in accordance with rules 6A.22 and 6A.23 through charges for all prescribed transmission services in the regulatory year in which they are forecast to be incurred.

Recovery of costs through a network support pass through

If actual costs vary from costs that were approved in the network support payment allowance, then a 'network support event' has occurred and the TNSP must seek a determination from the AER to determine the network support pass through amount. This means the TNSP can recover the difference between its actual network support payments and its network support allowance if actual costs are greater than approved costs, or return the difference to consumers if actual costs are less than approved costs. If the TNSP does not have a network support allowance (either because it has not applied for one, or the AER has not approved its application), then the TNSP will need to use the network support pass through process for all costs incurred.

Unlike 'pass through events' under clause 6A.7.3, there is no materiality threshold for network support pass throughs under clause 6A.7.2.

87 Clause 6A.6.6 of the NER.

88 The AARR differs from the MAR set by the AER as it is adjusted upwards or downwards to account for network support pass throughts and cost pass throughs under rules 6A.7.2 and 6A.7.3 respectively.

The TNSP's AARR includes an adjustment for any network support pass through amount under cl 6A.22.1 and the amount is recovered through (or refunded via) charges for all prescribed transmission services.

There is a 2 year delay in recovering costs under the network support pass through process (either the difference between the allowance and actual payments, or the full costs if no allowance applies) due to the timing of the pass through process in clause 6A.7.2. The pass through amount includes an allowance for the time value of money based on the TNSP's weighted average cost of capital (WACC).

4.2.3 The current network support pass through arrangements are ill-suited to large unpredictable liabilities

These arrangements, combined with the magnitude, likely volatility and unpredictability of the payments under the security frameworks, could lead to significant price volatility for customers in coming years.

The difficulty in forecasting costs under these contracts (described in section 4.2.1) is likely to lead to significant differences between approved costs and actually incurred costs. It will be very difficult for the AER and TNSPs to accurately forecast these costs as part of the revenue determination process, which requires these highly variable costs to be forecast up to six years before they are incurred. At the time the forecasts are prepared and approved, the TNSP may not have signed contracts, will not know how often AEMO will enable the service and therefore how often payments will be required, and may not know the price that will apply each time the service is enabled (e.g. if the price is linked to the spot price or some other variable benchmark).

Therefore, if costs were to be recovered through a TNSP's five-year revenue determination, it is likely that there would be significant over- or under-forecasting and therefore significant network support pass through amounts. Pass through amounts are adjusted for the TNSP's WACC, and so if pass through amount are significant, this will increase costs for customers.

Further, there is a two-year delay to TNSPs recovering costs through the pass through process. This could lead to cash flow and liquidity issues for TNSPs as they are required to incur large costs they cannot recover for two years. For example, a TNSP with an allowance of zero would incur costs in 2025/6, submit a pass through application in 2026/7 and recover its total costs as part of its transmission prices for 2027/8.

These issues are exacerbated in the early years of the revised system security frameworks. Currently, all TNSPs have network support allowances of zero in their revenue determinations, except ElectraNet which has a small allowance for inertia service payments related to an inertia shortfall previously declared by AEMO. The two year delay and the fact that almost all TNSPs currently have a network support allowance of zero could lead to significant price volatility for customers in coming years when TNSPs recover the inevitable shortfall between forecast and actual payments.

Further to volatility issues, if the Commission did not revise the cost recovery arrangements, it is possible that TNSPs would structure contracts to reduce price volatility and cashflow risks to the TNSP but with large risk premiums to compensate providers for bearing the wholesale market exposure. Such an outcome would likely increase costs for consumers and thereby compromise the efficiency and competitiveness of non-network solutions.

4.2.4 Current cost recovery arrangements could distort usage decisions for large customers and are inconsistent with beneficiary pays principles

The manner in which the network support allowance and any pass through amounts for system security costs are accounted for in the transmission pricing provisions in the NER leads to inconsistent outcomes and inefficient price signals. Under rules 6A.22 and 6A.23:

- All other system security network support costs included in the TNSP's Aggregate Annual Revenue Requirement (i.e. the network support allowance adjusted for any approved pass through amounts for system strength, inertia or NSCAS, less expected system strength service payments for that year) are not allocated to common transmission services and are instead apportioned between all prescribed transmission service prices in accordance with rule 6A.23. This means that part of the costs are recovered through locational TUOS charges and part from grandfathered prescribed entry charges for generators. This is inconsistent with the beneficiary pays principle and could distort usage decisions for some large customers. For example, some of these costs will be recovered from:
  - connection charges payable by existing synchronous generators even though these services are not related to connection costs and these generators do not benefit from the provision of these services; and
  - locational TUOS charges payable by large transmission customers, with charges varying depending on where the customer is located, despite these services providing an equal benefit to all customers across the transmission network.
- Expected system strength service payments for the coming regulatory year (as set by the TNSP as part of the annual pricing process) are recovered from transmission customers through prescribed common transmission services. This is consistent with efficient pricing signals and the beneficiary pays principle as it recovers the costs equally from all transmission customers through postage stamped charges in a way that is unlikely to distort customer's usage decisions.

4.2.5 TNSP cost recovery arrangements also differ for system strength, inertia and NSCAS needs

More broadly, the current arrangements for TNSP cost recovery differ depending on the service type being procured, with the costs being allocated to different categories of transmission services and therefore different transmission customers depending on the service being procured — as outlined in Figure 4.1 below.

Figure 4.1: Cost recovery arrangements for system security frameworks

	System strength	Inertia	NSCAS
Who are costs recovered from?	Costs are recovered from: • partly from inverter based resources and loads that consume system strength • partly from customers, with some costs recovered from prescribed common transmission services prices and some costs spread across all prescribed transmission services. No TNSP currently has a network support allowance for system strength costs.	Costs are recovered broadly from customers by being spread across all prescribed transmission services. Only ElectraNet currently has an approved network support allowance for inertia.	Costs are recovered broadly from customers by being spread across all prescribed transmission services. No TNSP currently has a network support allowance for NSCAS costs.

4.3 Stakeholder submissions raised significant concerns with the existing cost recovery arrangements

In their submissions to the second directions paper, the ENA and TNSPs raised significant concerns with the arrangements for cost recovery of system strength and inertia costs incurred by TNSPs for network support payments to generators and other non-network providers.[89] TNSPs consider that these costs are likely to present material cashflow risks due to their magnitude, volatility and the difficulty in forecasting them up to five years in advance for a revenue determination.

In its submission, the ENA strongly disagreed with our position in the second directions paper that TNSPs are best placed to manage the risk associated with variable system strength payments.[90]

To address these issues, the ENA proposed that AEMO directly settle variable payments and pass on the costs to market customers, or that the Commission:[91]

> explore approaches that achieve greater consistency between the true-up mechanisms for system strength payments and revenues that result in greater alignment of cashflow. Specifically, ENA recommends the AEMC assess two options for reform:
>
> - The CPA framework could be extended to cover opex, so that revenues can be adjusted for a forecast opex cost for non-network contracts.
> - Rule 6A.23.3A could be amended to enable the system strength revenue true-up process to also apply to system strength payments.

This view was reinforced by Transgrid who explained their:[92]

> significant concerns with the AEMC's proposal that TNSPs would be responsible for making enablement payments for system security services. We believe these payments will be substantial and unpredictable, and as a result will create significant cashflow risk for TNSPs, and highly variable and unstable prices for consumers. Modelling suggests it could more than double our regulatory operating expenditure, which would have significant impacts on the level and stability of network charges that would ultimately be passed on to consumers.

ENA provided modelling on behalf of the TNSPs to support these conclusions.[93] The Commission has not verified this modelling or undertaken its own, but agrees that the potential magnitude of these costs compared with TNSPs' existing operational expenditures, and difficulty forecasting them, present significant issues as outlined above.

The Commission has revised cost recovery arrangements for non-network system security costs introduced as part of this final rule to address the concerns raised by TNSPs in submissions to the second directions paper.

4.4 We investigated three options to resolve TNSPs' concerns

The Commission investigated three potential options in response to TNSP cashflow concerns:

89 Submissions to the second directions paper: ENA, p 1; Transgrid, p 1; TasNetworks, p 2.
90 Submission to the second directions paper: ENA, p 1.
91 Ibid., p 15.
92 Submission to the second directions paper: Transgrid, p 1.
93 Submission to the second direction paper: ENA Endgame Economics, pp. 7-8

- Status quo – No change to the status quo – TNSPs would remain liable for all costs under the security frameworks with reimbursements under existing processes. This is what we proposed in the directions paper.
- Option 1 – AEMO is responsible for settling variable payments, which are passed on to market customers.
- Option 2 (chosen for the final rule) – TNSPs can recover expected non-network security costs upfront through annual transmission pricing, and variations between expected and actual costs through pass throughs.

The Commission determined that the issues and risks presented by the 'status quo' option were significant and so was not a viable option (see section 4.2). We therefore investigated options 1 and 2 further.

Under Option 1, TNSPs would enter contracts with providers of security services, but any 'variable' payments for enablement would be paid directly by AEMO, likely through weekly market settlement. This would remove the TNSPs' exposure to the volatile component of operational expenditure. AEMO would then recover the costs from market customers based on a customer's energy consumption in the trading intervals when the service is enabled.

Under Option 2, TNSP cost recovery would be based on more frequent and accurate forecasts. Cost recovery timing would better align with costs incurred under the contracts, rather than having a two-year delay in cost recovery. This approach would reduce the magnitude of cost pass throughs, therefore reducing price volatility for transmission customers.

The Commission considered that Option 1 may potentially be an improvement over the status quo, however, there were three key drawbacks compared with Option 2.

Firstly, Option 1 shifts the variable component of costs from transmission customers to market customers who are online in the relevant intervals when the security service is enabled. This creates two issues:

- some customers who benefit from system strength and inertia but don't consume energy from the grid at those times would not contribute to the cost, for example solar PV customers. In contrast, Option 2 spreads costs across all transmission customers, better aligning costs with beneficiaries
- this approach could also create inefficient incentives on some customers to further reduce minimum demand to avoid paying costs for security.

Secondly, Option 1 has significant legal and policy complexities, and would likely require new contractual structures so that AEMO can make payments under contracts it would not normally be a party to, for example a new tripartite payment deed. It would also impact a broader range of stakeholders, particularly retailers, and require broader consultation. The Commission considered this presented significant implementation risks, as working through these issues would likely delay the broader reforms in the rule change and may delay TNSP entry into contracts.

Thirdly, Option 1 would remove the AER's ability to review the efficiency of the costs incurred by TNSPs. This would be a material change from the current rules where TNSPs can only recover these costs if approved by the AER as part of the network support allowance or pass through process. This could reduce incentives on TNSPs to seek to minimise these costs when negotiating contracts with service providers.

The Commission notes the preference of TNSPs and the ENA for AEMO to directly settle variable payments and pass on the costs to market customers. Although there may be benefits to this approach, the Commission considers that the risks and drawbacks of shifting the costs to market

customers and the legal complexities outweighed any benefits at this point. In comparison, accelerating cost recovery would require relatively minor incremental changes and resolve the most important issues raised.

A summarised full assessment of the options is in Figure 4.2 below.

Figure 4.2: Assessment of current arrangements and proposals

Criterion		Current Arrangements	Proposal 1: AEMO settlement of variable payments	Proposal 2: Annual TNSP cost projection and recovery
Principles of market efficiency	Supporting allocative efficiency	Inconsistencies in who pays, potentially distorting usage. Inconsistent with beneficiary pays principle.	Could reduce usage at times of minimum demand and mean some beneficiaries do not pay.	All beneficiaries pay in common manner. Unlikely to distort usage decisions.
	Minimising price volatility for customers	Material annual price volatility due to delayed cost recovery and WACC adjustments. Costs smoothed over the year avoids weekly volatility.	Material annual price volatility due to delayed cost recovery and WACC adjustments. Costs smoothed over the year avoids weekly volatility.	Price volatility significantly reduced. Regulator can address risk of systematic over-forecasting.
	Creating efficient incentives on TNSPs so payments reflect efficient costs	AER scrutiny of the efficiency of all TNSP costs. Delay in cost recovery can distort opex/capex incentives.	No AER review of efficiency of costs. AER oversight of capex but not opex can distort incentives.	AER scrutiny of the efficiency of all TNSP cost.
	Managing risk allocation of delays to TNSPs' recovery of efficient costs	TNSPs carry potentially material cashflow risk due to 2 year delay in recovery.	Weekly market settlement addresses TNSP cash flow risk.	AER can address risk of systematic over-forecasting.
Principles of good regulatory practice		AER scrutiny of the efficiency of all TNSP costs.	Inconsistent efficiency incentives due to no oversight of the efficiency of enablement payments.	AER scrutiny of the efficiency of all TNSP costs.
Implementation considerations		No changes required to existing arrangements.	Greater implementation costs and timeframes. Likely to delay TNSP entry into contracts to meet current system strength obligations.	Incremental NER changes requiring limited implementation.

Based on our assessment of the options, the Commission concluded that Option 2 — annual TNSP cost projection and recovery — best promotes the NEO and serves the long-term interest of consumers.

Option 2 would:

- resolve material TNSP cashflow concerns and consumer price volatility due to the TNSPs' exposure to potentially significant and volatile payments under system security contracts
- maintain the incentives under the system strength framework by ensuring costs are spread transparently and effectively through common transmission charges, which results in more efficient price signals than AEMO settlement
- maintain AER oversight of the efficiency of TNSPs costs, which would not occur if these costs were settled by AEMO
- resolve TNSP concerns without significant implementation costs or delays that would likely have eventuated with AEMO settlement of variable payments.

This approach ensures the revision to cost recovery does not delay the implementation of broader reforms introduced in this rule change, nor the entry by TNSPs into contracts with service providers. Although the Commission has decided against introducing AEMO settlement of variable payments in this final rule, this does not preclude the Commission from reconsidering this option at a later time.

4.5 The Commission has improved TNSP recovery processes for non-network system security contracts

The final rule revises and aligns system security cost recovery for TNSP procurement of non-network solutions. Instead of recovering costs through the network pass-through process with its two-year delay, TNSPs will now be able to make annual assessments of their expected costs and recover the expected amount of expenditure each year. Any difference between actual and expected costs would be recovered by the TNSP or returned to customers through a pass through

process. The final rule also includes arrangements to ensure that the AER has appropriate ex-ante and ex-post oversight of expenditure on system security contracts.

The change does not affect:

- the recovery of capital expenditure incurred by TNSPs for procuring synchronous condensers or other network solutions, or
- the system strength charge paid by generators and large inverter-based loads that elect to pay the charges instead of self-remediating.

4.5.1 Expected security costs will be included in prescribed transmission pricing, allowing for annual forecasting and addressing volatility and uncertainty

The rule introduces an annual process for forecasting and recovery of system security related network support costs incurred by TNSPs to address year-on-year price volatility and uncertainty of forecast security costs.

The final rule allows TNSPs to estimate their costs associated with non-network solutions for system strength, inertia and NSCAS services and incorporate this into the prescribed transmission pricing process.

TNSPs will no longer need to rely on a network support payment allowance approved by the AER through a revenue determination to set the amount that can be recovered in the year payments are incurred. The final rule provides alternative and more flexible way for network support payments related to system strength service payments, inertia service payments or NSCAS payments (system security network support payments) to be recovered from consumers.

Instead, TNSPs can recover their expected annual system security network support payments for the coming regulatory year through transmission prices for that year.

All costs related to system security network support payments will be recovered from transmission prices for prescribed common transmission services (other than any costs currently recovered through system strength charges payable by system strength transmission service users). This change is achieving by subtracting these costs from the aggregate annual revenue requirement (AARR) that is used in clause 6A.22.1 for setting all prescribed transmission service prices and adding them back into prescribed common transmission service prices in clause 6A.22.3.[94] This does not change the total amount of costs that are recovered from customers, but just affects which category of services these costs are recovered from and what price structures apply. This results in more efficient and fairer price signals as all transmission customers who benefit from these services will pay for them. However, we expect that the increased certainty and reduced volatility supports more efficient contracting and management of cash flows.

Any difference between TNSPs' expected and actual system security network support payments can be recovered through a modified version of the network support pass through arrangements. These arrangements allow TNSPs to recover the difference between their actual and expected costs, provided the AER determines their actual costs are efficient. If TNSPs' expected costs exceed their efficient actual costs, they must return the difference to customers through the following year's transmission prices.[95]

94 Final rule, clause 6A.23.3(h)(2).
95 Final rule, clause 6A.23.3(h)(3).

4.5.2 The AER can set requirements for how security costs are set in annual pricing

The AER already has the power to set requirements for how TNSPs set their expected annual system security network support payments. This would occur through the AER's transmission pricing methodology guideline made under NER clause 6A.25.1 and does not require any rule changes.

The current guideline already includes a requirement that TNSPs' proposed pricing methodologies explain how expected system strength service payments are calculated. The AER could extend this requirement to also cover inertia and NSCAS payments if it is considered necessary.

4.5.3 The AER can review the efficiency of the full amount of system security network support payments as part of the pass-through process, to ensure continued oversight

The final rule enables the AER to review the efficiency of the full amount of system security network support payments as part of the pass-through process, not just the difference between expected and actual payments.[96] This retains AER oversight over the full amount of these payments, not just any true-up amounts, and maintains the strong incentive for TNSPs to invest in the lowest-cost combination of network and non-network solutions to meet system needs. This ensures that customers will continue to pay no more than the efficient costs of these services.

Clause 6A.7.2 provides that when the AER is assessing a network support pass-through in relation to system security network support payments and applying the factors in clause 6A.7.2(i), the AER is to consider the total amount of actual network support payments incurred by the TNSP in the relevant regulatory year.

The final rule ensures that the AER can review the efficiency of the TNSP's costs even if there is a negative network support event[97] (not just for a positive event as under the current paragraph (i)).

4.5.4 The AER can make a determination on the efficiency of security contracts before expenditure is incurred

The final rule provides the ability for TNSPs to seek an ex-ante determination from the AER on whether expenditure for a proposed system security payment — or payment methodology — meets criteria indicating efficient and prudent expenditure.[98]

This allows the AER to provide an ex-ante view on the efficiency of a procurement process and forecast costs, and reduces the risk to TNSPs that the AER will later determine that payments under the contract were not efficient and cannot be recovered under the pass-through arrangements or a future revenue determination. The risk of the AER disallowing cost recovery several years after a TNSP enters into large network support contracts could result in inefficient and delayed contracting as parties increase prices or structure contracts in such a way to account for the risk of the cost recovery being disallowed.

Under the final rule, the AER can issue a determination on whether expenditure under a proposed contract is consistent with operating expenditure objectives in clause 6A.6.6(a), the operating expenditure criteria in clause 6A.6.6(c), the operating expenditure factors in clause 6A.6.6(e) and the relevant factors for a network support pass-through in clause 6A.7.2A(i).[99] In this determination, the AER would not be required to provide a view on other terms of the proposed

96 Final rule, clause 6A.7.2(i)(3a)
97 Final rule, clause 6A.7.2(c)(4)(i)
98 Final rule, clause 6A.6.6A(a)
99 Final rule, clause 6A.6.6A(a)

contract, or on the efficiency of AEMO's operational enablement of these contracts to meet real-time system security needs, over which the TNSP has limited control or foresight.

This process allows the AER to undertake its review of the efficiency of the proposed prices or expected expenditure under the agreement and the procurement process used by the TNSP to enter into the agreement before the TNSP enters into the contract and makes payments under the agreement, rather than only doing so two years after payments are made under the pass-through provisions. The ability to seek ex-ante AER review aims to level the playing field between capital and operational expenditure in meeting system security needs. To manage the administrative burden on the AER, the review would occur after the RIT-T and tender processes have been completed, just prior to contract execution. The AER view of the efficiency of non-network solutions seeks to partly replicate the certainty provided to TNSPs by contingent project applications for network investments.

The AER is not required (or expected) to provide a determination on every system security network support agreement under these provisions. The AER can determine eligibility criteria or thresholds for contracts that it will consider and make a determination on and specify these in its guidelines.[100] These thresholds could be based on factors like the expected amount of payments under the contract, the length of the contract or other factors the AER determines. Thresholds are included because this type of ex-ante review is more suitable for large contracts, more analogous to significant expenditure on capital projects to which the Contingent Project Application process applies. Applying appropriate thresholds also helps the AER manage its administrative burden of managing this new determination process.

Obtaining a determination on a contract will be voluntary on the part of a TNSP — even if that agreement meets the eligibility criteria and thresholds. The rule allows (but does not require) a TNSP to apply to the AER for a determination if it proposes to enter into a system security network support payment agreement that meets the thresholds.[101]

The AER will be required to publish guidelines setting out its process for making these determinations.[102] These guidelines will include any thresholds or eligibility criteria, the information requirements for applications, the process and timeframe for making determinations, and any other matters the AER considers relevant.

The AER is required to publish the guideline by **1 December 2024**. This allows time for the AER to develop and publish the guideline while ensuring it is in place by the time TNSPs need to enter into contracts to meet the system strength obligations that begin in December 2025. The transmission consultation procedures (in clause 6A.20) do not apply to the development of the guideline.[103]

The final rule also includes a requirement for the AER to take this determination into account in future revenue determinations or pass through determinations (as described in section 4.5.3)[104] but is not binding on the AER's future assessment of these costs once incurred. Nevertheless, it will help provide a level of comfort to TNSPs about the AER's expectations and approach to assessment of expenditure once incurred.

The Commission considers that the optional ex-ante AER review of non-network solutions is in the long-term interests of consumers. We appreciate that this will increase the process costs incurred

100 Final rule, clause 6A.6.6A(e)(2)
101 Final rule, clause 6A.6.6A(a)
102 Final rule, clause 6A.6.6A(e)
103 Final rule, clauses 6A.6.6A(f) and 6A.2.3(g).
104 Final rule, clauses 6A.6.6(e)(13a) and 6A.7.2A(i)(3a)(iii) — together these require the AER to take into account any determination that it has made under new clause 6A.6.6A

by the AER, compared to current arrangements. As the system's reliance on non-network solutions continues increasing, such a capability for the AER to assess the efficiency of TNSP operational procurement ahead of the costs being incurred will likely result in more efficient deployment of resources and a lower-cost system overall for consumers. We acknowledge that the AER will require increased resourcing. However, we consider an annual process will improve the information and experience with undertaking these assessments so that the costs of undertaking such a review, and the likelihood of them being requested, will decrease over time. Therefore, we consider the benefits outweigh the costs of making the change.

4.6 The use of non-network options is changing in the context of the energy transition

4.6.1 The changes in this final rule address issues specific to non-network security costs

As explained in section 4.2.3, non-network security costs are likely to be significant and difficult to forecast. TNSPs have limited control over enablement costs as AEMO will make enablement decisions according to security needs and efficiency and emissions considerations (chapter 6). Although the original contract pricing and terms are within the TNSP's control, these external factors and the wholesale market price at the time of enablement are not controllable by TNSPs — and these factors will materially influence total contract costs over time.

Whilst TNSPs could forecast on an ex ante basis the costs of non-network expenditure through the five yearly determination process and apply to the AER for a revenue allowance, this has generally not occurred in practice. Instead, networks rely on cost recovery for network support agreements via cost pass through arrangements — including for recovery of costs for non-network security contracts.

As a result, network support costs, including costs for non-network security contracts, are currently reimbursed under the network support pass through arrangements and already treated differently to other TNSP and DNSP costs, precisely because they are variable and uncertain.[105] Given they are recovered through pass throughs, they are not subject to the broader incentive-based regulatory regime (including the efficiency benefit sharing scheme or EBSS). If the EBSS applied, any difference between a network support allowance and actual system security costs would incur an EBSS reward or penalty for underspends or overspends against the allowance, even though those underspends or overspends may be largely outside of the TNSP's control. This approach could increase costs to consumers for no benefit. Instead, the AER assesses the efficiency of the cost pass through, which can be regarded as a weaker form of incentive-based regulation.[106]

4.6.2 There may be a need to consider cost recovery arrangements for non-network options more broadly in the context of the energy transition

The Commission considers it important to change TNSP cost recovery arrangements in this final rule so that they are in place in time for TNSPs' current system strength procurement activities, to meet their obligations under the new system strength framework. These changes will be in place for the system security contracts TNSPs will be entering in the next 12 months.

However, the Commission recognises that as a result of the energy transition the management of the power system is getting increasingly complex as thermal generators are being replaced by renewable energy and storage. Historically, TNSPs' forecast expenditure was based on recurring

105 The AER provides guidance to TNSPs on how to prepare a transmission network support pass through application in accordance with the rules.
106 AEMC, Recovery of Network Support Payments — final determination, 31 October 2013, p ii.

capex or opex for a small number of large capex projects. Expenditure on payments to service non-network providers was limited. However, the changing energy landscape, including generation and demand changes, policy and rule reform, and the new system strength framework means that networks are increasingly considering non-network solutions, including contracts with third parties for security and reliability services — e.g. grid-forming batteries, synchronous generators, and other non-network system security or storage providers.

As a result, the issues raised in this final determination regarding non-network security costs also raise questions about the treatment of broader network support costs and arrangements that cover other requirements, including reliability and congestion management.

Given the expected increased use and magnitude of non-network solutions in the context of the energy transition, the Commission considers that there may be a need in future to consider this issue of cost recovery for non-network options more holistically (beyond non-network solutions for security purposes), to ensure there are signals to drive efficient investment in non-network solutions by TNSPs as an efficient alternative to capex.

4.7 The changes to cost recovery promote the long-term interests of consumers.

The Commission considers the revisions to TNSP cost recovery promote the NEO, as they are consistent with the system services objective and assessment criteria. The reasons are summarised below.

4.7.1 The final rule supports the principles of market efficiency

The amendments to the cost-recovery arrangements promote market efficiency during a period in which TNSPs are expected to increase their reliance on non-network solutions to meet power system security needs. The final rule promotes market efficiency by:

- ensuring that all beneficiaries of system security services pay through common transmission charges
- minimising price volatility for consumers by reducing forecasting inaccuracies when compared to the current arrangements
- applying AER oversight of TNSP costs to ensure that TNSPs follow efficient processes with cost-effective outcomes for consumers
- minimising cash flow risks as TNSPs are able to recover their expected costs as they are incurred.

4.7.2 The revisions to TNSP cost recovery have considered implementation costs

The Commission has designed the revisions to TNSP cost recovery arrangements to be as simple to implement and execute as possible. By refining existing approaches — as opposed to having AEMO settle variable payments — the Commission has sought to minimise implementation costs and time.

The Commission recognises the AER's concerns that the change allowing for an optional ex-ante AER approval of non-network solutions procurement processes increases the AER's administrative burden. The Commission has concluded that the costs of the changes are outweighed by the benefits of incentivising a more efficient mix of network and non-network solutions. The final rule also includes sufficient flexibility for the AER to determine at what thresholds TNSPs can apply for ex-ante review, which may also help manage implementation costs.

4.7.3 The Commission considered principles of good regulatory practice

The Commission's final rule has sought to abide by principles of good regulatory practice by placing additional oversight on TNSPs' annual cost projections and contracting approaches to replace the safeguards included as part of the revenue reset process. By doing so, the final rule seeks to minimise the risk that consumers are liable for unjustifiable costs while still managing to resolve the cashflow concerns consistently raised by TNSPs. We consider the changes in the final rule best strikes the balance between significantly reducing the impact of regulatory uncertainty and maintaining AER oversight to deliver efficiency.

5 The rule introduces a new NMAS framework to address security needs arising from the system transition

Box 7: Key points in this chapter

- The Commission has introduced a new NMAS framework for transitional services (the 'transitional services framework'). The objective of the framework is to allow AEMO to procure a new type of NMAS service, with the aim of these services assisting the transition to a low- or zero-emissions power system where AEMO can maintain power system security.
- To achieve this, AEMO can procure two types of services:
  - **Type 1 contracts** can be procured where security services are not able to be procured through an existing framework, to meet an immediate and critical need of the power system.
  - **Type 2 contracts** are to support AEMO in building its understanding and confidence in how it can manage security in a low- or zero-emissions system. AEMO will be able to procure these contracts to trial either *new technologies* or the *new application* of existing technologies to manage power system security in a low- or zero-emissions power system.
- Collectively, the services procured through these contracts are referred to as "transitional services".
- A variety of existing planning and operational frameworks seek to cover and provide for most of the NEM's security needs. However, some security needs are not able to be specifically defined in terms of the services within these frameworks, and therefore not able to be planned for and procured through an explicit framework. To meet these needs, AEMO will now be able to enter contracts for security services referred to as **"type 1 contracts".**
  - These services can only be procured where there is no existing procurement framework and they meet a critical and immediate need of the power system.
  - These contracts can run for a maximum of three years, with this procurement power expiring after five years.
- AEMO can also use this framework to build its understanding and confidence in managing a secure system as we transition by entering into targeted trials through **"type 2 contracts".**
  - These services can only be procured where they are either a new technology or the new application of existing technology (with "new" defined as post 28 March 2024).
  - These contracts can run for a maximum of 10 years, with the entire framework sunsetting after 15 years.
- This framework is modelled on the existing NMAS framework. The costs of these contracts will be recovered from market customers, in line with existing NMAS frameworks including NSCAS.
- While these costs will be recovered from market customers, the Commission considers that these costs will be offset by the benefits of type 1 and type 2 contracts. Type 1 contracts will provide more certainty than directions that critical security needs can be met, and are likely to allow a higher level of low-cost generation to be dispatched. In the longer term, type 2

contracts will provide benefits by supporting AEMO to understand how to transition to a reliance on new, often lower-cost, technologies to keep the system secure.

- The transitional services framework will commence 3 June 2024, but before AEMO can start to procure transitional services, it must publish both the transitional services guideline and a statement of security needs.
- The guideline will outline the factors for how AEMO determines procurement of transitional services and any further relevant procurement requirements. This guideline will also outline how AEMO will consider emissions in its procurement decisions. The guideline must be published by 1 December 2024.
- While the transitional services framework will go live once AEMO publishes this guideline, AEMO will still be required to publish the statement of security needs before it can procure either type 1 or type 2 contracts. This will outline the security need(s) AEMO is procuring to resolve, the expected duration of the need, and AEMO's procurement process. For type 1 contracts, it will also outline why no other procurement framework applies.
- These contracts can then be procured and enabled, by AEMO, once these documents are released (see chapter 6 for more details on enablement).
- AEMO will also publish a transitional services annual report that will describe the type and costs of services procured through the framework, and how AEMO's procurement decisions are contributing to emissions reduction targets.

How we have incorporated stakeholder input and updated these arrangements since the Update paper and the second directions paper

- The framework has been updated following stakeholder feedback to two papers published in late 2023.
- In response to the second directions paper, most stakeholders broadly accepted the need for an additional framework to fill a gap in existing security frameworks. However, there was concern about the design of the proposed transitional framework, particularly the 10-year sunset period and lack of incentives for AEMO to use the trial aspect of the framework.
- Stakeholders also supported more dedicated arrangements to progress 'unbundled' security services, particularly by requiring AEMO to define services procured through the framework.
- Following stakeholder feedback and further analysis, we released an update paper in December 2023 that revised the design of the transitional services framework to address key areas of feedback in response to the directions paper — by introducing two different contract types that reflect the dual aspects of the framework.
- Stakeholders mostly supported the changes we proposed to the framework, with some suggesting further refinements were needed. Following this feedback, we have:
  - reduced the expiry for AEMO entering type 1 contracts
  - extended the sunset period for type 2 contracts
  - clarified the eligibility criteria for type 2 contracts
  - required AEMO to consult with the Panel on its plan for transitional service procurement, including its technical priorities for type 2 contracts.
- These changes will support AEMO to efficiently and transparently maintain a secure power system now and as we transition.

This chapter covers:

- Section 5.1 — The Commission has introduced the 'transitional services framework' to support power system security
- Section 5.2 — The framework meets two key needs of the transition: meeting current security gaps arising due to the transition; and building understanding of how we can use new resources maintain security
- Section 5.3 — Stakeholder feedback has shaped the final determination
- Section 5.4 — The new rule introduces two contract types that allow AEMO to procure services that meet security needs of the power system
- Section 5.5 — AEMO must publish the transitional services guideline and a statement of security needs before it can procure transitional services
- Section 5.6 — AEMO must set out its strategy for procuring transitional services and participants can request to be considered
- Section 5.7 — AEMO will need to consider emissions in its procurement decisions and provide transparency on emissions outcomes
- Section 5.8 — Transparency arrangements will increase information provision on how AEMO currently maintains system security and will also shed light on the emission considerations of transitional services
- Section 5.9 — The framework will be used as a transitional tool, with a set expiry date
- Section 5.10 — The Commission considers that the transitional services framework aligns with, and promotes, the assessment criteria.

5.1 The Commission has introduced the 'transitional services framework' to support power system security

The Commission has introduced a new NMAS framework for transitional services (the 'transitional services framework'). The objective of the framework is to allow AEMO to procure services (see below), with the aim to move to a low- or zero-emissions power system where AEMO can maintain power system security.[107]

To achieve this, AEMO can procure two types of transitional services:

Type 1 contracts can be procured where security services are not able to be procured through an existing framework (discussed more in section 5.4.1).[108] A variety of existing planning and operational frameworks seek to cover and provide for most of the NEM's security needs. However, some security needs are not specifically defined in terms of these services, and therefore not able to be planned for and procured through an explicit framework.

Type 2 contracts are to support AEMO in building its understanding and confidence in how it can manage security in a low- or zero-emissions system (discussed more in section 5.9.2). AEMO could use this framework to trial either *new technologies* or the *new application* of existing technologies to manage power system security in a low- or zero-emissions power system.[109] These trials will support AEMO in gaining operational experience in how it intends to manage system security when existing, emissions-intensive resources retire.

107 Final rule, clause 3.11.11(a).
108 Final rule, clause 3.11.11(b)(1).
109 Final rule, clause 3.11.11(b)(2).

Collectively, the services procured through these contracts are referred to as "transitional services".

5.2 The framework meets two key needs of the transition: meeting current security gaps arising due to the transition; and building understanding of how we can use new resources maintain security

5.2.1 Type 1 contracts address the need for a more transparent and targeted solution than directions to manage security in the short-term

While current frameworks already cover most security needs, we recognise there is a range of known unknowns that are not captured in existing security frameworks. Given that these security requirements do not relate to services that can be currently defined (e.g. inertia or system strength), they are not captured and so this results in AEMO directing for units to be online in order to manage system security.

For example, in South Australia, AEMO has identified a need for a minimum number of synchronous units online to meet operational requirements.[110] This is to keep the system operating within security parameters and risk tolerances it considers acceptable, while it tests whether it can transition confidently to fewer synchronous units online.

We are already seeing this arise in other jurisdictions. Earlier this year, AEMO published advice outlining that seven large synchronous units are requirements to keep NSW in a secure operating state, and six for a satisfactory operating state.[111]Following the retirement of Eraring in 2025, all but one of the large synchronous units in NSW will have to be continuously online, which may lead to a rise in system security directions.[112]

In order to maintain a secure operating envelope, AEMO currently directs required units online (if these units are not already dispatched to be online). There are no alternatives for AEMO aside from this. This issue becomes exacerbated in South Australia given there are so few assets that can meet the unit configurations, which has meant that units increasingly need to be directed.

Because of this, the number of security directions in South Australia has risen significantly since 2016 (although has declined more recently as AEMO becomes more comfortable with fewer synchronous units online at any one time and synchronous condensers and fly wheels have been installed). Reliance on directions causes a lack of certainty and transparency for market participants, potential wear and tear on equipment and increases the risk on the security of the system because they are issued as a last resort, rather than a proactive mechanism. Directions also do not solve the issue and we are already seeing a similar issue arise in NSW (as discussed above).

The Commission does not consider that directions should be relied on to maintain system security — they should be a last-resort mechanism but not the primary tool. Therefore, there is a need to put in place frameworks that allow AEMO to procure for these known unit configurations to avoid directions while AEMO develops a better understanding of how to maintain security through the transition.

110 See: https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/sa-transition-to-fewer-synch-gen-grid-reference.pdf.

111 See: https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/2024/transfer-limit-advice—-system-strength-nsw.pdf.

112 See: https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/2024/transfer-limit-advice—-system-strength-nsw.pdf.

Type 1 contracts in the transitional services framework will allow AEMO to procure security services for specific power system needs, for example, to help contribute and form the unit configurations that are being used to manage the power system. These services — that cannot be specifically and individually defined in the same way that inertia and system strength can be — can be procured from assets that make up the unit configurations. This will allow such resources to be used that AEMO knows are needed to maintain power system security, rather than relying on directions. It also allows for more transparency and certainty about the arrangements that are being used.

This new framework will be a simple yet effective approach to manage technical risks while helping us transition to a power system with fewer synchronous units online.

5.2.2 Type 2 contracts address the need to move to reliance on new technologies for system security

As described above, AEMO currently relies on known unit (or asset) configurations involving synchronous machines to ensure the system is secure. However, this is not an enduring solution, and with the energy transition underway, the NEM is at the leading edge of global thinking about how to run large, interconnected systems with significant amounts of inverter-based resources (IBR).

There is a broad range of technical challenges for operating a grid with high penetrations of variable renewable energy (VRE) and IBR. Some of these technical challenges are better understood than others. As we transition to higher amounts of IBR and fewer synchronous units online, the technical risks of whether new technologies will provide an adequate level of system security increase.

Developing the ability and confidence to meet security needs using new technologies and in new operating conditions will involve a process of progressive and iterative testing. In the Engineering Roadmap to 100% Renewables, AEMO outlines how it envisages transitioning to 100% renewables NEM-wide by progressing through 'major hold points'. In this process, the power system's operating limits are expanded through successive milestones, through an iterative process of analysis, testing and assessment, and formalising the new operating envelope.

The transitional services framework recognises the need to address potential transitional needs across various jurisdictions within the NEM. This framework is designed to enable AEMO to trial and assess new technologies, aiming to enhance its understanding of security management. Type 2 contracts in the transitional services framework will allow AEMO to trial new technologies with the purpose of understanding how it can manage security without relying on synchronous units. AEMO will be able to procure transitional services from a broad range of technologies (known as 'transitional services providers') such as inverter-based resources. These trials will serve to evaluate the capabilities of these resources and contribute to the ongoing enhancement of security measures.

5.2.3 The framework is designed as a transitionary measure to meet a temporary problem

The NMAS framework is deliberately designed as a *transitionary* measure. System security is becoming more challenging to manage as we transition. Hopefully, this will only be the case for a transitional period, as in the future we will likely have sufficient resources and services to provide system security and these will be plentiful as new technologies emerge. However, during the transition, system security may be scarce as synchronous plant retires, and as we learn about, and

test, the capabilities of new technology.[113] Given the importance of system security to the integrity of the grid, we consider it necessary to give AEMO an additional tool to manage this.

While AEMO's understanding of the power system is evolving, it is essential that the current arrangements are enhanced to support the most efficient and transparent procurement of these system needs. This framework is designed to adapt as the needs of the power system, and our understanding of it, develops in the longer term. This ensures we are delivering the best approach based on the information that we know today, while also preparing us to meet the system needs of the future.

5.2.4 The rule change request identified the need to value security services that are currently being acquired via directions

The rule change requests[114]identified that the changing generation mix and increase in inverter-based resources have led to a scarcity of security services like inertia and system strength. In recent years, this has led to an increase in directions to keep synchronous units online to provide these security services.

As discussed in section 5.2.1, AEMO currently uses unit configurations and directions to meet security gaps that arise operationally which cannot be met through other tools.

The introduction of type 1 contracts addresses a critical issue that was raised by the rule change requests. It provides a solution for procuring services without the need for directions. These contracts offer flexibility in the procurement process and allow AEMO to procure security services to meet specific power system requirements e.g. to help contribute and form the unit configurations that are being used to manage the power system. The rule change requests also focused on procuring these services but suggested different approaches, either through a day-ahead mechanism (as proposed by Delta Electricity) or a co-optimised valuation of security constraints (as proposed by Hydro Tasmania).[115]

While the rule change requests did not outline specific mechanisms for trialling new sources of security services, the Commission recognises the inherent need to operate the system without the retiring synchronous assets. Consequently, trials are seen as crucial in bridging the gap between current knowledge and operational experience and the future where the system can confidently and securely operate with a diverse range of security sources compared to those relied upon today. Type 2 contracts aim to pave the way for a smoother transition to a low- or zero-emissions power system and ensure the system's security in the absence of traditional assets.

Together, these contracts not only resolve the critical issues highlighted in the rule change request, but also provide the flexibility needed for immediate power system requirements while concurrently paving the way for a secure transition to a low- or zero-emissions future.

5.3 Stakeholder feedback has shaped the final determination

As discussed in chapter 1, we have completed five rounds of formal consultation throughout the course of this rule change. Throughout each of these consultation phases, we have collected valuable feedback from a broad range of stakeholders. This iterative engagement has been instrumental in shaping and refining the transitional services framework. The insights gleaned from these consultations have played a pivotal role in guiding the nuanced development of the

113 Discussed further in chapter 4 of the directions paper.

114 Rule change requests to the AEMC: Hydro Tasmania, p 3; Delta Electricity, p 3.

115 See appendix B for more detail on the rule change requests.

framework, ensuring that it aligns effectively with the needs of the energy market as we transition, and reflects the insights provided by stakeholders. Prior stakeholder views and our thoughts can be found in the earlier papers.

5.3.1 We sought feedback through a second directions paper

In August 2023, we sought feedback on a proposed new transitional services NMAS framework through our second directions paper. We proposed AEMO could use the framework to procure services not covered by other planning timeframe frameworks and also conduct trials of new technology to manage security. Both would be subject to clear transparency requirements. The directions paper proposed that contracts would be a maximum of three years, and the transitional services framework would sunset after 10 years.

Most stakeholders recognised the need for the framework.[116] For example, the AEC commented:[117]

> The AEC supports the need for an additional framework to address the current gap in the existing essential system services (ESS) and power system security frameworks as the energy transition accelerates.

AEMO also considered:[118]

> This is an important step in recognising that while current frameworks are designed to cover specific security needs, not all security needs can be currently defined and captured in long-term planning frameworks.

However, there was mixed feedback on design elements of the framework, including:

- Some thought the framework should better promote the secure decarbonisation of the electricity system and facilitate the unbundling of security services.[119]
- Some strongly considered that there should be clear incentives on AEMO to use the trialling component of the framework, and greater transparency on its outcomes, as this could help deploy new technologies that may be crucial in operating the system with high penetrations of renewable energy.[120]
- Some thought a three year contracting period was appropriate[121]
- Some thought a three year contracting period was too short to incentivise new investment, and there should be a separate type of contract for trials with a longer duration. Stakeholders proposed dividing the framework into two contract types with two distinct objectives to achieve this.[122]
- Many considered a sunset period that allowed procurement of existing technology for 10 years was too long and an impediment to the continued unbundling of security services.[123] In contrast, AEMO's submission argued that the need for the transitional arrangements may extend beyond the proposed 10-year sunset period.[124]

116 Submissions to the second directions paper: AEC, p 1; CS Energy, p 2; Origin Energy, p 1; Snowy Hydro, p 1; AEMO, p 2; EnergyAustralia, p 1; Iberdrola, p 1; AGL, p 1.

117 AEC submission to the second directions paper, p 1.

118 AEMO submission to the second directions paper, p 2.

119 Submissions to the second directions paper, EnergyAustralia, pp 1-2; Ergon Energy Retail, p 2; AEC, p 4; Snowy Hydro, p 4; Stanwell, p 3; CS Energy, p 2; CEC, pp 1-2; Delta, p 1; Iberdrola, pp 2-3; AGL, pp 2-3.

120 Submissions to the second directions paper: CS Energy, p 3; Iberdrola, p 4; GPE, p 3; CEC, p 2.

121 Submissions to the second directions paper: Snowy Hydro, p 2; CS Energy, p 6.

122 Submissions to the second directions paper: Iberdrola, p 2; CEC, p 3; AEMO, p 2; CS Energy, p 2; EnergyAustralia, p 1.

123 Submissions to the second directions paper: EnergyAustralia, p 6; Alinta Energy, p 2; Ergon Energy, p 2; Snowy Hydro, p 4; Origin, p 2; EUAA, p 1; CEC, p 11; AEC, p 4; Delta, p 2; Iberdrola, p 2.

5.3.2 We proposed further amendments in an update paper

Following stakeholder feedback, we released an update paper in December 2023 to seek further feedback on this proposed framework. The paper suggested revising the design of the transitional services framework to address key areas of feedback in response to the directions paper — by introducing two different contract types that reflect the dual aspects of the framework.

The revisions to the transitional services framework proposed introducing two contract types, each with a specific objective, expiry/sunset period, and contract length. For **type 1** contracts, AEMO would be able to enter into contracts to meet critical and immediate security needs of the power system. These contracts would be for a maximum of three years. AEMO's procurement power for these contracts would expire after five years. AEMO would not be able to enter into any type 1 contract after the five-year expiry. However, any multi-year contract AEMO entered into before the five years could continue past the expiry, for a maximum of three years.

For **type 2** contracts, AEMO would be able to enter into contracts to trial new technologies to understand and test how it can manage security in a low- or zero-emissions power system. These contracts would be for a maximum of 10 years. The transitional services framework would sunset after 10 years. AEMO would not be able to enter into type 2 contracts that extended beyond the sunset period. Unlike the type 1 contracts, this sunset would be a hard stop and no multi-year contracts could extend past this date.

In addition, the framework proposed that AEMO would be required to consider emissions reduction in its procurement decisions, which it would need to weigh against both the cost of these contracts and the security needs of the power system. We also proposed additional reporting obligations on the trial aspect of the framework, to promote transparency and industry-wide learnings on the security needs of the power system as we transition.

Stakeholder feedback on these refinements has shaped the final determination. This feedback, as well as how the final rule operates, is outlined below.

5.4 The new rule introduces two contract types that allow AEMO to procure services that meet security needs of the power system

5.4.1 AEMO can enter into type 1 contracts to meet critical and immediate system needs that are not met by other security frameworks

How type 1 contracts operate

Type 1 contracts are a specific contract type under the transitional services framework. These contracts can be used to meet short-term needs of the system that are already arising, and may continue to emerge as we transition.[125]

These contracts have two **eligibility criteria:**[126]

1. the services are required for power system security, and
2. these services cannot otherwise be provided by either an existing NMAS or MAS framework (e.g. inertia network service, a system strength service, primary frequency response, NSCAS, FCAS or any other NMAS/MAS).

124 AEMO submission to the second directions paper, p 8.
125 Final rule, clause 3.11.11(b)(1).
126 Final rule, clause 3.11.11(b)(1)

Importantly, type 1 contracts can only be used to meet security needs of the power system. Existing frameworks, including the RERT, are already in place to manage the NEM's reliability needs.

Type 1 contracts have a maximum duration of three years[127] and AEMO's ability to procure type 1 contracts expires after five years, on 1 December 2029.[128] Type 1 contracts will not be able to extend past this date. Section 5.9.1 explains these arrangements in more detail.

The benefits of type 1 contracts

In the **immediate term**, type 1 contracts procured through the transitional services framework will be a more efficient tool than directions for managing the security of the system. They will provide AEMO with a mechanism to help manage the system through periods of high renewable penetration and low levels of synchronous generation, without resorting to interventions as a primary tool.

This means that AEMO must only procure security services where there is a gap in existing security procurement frameworks and these services are crucial to maintaining a secure power system. As discussed in section 5.2.3 and the directions paper, while current frameworks already cover most security needs, we recognise there is a range of known unknowns that are not captured in existing frameworks.

Type 1 contracts will allow AEMO to procure security services for these specific power system needs. While other frameworks procure for individual services, the transitional services framework will allow procurement of more general power system requirements, for example, the online presence of a generator in a unit configuration under specified conditions. This allows such resources to be used that AEMO knows are needed to maintain power system security, rather than relying on directions. The transitional services framework moves these services away from being acquired only via directions to a more stable and predictable framework that values and recognises their function in supporting the transition.

Type 1 contracts are a simple yet effective approach to manage technical risks while we transition to a power system with fewer synchronous units online. They are also designed as a transitional tool to meet a temporary need. They are not proposed as an enduring solution, with the ability to procure type 1 contracts expiring after five years.[129] In the transition plan for system security, AEMO will also need to describe the work it is doing to move away from needing to rely on type 1 contracts to manage system security (see chapter 8 for more detail on the transition plan).

How we have incorporated stakeholder feedback in the design of Type 1 contracts

Stakeholders recognised that type 1 contracts are a better tool than directions for managing system security.[130] For example, the AEC noted:[131]

> Type 1 contracts should be procured through the transitional services framework rather than directions for managing the security of the System for the next three years.

Snowy Hydro similarly considered:[132]

127 Final rule, clause 3.11.11(m)(1)(i)
128 Final rule, clause 3.11.11(m)(1)(ii).
129 Final rule, clause 3.11.11(m)(1)(ii).
130 Submissions to the update paper: AEC, p. 2; Snowy Hydro, p 2.
131 AEC submission to the update paper, p 2.
132 Submission to the update paper, Snowy Hydro p 1.

> It is sensible for type 1 contracts, for up to three year[s], to be procured through the transitional services framework rather than directions for managing the security of the system as it would provide AEMO with a mechanism to help manage the system through periods of high renewable penetration and low levels of synchronous generation, without resorting to interventions as a primary tool. It is however important that these contracts are designed as a transitional tool to meet a temporary need with a longer term need for markets.

However, some stakeholders considered the AEMC clarify the use of type 1 contracts, with the AEC stating:[133]

> The new rules in the final determination associated with this rule change must contain clear provisions that AEMO must not include in any ESS bundle any service, or proposed alternative, which can already be provided by an existing market service.

The Commission affirms, as noted above, that the transitional services framework cannot be used to procure services in cases where there is an existing framework or market service, such as the inertia, NSCAS, or system strength frameworks, or the frequency market.[134]

5.4.2 AEMO can enter into type 2 contracts to trial new and emerging technologies that could play a critical role in managing the security of the power system

How type 2 contracts operate

AEMO can enter into type 2 contracts to trial either *new* technologies or the *new application* of existing technologies to manage power system security in a low- or zero-emissions power system.[135] This will allow AEMO to gain operational experience with, and develop a deeper understanding of security services provided by, technologies that have not been used to manage system security to date but could do so in a low- or zero-emissions power system.

To be **eligible,** these contracts need to involve a new method of delivering power system security. The application of the technology must not have been used to manage system security before 28 March 2024 (the date the final determination was published)[136] However, this does not preclude assets that have provided security prior to this date from being able to be procured under type 2 contracts, if they are providing security services in a way that is distinct from their previous services.

The Commission has intentionally not specified what technology types are eligible under type 2 contracts. This is to ensure flexibility to enable AEMO to use these contracts to trial emerging technologies and novel applications of existing technologies, some of which may not be considered with today's engineering knowledge. We expect that the resources procured will be those that will be prevalent and operate in a low- or zero-emissions power system.

Type 2 contracts have a maximum duration of 10 years[137] and must not extend past 1 December 2039.[138] The entire transitional services framework sunsets after 15 years.[139] section 5.9.2 explains these arrangements in more detail.

133 AEC submission to the update paper, p 4.
134 Final rule, clause 3.11.11(b)(1).
135 Final rule, clause 3.11.11(b)(2).
136 Final rule, clause 3.11.11(b)(2).
137 Final rule, clause 3.11.11(m)(2)(i).
138 Final rule, clause 3.11.11(m)(2)(ii).
139 Final rule, clause 11.168.5

The benefits of type 2 contracts

Type 2 contracts are an innovative solution to a current and likely temporary problem. AEMO requires operational experience to stress test engineering theories and assumptions. Type 2 contracts will facilitate AEMO in gaining this experience by introducing a controlled, targeted, and flexible approach to trialling new technologies.

Type 2 contracts will allow AEMO to trial new technologies at scale, as it works through system hold points and becomes more comfortable with new operational states. They also provide an opportunity to identify any emergent phenomena that could occur in real-life operation that may not be predicted through theoretical testing.

This will introduce a targeted and flexible approach to trialling new technologies to support a smooth transition to a low- or zero- emissions system. AEMO will also be required to report on the outcomes of the trials it is progressing in the transition plan for system security and how they are contributing to long-term security management (see chapter 8 for more detail on the transition plan). While we recognise this is also meeting a transitional need, type 2 contracts may need longer procurement windows to incentivise the right plant to enter the system and ensure trials can be run over multiple years, if required, to gain a depth of engineering knowledge.

How we have incorporated stakeholder feedback in the design of Type 2 contracts

Stakeholders generally supported the development of type 2 contracts.[140] For example, AEMO considered[141]

> While AEMO is fully supportive that it should not use transitional services as a substitute for other frameworks, in the context of Type 2 contracts, AEMO can see value in being able to enter Type 2 contracts for services that are currently defined or could be provided by other frameworks.

However, several stakeholders considered the AEMC needs to provide more clarity on how type 2 contracts can be used and/or what is eligible under these contracts.[142] CS Energy considered:[143]

> Type 2 contracts could provide a means to trial synthetic inertia in an operational timeframe however, it is unclear that this service is eligible under the proposed framework given proposed planning frameworks will be available.

EnergyAustralia similarly noted:[144]

> EnergyAustralia is supportive of type 2 contracts, however as suggested above, eligibility criteria should be codified in the NER and suitable incentives should be placed on AEMO to actively engage and trial new technologies.

As noted above, the Commission has clarified in the final rule the eligibility criteria for both type 1 and type 2 contracts.

140 Submissions to the update paper: CS Energy, p 3; Snowy Hydro, p 2; AEMO, p 3; EnergyAustralia, p 2.
141 AEMO submission to the update paper p 3.
142 Submissions to the update paper: CS Energy, p 3; AEMO, p 3; EnergyAustralia, p 2.
143 CS Energy submission to the update paper, p 3.
144 EnergyAustralia submission to the update paper, p 2.

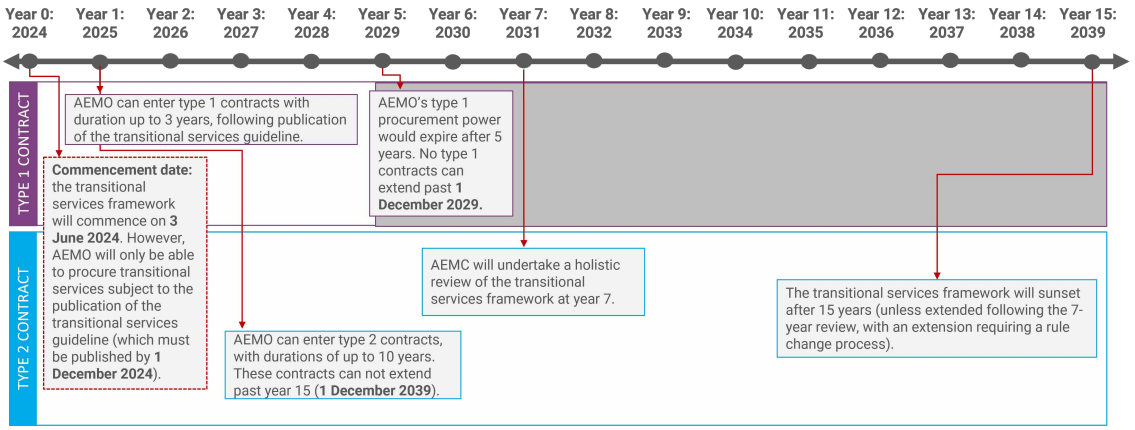
5.5 AEMO must publish the transitional services guideline and a statement of security needs before it can procure transitional services

5.5.1 The transitional services framework commences 3 June 2024

The transitional services framework commences 3 June 2024 and AEMO must publish the transitional services guideline before 1 December 2024. AEMO will be able to procure transitional services after it publishes the guideline (and a statement of security needs for each procurement exercise as outlined below). This means:

The timeline of the transitional services framework is outlined below.

Figure 5.1: Timeline of transitional services



- AEMO can procure transitional services after **3 June 2024,** subject to the publication of the transitional services guideline[145]
- AEMO must publish the transitional services guideline by **1 December 2024.**[146]

5.5.2 The transitional services guideline must outline a competitive process

To provide transparency on the procurement processes for type 1 and type 2 contracts, AEMO must publish a transitional services guideline. The transitional services guideline will provide clarity to the industry and potential transitional service providers on how AEMO intends to achieve the transitional services procurement objective.[147] The transitional services procurement objective includes reasonable endeavours when acquiring transitional services for AEMO to:[148]

1. contribute to achieving emissions reductions targets[149]
2. achieve and maintain power system security[150]
3. minimise the costs of transitional services to end users.[151]

145 Final rule, clauses 11.168.1, 11.168.3(b) and 3.11.11(d).
146 Final rule, clause 11.168.3(a).
147 Final rule, clause 3.11.11(f).
148 Final rule, clause 3.11.11(c).
149 Final rule, clause 3.11.11(c)(1).
150 Final rule, clause 3.11.11(c)(2).
151 Final rule, clause 3.11.11(c)(3).

It must also outline the process for which AEMO will procure transitional services. AEMO is required to adhere to a competitive process, where possible, and to outline this competitive process in the transitional services guidelines.[152] The Commission emphasises the importance of achieving a competitive process whenever feasible. Prioritising competitiveness is crucial in ensuring a fair and dynamic environment, contributing to a market that encourages diverse participation and enhances efficient outcomes in the interests of consumers.

However, recognising the dynamic nature of the transition, the final rule also allows AEMO the flexibility to opt for alternative processes when implementing a competitive approach is deemed impracticable.[153] This is because it is likely that there will be a shallow market to start with for the procurement of these services, particularly in relation to type 1 contracts, where the need may be for specific assets that form part of unit configurations while transitioning to fewer synchronous units.

For example, in South Australia, there are just two units that AEMO has identified that it needs online to maintain power system security.[154] Because of this, the framework allows for procurement without a competitive tender and for AEMO to determine the appropriate procurement process. In the transitional services guideline, AEMO must include guidance on the factors for how AEMO determines the appropriate process (for example, how much competition exists).[155] Where competition does not exist, the guideline must also outline the process AEMO will follow to negotiate the provision of transitional services,[156] and the process for a transitional service provider to contact AEMO to offer transitional services without a competitive tender process (which AEMO is not obliged to accept).[157]

The transitional services guideline must also include any further relevant procurement requirements of processes (for example, requirements for information, equipment testing, requirements for NSPs or other Registered Participants to identify and resolve issues relating to the provision of the service).[158]

The preparation of the guideline and any major updates will be subject to the rules consultation procedure, ensuring stakeholder feedback is taken into account in its development.[159]

5.5.3 Before AEMO can procure transitional services it must publish a statement of security needs

Before AEMO through the transitional services framework, it is first required to publish a statement indicating how the transitional services satisfy the transitional services objective — that is, how they contribute to maintaining a secure power system in the transition to a low- or zero-emissions power system.[160] This statement must also outline the intended procurement process and AEMO's reasons for choosing that process. If AEMO proposes to use direct tender, it would need to explain this in the statement and justify its reasoning for direct tendering.[161]

For type 1 contracts, the statement must also include:[162]

152 Final rule, clause 3.11.11(f)(1).
153 Final rule, clause 3.11.11(f)(2).
154 See: https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/congestion-information-resource/related-resources/operation-of-davenport-and-robertstown-synchronous-condensers.
155 Final rule, clause 3.11.11(f)(2).
156 Final rule, clause 3.11.11(f)(4)
157 Final rule, clause 3.11.11(f)(5).
158 Final rule, clause 3.11.11(f)(6).
159 Final rule, clause 3.11.11(e).
160 Final rule, clause 3.11.12(a)(1).
161 Final rule, clause 3.11.12(a)(3).
162 Final rule, clause 3.11.12(a)(2).

- the security need
- the expected duration of the security need
- why no other long-term procurement framework applies (for example, why system strength, inertia, NSCAS, FCAS and other relevant frameworks are not able to solve the need).

The Commission considers the statement of security needs provides industry insight into, and better understanding of, security needs as the system evolves. It also provides assurance that type 1 contracts are only being used where there is not a more specific framework for a service to meet security needs.

5.5.4 AEMO needs to consider emissions in its procurement decision

The transitional services framework incorporates emissions reduction considerations.[163] As proposed in the update paper, we consider it appropriate to recognise emissions reduction in the framework given that it directly relates to the energy transition and the sourcing of security services from zero-emissions sources. This also follows the new emissions reduction component of the NEO, as well as stakeholder feedback to the directions paper that the framework should prioritise low- or zero-emission technologies. There are two primary ways emissions are considered: through a requirement for AEMO to consider emissions in its procurement decisions (see section 5.7) and through the transparency provided by the transitional services annual report (see section 5.8).

5.6 AEMO must set out its strategy for procuring transitional services and participants can request to be considered

AEMO must set out its strategy for procuring transitional services in the transition plan for system security. This must cover at least a two-year period and include the number of contracts AEMO is intending to procure under each contract type.[164] For type 2, this must also include AEMO's technical priorities for these contracts, which could include the concepts, technical services, or particular technology capabilities it is investigating.[165] The Reliability Panel will then have the opportunity to note comments, raise questions or provide targeted questions on AEMO's strategy and priorities through its consultation on the transition plan (see chapter 8 for more detail on the transition plan).[166]

In addition, participants can request to be considered under both contract types. Participants can submit offers to AEMO to set up a contract through the transitional services framework.[167] Similarly, where participants meet both the eligibility criteria of type 2 contracts and the priorities AEMO has outlined, they can request to be procured and trialled through the transitional services framework.[168] If AEMO does not determine that the participant's services can be procured under the proposed framework, AEMO must outline its reasoning why in the transitional services annual report.[169] Similarly, where AEMO considers a participant meets the eligibility criteria of type 1 or type 2 contracts, AEMO can contact the participant to negotiate provision of services through the transitional services framework.[170]

163 Final rule, clause 3.11.11(c)(1).
164 Final rule, clause 5.20.8(c)(4).
165 Final rule, clause 5.20.8(c)(8).
166 Final rule, clause 5.20.8(d).
167 Final rule, clause 3.11.11(f)(5).
168 Final rule, clause 3.11.11(k)
169 Final rule, clause 3.11.12(b)(5).
170 Final rule, clause 3.11.11(f)(4).

As noted in section 5.4.1 and section 5.4.2, there was strong stakeholder feedback that the AEMC should implement an obligation on AEMO to enter into type 2 contracts.[171] These stakeholders considered that AEMO would prioritise the procurement and use of type 1 contracts, particularly given the complexity of the transition and likely near-term costs of entering into type 2 contracts.[172] To avoid this, these stakeholders considered AEMO should be given a clear target to enter into type 2 contracts, for example, a target set in consultation with the Panel, a target linked to the ISP, or a minimum requirement for type 2 contracts each year.[173]

Conversely, AEMO considered:[174]

> The optional design of this framework is an important feature as it ensures neither AEMO nor service providers are forced into entering an agreement. This makes the framework more dynamic, robust and allows AEMO to factor costs into any decision as to whether to enter a contract or not.

The Commission recognises these concerns from stakeholders and has considered the best approach to ensure consistency, clarity and flexibility when procuring type 2 contracts. We consider requiring AEMO to engage with the Panel on its strategy and priorities for type 2 contracts will provide transparency and clarity to the industry on how AEMO is looking to manage long-term security.

We consider that having a fixed, rules-based obligation or target for type 2 contracts could result in inefficient procurement, by putting AEMO in a position where it is required to enter into trials even where they are not valuable to the industry, in order to comply with the rules. These costs would ultimately be borne by consumers. The approach described above provides more assurance that these trials will be targeted and efficient in meeting long-term security needs, but also provides accountability by requiring AEMO to provide transparency on its strategy and priorities, and allowing the Panel to provide commentary on these.

5.6.1 Costs will be recovered across all market customers

All costs for transitional services will be recovered in line with the current NSCAS provisions, as proposed in the directions paper and the update paper.[175] This will allow AEMO to recover the costs of transitional services contracts across all market customers, with AEMO having the ability to specify regional beneficiaries, if appropriate.

While these costs will be recovered from market customers, the Commission considers that these costs will be offset by the benefits of type 1 and type 2 contracts. Type 1 contracts will provide more certainty than directions that critical security needs can be met, and are likely to allow a higher level of low-cost generation to be dispatched. In the longer term, type 2 contracts will provide benefits by supporting AEMO to understand how to transition to a reliance on new, often lower-cost, technologies to keep the system secure.

5.6.2 AEMO will be required to consider whether costs are reasonable

We considered whether ongoing oversight arrangements of the framework's total costs would be warranted, however we ultimately concluded that the oversight provided by the AEMC's seven-year

171 Submissions to the update paper: AEC, p 3; CS Energy, p 4; EnergyAustralia, p 2; Iberdrola, p 3.
172 Submissions to the update paper: CS Energy, pp 2-5; Iberdrola, p 4.
173 Submissions to the update paper: CS Energy, p 5; Iberdrola, p 4; EnergyAustralia, p 2.
174 AEMO submission to the update paper, p 2.
175 Final rule, clause 3.15.6A.

review (see section 5.9.3) and transparency provided by regular reporting (see section 5.8) is sufficient. The Reliability Panel may also wish to consider reporting on this in its Annual Market Performance Review (AMPR) report.

However, the final rule includes provisions to contain costs to a reasonable level within individual procurement exercises. As outlined above, it is likely there will be few eligible providers for the transitional services framework in the near term as the system transitions to fewer synchronous units online. This may create a risk that AEMO would be unable to negotiate costs as potential providers may have low competition and therefore significant leverage.

In light of this, where there is a lack of competition in a procurement process or where a direct tender has been conducted, AEMO will be required to minimise costs as far as practicable while considering appropriate remuneration when deciding whether to enter transitional service agreements.[176] The Commission expects AEMO to take into account the following factors when determining appropriate remuneration:

- AEMO's understanding of costs to the provider, profit margins and opportunity costs
- the cost of using directions for the service — which may indicate a lower bound for reasonable costs
- the costs of alternative infrastructure that could provide similar functions when AEMO has confirmed its ability to keep the system secure — for example, synchronous condensers (which may indicate an upper bound for a reasonableness test).

We consider this approach balances costs with flexibility, aiming to reduce risks of high costs while also being able to adapt to the particular services being procured.

In the update paper, the Commission proposed that service providers would be able to engage an independent expert to determine fair pricing in the event that AEMO and the provider are unable to reach an agreement on pricing for the service. However, on further analysis and review, we have removed this ability from the final determination. We consider it would be administratively burdensome and complex to implement, with minimal benefit to either AEMO, the participant, or the wider industry. Participants are not obliged to enter into a contract under the transitional services framework. If AEMO and the provider are unable to reach an agreement on price, neither party is required to enter into the contract. If AEMO still requires these services to secure the power system, it can direct the participant online. At this time, the participant can engage an independent expert under the existing NER arrangements, to determine a fair price.[177]

5.7 AEMO will need to consider emissions in its procurement decisions and provide transparency on emissions outcomes

The final rule will require AEMO to consider emissions reductions in its assessment of contract options for both type 1 and type 2 contracts, to ensure the framework complements government emissions reduction targets.[178]

AEMO will set out in the transitional services guideline how it intends to weigh emissions reductions against both the cost of these contracts to consumers and the security needs of the power system.[179] We consider it is best for AEMO to be able to balance security, cost, and emissions reductions on a case-by-case basis when comparing procurement options (not in real

176 Final rule, clause 3.11.11(h).
177 NER clause 3.12.3.
178 Final rule, clause 3.11.11(c)(1).
179 Final rule, clauses 3.11.11(c) and 3.11.11(f)(3).

time dispatch as discussed in the chapter 6 which outlines enablement arrangements), noting that under the NEL AEMO is required to consider the government emissions reduction targets set out in the targets statement.[180]

AEMO could choose to either take a more quantitative, prescriptive approach to considering emissions or a qualitative approach, for example:

- AEMO could decide that in situations where two contracts both meet security requirements and are the same cost, it would choose the lower emissions option.
- AEMO could choose to use the value of emissions reduction and estimate the emissions reductions from each option.

While this would extend to type 2 contracts, we expect that most type 2 contracts will be procured from low- or zero-emission technologies. This could mean that procurement options for these trials are less differentiated by their emissions impacts.

In response to the update paper, stakeholders supported a requirement for AEMO to consider emissions in its procurement decisions.[181] EnergyAustralia noted:[182]

> We support the other design updates, including the requirement on AEMO to consider an emissions objective in its contract decision-making, and to report on outcomes of its trials.

However, both Ergon Energy Retail and Origin Energy considered that the AEMC should provide further details on how AEMO should consider emissions.

While we recognise this feedback, we consider that providing a more flexible approach for AEMO to consider emissions in its procurement decisions is appropriate for the framework's objective. Achieving a low- or zero-emissions power system is beyond the scope of this framework alone, and the transitional services framework is designed to complement, rather than lead, industry progress towards government emissions and renewable targets for the energy system. We are therefore not setting specific targets for procurement from zero-emission resources through this framework, particularly given uncertainty over how quickly new technology will contribute to security provision.

Moreover, the maintenance of system security and reliability is a crucial component of the progressive replacement of thermal generators with VRE. Compromised security could lead to a significant deceleration of progress towards emissions targets, as we would have to rely more frequently on market interventions and costly measures. It is for these reasons that we consider AEMO must balance the security of the system against the emissions impact (and cost) of each transitional services contract.

5.8 Transparency arrangements will increase information provision on how AEMO currently maintains system security and will also shed light on the emission considerations of transitional services

The transitional services framework includes explicit transparency arrangements. These will support broader industry understanding of how AEMO currently manages system security and will mitigate against the risk of opaque or inefficient procurement.

180 NEL section 32A(5).
181 Submissions to the update paper: Ergon Energy Retail, p 1; Origin Energy, p 1; EnergyAustralia, p 2.
182 EnergyAustralia submission to the update paper, p 2.

We are maintaining the transparency measures proposed in the directions paper and the update paper, including:

- **Transitional services guideline:** outlining AEMO's procurement process (see section 5.5.1 for more detail).[183]
- **Statement of security needs**: for each procurement exercise, a statement outlining the security need, expected duration, intended procurement process and why no other procurement framework applies (see section 5.5.3 for more detail).[184]
- **Transitional services annual report:** a description of the type and costs of services procured through the framework.[185] While the statement of security needs addresses the 'why', the annual report will address the 'how' and the 'what' by including the services and costs of the transitional services framework. AEMO will also explain in the transitional services annual report how its contracting processes and outcomes are contributing to the transitional services performance objective, balancing cost of the contract, security of the system and emissions reductions. Consistent with the directions paper, the annual report provides a description of the type and costs of services procured through the framework. This will be considered and reported holistically, across both type 1 and type 2 contracts.
- **Trials:** the outcomes of trials conducted under type 2 contracts will be provided as an addendum to the transition plan for system security (see chapter 8 for more detail on the transition plan).[186]

In the transitional services annual report, AEMO is required to publish each year a description of the services procured under the framework and include a breakdown of costs for each facility under the ancillary services agreements.[187]This aligns with the current arrangements where AEMO procures services under the NSCAS framework. The annual cadence of the report also aligns with the broader security frameworks, including NSCAS, inertia and system strength, and the newly introduced transition plan for system security (see chapter 8 for more detail on this plan).

5.9 The framework will be used as a transitional tool, with a set expiry date

The framework will have two different sunset/expiry dates and contract lengths, which are each linked to the purpose of each contract type.

5.9.1 Type 1 contracts: maximum of three years in contract length and will expire after five years

Contract length

Type 1 contracts will be for a maximum of three years, consistent with what we proposed in the directions and update paper.[188] The Commission considers that this timeframe balances the need for certainty amongst industry, the pace at which power system understanding is evolving and the efficiency in multi-year contracts. This approach also broadly aligns with the current interim reliability measure (IRM) and the reliability and emergency reserve trader (RERT) framework, as well as the notice of closure, which provides simplicity and consistency for participants.

Expiry

183 Final rule, clause 3.11.11(e).
184 Final rule, clause 3.11.12(a).
185 Final rule, clause 3.11.12(b).
186 Final rule, clause 5.20.8(d)(7).
187 Final rule, clause 3.11.12(b).
188 Final rule, clause 3.11.11(m)(1)(i).

The final rule maintains the five-year expiry period that we proposed in the update paper. However, multi-year contracts will not be able to extend past the five years.[189] For example, from 2027 AEMO will only be able to enter into two-year contracts and this would progressively reduce until 1 December 2029, at which time all contracts would cease. All type 1 contracts will expire on 1 December 2029, unless this procurement power has been extended through a rule change.

In the update paper we proposed that type 1 contracts could be in place until 2032 (eight years from commencement), as any multi-year contract entered into before the expiry can continue (for up to three years).

Many stakeholders were concerned that this retains type 1 contracts for longer than necessary.[190]

EnergyAustralia was also concerned that the proposed timing meant that AEMO could continue to rely on enabling these contracts for security after the five-year expiry, which could reduce the incentives for type 2 contracts to be entered into.[191]

Conversely, AEMO held concerns that the system may require type 1 contracts beyond the five-year expiry, and that having the sunset may mean that we need to revert to directions to manage the system where gaps still exist.[192]

We agree with stakeholders that the five-year expiry (which was in effect eight years as previously designed) was longer than necessary, as ideally AEMO will be maintaining system security outside of these contracts by 2032.

However, we also acknowledge AEMO's concerns and recognise that we cannot say for certain when AEMO will no longer require synchronous generators in the form of unit combinations to provide the system's security needs. Given this, type 1 contracts could remain in place if this power is extended through a rule change process. The rule change request would need to be initiated by an external party as the AEMC cannot self-initiate a rule change.

5.9.2 Type 2 contracts: maximum of 10 years in contract length and will sunset after 15 years

Contract length

Type 2 contracts will run for a maximum of ten years.[193] This is consistent with what we proposed in the update paper. We consider that the longer contract length for these contracts would support investment in resources required to manage system security in a transitioning power system.

Sunset date

The entire transitional services framework, including the power to enter type 2 contracts, will sunset after 15 years, by 1 December 2039.[194] This will happen automatically and will not require a rule change.

This is a slight extension of the 10 year sunset period that we proposed in both the directions paper and the update paper. We consider that the 15-year sunset date is required, as type 2 contracts are envisioned to meet a medium-term need, to build AEMO's understanding of power system engineering knowledge. The longer sunset period better reflects AEMO's ISP forecasts for coal-fired generation retirements, which considers that by 2038, there will be no coal capacity left

189 Final rule, clause 3.11.11(m)(1)(ii).
190 Submissions to the update paper: Iberdrola, p 5; CS Energy, p 2; EnergyAustralia, p 2; AEC, p 1.
191 EnergyAustralia submission to the update paper, p 2.
192 AEMO submission to the update paper, pp 4-5.
193 Final rule, clause 3.11.11(m)(2)(i).
194 Final rule, clause 11.168.5.

in the NEM.[195] The transitional services framework will now expire 1 December 2039, which provides a 12-month buffer after the system's projected coal exit to allow AEMO to continue to trial any required resources if needed.

This date also addresses stakeholder feedback that type 2 contracts may be needed beyond a 10-year sunset period.[196] CS Energy considered:[197]

> CS Energy is supportive of longer contract opportunities for newer technologies and the intent of the ten-year contracting period. This, however, only represents an upper bound on the contract length, with the ten-year sunset period meaning that realistically, very few providers will be contracted for the full ten years.

As noted by CS Energy, the previous 10-year sunset period may have resulted in shorter contracts, especially if it takes a few years for AEMO to enter into type 2 contracts. A 15 year period gives AEMO more opportunities in the early years to enter into 10-year contracts.

AEMO also questioned the need for a sunset for these contracts given it considered there was value in allowing such trials to continue into the future.[198]

We consider a sunset period for type 2 contracts is still required, as we consider the transitional services framework as a temporary solution to address a temporary problem. By the late 2030s, the transition should be advanced. If it is not, the framework could still be extended by a rule change request if the need is enduring.

See Figure 5.1 for a timeline on the transitional services framework.

5.9.3 The AEMC will review the framework after seven years

The Commission will review the transitional services framework by the end of 2031.[199] This review will assess whether the transitional services framework is delivering on its objectives and determine whether this procurement power is still needed, in light of AEMO's progression of system security understanding and the framework's overall performance.[200] This review will recommend whether the framework is required beyond the 15-year point. This is consistent with the proposed review in the directions paper – although the review will now only apply to type 2 contracts (trials) given the type 1 contracting power is proposed to expire earlier.

In addition to the transitional services framework, this review will also consider whether the transition plan for system security is meeting its intended objectives (see section 8.5 for further details).

Some stakeholders considered that the seven-year review was too late and that it should be brought forward, with a particular focus on AEMO's use of type 2 contracts.[201] Both the AEC and CS Energy though instead that the review should occur no later than three years after the framework commences.[202]

The Commission acknowledges these stakeholder concerns but considers that the seven-year review timeframe remains appropriate to allow sufficient time for the framework to operate so that

195 AEMO, *Draft Integrated System Plan,* December 2024, p. 18.
196 Submissions to the update paper: CS Energy, p 3; AEMO, p 5.
197 CS Energy submission to the update paper p 3.
198 AEMO submission to the update paper, p 5.
199 Final rule, clause 11.168.4(a).
200 Final rule, clause 11.168.4(b).
201 Submissions to the update paper: AEC, p 1; CS Energy, p 2.
202 Submissions to the update paper: AEC, p 1;CS Energy, p 2.

trends or issues could be identified and AEMO can undertake relevant trials to progress its power system knowledge.

The AEMC could also choose to conduct the review sooner if major issues are identified in the annual reporting processes.

5.10 The Commission considers that the transitional services NMAS framework aligns with, and promotes, the assessment criteria

The Commission considers the transitional services NMAS framework promotes the NEO, as it is consistent with the system services objective and assessment criteria. The reasons are summarised below.

5.10.1 The final rule promotes the security of the power system

The transitional services NMAS framework promotes power system security by providing AEMO with a dedicated, bespoke tool that can procure both type 1 and type 2 contracts, managing immediate and medium-term security needs.

Having the transitional services NMAS framework in place will mean there is less likelihood that other areas of the NEM will reach a similar situation to South Australia, where directions are relied on as a primary means to maintain power system security.

The framework also allows AEMO to improve its understanding of how power system security can be maintained operationally. As we continue the transition to higher levels of IBR online, AEMO will be able to undertake trials on how newer technologies and resources can maintain system security in the new operating environment.

5.10.2 The transitional services framework contributes to reducing emissions in the power system

The transitional services framework NMAS supports emissions reduction by requiring AEMO to consider emissions in procurement (not in real time); and improving AEMO's technical understanding of how new technologies can provide security services, particularly in the context of retiring synchronous generators.

Type 2 contracts allow AEMO to get 'real-world' experience in how low or zero-emissions technologies can maintain power system security. This will give AEMO and participants the ability to test and learn about the best way to manage power system security as we transition.

5.10.3 The final rule support principles of market efficiency

The transitional services NMAS framework will provide appropriate incentives and risk allocation by creating a more fit-for-purpose arrangement than directions for those participants whose presence is needed to maintain a secure operating envelope.

5.10.4 The transitional services framework has considered implementation costs

The Commission has designed the transitional services NMAS framework to be as simple as possible, in line with existing frameworks, which will help curb implementation costs. The framework has also been designed to retain many of the features of the existing NMAS frameworks, to ensure consistency and simplicity for participants. This includes the cost-recovery provisions of the NSCAS framework, annual reports, and the procurement process. However, some implementation costs may remain as AEMO is required to develop the transitional services guideline and publish a statement of security needs before it can procure transitional services.

Ongoing costs of procurement will be published in AEMO's transitional services annual report and the Panel may also wish to consider reporting on this in its AMPR report.

5.10.5 This rule is underpinned by principles of good regulatory practice

The transitional services NMAS framework includes explicit transparency measures to shed light on the security needs of the system and how different technologies can meet them.

The proposal is also relatively simple to implement, given that it does not require any major system upgrades.

The transitional services framework NMAS also ensures flexibility and consistency with broader reform by allowing AEMO to adapt and expand the transitional services NMAS framework to incorporate new technologies, in response to developments of the market transition and its technical knowledge. The simplicity of the framework and the proposed sunset clause would also allow for broader reform to complement, or indeed replace, the framework as required.

6 AEMO's operational enablement of planning timeframe security contracts

Box 8: Key points in this chapter

- The final rule makes AEMO responsible for the operational enablement of security contracts that have been procured in the planning timeframe: system strength, inertia, selected NSCAS, and transitional service contracts.
- Placing enablement responsibility on AEMO:
  - aligns with AEMO's overarching responsibility to maintain system security, seeking to minimise the reliance on market interventions (i.e. directions) to maintain security,
  - allows for the entire pool of contracts NEM-wide to be leveraged to minimise costs for consumers, and
  - leverages its better visibility than TNSPs over real-time security and IBR participation.
- Under this approach AEMO will enable contracts to:
  - meet real-time system security gaps at least cost for consumers, and
  - provide system strength to support the projected level of IBR online, as intended under the system strength framework.
- AEMO's operational enablement will be guided by principles specified in the rules, including that contracts should:
  - be enabled to meet security requirements at the lowest cost
  - be enabled as close to real-time as practicable but not more than 12 hours ahead of time
  - only be enabled to meet operational security gaps, not the full amount of the required service
  - only be enabled to maintain the stable voltage waveform and host the projected level of IBR, and not be enabled if enabling those contracts would result in a significant adverse effect on emissions or efficiency.
- AEMO will publish the security enablement procedures which will outline:
  - how AEMO forecasts system security requirements (including the projected level of IBR),
  - how it makes and communicates enablement decisions
  - the timing of its enablement decisions, and
  - any minimum or recommended requirements that TNSPs need to include in contracts for security services — to ensure that AEMO has the relevant information to effectively enable contracts.
- AEMO will also be required to publish daily enablement outcomes, including:
  - details of each type of system security service
  - the relevant facilities
  - the quantity of system security services enabled
  - estimates of the enablement costs enabled in the previous day
  - the reasons for system security service enablement.

- AEMO will also be required to publish a system security services report by no later than 30 September each year. The report will set out:
  - an assessment of the extent to which system security contracts achieved the minimum security requirements and voltage stability requirements in the previous year
  - the total quantity and costs of each type of system security contracts enabled in the previous year
  - the relevant facilities that were enabled in the previous year
  - the reasons for enablement of security contracts in the previous year
  - any trends in the enablement of security contracts compared with earlier years.
- TNSPs will be required to provide information to AEMO to ensure that AEMO has the relevant information to effectively enable contracts, including costs.
- The enablement changes will commence in three stages:
  a. By **30 June 2024**, AEMO will publish the part of the security enablement procedures which provide any minimum or recommended requirements to be included in TNSPs' contracts for security services. This will provide guidance to TNSPs currently seeking to enter into system strength contracts to meet their obligations under the new system strength framework.
  b. By **31 August 2025**, AEMO will be required to publish the full security enablement procedures after consulting on them with industry.
  c. On **2 December 2025**, the full enablement obligations on AEMO will commence, which is the date by which system strength service providers must meet the new system strength standard.

How we have incorporated stakeholder input and updated these arrangements since the second directions paper

- Based on stakeholder feedback to the second directions paper, the Commission has simplified the enablement principles, in response to concerns that the principles were not flexible enough to ensure AEMO is capable of implementing a tool in time for the commencement of the full system strength framework on 2 December 2025. The simplified and more flexible approach more closely aligns with the current engineering understanding of the complex and non-linear relationship between increasing system strength and IBR hosting capacity. The final rule:
  - removes the enablement principle requiring AEMO to prioritise contracts for their intended purposes
  - provides greater flexibility for AEMO's enablement of contracts to meet the voltage stability requirements for the projected level of IBR.
- Stakeholder submissions reinforced the importance both of AEMO enabling contracts to meet the projected level of IBR — as intended under the system strength framework — and for AEMO to make both economic and emissions assessments when doing so. As such, the final rule retains an obligation for AEMO to enable contracts to maintain voltage waveform stability at projected levels of IBR, but not to do so if there would be material adverse outcomes on efficiency or emissions.
- In response to feedback, the Commission has also introduced a requirement for AEMO to set out the standardised contract parameters to guide TNSP procurement of system security contracts by 30 June 2024, in advance of the publication of the full enablement procedures on

31 August 2025. By setting out the required contract form, AEMO will ensure that TNSP contracts are compatible with any scheduling tool developed in time for the full commencement of the rule.

This chapter covers the approach in the final rule to the enablement (or scheduling) of planning timeframe contracts for system security, including:

- Section 6.1 — The final rule requires AEMO operational enablement of planning timeframe contracts to promote security, efficiency and transparency
- Section 6.2 — The final rule streamlines enablement responsibilities for system strength, inertia, NSCAS, and transitional services contracts
- Section 6.3 — AEMO will enable security services to meet security requirements at least cost for consumers, guided by principles in the rules
- Section 6.4 — The full enablement arrangements commence on 2 December 2025
- Section 6.5 — AEMO enablement of security contracts aligns with the assessment criteria, promotes the NEO and benefits power system security.

6.1 The final rule requires AEMO operational enablement of planning timeframe contracts to promote security, efficiency and transparency

The long-term procurement frameworks for system strength, inertia, NSCAS and transitional services allow for these security needs to be met through longer-term contracts with non-network parties, where this is the most efficient solution. We refer to such contracts as being 'procured in the planning timeframe'. The changes to these procurement frameworks (described in chapter 3 and chapter 4) aim to provide investment certainty for new investments that provide these needs. They also provide AEMO (and the market more generally) with greater certainty that security needs can be met on the day, even as thermal generators continue to decommit. This is because they institute a more forward-looking approach to procurement such that sufficient security contracts are likely to be available to meet needs on the day.

It is important to complement these long-term procurement arrangements with clear arrangements to meet real-time system needs through operational 'enablement' — or 'scheduling' — of these contracts. 'Enablement' refers to making decisions in operational timeframes about which participants will be online to meet security requirements, when, and for how long. For example, enablement could be for a hydroelectric or thermal unit to be online and synchronised with the power system, or for a battery or other device (such as a synchronous condenser) to be in an operating mode so that it can provide services such as system strength or synthetic inertia.

Prior to this final rule, enablement responsibilities were varied — either sitting with the generator itself, AEMO, or TNSPs, depending on the security framework and specific contractual arrangements (see section 6.2).

Through this final rule, the Commission has streamlined and centralised enablement arrangements to improve security, efficiency, and transparency by:

1. **Placing enablement responsibility on AEMO (**section 6.2**)** — AEMO is now responsible for enabling all system strength and inertia contracts (including any system strength and inertia needs that were met through NSCAS). AEMO will have the flexibility to enable other NSCAS contracts and any new transitional services contracts if it considers it beneficial, but this is not

required. Importantly, centralising the obligation on AEMO should reduce the need for frequent directions to maintain system security as the generator fleet continues to decarbonise.

2. **Ensuring AEMO's enablement decisions promote efficiencies, but allowing AEMO appropriate flexibility (**section 6.3.6**)** — contracts will be enabled to meet gaps in minimum system security requirements and also provide system strength to support IBR projected to be online, to reflect the intent of the planning frameworks for system strength and inertia. AEMO's enablement decisions will aim to minimise costs for consumers. It will also be at AEMO's discretion to decide on exact enablement arrangements (for example, the tool or method to be used to make enablement decisions, and timing of issuing enablement instructions), but it must be guided by principles set out in the rules.
3. **Ensuring enablement processes and outcomes are transparent (**section 6.3.6**)** —the rules introduces transparency requirements on AEMO to ensure that stakeholders are kept informed of its methodology for making enablement decisions and the costs and outcomes of enablement, promoting predictability and transparency to the market.
4. **Placing requirements on TNSPs to provide AEMO with the necessary information to make enablement decisions and ensuring contracts are compatible with the enablement approach (**section 6.3.7 **and** section 6.3.8**)** — we envisage that TNSPs will require, through contracts, the collection of information from providers to allow them to pass on this information to AEMO. AEMO will outline the information it requires from TNSPs and any minimum contracting parameters in an enablement procedure.

6.2 The final rule streamlines enablement responsibilities for system strength, inertia, NSCAS, and transitional services contracts

As described above, prior to this final rule scheduling and enablement responsibilities for the long-term security frameworks fell to either generators themselves, AEMO or TNSPs, and differed depending on the different procurement frameworks as well as the individual contractual arrangements within the frameworks.

6.2.1 AEMO could enable inertia and NSCAS contracts — but was not required to prior to this final rule

Under the previous inertia framework, as described in chapter 3, TNSPs procure inertia, and TNSPs could set the enablement arrangements or AEMO could enable the inertia services if provided for under the contract.[203] AEMO was empowered to enable services in the following situations:

- Where a contingency event that would result in the islanding of an inertia sub-network has been classified as a credible contingency event or defined as a protected event — AEMO could enable inertia services up to the 'minimum threshold level'.
- When an inertia sub-network is islanded — AEMO could enable inertia services up to the secure operating level.[204]

In selecting the inertia network services to be activated, AEMO was required to use reasonable endeavours to select the services in the order of priority specified by the relevant TNSP.[205]

Similarly, under the NSCAS framework, where NSCAS was acquired by TNSPs it could be dispatched (equivalent to enablement) by either the TNSP or AEMO.

203 Previous NER clause 4.4.4.
204 Previous NER clauses 4.4.4(a) and (b).
205 Previous NER clause 4.4.4(c).

In cases where AEMO procures NSCAS because the TNSP has not been able to, AEMO was able to dispatch the NSCAS in accordance with contractual arrangements.

6.2.2 TNSPs were responsible for ensuring the full amount of system strength is available in real-time

In 2021 we put in place arrangements to evolve the existing system strength framework. Its implementation is currently underway and it will be fully implemented by December 2025. Under the framework, system strength service providers (SSSPs)[206] are required to use reasonable endeavours to plan, design, maintain and operate their transmission networks, or make system strength services available to AEMO, to:

- meet the minimum level of system strength (the three phase fault level), and
- achieve stable voltage waveforms for the level and type of IBR projected.[207]

SSSPs can choose to meet these requirements through network investment (such as synchronous condensers) or by entering contracts with providers of system strength services, such as synchronous generators or privately owned synchronous condensers. Some contracted system strength requires enablement decisions close to real-time, — for example, a thermal generator needs to be dispatched in order to provide system strength.[208] Prior to this final rule, AEMO could only enable these contracts to maintain the minimum three phase fault level at any system strength node but could not enable them to achieve stable voltage waveforms to support projected IBR.[209]

In the system strength rule change, the Commission considered whether AEMO should be allowed to enable contracts to meet the second limb of the system strength standard (i.e. to support the stable voltage waveform) and achieve net market benefits. While it was noted that SSSPs could include arrangements in the contract itself that incentivise or require generators to self-commit in order to provide system strength to meet the second limb of the standard,[210] the Commission considered that the ISF rule change process should consider how AEMO would enable system strength services contracted under the second limb:[211]

> The draft rule did not specify how AEMO would enable system strength services contracted under the second limb [the efficient level]. This was due to there being ongoing parallel rule change processes that were considering the most efficient and effective ways for operational arrangements for unit commitment and other required services that are essential for power system security. This is continuing through the AEMC's consideration of the Capacity commitment mechanism proposed by Delta Electricity and the Synchronous services market proposed by Hydro Tasmania.

Following the commencement of this rule on 2 December 2025, AEMO will be required to enable a portfolio of system security contracts to meet both limbs of the system strength framework, as discussed in the rest of this chapter.

206 System strength service providers (SSSPs) are a subset of TNSPs and AEMO in Victoria.

207 NER clause 5.1.14.

208 Some non-network solutions, such as collective inverter retuning, or network solutions such as installation of synchronous condensers, do not require instructions from AEMO or the TNSP to be enabled, and could therefore be used in the operational timeframe to provide system strength services to meet both limbs of the standard.

209 Previous NER clause 4.4.5.

210 AEMC, System strength — final determination, pp 95-96.

211 Ibid., pp 96, 101.

6.2.3 Both rule change requests and the OSM draft determination proposed new enablement approaches

Both rule change requests and the OSM draft determination proposed approaches to enablement (scheduling) to improve operational efficiency and coordination:

- Hydro Tasmania proposed that participants would bid and be paid for co-optimised real time security services in the same way as for energy and FCAS.[212]
- Delta Electricity proposed a day-ahead, ex-ante commitment market, where participants could be committed to provide security and reliability services for a whole day (for slow start plant) or specific trading intervals (for faster-start plant).[213]
- The OSM Draft Determination proposed a scheduling mechanism which would iteratively determine system security needs, and procure and schedule for these needs as close to real-time as possible. This design aimed to maximise the net benefits of trade across the energy, FCAS and OSM markets by publishing expected OSM schedules and allowing all markets to iteratively adjust in response.[214]

The approach to enablement described in this final determination (section 6.3) is simpler and more flexible than the previously proposed scheduling mechanism. It gives AEMO flexibility in exactly how to make enablement decisions, while ensuring that costs for consumers are minimised and system security is maintained. Furthermore, it is unlikely to significantly or adversely affect the wholesale energy market as it avoids creating an 'ahead' market thereby avoiding undesirable distortions of spot market price signals.

6.3 AEMO will enable security services to meet security requirements at least cost for consumers, guided by principles in the rules

In guiding AEMO's operational enablement of planning timeframe contracts the Commission has implemented a more flexible approach than the OSM proposed in the draft determination. Instead of detailed prescription, the final rule sets out enablement principles and minimum requirements expected as part of the operationalisation of security contracts. The Commission expects this will be lower cost and faster to implement.

6.3.1 AEMO will be responsible for enabling security contracts in the operational timeframe

The final rule places responsibility on AEMO for enabling most long-term security contracts in the operational timeframe.[215]

The Commission envisages AEMO would develop a tool or system for enablement to carry out this responsibility. One example of this approach could be a simplified version of the previously designed scheduling tool described in the OSM draft determination. In general, a tool or system for enablement would:

- identify system security needs close to operational time
- decide which is the lowest-cost set of security contracts to meet these needs, and
- communicate enablement decisions to participants.

Having one party — AEMO — responsible for operational enablement:

212 Rule change request to the AEMC: Hydro Tasmania.
213 Rule change request to the AEMC: Delta Electricity.
214 AEMC, Operational security mechanism — draft determination, 21 September 2022.
215 Final rule, clause 4.4A.1

- minimises costs for consumers by leveraging the combined pool of contracts to meet security requirements at any given time
- improves security outcomes by making all options available to meet security needs (for example, inertia contracts could also incidentally meet system strength needs)
- reduces reliance on market interventions as the system continues to decarbonise.

Placing enablement responsibility on AEMO aligns with AEMO's responsibility for system security, and also achieves efficiency in a number of ways

The Commission considered two options for enablement in this rule change: either AEMO or TNSPs would be responsible for enablement.

The Commission considered that TNSPs would also be capable of developing systems to enable long term security contracts to meet these goals in a coordinated manner, for example, by specifying in contracts the conditions under which a provider needed to self-commit into the energy market to maintain security, or by developing more sophisticated real-time enablement systems.

However, while possible for TNSPs to be responsible for operational enablement of security contracts, AEMO is better placed for a number of reasons.

This approach aligns with one of AEMO's key responsibilities under the Rules and the Law: ensuring operational system security.[216] AEMO being responsible for enabling contracts will help to make sure that AEMO has the tools it needs to achieve a secure system as thermal generators continue to retire. In fact, this responsibility is already reflected in AEMO's current powers to enable security contracts like inertia and system strength if necessary (even though those contracts are between participants and TNSPs).

There are also a number of efficiencies which flow from AEMO enabling contracts.

Being the market operator, AEMO has extensive visibility over real-time security needs. Therefore, AEMO is better-placed to more precisely determine the number of contracted resources needed online at the time. This will reduce the chances of over- or under- enablement, therefore reducing risks to security (by under-enablement) and costs for consumers (by over-enablement). In contrast, TNSPs:

- have less visibility of inter-regional flows of system strength and other security services. As such, TNSPs would likely activate more contracts than required to be certain the required level is met in all regions.
- would not be able to activate or enable contracts in adjacent regions. As such, TNSPs would be unable to optimise the activation of all contracts to come to a NEM-wide lowest cost solution.

This lowered visibility could also give rise to security risks if TNSPs were responsible for enabling contracts. This is because there may be disparity between TNSPs' and AEMO's parameters for the level of services required to maintain security in the operational timeframe. AEMO would always need operational oversight of security, and the power to address gaps through tools like directions, even if TNSPs were responsible for enabling security contracts — and this would result in duplication of efforts.

Having a single party responsible for enablement, rather than multiple TNSPs, also means that only one centralised system for enablement will be needed, rather than multiple parties developing

216 NER, clause 4.2.1(a), and NEL, clause 49(1)(e).

their own capabilities and systems for enablement, including the need to communicate close to real-time with other TNSPs to determine security needs and which TNSPs' contracts would be enabled to meet those needs. Having a single party responsible would also make sure there is a consistent and transparent approach, which is less likely than when multiple parties developing systems and approaches for enabling contracts.

The final rule means TNSPs will contract for resources but AEMO will enable the contracts

The Commission recognises that this approach will likely result in split contracting and enablement responsibilities. TNSPs will not be activating their own contracts — but will be incurring activation and ongoing costs. This could potentially result in the following theoretical risks:

- Financial risks for TNSPs, if contracts are activated more than originally expected and recovered for. However, this is mitigated by TNSPs' abilities to recover any extra costs through transmission use of system (TUOS) entitlement adjustments and revisions to the cost recovery arrangements outlined in chapter 4.
- A lack of the ability to build in incentives for TNSPs to 'beat' their originally projected costs and lower costs for consumers — analogous to the efficiency benefits sharing scheme (EBSS) / capital efficiency sharing scheme (CESS).[217] However, costs for consumers will be managed by AEMO activating contracts at lowest cost, avoiding duplicating activation of contracts to meet the same security need, and the increased efficiency from AEMO's ability to more closely reflect security needs on the day.

We therefore consider that these risks can be managed, and that the benefits from allowing AEMO to enable TNSP contracts outweigh these risks, most notably in ensuring efficiency over the operational and planning timeframes (as discussed in section 6.2 and section 6.3).

Stakeholders strongly supported AEMO's operational enablement of system security contracts but noted the complexity of implementing such a tool prior to the commencement of the system strength framework

The Commission's conclusion was universally supported by submissions to the directions paper.[218]

Several stakeholder submissions did note that the complexity of implementing such a tool could result in the tool not being available in time for the commencement of the system strength rule change in December 2025.[219] Alinta Energy noted that the enablement proposal:[220]

> is sufficiently complex that its implementation may approach the same order of magnitude of cost and technical challenge of the OSM.

As such, the Commission has sought to streamline and simplify the requirements compared with those outlined in the second directions paper, without compromising important requirements crucial to ensuring that contracts are enabled in the best long-term interest of consumers.

217 The efficiency benefits sharing scheme (EBSS) is an AER-administered scheme that aims to reward network service providers that improve the efficiency of their operating expenditure and pass on these efficiency gains to consumers. The capital efficiency sharing scheme (CESS) is a similar AER scheme that applies to the capital expenditure, rather than the operational expenditure, of network service providers.

218 Submissions to the second directions paper: EnergyAustralia, p 14; Alinta Energy, p 2; AEC, p 4; SnowyHydro, p 5; CS Energy, p 7; Origin Energy, p 2; TasNetworks, p 1; AEMO, p 1; AER, p 3; CEC, p 13; ENA, p 13; Delta Electricity, p 2; Shell Energy, p 5; AGL, p 3.

219 Submissions to the second directions paper: Alinta Energy, pp 3-4; AEMO, p 8.

220 Alinta Energy submission to the second directions paper, p 3.

6.3.2 AEMO will enable security services to meet minimum security requirements and system strength to host the projected dispatched level of IBR

AEMO will enable planning timeframe contracts to levels that align with the policy intent of the long-term security procurement frameworks.[221] This means that contracts will be enabled to meet minimum inertia, system strength, NSCAS, and any transitional security requirements, as per the respective security goals of each framework.[222] In the case of system strength, AEMO will be able to enable contracts above the minimum level required for security in order to support the projected level of dispatched IBR, to align with the policy intent of the system strength framework.[223] The Commission notes that this was not intended to guarantee dispatch of IBR in operational timeframes, with this still being guided by the outcomes of NEMDE. However, in general, the Commission considers that system strength contracts should be enabled to support this goal where practical, economically efficient and aligned with emissions reduction targets.

The enablement levels are set out in Table 6.1 below. AEMO will set out how it determines and meets these levels in the security enablement procedures (the 'enablement procedures').[224] The enablement procedures must be published by 31 August 2025 in accordance with the rules consultation procedures.[225]

Table 6.1: Security service enablement level

Security service/need	Contracts enabled by AEMO	Level of security service to be enabled
System strength	AEMO will enable system strength contracts — including any NSCAS contracts for system strength — to meet system strength gaps.	System strength will be enabled to: • meet the minimum three-phase fault level, which represents minimum security requirements • provide a secure voltage waveform to host the projected dispatched level of IBR, subject to the enablement principles.
Inertia	AEMO will enable inertia contracts — including any NSCAS contracts for inertia — to meet inertia gaps.	Enough inertia will be enabled to meet minimum inertia requirements for security — that is, the mainland inertia floor during normal operation and any inertia needed in an inertia sub-network if it is at risk of separation. In setting inertia enablement levels, AEMO will take into account inertia support

221 Final rule, clause 4.4A.1.
222 Final rule, clause 4.4A.3.
223 Final rule, clause 4.4A.1(b).
224 Final rule, clause 4.4A.6.
225 Final rule, clause 11.168.2.

Security service/need	Contracts enabled by AEMO	Level of security service to be enabled
		activities (such as fast frequency response).
NSCAS	It is at AEMO's discretion whether to include or exclude NSCAS contracts from any enablement tool or process (except NSCAS contracts for system strength or inertia that must be enabled through the enablement tool, as above). NSCAS contracts can address very specific locational needs, which means that it may not make sense to include every NSCAS contract in an overall enablement process.	NSCAS contracts, if included in overall enablement processes, would be enabled to meet the relevant system security requirements (i.e. to meet the declared NSCAS gap).
Transitional services	It is at AEMO's discretion whether to include or exclude transitional service contracts from any enablement tool or process. Like NSCAS, transitional service contracts may address specific locational needs.	Transitional service contracts, if included in overall enablement processes, would be enabled to meet the relevant system security requirements (i.e. to meet the transitional need)

Source: Final rule, clause 4.4A.3.

The final rule excludes the reliability standard or the system restart standards from the minimum security requirements for which AEMO can enable system security contracts.[226]

To facilitate all inertia and system strength contracts being enabled by AEMO, including those under NSCAS, TNSPs are required to establish arrangements in contracts to ensure that the security services are capable of being enabled by AEMO from 2 December 2025 (which is when the obligation on AEMO to enable contracts begins).[227] This requirement does not apply to other NSCAS contracts, or transitional services contracts, so that AEMO can choose at its discretion whether these are appropriate to be enabled through the centralised process or in another way. The final rule maintains arrangements for AEMO to develop procedures for dispatching any NSCAS that is not enabled through the central enablement process.[228]

6.3.3 AEMO will enable system strength to meet the projected level of dispatched IBR

System strength is the only service that will be enabled to achieve a goal above minimum security requirements. The intent of the system strength framework is to have enough system strength available to host the level of IBR online that was projected in the planning timeframe. However, the Commission was clear in the *Efficient management of system strength on the power system* final determination that the system strength framework will not provide all IBR with an absolute guarantee of dispatch in real-time, stating that:[229]

> While it is acknowledged that one of the objectives of this final rule is to minimise these system security interventions by AEMO, the Commission considers that it will be inefficient

226 Final rule, clause 4.4A.3(b).
227 Final rule, clauses 3.11.3(b2), 5.20B.6(b2), 5.20C.6(b2).
228 Final rule, clause 3.11.6.
229 AEMC, Efficient management of system strength on the power system final determination, p 38.

to eliminate them completely. The costs of SSS Providers providing system strength services so that IBR could have unconstrained access will in all likelihood exceed the benefits of the reduced generation costs.

System strength will be enabled to host IBR unless it is economically inefficient or results in unjustifiable emissions outcomes

To implement this policy intent, system strength will be enabled to host the level of IBR online but not if it results in dispatch outcomes that significantly compromise power system efficiency or emissions outcomes.[230] [231] Specifically, the following situations are to be avoided, unless they are required to meet minimum system security levels:

- An entire system strength contract is enabled to support a very small amount of IBR dispatch, which would result in inefficiently high costs for consumers. For example, a thermal generator with a 50MW baseload is enabled to provide a stable voltage waveform for the final 1 MW of a dispatched IBR resource.
- System strength is enabled to support IBR coming online and the result is that this simply displaces an equivalent amount of IBR that would have otherwise been dispatched. For example, 50 MW of system strength is enabled to support 50 MW of IBR, which displaces 100 MW of IBR from being dispatched elsewhere.

It is worth emphasising that these considerations of reliability, cost and emissions are not necessarily expected to occur in real time, nor to be explicitly referenced in dispatch.

As well as supporting efficient outcomes and aligning with emissions reduction targets, this approach will help manage costs for consumers by reducing the frequency of situations where system strength contracts are enabled to increase the amount of dispatched IBR without a reduction in the wholesale energy price. Moreover, it is reasonable to incur system strength contract costs where these simply implement the intent of the system strength framework and help incentivise more IBR to be dispatched and come online. Over time, if cheaper IBR is dispatched more often through enablement, then the wholesale energy price is likely to reduce, outweighing the enablement costs.

Stakeholders supported the alignment with the system strength intent to host the efficient level of IBR

Stakeholder submissions to the second directions paper supported the enablement of contracts in line with the intent of the system strength rule change — that is, to enable the projected level of IBR. The CEC also noted the benefits of simplifying the enablement targets and how this aligns with the revised NEO that incorporates emission reduction.[232]

6.3.4 The enablement procedures will set out how AEMO intends to meet minimum security requirements and host the projected level of IBR

AEMO will develop the 'security enablement procedures' (the procedures) to describe how it will determine and meet the relevant enablement levels for security services.[233] The procedures will be subject to stakeholder consultation.[234]

230 Final rule, clause 4.4A.4(d).

231 Note: AEMO will only consider economic efficiency or the emissions trade-off when enabling system strength contracts to host the projected level of IBR - not when enabling contracts to meet minimum security requirements.

232 CEC submission to the second directions paper, p 13.

233 Final rule, clause 4.4A.6.

234 Final rule, clause 4.4A.6(b).

For the minimum system security requirements[235], AEMO will be required describe its methodology for determining these requirements in operational timeframes.[236]

For enabling system strength to meet projected IBR, AEMO would be required to explain in the procedures how it intends to determine the required level of stable voltage waveform, based on the projected level of IBR that could be dispatched (if it was not constrained for system strength) over a specified enablement period.[237]

The rules provide AEMO with the flexibility in how specifically to calculate the projected level of IBR, however, we expect AEMO to consider factors such as:

- IBR bids into pre-dispatch
- forecasts of projected inverter based resources
- ST PASA
- effects of network and system security constraints
- operational demand
- any other factors AEMO reasonably considers relevant.

AEMO will then determine the amount of system strength required to ensure a stable voltage waveform when hosting the projected level of inverter based resources and enable a suitable number and combination of contracts to fill any system strength gap over the enablement period at least cost.

The Commission revised the drafting from the proposed rules in the second directions paper to provide AEMO with greater flexibility in how to determine the exact projected level of IBR. Clause 4.4A.1 of the proposed rule stated:

> 1 AEMO may, at any time, *enable:*
>
> 2 ...
>
> (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 forecast to be dispatched in the pre-dispatch schedule ("stable voltage waveform requirements").
>
> In accordance with this rule 4.4A and the *System Security Services Procedures.*

In essence, based on AEMO's feedback to the second directions paper[238] the Commission revised the rule to allow AEMO to consider a wider range of possible factors when determining the appropriate level of IBR to host by removing the reference to the pre-dispatch schedule. Importantly, AEMO will still be required to specifically set out in the enablement procures how it intends to calculate the projected IBR level in real time. Any revisions to the approach require stakeholder consultation.[239]

The enablement procedures will also outline a methodology for how AEMO will make enablement decisions in line with the enablement principles (see section 6.3.5 below).[240]

---

235 that is, the minimum levels of system strength, inertia, NSCAS and transitional services as described in the Final rule, clause 4.4A.3.
236 Final rule, clause 4.4A.6(a)(1).
237 Final rule, clauses 4.4A.1(b) and 4.4A.6(a)(4).
238 AEMO submission to the second directions paper, p 28.
239 Final rule, clause 4.4A.6(b).
240 Final rule, clause 4.4A.6(a)(2).

To support these methodologies in the procedures with practical arrangements, the final rule also sets out a requirement for units that have entered into inertia or system strength contracts with TNSPs to register the units with AEMO to allow for real-time enablement.[241] AEMO will be required to give instructions for enablement in accordance with the dispatch instructions under the rules or arrangements that are otherwise relevant.[242]

6.3.5 AEMO's enablement will be guided by principles in the Rules

AEMO should aim to achieve system security at least-cost for consumers, but it should also have some flexibility in how it makes and communicates enablement decisions, so that it can accommodate both system needs and the needs of security service providers. The final rule therefore introduces a principles-based approach to AEMO's enablement decisions to promote both economic efficiency and flexibility, where AEMO will be required to use reasonable endeavours to:[243]

- enable a combination of contracts that meet the required level of the security services at lowest cost
- enable contracts as close as practicable to the relevant trading interval, and no more than 12 hours ahead of time
- only enable contracts to meet security service gap, not always enable for the full amount of the required service, that is, enable contracts only when energy spot market outcomes are not expected to provide the required level
- enable contracts reasonably necessary to maintain stable voltage waveforms and host the projected level of IBR, but not enable contracts that would result in a significant adverse effect on power system emissions or efficiency.

Stakeholder feedback to the second directions paper broadly supported the proposed enablement principles, however, many noted the trade-off between the tool's sophistication and AEMO's ability to implement it in time for the commencement of the system strength rule in December 2025.[244]

As such, based on the feedback, the Commission decided to:

- remove the proposed enablement principle to prioritise contracts for their intended purpose (i.e. prioritise inertia contracts for inertia needs). Both TNSPs and AEMO opposed the proposed inclusion of the principle due to the increased complexity, negligible benefits and reduced flexibility
- retain a requirement for AEMO to consider economic efficiency and emissions reduction when enabling system strength contracts to meet the efficient level, but remove the prescriptive formulation which may have increased implementation complexity.

The principles intentionally do not specify a particular tool or process for AEMO to use in making enablement decisions — AEMO has the flexibility to determine what is operationally most suitable and efficient. To see how the principles would work in practice, we have provided a simplified example of how AEMO could choose to make its decisions on the following pages. Note that this should not be seen as a prescription for how AEMO would implement enablement decisions, nor how TNSPs will enter into contracts with system security providers, but rather serve as an illustrative example.

241 Final rule, clauses 3.11.3(b1), 5.20B.6(b) and 5.20C.4(b).
242 Final rule, clause 4.4A.5.
243 Final rule, clause 4.4A.4.
244 Alinta Energy submission to the second directions paper, pp 3-4.

The requirements for enablement are simpler and more flexible than the design proposed in the draft determination and the second directions paper. By simplifying the design and providing flexibility, the Commission is seeking to manage AEMO's implementation costs while still achieving the intent of maintaining security. AEMO will require resourcing to develop and operate a tool or system for enablement. However, the Commission considers this will be simpler than the previous OSM design with a lower cost. It could also be designed in such a way that it is more flexible as the system continues to develop, new forms of technology start participating and new security challenges materialise.

AEMO will enable system security contracts to meet security requirements at lowest cost

As outlined in the second directions paper, the Commission has concluded that enabling security contracts to meet requirements at lowest cost, as opposed to maximising the value of trade, results in the least distortion of the energy market. AEMO's OSM prototyping illustrated the drawback of maximising the value of trade as the prototype brought online units for their energy contributions without any security need or justification other than lowering short-term spot market outcomes. The final rule's requirement for AEMO to enable contracts at least cost ensures that undesirable interactions with the energy market are minimised the spot prices are not unnecessarily distorted by out-of-market security payments.

Stakeholder submissions to the second directions paper broadly supported this approach.[245]

AEMO will enable contracts as close to real-time as practicable but no more than 12 hours ahead of time

Enabling contracts ahead of time to manage system security requirements involves managing the trade-off between unit commitment constraints (i.e. start-up times of thermal generators) and increasing forecasting uncertainty the further from real-time units are enabled. The Commission's second directions paper sought to balance the trade-off by limiting the AEMO's ahead commitment of units to 12 hours.

Stakeholder submissions to the second directions paper noted this careful balance with Shell and the EUAA recommending shorter enablement timeframes to maximise cost-efficiency and ensure contracts are not needlessly activated.[246]

Conversely, AEMO and the ENA sought greater flexibility to improve the practicality of implementing the enablement tool and accommodate older plant that may not be capable of responding within 12 hours, respectively.[247]

The Commission agrees with the views raised that shortening the enablement limit could increase efficiency by increasing certainty that the assets will be required. Despite this, the Commission does still consider that requiring enablement to occur as close as practicable to real-time with a 12 hour limit to be the appropriate balance as the benefit of increased economic efficiency is outweighed by the severe curtailment of available providers who would likely be capable of providing services within that timeframe.[248]

Similarly, the Commission also notes the ENA's view that increasing the limit beyond 12 hours could increase the pool of available resources capable or providing system security.[249] However,

245 Submissions to the second directions paper: Shell, p 5; EnergyAustralia, p 14.

246 Submission to the second directions paper: EUAA, p 2.

247 Submission to the second directions paper: AEMO, p 9.

248 AEMC, Operational Security Mechanism - draft determination, 21 September 2022, p.56. The OSM design in the draft determination included a block length of between 4 – 8 hours, however, the iterative design allowed plant to manage their enablement risk more effectively.

249 Submission to the second directions paper: ENA, p 16.

this final rule seeks to promote flexible and innovative plant with the capability of rapidly responding to shifting market conditions to maintain system security in the context of a system undergoing a significant transformation. Continuing reliance on slow start-up generators, over the long-term, is incompatible with a system nearing occasional instantaneous 100% IBR penetration, which is likely to occur in the transition to net zero.

AEMO enable contracts to meet real-time security gaps to ensure energy market outcomes are secure

AEMO will only enable contracts where there is a gap between the outcomes of projected dispatch and the relevant security enablement levels (section 6.3.2). This maintains the effectiveness of the energy market spot signal. If contracts were to be activated to meet the entire system security need instead, then it is likely that at times, a large proportion of the wholesale market may be enabled ahead of time, increasing costs for consumers and severely distorting the energy spot market, which is not the intent of the security frameworks.

The Commission appreciates that enabling contracts to manage gaps could result in real-time shortfalls were the portfolio of self-commited generators to change following the final run of the scheduling tool. However, this risk would be somewhat mitigated given that:

- the enablement level to host the expected level of IBR will likely significantly exceed the minimum security requirements, meaning that an operational shortfall would more likely result in curtailment of renewables, and
- AEMO continues to be able to direct plants online in the worst case scenario to ensure minimum security needs are met.

Submissions to the second directions paper supported the Commission's decision on the grounds of minimising distortions and economic efficiency.

We acknowledge that this approach could result in participants being enabled for security requirements that have flow-on impacts on the energy spot price, which may cause other participants to decommit in response — which could then cause a secondary security gap that requires further units to be enabled. However, this risk is significantly reduced when compared with the design of the OSM as outlined in our draft determination. In the OSM design, enablement and dispatch outcomes would have been iteratively adjusted based on expected spot market prices and changing OSM rebids to maximise the value of trade across the OSM, energy market and ancillary service markets. Here, the final enablement principles will mean that although some participants may be displaced, the overall effect on the spot market will be much more minimal due to the static costs of enabling contracts and the fact that enablement is not based on forecast energy or ancillary service prices.

The inefficiency risk of affecting energy market outcomes by enabling contracts for the gap between pre-dispatch and real-time is still preferable to enabling all units up to the required levels. This risk would also be mitigated by the enablement principles that AEMO would aim for efficient outcomes when enabling contracts ahead of time (section 6.3.5).

AEMO will enable system strength contracts to host the projected level of IBR, but not if the enablement would have significant adverse effects on economic efficiency or emissions reduction

As outlined in section 6.3.3 above, one of the primary objectives of enablement is to enable system strength contracts to host the projected level of IBR online. This objective operationalises the intent of the system strength framework ensuring that sufficient system strength is available to minimise curtailment. Importantly, the tool does not guarantee that IBR will not be sporadically curtailed on system security grounds given that the level of system strength depends on the accuracy of forecasting and other variable and uncertain considerations. Based on the

enablement principles, the activation of additional system strength should consider power system efficiency and emissions reduction impacts when activating units through this out-of-market mechanism. Contracts should not be enabled if they are likely to be inefficient (economically unjustifiable) or if they are likely to have a material adverse effect on emissions reduction.

We have simplified this enablement principle compared with the principle proposed in the second directions paper, which was:

> To ensure IBR is not simply displaced by system strength bringing different IBR resources online, AEMO would enable contracts only if:
>
> - the enablement of system strength contracts results in an overall increase in dispatched IBR
> - the total increase in dispatched IBR is greater than the total energy provided by additional system strength contracts.

Instead of a strict mathematically-expressed requirement, the final rule takes a more principles-based approach, requiring AEMO to avoid significant adverse effects on efficiency or emissions reduction.[250] Similarly to other components of the final rule, AEMO will be required to set out in its enablement procedures how it intends to comply with the requirement. We do not expect that these considerations of reliability, cost and emissions necessarily occur in real time, nor be explicitly referenced in dispatch.

The changes respond stakeholder feedback which supported the approach of considering emissions and efficiency [251] but requested the Commission to ensure that the enablement principles were practically achievable. AEMO noted:[252]

> In the interests of implementing a solution as soon as possible, AEMO considers that these should not be prescribed in the rules as they can be added, if appropriate, through consultation on AEMO's enablement guideline at a later stage.

This view was reinforced by Transgrid who noted the potential for the tool to near the level of complexity and sophistication that the Commission rejected following the draft determination.[253]

Over time, following its initial implementation, as the tool becomes increasingly more sophisticated and as the industry's understanding of the relationship between system strength and IBR hosting capacity develops, the Commission understands that AEMO would likely be capable of considering a greater number of factors when making its assessment.

Simplified example of AEMO enablement of system security

This sub-section provides an illustrative example of how a scheduling tool — to be implemented by AEMO — could manage the complex trade-off between the enablement of system services to meet operational security needs. The hypothetical and simplified example is only an indication of how AEMO may choose to schedule planning timeframe contracts or the contract types that TNSPs will enter into to meet their planning timeframe obligations.

Suppose that the time is sometime before 13:00 on 1 January 2028 (a maximum of 12 hours ahead). AEMO is determining which security contracts may need to be enabled for the trading

250 Final rule, clause 4.4A.4(d).
251 for example, submission to the second directions paper: AGL, p 3.
252 Submission to the second directions paper: AEMO, p 14.
253 Submission to the second directions paper: Transgrid, p 10.

intervals between 13:00 and 14:00pm on 2 January 2028 for NSW (the 'relevant trading intervals'). AEMO determines that it has the following contracts available in NSW:

Table 6.2: Hypothetical contracts available for AEMO to enable in NSW

Generator	Services included in contracts	Enablement cost (for 1 hour)
Blackwood BESS (300 MW)	• 500 MWs of inertia	$5,000
Red Gum Hydro Plant (300 MW)	• 400 MWs of inertia • 500 MVA of fault level at the Buronga node	$10,000
Wattle Thermal Power Station (350 MW)	• 300 MVA of fault level at the Buronga node	$15,000
Jacaranda Thermal Power Station (500 MW)	• 600 MVA of fault level at the Buronga node	$20,000

Note: For this example, all units in the table above are not yet bidding to be dispatched at 13:00 on 2 January 2028. Enablement costs include both start and running costs for the generators to be enabled during the relevant trading intervals.

By looking at pre-dispatch and forecast IBR generation based on weather data, AEMO estimates that the level of inverter based resources that is likely to generated and could be dispatched in NSW at 1:00 pm on 2 January is 5000 MW.

Time passes, generators rebid, and as close as practicable to 13:00 1 January 2028, AEMO forecasts that according to pre-dispatch, there will be:

- 7500 MWs of inertia in NSW
- 1500 MVA of fault level at the Buronga system strength node

during the relevant trading intervals between 13:00 and 14:00 on 2 January.

These levels of inertia and fault level are below the minimum security requirements that have been determined by AEMO. Also, there is some inverter based resources that was initially forecast to be dispatched that would require additional system strength to be dispatched. AEMO enables two contracts to meet minimum security requirements, and one to allow for extra inverter based resources dispatch. AEMO also determines that no NSCAS or transitional service contracts need to be enabled to ensure the system remains secure.

Table 6.3 shows these security gaps, the opportunities for additional IBR dispatch, whether contracts were enabled, and settlement amounts (assuming the average energy spot price over the relevant trading intervals is $10/MWh).

Table 6.3: Summary of contracts enabled to meet security requirements and dispatch additional IBR

Security need / IBR requirements	Security gap	Contracts enabled
Inertia floor: 8 GWs	500 MWs	Contract with Blackwood BESS for synthetic inertia
Minimum fault level at Burunga: 1,750 MVA	250 MVA	Contract with Red Gym Hydro Plant enabled

Security need / IBR requirements	Security gap	Contracts enabled
Stable voltage waveform requirement for additional IBR	800 MVA to relieve constraints to unlock another 400 MW of IBR	No contract enabled
Stable voltage waveform requirement for additional IBR	1,100 MVA to relieve constraints to unlock another 800 MW of IBR	Contract with Jacaranda PS enabled

Table 6.4 explains the reasons as to why AEMO enables the contracts to meet each need according to the principles outlined in section 6.3.5.

Table 6.4: Contract enablement reasons

Unit	Contract status	Security need and reason for enablement
Blackwood BESS	Activated	To meet the 500 MWs inertia gap at least cost ($5,000/hour)
Red Gum Hydro Plant	Activated	To meet the 250 MVA minimum fault level gap at least cost ($10,000/hour — the next least-cost contract after Blackwood BESS)
Wattle PS	Not activated	After meeting minimum security requirements through enabling the two contracts above, AEMO notes that Wattle could relieve the security constraint preventing additional IBR dispatch. AEMO estimates what the effect on dispatch would be if it enabled Wattle PS: • The enablement of Wattle PS is estimated to unlock 100MW of IBR but displace another 100 MW of IBR • Wattle PS is a thermal power station, and produces emissions when enabled • As such, given no additional IBR is dispatched and additional emissions are generated by Wattle PS's enablement, AEMO decides not to enable Wattle PS as it would have an adverse effect on emissions.
Jacaranda PS	Activated	AEMO estimates what the effect on dispatch would be if it enabled Jacaranda PS: • The enablement of Jacaranda PS is estimated to unlock 1050 MW of IBR but displace 250 MW of IBR — a net increase of 800 MW. • AEMO considers that this significant increase in IBR means that there is not an adverse emissions impact from the enablement of Jacaranda PS, and therefore chooses to enable Jacaranda PS.

Note: This hypothetical and simplified example is only an indication of how AEMO may operationalise a process for the enablement of security contracts and is not intended to be a prescriptive method. Security service quantities, contract costs and generator parameters are hypothetical examples and are not necessarily representative of reality.

6.3.6 AEMO's enablement approach will be outlined in published procedures and AEMO will regularly publish enablement outcomes

Stakeholders have consistently requested more transparency over the system's needs for security services and how these can be provided. Throughout the rule change process, stakeholders have emphasised the need for improved transparency. This can assist stakeholders to manage their plant and make investment and operational decisions in ways that help to provide system security in the most efficient way possible.

As such, under the final rule, AEMO will be required to consult on and publish an enablement procedure by 31 August 2025[254] outlining its proposed approach to enabling contracts in the operational timeframe. The procedure will set out, for example, how AEMO forecasts system security requirements (including how it calculates the projected level of inverter based resources), how it makes and communicates enablement decisions, and the timing of its enablement decisions.

In addition, to promote transparency for market participants AEMO will be required to, under the final rule, publish enablement outcomes each day outlining:[255]

- which contracts have been enabled
- the relevant facilities
- the reasons for enablement
- enablement costs over the day.

Although this information may already be mostly available by piecing together dispatch outcomes and implementing a daily reporting channel may require AEMO resourcing, the Commission considers that clear daily reporting of enablement outcomes will provide stakeholders with easily accessible information on the out-of-market security payments being made to bring economically de-committed units back online. Such information could provide investment signals for new providers of security services who may be capable of meeting system needs at lower costs, without distorting the outcomes of the wholesale electricity market.

AEMO will also be required to report at least annually, by 30 September each year, on its enablement processes and outcomes and provide an assessment of whether minimum security requirements were effectively met.[256] In concert with the transition plan for system security, this report would include any trends in enablement of security services compared with previous years, and could also include commentary on any potential improvements that could better promote the long-term interests of consumers. The report would also provide useful information that can help assess the effectiveness of the transitional services framework on an ongoing basis prior to its sunset, as well as the efficacy of the system strength, inertia and NSCAS frameworks in efficiently meeting system security needs.

6.3.7 AEMO will be empowered to set minimum contracting requirements or parameters to ensure TNSP contracts are compatible with the scheduling approach

The final rule empowers AEMO to set minimum requirements for system security contract parameters in the enablement procedures.[257] Specifying contracting parameters would allow for the timely implementation of a scheduling tool and ensure that TNSP contracts are compatible,

254 Final rule, clauses 4.4A.6 and 11.168.2.
255 Final rule, clause 4.4A.7(a).
256 Final rule, clause 4.4A.7(b).
257 Final rule, clause 4.4A.6(a)(3).

standardised, and comparable. Over time AEMO can update these required parameters, for example to reflect any increased sophistication in its enablement approach.

The submission by the ENA to the second directions paper noted concern that the proposed publication date of the enablement procedures was too late, stating that the:[258]

> ENA considers it unworkable that AEMO would produce enablement guidelines by 2 December 2025. TNSPs are currently undertaking RIT-Ts and are seeking to run procurement activities, including the design of contracts, in parallel. AEMC, TNSPs and AEMO must work in collaboration to ensure that by the end of 2023 (or early 2024 at the latest), a workable arrangement is in place so that TNSPs can negotiate contracts that contain enablement requirements (and associated payment terms) during 2024 and 2025.

Based on the ENA's submission, given that the enablement procedures will be published in August 2025 and that TNSPs are currently in the process of seeking system security providers, transitional rules require AEMO to publish required TNSP contracting parameters by 30 June 2024.[259] AEMO will not be required to consult on the first iteration of the minimum contracting requirements, however, by 31 August 2025 the requirements will be folded into the enablement procures on which AEMO is required to follow the rules consultation procedures. The minimum requirements set out by AEMO limit the range of potential contracting forms that TNSPs and security service providers can enter into, thereby ensuring that they will be capable of being enabled through AEMO's centralised tool on day one.

6.3.8 TNSPs will be required to provide AEMO with the necessary information to effectively schedule contracts

The final rule also maintains requirements for TNSPs to provide AEMO with the contractual information required to effectively enable contracts in the operational timeframe.[260] This includes the costs of enablement and covers any operational parameters such as plant start-up time and any other information requested by AEMO. TNSPs will be required to provide — and regularly update — any requested information with respect to planning timeframe contracts.

6.4 The full enablement arrangements commence on 2 December 2025

The full new enablement responsibilities, arrangements and obligations fully commence on 2 December 2025, in line with the beginning of the first compliance period of the new system strength framework, and the proposed changes to the inertia and NSCAS frameworks. This will ensure that there is a method for AEMO enabling system strength contracts entered into under the new system strength framework — the proposed date coincides with when system strength service providers (SSSPs) are required to meet the system strength standard. To implement this intent, contracts set up under the new system strength framework and the proposed new inertia framework are required to specify AEMO as the enabling party.[261]

AEMO will produce the enablement procedures and set up enablement systems and/or processes by 31 August 2025. Although these would be new, the Commission considers that the flexibility provided to AEMO in the systems it uses for enablement allows for a less complex approach than under the previous OSM, which would help manage implementation timeframes. Further, it is

258 Submission to the second directions paper: ENA, p 17.
259 Final rule, clause 11.168.2(b).
260 Final rule, clauses 5.20B.6(c) and 5.20C.4(c).
261 Final rule, clauses 3.11.3(b2), 5.20B.6(b2), 5.20C.6(b2).

possible that AEMO could draw on some of the previous OSM thinking in designing enablement arrangements, as the new arrangements are flexible, and some work done to date would likely be relevant.

6.5 AEMO enablement of security contracts aligns with the assessment criteria, promotes the NEO, and benefits power system security

This sub-section sets out the Commission's view that the centralised and streamlined enablement of system security contracts benefits system security, is consistent with the assessment criteria, and promotes the NEO.

6.5.1 AEMO enablement promotes power system security

The Commission considers that AEMO enablement of system security contracts will promote power system security and align with AEMO's overarching responsibility to maintain security, as discussed in section 6.2 and section 6.3. It would reduce the need for directions by ensuring that all security contracts are appropriately enabled when security needs arise, and ensure that AEMO has the tools necessary to maintain a secure system at least cost. Moreover, by pooling system strength, inertia, selected NSCAS and transitional service contracts, it becomes significantly less likely that AEMO does not have a resource available to meet a system security need and has to resort to market intervention.

6.5.2 AEMO enablement contributes to reducing emissions in the power system by activating sufficient system strength contracts to host projected IBR

As noted in chapter 2 we have used an emissions reduction criterion as part of the assessment framework for this rule change following the change to the NEO. The proposed enablement of system strength contracts to provide a stable voltage waveform for projected IBR promotes emissions reduction by supporting IBR to be dispatched more often, increasing the NEM's renewable penetration. Similarly, the enablement principle for AEMO to consider economic efficiency and emissions reduction when enabling system security contracts (but not those for the minimum level) seeks to ensure that enablement to meet the stable voltage waveform does not result in NEM-wide increases in emissions.

6.5.3 The final rule promotes the principle of market efficiency by incentivising long-term security provision and appropriately allocating risks to the party best able to manage it

The Commission considers that allocating enablement responsibility to AEMO aligns with AEMO's remit to ensure operational system security under the NER and the NEL. TNSPs maintain their responsibility to procure and meet long-term security needs (guided by AEMO through joint planning). These arrangements would best align with existing security responsibilities.

The enablement principles (particularly the principle requiring enablement to meet security requirements at least cost) along with TNSPs' RIT-T requirements under the security frameworks, would help incentivise both TNSPs and AEMO to procure and manage security services at least cost to consumers.

Placing responsibility for enablement on AEMO also promotes economic efficiency by leveraging AEMO's visibility over dispatch and ability to consider inter-regional security service flows. AEMO will be able to consider inter-regional ESS flows and enable contracts across the entire NEM to result in a least-cost outcome.

The proposed arrangements also provide clearer enablement responsibilities, enablement principles and information sharing requirements for AEMO and TNSPs, to help provide guidance to TNSPs as they fulfil their responsibilities under the new system strength framework.

6.5.4 The rule aims to minimise implementation costs and time

As described in section 6.5, the Commission considers that the flexibility provided to AEMO, simplicity of the enablement approach, and drawing on preexisting work could help manage implementation cost and complexity. Importantly, by developing a centralised enablement tool, the need for all TNSPs to develop discrete approaches would be avoided, thereby intuitively resulting in a lower cost outcome.

6.5.5 The final rule promotes the principle of good regulatory practice

The Commission's final rule promotes flexibility by outlining principles and procedures that should be followed in enablement, rather than prescribing a specific or detailed operational method. The final rule allows AEMO to design enablement systems and processes as it sees best, and to modify them to meet changing security demands of the NEM during the energy transition. The changes are also consistent with the policy intents of the existing security frameworks. The final rule requires the levels of services enabled operationally to match the levels procured in the planning timeframe — that is, minimum levels for security in most cases and levels to support projected IBR in the case of system strength.

The requirements for AEMO to provide enablement procedures and publish regular enablement outcomes would provide stakeholders with clear information about enablement purposes and costs. This will allow TNSPs and service providers to better understand and predict how often they may be enabled and for which security reasons. Furthermore, AEMO enabling contracts instead of TNSPs will result in a consistent approach to enabling planning timeframe contracts across the NEM, rather than different approaches in each region.

7 The rule makes changes to the directions reporting framework to improve transparency

Box 9: Key points in this chapter

The reforms to system strength, inertia, NSCAS and the addition of a new transitional services NMAS framework are intended to provide tools to ensure sufficient security services are available and help reduce the number of security directions that are issued by AEMO.

The Commission considers that directions are a last-resort mechanism in AEMO's toolkit, and should not be relied upon as a primary mechanism to procure services or system needs. This has underpinned the recommendations in chapters chapter 3 through chapter 5, which seek to give AEMO additional tools to manage system security, enabling directions to return to being a back stop mechanism. However, we recognise that as the system transitions and each region undergoes changes in its generation mix, directions may still be needed at times to manage system security.

As such, the Commission has made improvements to real-time and post-event directions reporting to provide more transparency to stakeholders. We recognise that most of the directions occurring in the NEM to date have been for security purposes, with few issued for reliability reasons (aside from in the June 2022 market suspension). However, the changes made in this chapter apply to any direction issued by AEMO, regardless of whether it was for security or reliability. While these benefits will largely be seen in the system security directions we consider that these amendments also make sense in the context of reliability directions.

We have made improvements to market notices

- Currently, there are no explicit requirements in the NER for AEMO to publish a market notice when issuing a direction, nor any detail on what information AEMO should provide the market.
- The final rule codifies AEMO's obligation to publish a market notice when issuing a direction and outlines the details required in market notices. This information includes the identity of the directed participant and the type of directed resource subject to the direction, the required action to be taken, the service or need that was provided, and the circumstances that necessitated the need for the direction.
- This aims to improve transparency around direction events and provide market participants and consumers with valuable information needed to understand security requirements and market outcomes to position their plant operationally.

We have made improvements to directions reporting

- The NER currently requires AEMO to publish a report for each direction event 'as soon as reasonably practicable'. The absence of a precise time by which reports must be published, as well as the frequent use of directions, has resulted in a significant time lag between a direction being issued and its corresponding report being published.
- The Commission has clarified the timing of AEMO directions reporting. The final rule provides that AEMO must, within 40 calendar weeks of a direction being revoked or the direction otherwise ending, publish a report that outlines why the direction was needed, among other information, most of which is already required in reporting.

- We consider that this timing will provide clarity for AEMO and market participants alike, and remove the time lag between a direction being issued and its corresponding report being published.
- The final rule will also require AEMO to publish a breakdown of the total amount of compensation paid to each directed and affected participant. This requirement will seek to enable accurate reporting on the compensation amounts payable, providing both participants and consumers with clearer information and greater transparency.
- There is also a new requirement for AEMO to maintain and publish up-to-date information in aggregate on the directions that have been issued, such as the date, timing, region, and required action to be taken by the directed participant.
- In addition to these improvements, AEMO is now explicitly required to report on trends in the number of directions that it has made, in its annual transition plan for system security (see chapter 8). This will provide a clear picture of how AEMO expects interventions may need to be used in the future, with greater detail surrounding security issues that face the NEM.
- These changes will provide stakeholders with a better insight into system security needs and any trends that may be occurring, allowing greater opportunities for networks, generators, and market bodies to identify efficient solutions to alleviate security needs across short and long-term planning.

How we have incorporated stakeholder feedback and updated these arrangements since the second directions paper

- We received strong support from stakeholders for our proposals to improve the directions reporting framework to provide greater transparency.
- Stakeholders provided valuable feedback in submissions to our second directions paper. In summary:
  - we received strong support for increased transparency and accountability, particularly regarding our proposal to provide greater detail being published in market notices. For instance, as we identified in our second directions paper, market notices do not contain the identity of the directed participant, nor any description of the system security service that was needed beyond that the direction is needed to maintain system security.
  - regarding directions reporting, stakeholders explained how market participants and consumers can benefit from clear timing on directions reporting, greater information being included around the direction event, and the value in receiving data on the total compensation payable to directed and affected market participants.
- The Commission proposed changes to the directions compensation framework in the second directions paper. We received feedback from stakeholders that any changes to the directions compensation framework should be considered as part of a larger review. Consequently, the issue of directions compensation is not covered in this rule change, but instead, will be considered in the *Review into electricity compensation frameworks.* Submissions to the consultation paper closed on 1 February 2024 and the next step is to publish a draft determination, which is expected in late 2024.

We consider that these changes will advance the NEO by improving the transparency of the directions framework by ensuring that participants receive valuable information in a timely manner, while also minimising the administrative burden on AEMO. They will also allow more opportunities for stakeholders to understand how AEMO is managing the power system during the

decarbonisation and transition of the NEM.

The changes to market notices and directions reporting will commence on **4 July 2024** (except for directions trends reported on in the transition plan for system security, which will commence from **1 December 2024 as discussed in** chapter 8).

Note: For information about the *Review into electricity compensation frameworks,* visit our website: https://www.aemc.gov.au/market-reviews-advice/review-electricity-compensation-frameworks

This chapter covers the Commission's amendments to real-time and post-fact directions reporting that will provide greater value and transparency to market participants and consumers:

- Section 8.1 — The final rule requires AEMO to provide greater transparency in market notices and direction reports
- Section 8.2 – We have made improvements to the level of detail required in market notices for directions
- Section 8.3 — We have improved the timing and level of detail required in AEMO's directions reporting
- Section 8.4 — Reporting on direction trends will be included in the transition plan for system security
- Section 8.5 — The Commission considers that changes to directions transparency align with, and promote, the assessment criteria

7.1 The final rule requires AEMO to provide greater transparency in market notices and direction reports

The Commission has made improvements to real-time and post-fact directions reporting, ensuring market participants receive greater insights on the use of directions in a timely way. Accordingly, the final rule:

1. requires AEMO to provide more details in market notices for **directions,** such as the identity of directed participants and detail about the nature of the direction
2. requires AEMO to prepare detailed directions reporting **following a 40 calendar week cadence** that includes information on compensation paid, the cumulative number of directions issued by AEMO, and trends in direction events.

The Commission considers that these improvements complement the other reforms in this final rule that are aimed at providing tools to ensure sufficient security services are available and reducing the continued reliance on directions. It also streamlines AEMO's existing processes and minimises any additional administrative burden for AEMO in reporting on direction events.

These changes are set to commence on **4 July 2024**.

7.1.1 Directions remain a 'last resort' mechanism but may be needed to maintain system security from time to time

As the NEM decarbonises, new security needs are likely to arise in different regions. The new transitional services framework as well as our improvements to existing security frameworks are aimed at ensuring AEMO can proactively and efficiently meet these security needs over both the short-term and as the system transitions.[262]

262 See chapter 3 and chapter 5.

However, in operational timeframes, we have seen there are instances where power system security is threatened due to security needs that have not been foreseen in the planning timeframe, or that have manifested in unexpected ways. In these cases, AEMO has the power to issue directions to registered participants to take any action as AEMO sees fit to ensure the power system is stable and secure.[263] We have seen AEMO carry out this power in response to recent system security threats.

It remains the case in the NEM, as identified in our second directions paper and mentioned in chapter 4, that the majority of directions are to synchronous gas-fired generators to ensure that there is adequate system security in South Australia and to make sure there are sufficient synchronous units online in AEMO's unit configurations.[264] For instance, from 1 January 2024 to 19 February 2024, AEMO issued approximately 18 directions to participants in South Australia.[265]

While directions for system security tend to mostly be issued for the South Australia region at present, there are instances where AEMO issues directions in other jurisdictions for system security — and this could increase in the future. For example:

- on 14 February 2024, AEMO issued a direction to a participant in the Victoria region[266]
- on 22 and 27 January 2024, AEMO issued a direction to a participant in the Queensland region[267]
- on 16 March 2023, and 15 November 2023 AEMO issued a direction to a participant in the New South Wales region.[268]

It is worth noting that the majority of directions used in the NEM are for system security purposes. Directions for reliability purposes are much less frequent (aside from a number of directions issued to maintain reliability in the June 2022 events).

These examples demonstrate that directions have, in recent months, continued to be used relatively frequently by AEMO to maintain system security, even though they are intended as a 'last-resort' mechanism in AEMO's toolkit for unexpected market events.[269]

The Commission considers this 'last-resort' intent continues to be appropriate — directions are not intended as a primary mechanism to procure, provide or incentivise security services.[270] We have observed that reliance on directions has tended to increase security risks on the power system because of inadequate transparency, increased administrative burden, not providing certainty to participants, and not incentivising new methods to support power system security.[271]

This is consistent with Delta Electricity's rule change request that explained intervening in the market through directions is inherently inefficient as generators will seek a commercial return from the directions without the presence of competition.[272]

The new transitional services framework, as well as our improvements to existing security frameworks, should work to alleviate the need for frequent directions. However, given directions

263 NER, clause 4.8.9(a).

264 AEMC, second directions paper, p 56.

265 See the following AEMO Market Notices: 114835, 114818, 114778, 114721, 114536, 114245, 114219, 113930, 113710, 113483, 113322, 113275, 113227, 113188, 113147, 113079, 113068, 113010.

266 See AEMO Market Notice 114697.

267 See AEMO Market Notice 113610 and 113839.

268 See AEMO Market Notice 106711 and 111375.

269 AEMO's continued use of directions has been recognised by stakeholders. For example, see EnergyAustralia submission to the second directions paper, p 7.

270 AEMC, *Investigation into intervention mechanisms and system strength in the NEM*, final report.

271 AEMC, second directions paper, p ii; AEMC draft determination, p ii.

272 Delta Electricity rule change request to the AEMC, pp 6, 22.

may continue to be used by AEMO from time to time, the final rule has made improvements to real-time and post-fact directions reporting ensuring market participants and consumers receive valuable information in a clear and timely manner, thereby allowing stakeholders to better understand market outcomes and how system security is managed.

The Commission notes that the reporting changes in the final rule apply to all direction events, including those issued for system security or reliability.[273] While, as described above, the majority of the directions are for system security purposes, the Commission considers that the benefits from making this change would also apply to any directions made for reliability purposes.

7.1.2 The methodology for directions compensation is being considered in the *Review into electricity compensation frameworks*

In the second directions paper, the Commission proposed changing the basis for directions compensation to be a benchmark-based compensation framework, similar to the framework used during market suspension periods. We proposed that:

- directed participants who provide a compensable service would be entitled to compensation based on predetermined benchmark values that reflect their short-run marginal costs (SRMCs), as determined through ISP data inputs.
- a 15% premium would supplement the benchmark values to account for the variability of heat rates and other divergences between the estimated and actual costs on the day.
- the ability for market participants to lodge a claim for additional compensation would remain.[274]

These proposed changes aimed to address issues identified with the current approach to compensation, which is based on the 90th percentile price for energy or frequency control ancillary services (FCAS) over the preceding 12 months from when the direction was issued. The Commission identified, among other things, that this approach led to generators being over- or under-compensated.[275]

In response, stakeholders raised concerns about the proposed reforms and strongly advocated that any changes to the directions compensation framework be considered as part of a larger review. Consequently, the issue of directions compensation is not covered in this rule change, but instead, will be considered in the *Review into electricity compensation frameworks*.[276] Submissions to the consultation paper closed on 1 February 2024 and the next step is to publish a draft determination, which is expected in late 2024.

7.2 We have made improvements to the level of detail required in market notices for directions

7.2.1 We identified gaps in the current directions framework relating to market notices

Currently, there are no explicit requirements in the NER for AEMO to publish a market notice when issuing a direction, nor any detail on what information AEMO should provide the market. While this issue was not explicitly identified in the rule change requests from Delta Electricity and Hydro Tasmania, it was discussed during our consultation process in connection with potential reforms to the directions compensation framework.

---

273 Load shedding for reliability can be categorised as either a direction or 4.8.9 instruction. Either categorisation impacts AEMO's notification and compensation responsibilities. For more information, see AEMO's Procedures for issue of directions and clause 4.8.9 instructions.

274 AEMC, second directions paper, p 91.

275 AEMC, second directions paper, p 95.

276 More information on the *Review into electricity compensation frameworks* can be found on our website.

The NER currently provides AEMO with the power to issue a direction to any registered market participant to take a specified action to ensure the power system remains reliable and secure.[277] There are four key points at which AEMO publishes a market notice when exercising its power to issue a direction.[278]

1. Prior to issuing a direction, AEMO is required to publish a market notice identifying any foreseeable circumstances that may require AEMO to implement an intervention event.[279]
2. AEMO must then publish a market notice estimating the latest time at which it would need to intervene if a market response does not alleviate the need for direction.[280]
3. Once the latest time for AEMO intervention is reached without a suitable market response, in practice AEMO then issues a direction by notifying the relevant participant(s) and publishes a market notice indicating it has issued a direction.[281] This practice is not codified in the NER (see Figure 1.1 that illustrates this gap).
4. Finally, AEMO should then revoke the direction as soon as AEMO determines that the direction is no longer required.[282] AEMO usually does this by notifying the participant and issuing a new market notice.

The NER is similarly silent on what type of information AEMO is required to provide to the market when issuing a direction. Market notices for directions are valuable to market participants because they can provide:

- information about security requirements under both normal and exceptional circumstances, and how participants' services could respond to alleviate these security needs
- information about how the direction has impacted regular market outcomes so that participants can manage risk and impacts on their operations.[283]

We have heard from stakeholders there is a desire for greater information to be included in such market notices, particularly for system security. For instance, as we identified in our second directions paper, market notices do not contain the identity of the directed participant, nor any description of the system security service that was needed beyond that the direction is needed to maintain system security. We heard from EnergyAustralia:[284]

> In our view, stating that a Direction is required to "maintain PSS power in a region(s) for a specified period of time" does not provide a full account of all relevant and meaningful details as specified in NER Rule 4.8.3. The absence of this level of detailed information on the need to trigger a direction is further exacerbated by the lack of information of the service required to restore or maintain PSS. Arguably this represents a lost opportunity on the generation of market signals to address the need for the direction, particularly if the same issue occurs on a regular basis.

An example of the information AEMO provides in its market notices is provided below.[285]

> **AEMO ELECTRICITY MARKET NOTICE — Direction — NSW region — 15/11/2023**

277 NER clause 4.8.9(a1).
278 AEMO market notices are published at https://aemo.com.au/en/market-notices.
279 NER clause 4.8.5A.
280 NER clause 4.8.5A(c).
281 When issuing this market notice, AEMO is guide by its Procedures for issue of directions and clause 4.8.9 instructions.
282 NER clause 4.8.9(b)(2).
283 AEMC, Second directions paper, p 104.
284 EnergyAustralia submission to the second directions paper, p 7.
285 This content was taken from AEMO Market Notice 111375.

> In accordance with section 116 of the National Electricity Law, AEMO has issued a direction to a participant in the NSW region. For the purposes of the National Electricity Rules this is a direction under clause 4.8.9(a).
>
> The direction was necessary to maintain the power system in a secure operating state.
>
> AEMO may issue or revoke additional directions in order to meet the current requirement, unless sufficient market response is provided. A further market notice will be issued when all directions related to this requirement have been cancelled.
>
> The issue of the direction commences an AEMO intervention event. AEMO declares all trading intervals during the event to be intervention trading intervals, commencing from the interval ending 2205 hrs on 15/11/2023.
>
> Intervention pricing does not apply to this AEMO intervention event.
>
> Manager NEM Real Time Operations

The Commission considers there is a level of detail that could be included in market notices that would provide market participants with the valuable information needed to understand security requirements and market outcomes to position their plant operationally, while also ensuring that the administrative burden on AEMO to issue slightly more detailed market notices is not excessive.

7.2.2 The final rule addresses this gap by requiring AEMO to provide valuable detail in market notices

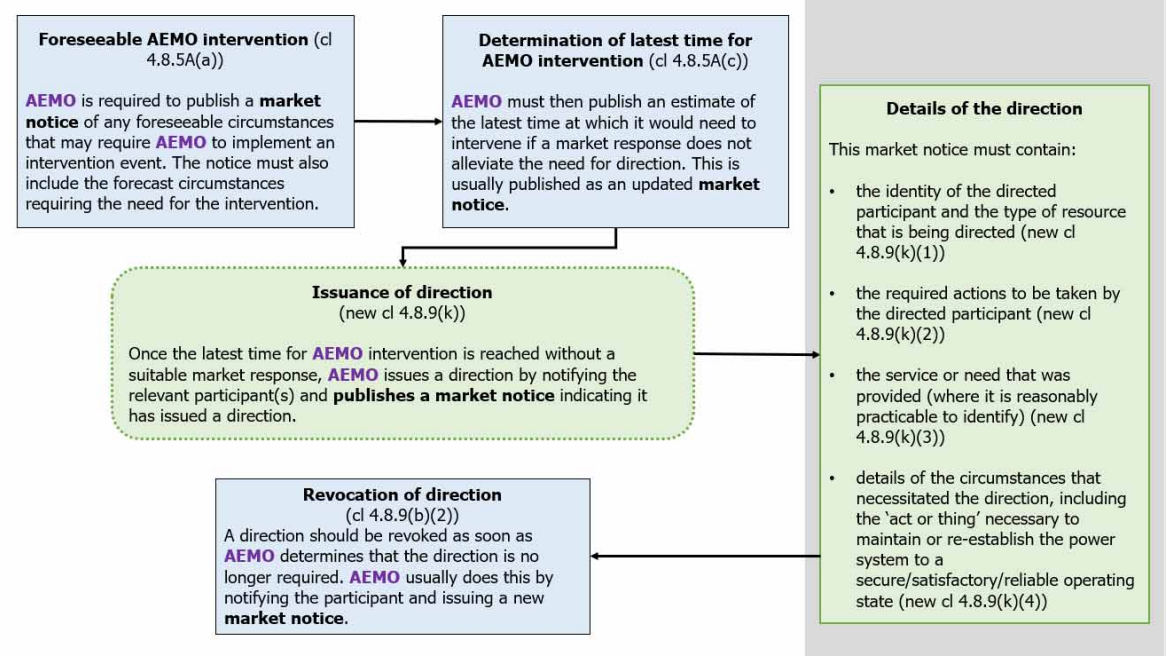
The final rule codifies AEMO's obligation to publish a market notice when issuing a direction and prescribes the level of detail required. This aims to improve transparency around direction events while balancing extra detail required this with AEMO's administrative burden. To that end, the final rule provides that if AEMO has issued a direction, it must publish a market notice setting out:[286]

- the directed participant and the type of directed resource subject to the direction
- the required actions to be taken by the directed participant
- the service or need that was provided (where it is reasonably practicable to identify this)
- details of the circumstances that necessitated the direction, including the 'act or thing' that is necessary to maintain or re-establish the power system to a secure operating state, a satisfactory operating state, or a reliable operating state.

By including this information, market participants are able to better understand the security requirements and needs of the power system in real-time, enabling participants to learn how to respond more promptly and efficiently to market intervention events.

286 Final rule, clause 4.8.9(k).

Figure 7.1: The new market notice framework



7.2.3 The new detail to be included in market notices is informed by stakeholder feedback

The final rule is informed by the feedback we received from stakeholders in response to our second directions paper. There, we proposed that when issuing a direction AEMO would be required to publish a market notice that includes high-level information about the direction, such as the identity of the directed participant(s).[287]

Stakeholders near unanimously supported our proposal to codify AEMO's obligation to publish a market notice when issuing a direction, as well as the level of detail required, citing a need for greater transparency.[288] In particular, stakeholders strongly called for AEMO to better detail the security service or need being addressed in market notices, as this would improve market signals.[289]

We heard from ENGIE that:[290]

> This would be a very low-cost reform. We agree that better information about the reason for the direction in the form of an appropriately specified market notice would provide better real time information to market participants.

Similarly, AEMO has expressed support for providing more information through market notices. However, AEMO did not support the proposals in the second directions paper to include the number of megawatts (MWs) directed and a brief description of the circumstances that necessitated the direction.

287 See Box 2: Refresher on what we proposed in our second directions paper.

288 Submissions to the second directions paper: Energy Australia, p 8; AER, p 4; Clean Energy Council, p 16; ENA, p 19; Delta Electricity, p 3; Shell Energy, p 4; ENGIE, p 4.

289 AEMC, second directions paper, p 106; Submissions to the second directions paper: CS Energy, p 8; EnergyAustralia, p 7.

290 ENGIE submission to the consultation paper, p 4.

AEMO indicated that including the number of MWs that was directed and details about any future dispatch targets is not feasible. This is because AEMO directions are not for an energy quantity in MW, but rather for a participant to synchronise and follow dispatch targets.[291]

In light of this feedback, the Commission has decided to not include this requirement in the final rule. Further, information pertaining to the number of MWs directed is available to market participants and consumers on AEMO's website.[292]

Regarding the requirement for AEMO to provide a brief description of the circumstances that necessitated the direction, the Commission expects AEMO would identify the technical category of a particular direction. This would include whether voltage control or grid reference was required from the directed participant. We note AEMO's feedback that requiring any further details of circumstances necessitating the direction would unduly impede NEM Real Time Operations (RTO) and are more appropriately identified in other publications.[293]

The Commission considers that as AEMO already publishes market notices following directions, and the additional information outlined above is already known by AEMO at the time of a direction being issued, the extra level of administrative burden to implement these changes is expected to be minimal.

7.3 We have improved the timing and level of detail required in AEMO's directions reporting

7.3.1 Greater transparency and clarity on timing is needed for AEMO directions reporting

The NER currently requires AEMO to publish a report for each direction event 'as soon as reasonably practicable'.[294] The absence of a precise time frame has resulted in a significant time lag between a direction being issued and its corresponding report being published.[295] This time lag is compounded by the large volumes of directions being issued. For instance, from 1 January 2020 to 17 February 2024, 636 market notices issuing directions were published.[296] Further, the laborious process of AEMO having to prepare a directions report for each direction event has contributed to this delay.[297]

The time lag was also noted by the Commission's 2019 Intervention mechanisms review, where we stated:[298]

> The lack of a precise time by which reports must be published means that there is a significant time lag between the issuance of a direction and the report published in relation to that direction. The Commission acknowledges that AEMO has recently published a number of additional market event reports that were not available when the consultation paper was published. These latest reports cover system strength directions up to October 2018. Many directions have been issued since then for which reports are yet to be prepared.

291 AEMO submission to the second directions paper, p 20.

292 See NEMWEB for this market data from AEMO.

293 AEMO submission to the second directions paper, p 20. As noted in our second directions paper, AEMO also publishes information relating to directions in other publications, such as their Quarterly Energy Dynamics reports (see pp 105-105).

294 NER clause 3.13.6A(a).

295 For examples of this time lag, see our second directions paper, p 105.

296 We note that the figure on p 104 of our second directions paper was inclusive of revocation notices issued by AEMO pursuant to NER clause 4.8.9(b)(2).

297 AEMC, second directions paper, p 92.

298 AEMC, Investigation into intervention mechanisms and system strength in the NEM, p 83.

In the final report for the AEMC's 2019 Intervention review, the Commission agreed with stakeholder sentiment that greater transparency in directions reporting was required, and recommended that AEMO should publish its directions reports within a clearly defined period.[299]

This sentiment remains, as stakeholders in their submissions to the second directions paper supported further codification around directions reporting, particularly with respect to timing.[300]

7.3.2 The final rule provides clarity on the timing for directions reporting

The Commission has clarified the timing of AEMO directions reporting. The final rule provides that AEMO must, within 40 calendar weeks of a direction being *revoked* in accordance with NER clause 4.8.9(b)(2), or the direction otherwise ending, publish a report on the direction.[301]

We consider that this timing will provide clarity for AEMO and market participants alike, and address the significant time lags experienced between a direction being issued and its corresponding report being published. The directions report is required to include all information previously required in the NER, with one new addition: AEMO will be required to include the identity of the directed participant and the type of directed resource.[302] This is consistent with the changes to market notices when issuing a direction, and will provide market participants and consumers with greater transparency and valuable information to better understand market outcomes and the security needs of the power system.[303]

Along with information that is already required, this means directions reports will include:

- the circumstances giving rise to the need for the direction
- the basis on which it determined the latest time for that direction and on what basis that it determined that a market response would not have avoided the need for the direction
- details of the changes in dispatch outcomes due to the direction
- the processes implemented by AEMO to issue the direction
- if applicable, the basis upon which AEMO did not follow any or all of the processes set out in rule 4.8 (Power system security operations) before issuing the direction
- the basis upon which AEMO determined its approach to setting spot prices and ancillary service prices
- details of the adequacy and effectiveness of responses to inquiries made by AEMO to estimate and publish the latest time at which a direction intervention is needed
- information regarding any notification by a Registered Participant that it will not be able to comply with a direction
- if applicable, the information pertaining to AEMO's use of the supply scarcity mechanism
- the identity of the directed participant and the type of directed resource (new addition in the final rule).

299 AEMC, Investigation into intervention mechanisms and system strength in the NEM, final report, pp 84 – 87.

300 Submissions to the second directions paper: Alinta Energy, p. 4; Australian Energy Council, p. 6; Transgrid, p. 9; AER, p. 4; ENA, p. 19; ENGIE, p. 4; Shell Energy, p. 4.

301 Final rule, clause 3.13.6A. The reasons for this timeframe are provided in section section 7.3.3.

302 Final rule, clause 3.13.6A(a)(10).

303 AER submission to the second directions paper, p 4; See section 8.2.1 on changes to market notices.

7.3.3 The 40 calendar week cadence for directions reporting allows AEMO to provide final settlement data to market participants

As noted above, the final rule provides that AEMO must publish a report within 40 calendar weeks of a direction being revoked or otherwise ending.[304] The Commission has therefore departed from its proposal in the second directions paper that AEMO be required to prepare quarterly reports that include detailed information about directions in each quarter.[305]

We understand that submissions to our second directions paper were in response to the quarterly reporting timing, for which we received near-unanimous support from stakeholders.[306] However, the 40 calendar weeks timing was arrived at in collaboration with AEMO, who advised that final settlement data is only available 30 calendar weeks ex-post.[307] As such, quarterly directions reporting would rely on provisional settlement data, thereby providing market participants with an incomplete data set. It would also increase AEMO's administrative burden, as revisions to the quarterly reporting would be needed to account for final settlement data.

The new 40 calendar week approach better balances the needs of market participants with the administrative resources of AEMO, and the cadence of its final settlement data for direction events. The clock starts for this timeframe when the direction is either revoked or otherwise ended, as opposed to when the direction is issued. This is because a direction may span several days, therefore impacting the period in which compensation for the direction event is calculated, and in turn, when settlement data is finalised.

The Commission has not prescribed the precise period that ought to be canvassed in AEMO's directions reports, to allow for flexibility when direction events run across prolonged timeframes. However, AEMO has recently updated and automated its approach to directions reporting. It now reports on a period of approximately one month in a concise format that aligns with NEM settlement timetables,[308] and the Commission expects this reporting trend will continue.[309] This means that AEMO will no longer be required to undertake the onerous exercise of producing a single report for each direction event, which has contributed to delays in the reporting process. The Commission considers this approach will provide greater certainty and transparency for market participants while ensuring AEMO is clear on its direction reporting timeframe obligations.

7.3.4 The final rule requires AEMO to publish a breakdown of the total compensation paid to each directed participant

Currently, the NER requires AEMO to publish a breakdown of the compensation recovery amount by each category of registered participant, as determined by AEMO, in each region.[310] This is the difference between the amount payable under automatic compensation and the amount AEMO retains from normal spot market prices. In addition to this requirement, the final rule will require AEMO to publish a breakdown of the total amount of compensation paid to each directed and affected participant.[311]

304 Final rule, clause 3.13.6A(a).

305 This proposal is outlined in section 6.5.2 of our second directions paper.

306 Submissions to the second directions paper: Alinta Energy, p 4; Australian Energy Council, p 6; Transgrid, p 9; AER, p 4; ENA, p 19; ENGIE, p 4; Shell Energy, p 4.

307 AEMO submission to the second directions paper, p 17.

308 AEMO submission to the second directions paper, p 15.

309 See AEMO's updated approach to directions reporting here. The timing is evident in the reports for Directions to SA Generators — 27 May 2023 to 26 June 2023, 2 May 2023 to 27 May 2023, and 24 March 2023 to 28 April 2023.

310 NER clause 3.13.6A(b)(3).

311 Final rule, clause 3.13.6A(c)(1).

For each of these requirements, AEMO can publish this information in accordance with the 40 calendar week cadence, thereby providing final settlement data in the reporting. Regarding the compensation recovery amount, this timing is permitted under the existing wording in clause 3.13.6A(b). The final rule also expressly permits this timing for publishing a breakdown of the total amount of compensation paid.[312]

This new requirement will enable accurate reporting on the compensation amounts payable, providing both participants and consumers with clearer information and greater transparency. The current compensation recovery amount that is reported is somewhat opaque. Reporting based on compensation recovery amounts alone can be an inaccurate signal to the cost of compensation, rather than reporting the total amount payable to each directed and affected participant.[313] Including a breakdown of compensation payable to each directed and affected participant would benefit market participants and consumers by providing:

- a more accurate metric on the costs of directions and a better understanding of their effect on the wholesale market
- market customers and consumers with clearer compensation information about their wholesale electricity costs
- greater transparency at the individual level to temper any potential inefficiencies from inefficient bidding behaviour.

We heard from various stakeholders that there is a need for improved reporting on the compensation paid to each directed participant — and stakeholders supported our proposal to do so in the second directions paper.[314]

7.3.5 The final rule requires AEMO to maintain a single source of specific information for each direction

The final rule requires AEMO to publish and maintain, a single source covering the following information for each direction:[315]

- the date and time the *direction* was issued and the date and time it was revoked in accordance with clause 4.8.9(b)(2), or otherwise ended
- the type of *directed resource* subject to the *direction*
- the identity of the *Directed Participant*
- the *region* in which the *directed resource* is located
- the required actions to be taken by the *Directed Participant*.

The Commission considers this additional information will provide stakeholders with better insight into system security needs and any trends that may be occurring, providing greater opportunities for networks, generators, and market bodies to identify efficient solutions to alleviate security needs across short and long-term planning. Moreover, this will enable market participants to see aggregated data and information on directions, including numerical trends over time.

We note that AEMO has recently updated its directions reporting method to provide this additional information (see Figure 7.2 below). The Commission considers that AEMO's improvements provide increased transparency and valuable information for market participants. We consider

312 Final rule, clause 3.13.6A(d).

313 AEMC, second directions paper, p 108.

314 AEMC, draft determination, pp 7, 110; Submissions to the second directions paper: Shell Energy, p 4; AGL, p 4; Snowy Hydro, p 5; CEC submission to the draft determination, pp 6-7.

315 Final rule, clause 3.13.6A(c)(2).

AEMO will experience minimal to no administrative burden in implementing this aspect of the final rule as it codifies AEMO's current practice.

The timing of publishing this aggregated information aligns with the new timing for direction reports — that is, AEMO is not obliged to update the information until 40 weeks after the direction is revoked or otherwise ends.[316] This reduces the administrative burden on AEMO as it allows AEMO to align its reporting activities. However, AEMO might choose to update some or all of this information earlier than 40 weeks if it becomes available.

Figure 7.2: Example of system security directions included in AEMO's new reporting method

Table 2 Summary of South Australian system security directions (energy only) and the circumstances giving rise to the need for direction.

Summary of system security directions

Report Event	Directed unit	Directed Participant	Region	Issue time	Effective time	Cancellation time	Reason	Direction instruction	Market Notice for the latest time to intervene
20230527	MINTARO	Synergen Power Pty Limited	SA1	27/05/2023 14:45	27/05/2023 22:30	29/05/2023 06:00	System security	Synchronise	MN 108216
20230527	TORRB4	AGL SA Generation Pty Limited	SA1	27/05/2023 14:45	28/05/2023 01:00	28/05/2023 15:00	System security	Synchronise	MN 108216
20230527	TORRB4	AGL SA Generation Pty Limited	SA1	30/05/2023 16:30	31/05/2023 12:00	31/05/2023 15:00	System security	Synchronise	MN 108269
20230527	MINTARO	Synergen Power Pty Limited	SA1	30/05/2023 22:00	31/05/2023 09:30	31/05/2023 15:30	System security	Synchronise	MN 108269
20230527	OSB-AG	Origin Energy Electricity Limited	SA1	30/05/2023 22:30	31/05/2023 09:30	31/05/2023 12:00	System security	Remain	MN 108269
20230527	MINTARO	Synergen Power Pty Limited	SA1	01/06/2023 21:00	02/06/2023 10:30	02/06/2023 08:20	System security	Synchronise	MN 108321
20230527	MINTARO	Synergen Power Pty Limited	SA1	02/06/2023 21:00	03/06/2023 10:30	02/06/2023 23:30	System security	Synchronise	MN 108330
20230527	TORRB4	AGL SA Generation Pty Limited	SA1	02/06/2023 23:30	03/06/2023 10:30	03/06/2023 10:00	System security	Synchronise	MN 108330
20230527	QPS5	Origin Energy Electricity Limited	SA1	03/06/2023 11:25	03/06/2023 13:30	03/06/2023 15:30	System security	Synchronise	MN 108330
20230603	MINTARO	Synergen Power Pty Limited	SA1	03/06/2023 10:20	03/06/2023 20:00	05/06/2023 15:00	System security	Synchronise	MN 108335
20230603	TORRB4	AGL SA Generation Pty Limited	SA1	03/06/2023 15:00	04/06/2023 00:00	05/06/2023 05:30	System security	Synchronise	MN 108335
20230603	MINTARO	Synergen Power Pty Limited	SA1	05/06/2023 14:00	05/06/2023 21:00	06/06/2023 15:00	System security	Synchronise	MN 108357
20230603	TORRB4	AGL SA Generation Pty Limited	SA1	05/06/2023 14:00	06/06/2023 00:30	06/06/2023 07:00	System security	Synchronise	MN 108357

Source: AEMO Direction report, Directions to SA Generators – 27 May 2023 to 26 June 2023.

7.4 Reporting on directions trends will be included in the transition plan for system security

The final rule requires AEMO to identify any trends in the use of directions in its new annual reporting obligation of a transition plan for system security.[317] As such, this report would include commentary on how directions are being used, and if frequently used, what AEMO plans to do to reduce their use. AEMO is required to publish its transition plan annually, starting from **1 December 2024**.

In the transition plan for system security, AEMO's commentary could cover details like the information proposed in our second directions paper:[318]

- any trends in the use of directions (like those included in the QED), such as the percentage of time each region is under direction. Trends could include:
  - the percentage of time each region is under direction

316 Final rule, clause 3.13.6A(d).
317 Final rule, clause 5.20.8(c)(9).
318 AEMC, second directions paper, p 107.

- aggregate historical costs of issuing reliability and security directions across the NEM
- a breakdown of the number of directions categorised by system security need or reason.

- AEMO's view on whether the circumstances necessitating directions could occur again in the future, and whether any actions are being taken to manage power system reliability and security (to reduce the instance of directions)

In the second directions paper, the Commission proposed that AEMO would be required to prepare a detailed quarterly report that includes trends observed in directions in each quarter and AEMO's view on whether directions may be required in future reporting periods.[319] We received broad support from stakeholders on this policy proposal. For example, EnergyAustralia said:[320]

> EA strongly supports the proposal to codify AEMO reporting obligations to improve transparency on the use, nature and type of direction being utilised. However, the proposed quarterly report content needs to be substantially more than statistical reporting and include, as proposed by the AEMC, trends observed in directions in each quarter and a view on whether directions may be required in future reporting periods.

AEMO's feedback in its submission indicated that any reporting on directions trends would be better placed along with other system security reports, and that trends on when or how directions are required can only be reported 'objectively'. AEMO considered that providing anything beyond 'objective' reporting explaining why directions are occurring would require AEMO to explain the function and design of other security and market frameworks.[321]

In light of this feedback, the Commission considers it more appropriate for AEMO to report on direction trends in the transition plan. As explained in chapter 8, the transition plan requires AEMO to outline the steps it will take to manage system security through the transition.

Part of this plan should be to provide a clear picture of how AEMO expects interventions may need to be used in the future, as far as this is known, with greater detail surrounding reliability and security issues that face the NEM. Therefore, reporting on directions trends, and any additional commentary on reasons for the current or potential future use of directions and how AEMO is managing this, would be valuable within the broader transition plan for system security.

We consider this revised approach, with a simpler requirement to report on 'any trends in the use of directions' takes into account AEMO's feedback that it can only provide objective reporting, while positioning this reporting within the broader context of AEMO's transition plan for system security, and allowing AEMO flexibility to provide any further commentary on the past or future expected use of directions as relevant. Finally, this new report is required to be published on an annual basis — and we consider this to be an appropriate timeframe for which AEMO can collate and produce meaningful reporting on direction trends.

7.4.1 The final rule does not include a trigger for reporting following the repeated use of directions

We proposed in our second directions paper that any repeated use of directions would trigger a reporting requirement for AEMO. Specifically, if a direction has been issued to a particular generator 30 times or more within a 12-month period, then AEMO would be obliged to:[322]

- detail the circumstances that have led to the need for repeated directions

319 AEMC, second directions paper, p 107.
320 EnergyAustralia submission to the second directions paper, p 8.
321 AEMO submission to the second directions paper, p 19.
322 AEMC, second directions paper, p 108.

- provide details of any ongoing or planned investigation or joint planning with TNSPs to procure services to alleviate the need for directions
- state whether AEMO has, or intends to enter into, a contract to procure security services that would obviate the need for repeated directions (for example, a contract for the provision of inertia, system strength, or a transitional service).

The Commission has decided to not include this proposal in the final rule as we consider that AEMO will have the opportunity to explain why a direction event is particularly enduring when reporting on direction trends in the transition plan for system security.[323] We also note feedback from AEMO to the second directions paper which indicated that:[324]

> The circumstances for a repeated direction are the same as for a single direction, so AEMO would already have provided this information through other reporting obligations.

7.5 The Commission considers that changes to directions transparency align with, and promote, the assessment criteria

7.5.1 The final rule promotes power system security through increased transparency

Improving the directions reporting process through more detailed market notices and clearer directions reporting will promote power system security. Market notices can give important information about system security issues in real-time, allowing generators who may be able to relieve security gaps to reposition their plant operationally to meet system needs. The requirement for AEMO to publish its direction reports within a 40 calendar week cadence and include greater detail about the circumstances surrounding the direction event, as well as the total compensation amount recovered, will also provide stakeholders and consumers with valuable information about power system security.

7.5.2 The final rule promotes principles of good regulatory practice through transparency, predictability and simplicity

The changes to market notices and directions reporting will promote greater transparency over how AEMO manages power system security, and provide stakeholders with useful information about the market. This will allow participants to understand security issues better, enabling them to make more efficient operational and economic decisions. Clearer compensation information will also allow costs to be better understood by participants and consumers and therefore these costs will be more predictable. Further, reporting on direction trends in the transition plan will increase transparency for those times — which should become more scarce — when AEMO needs to resort to market interventions to manage system security.

7.5.3 AEMO will experience minimal to no implementation burden

The Commission has sought to reduce administrative burden where possible. The final rule draws on existing arrangements and where possible, aligns the details of how AEMO's obligations are expressed with AEMO's recent transparency improvements. The relatively low implementation costs are outweighed by the market benefits provided by providing greater transparency to market participants and consumers.

323 More information is provided in section section 7.4 and chapter 8.

324 AEMO submission to the second directions paper, p 21.

8 The rule introduces a transition plan for system security

Box 10: Key points in this chapter

- The Commission has introduced a new annual reporting requirement known as the **"transition plan for system security"** (transition plan).
- The transition plan, coupled with type 2 contracts introduced through transitional services framework, will together provide AEMO with the necessary tools to manage security in a low or zero-emissions power system and will ensure the industry is well-informed throughout this process.
- The transition plan requires AEMO to report on the steps it will take to manage system security through the transition.
- It will support industry understanding of:
  - how AEMO is planning to meet the security needs of the power system through the transition to a low- or zero-emissions system, and
  - the current technical understanding of system security and work to improve this understanding and specify services.
- Importantly, the rules specify the content AEMO must address in the transition plan. This will provide greater clarity and certainty to the industry on what security services, technologies, or capabilities are needed to maintain a secure power system as we transition. The transition plan will cover:
  - AEMO's current understanding of, and work on refining, security services and any operational metrics AEMO uses, or is developing, to manage security.
  - a detailed description of AEMO's long-term plan to manage security and the work it is doing to address system security challenges as we transition
  - the required capabilities or new entrant resources that could participate in managing system security
  - a plan for how AEMO intends to move away from using the contracts that are contained within the transitional services NMAS framework
  - the outcomes and learnings from the trials conducted through type 2 contracts (see chapter 5), and how this is contributing to long-term security management. AEMO must also publish outcomes from trials as soon as possible if they conclude between publications of the transition plan.
- It is likely that AEMO will require information and may seek advice from NSPs to meet the requirements outlined in this report. In doing so, we expect NSPs to engage with AEMO, fostering a collaborative effort to ensure the successful completion of each plan.
- The Reliability Panel (the Panel) has the opportunity to provide input on the annual transition plan, within 6 months of the publication of the transition plan. Any input provided by the Panel will be public. AEMO will then address this input in its next publication. This could include clarifying comments, questions, or targeted input.

- The AEMC intends to review these new reporting obligations after seven years, in the same review as the transitional services framework review. This review will consider whether the consultation process achieves its intended outcomes to provide increased transparency and clarity to the industry. Additionally, the review will assess if the transition plan effectively serves as an avenue for stakeholders to actively contribute to and enhance their understanding of the management of security through the transition, and whether AEMO is able to obtain the necessary information, from NSPs or otherwise, to fulfill the requirements of the transition plan.
- AEMO must publish the first transition plan for system security by 1 December 2024. We expect AEMO will undertake stakeholder consultation in developing this report, which could involve targeted consultation with NSPs.
- As noted above, AEMO must also engage with the Panel following the release of the transition plan for system security and incorporate any feedback into its next publication.

How we have incorporated stakeholder input and updated these arrangements since the Update paper

- Stakeholders overwhelmingly supported the introduction of a new reporting requirement — the transition plan for system security — and the increased transparency it would provide, as well as a role for the Panel to engage with the transition plan.
- In the final rule, the Commission has increased the cadence of the report to an annual cycle, compared with the two-year draft and final cadence proposed in the update paper. This responds to AEMO's concerns that the two-year cadence could delay the timely delivery of valuable information to industry.
- Within the content of the transition plan, some stakeholders considered that the timelines for specifying services should be codified to ensure the timely transition to procurement of individual services. While we recognise stakeholder feedback that there is a need to introduce timelines to individually procure services, we consider that increasing the transparency on AEMO's understanding of security needs, and any work it is doing to individually define security services, is the best approach for the industry given our current engineering knowledge.
  - The former approach assumes an outcome before the technical feasibility studies are complete and the economic justification is thoroughly explored.
  - Given that the NEM is at the forefront of understanding how to run a large, interconnected power system on high levels of IBR, flexibility is essential to ensure the power system is managed securely and efficiently.
- Some stakeholders considered the Panel's role should be expanded beyond a consulting role. The AEMC considers the Panel's role of providing input as specified in the final rule is appropriate, however, after seven years the AEMC will review whether the transition plan is achieving its intended outcomes, with a focus on the effectiveness of the consultation process between the Panel and AEMO.
- Stakeholders also considered that the trial outcomes be published as soon as a trial has concluded, rather than waiting for the transition plan, which we agreed with and have addressed.

This chapter covers:

- Section 8.1 — the Commission is introducing a new report that outlines AEMO's transition plan for system security
- Section 8.2 — why the Commission considers an additional reporting requirement is needed
- Section 8.3 — AEMO will report annually on its transition plan for system security
- Section 8.4 — AEMO will engage with the Reliability Panel on the transition plan for system security
- Section 8.5 — the AEMC will review whether the transition plan is achieving the intended outcomes of transparency
- Section 8.6 — the Commission's policy proposals complement AEMO's broader work on security
- Section 8.7 — the Commission considers that the transitional services framework aligns with, and promotes, the assessment criteria.

8.1 The Commission is introducing a new report that outlines AEMO's transition plan for system security

We are introducing a new report called the "transition plan for system security".[325] Through this report, AEMO will outline the steps it is undertaking to manage system security as the power system transitions to net zero.

The purpose of the transition plan is to support industry understanding of:[326]

- how AEMO is planning to maintain power system security through the transition to a low- or zero-emissions power system
- AEMO's current technical understanding of what is needed to achieve power system security in a low- or zero-emissions power system and the work AEMO is undertaking to improve this understanding and specify the range of services that will be required.

To complement and support industry-wide learning and collaboration, the Panel may provide written commentary to AEMO on the transition plan following its publication.[327] This may involve targeted feedback, questions or the request for further information on key issues. Any written feedback provided by the Panel will be made public through the transition plan.[328]

AEMO must respond to any written commentary raised by the Panel in the next transition plan.[329] We also expect AEMO will undertake stakeholder consultation on the transition plan.

We consider that the transition plan for system security addresses stakeholder feedback and creates the right incentives for both AEMO and the industry to support investment in the right capabilities of plant needed to maintain a secure system before existing resources retire.

This strikes an appropriate balance between improving transparency on security needs, while also not prescribing the milestones AEMO should be undertaking to progress its understanding of system security needs given the uncertainty on how that understanding will evolve. This provides flexibility in determining the most appropriate ways of managing system security.

325 Final rule, clause 5.20.8(a).
326 Final rule, clause 5.20.8(b).
327 Final rule, clause 5.20.8(d).
328 Final rule, clause 5.20.8(c)(10).
329 Final rule, clause 5.20.8(e).

8.2 Why the Commission considers an additional reporting requirement is needed

We consider this report is needed to ensure that industry is well-informed about:

- how AEMO is planning to meet the security needs of the power system through the transition to a low- or zero-emissions system, and
- the current technical understanding of system security and work to improve this understanding and specify services.

In providing this information, the plan will help promote knowledge to the market about what investment is required in the resources and capabilities needed to manage a secure system, before existing plant retires. It addresses feedback from stakeholders about the need for more transparency on the services and any operational standards AEMO implements to manage power system security and the progress AEMO is making towards managing system security with high levels of inverter based resources.

8.2.1 Both rule change requests identify that the energy transition is causing security challenges

The rule change requests[330] identified that the changing generation mix and increase in inverter-based resources have led to a scarcity of security services like inertia and system strength. These services have historically been provided by synchronous thermal generators, which are now retiring. Even before retirement, they may be incentivised to de-commit from the market during periods of low demand and low energy prices[331] In recent years, this has led to an increase in directions to keep these synchronous units online to provide security services.

As we transition to net zero where there will be a high proportion of inverter-based resources, ensuring the security of the system without the support of security services from synchronous generators becomes paramount. However, the challenge lies in the lack of knowledge and operational experience to achieve this transition seamlessly. Recognising this gap, transitional services contracts (as discussed in chapter 5) emerge as valuable tools, offering pathways to learn and manage the system in the interim.

The Commission still considers that the ultimate goal — if both technically feasible and economically justifiable — remains the independent procurement and valuing of security services (or 'unbundling'). We recognise that this could provide investment and scarcity signals for participants to deliver these services at least cost to consumers. However, at present, the required knowledge and operational experience for such a transition are lacking. To navigate this uncertainty, a clear and transparent plan, along with a comprehensive program of work, is essential to transition the system securely.

Despite the absence of a direct proposal for such a plan in the rule changes, the Commission emphasises the fundamental importance of transparency and stakeholder involvement in developing a plan — both of which were concepts covered in the rule change requests and their solutions. This proactive approach is seen as critical to managing the challenges outlined in the rule change requests and achieving a smooth transition to a system that no longer relies on synchronous generators for security needs.

330 Rule change requests to the AEMC: Hydro Tasmania, p 3 and Delta Electricity, p 3, rule change requests to AEMC.
331 Delta Electricity rule change request to the AEMC, p 3.

8.2.2 We proposed the transition plan for system security in response to stakeholder feedback on unbundling

Throughout this rule change process, a recurring concern raised by stakeholders is the desire for the unbundling of services, which includes the individual specification, valuation, and procurement through spot market arrangements. Stakeholders emphasise the need for AEMO to independently and technically specify, as well as operationally manage services, rather than relying solely on unit configurations. While acknowledging the current limitations faced by AEMO in fulfilling this request, stakeholders are keen to understand AEMO's plans for increasing its technical understanding and engineering knowledge, and specifying system security needs as the system undergoes the transition.

Consistent with this, many stakeholder submissions to the second directions paper strongly called for 'unbundling' of security services as soon as possible, particularly the consideration of an inertia spot market (see chapter 3 for more details).[332]

As the Commission has previously set out, advice from AEMO says that unbundling system security services in real time, including inertia, is not possible at the current time. AEMO's view is that further understanding and knowledge is required first.

Accordingly, the December 2023 update paper proposed to introduce a new reporting requirement on AEMO to produce a **"transition plan for system security"**. This was designed to support transparency of, and investment in, resources needed to manage system security in the longer term. To promote collaboration and industry-wide learning, it was proposed that AEMO would publish a draft plan, which it would engage with the Panel on, as it does with other security reports.

8.2.3 Stakeholders supported the introduction of the transition plan

Stakeholders overwhelmingly supported the introduction of the transition plan.[333] Stakeholders highlighted that this would promote and improve transparency, helping to provide investment signals for the right type of resources to provide security.

Conversely, AEMO, while recognising the benefits of stakeholder engagement, held concerns about the level of prescription in the rules that we proposed. AEMO noted:[334]

> AEMO agrees cross industry collaboration is fundamental to securely transitioning the NEM to a decarbonised power system and AEMO is committed to delivering increased transparency. AEMO supports the intention of the proposed "transition plan for system security" to support increased transparency and industry engagement but considers that the reporting and engagement should reflect the evolving nature of the transition.

8.3 AEMO will report annually on its transition plan for system security

AEMO will report annually (by 1 December each year) on its transition plan for system security and the pathway AEMO is undertaking to evolve its engineering knowledge and manage security in a low- or zero-emissions system without needing to rely on type 1 transitional service contracts.[335]

---

332 Submissions to the second directions paper: EnergyAustralia, pp 1-2; Ergon Energy, p 2;, AEC p 4; Snowy Hydro, p 4; Stanwell p 3; CS Energy p 2; CEC, pp 1-2; Delta, p 1; Iberdrola, pp 2-3; AGL, pp 2-3.

333 Submissions to the update paper: CS Energy, p 5; Alinta, p 1; Snowy Hydro, p 2; Origin Energy, p 1; Ergon Energy Retail, p 2; AGL, p 2; EnergyAustralia, p 2.

334 AEMO submission to the update paper, p 5.

335 Final rule, clause 5.20.8(a).

Specifically, the transition plan for system security will include: [336]

1. an outline of AEMO's **current understanding** of system security services and any current or planned work towards **refining the specifications for security services** (this could include a description of system settings and technical parameters AEMO believes are necessary to deliver security services from new entrant resources)[337]
2. any **operational metrics** AEMO uses, or is developing, to manage power system security[338]
3. a detailed description of **AEMO's plan to manage power system security** through the transition to a low- or zero-emissions power system, including the work AEMO is doing to address the challenges of transitioning,[339], for example:
   - challenges in different regions and how it plans to address them
   - how it plans to meet required levels of services or aspects of the technical envelope.
4. the proposed number of ancillary services agreements that AEMO is likely to enter into the following two year period in respect to type 1 and type 2 contracts (described in chapter 5)[340]
5. information on how AEMO intends to move away from using type 1 contracts to manage power system security[341]
6. a description of known **capabilities of any particular resources** or equipment that could participate in managing system security[342]
7. the **outcomes, actions and learnings from the trials** conducted through type 2 contracts and how the trials are contributing to maintaining and achieving power system security (note, AEMO can also choose to publish outcomes of trials outside of the transition plan)[343]
8. the **technical priorities** AEMO seeks to investigate through type 2 contracts[344]
9. any **trends in the use of directions**[345]
10. a copy of **any written commentary** provided by the Panel.[346]

In fulfilling the requirements of the transition plan, the collaboration between AEMO and NSPs is pivotal. NSPs play a crucial role in offering insights into the intricacies of the power system and contributing essential data on network conditions. AEMO relies on the expertise and operational knowledge of NSPs to effectively assess and address security needs. TNSPs and AEMO already actively consult and share information as they collaborate within the joint planning process.[347] This established relationship ensures a continuous exchange of insights and data, enhancing their collective planning efforts in the energy sector.

It is likely that AEMO will also find it necessary to draw on information and seek advice from NSPs to meet the requirements outlined in this report. In doing so, we expect NSPs to engage with AEMO, fostering a collaborative effort to ensure the successful completion of each plan. This collaboration not only contributes to the plan's efficacy but also brings widespread industry benefits by supporting a secure power system as the system transitions. We also encourage

336 Final rule, clause 5.20.8(c).
337 Final rule, clause 5.20.8(c)(1).
338 Final rule, clause 5.20.8(c)(2).
339 Final rule, clause 5.20.8(c)(3).
340 Final rule, clause 5.20.8(c)(4).
341 Final rule, clause 5.20.8(c)(5).
342 Final rule, clause 5.20.8(c)(6).
343 Final rule, clause 5.20.8(c)(7).
344 Final rule, clause 5.20.8(c)(8).
345 Final rule, clause 5.20.8(c)(9)
346 Final rule, clause 5.20.8(c)(10).
347 Clause 5.14.4 of the NER.

AEMO to engage with NSPs specifically on developing the transition plan, as an integral aspect of its broader stakeholder engagement efforts. As part of its review, the AEMC may also assess whether AEMO can obtain the necessary information, from NSPs or otherwise, to fulfill the requirements of the transition plan (see section 8.5 for more detail).

While AEMO will be required to meet the above requirements in each report, the Commission also recognises that the initial transition plan might adopt a more streamlined approach compared to subsequent plans, as AEMO will have a limited timeframe to compile the first report. However, for the 2025 plan, AEMO will have sufficient time to meet the plan's requirements and address any feedback from the Panel, and we expect AEMO would achieve a increase in both the quantity and depth of information from this point on. In the subsequent years, AEMO will iteratively enhance the transition plan, contributing to industry-wide understanding and improvement in managing system security through the transition.

8.3.1 The transition plan will increase transparency on current security needs and how AEMO plans to evolve its understanding of these needs over time

The rule requires AEMO to report on its current understanding of security services and operational metrics, and work being done to further develop and understand these (points 1 and 2 above). This will help industry better understand the status of AEMO's technical understanding of system security. We heard strong and consistent feedback throughout this rule change process for more transparency on this. For example, CS Energy considered:[348]

> that a system operability metric should be established. This needs to be treated like any other market parameter, with the economic trade-offs of the level of operational certainty considered and independently scrutinised. A metric would also assist AEMO in its procurement and enablement of contracts, through a consistent parameter to which they must adhere.

Stakeholders not only wanted the ability for industry to better understand security requirements, but also to use this to understand how participants can assist in meeting requirements.

We also consider that this transparency is important to progress the discussion of 'unbundling' of security services. A prerequisite to unbundling is that a service can be technically and individually specified, and that it is technically feasible to manage the service in operational timeframes — whether that be using metrics or another method. At this point, we do not know whether unbundling of security services (beyond frequency, which is already procured through co-optimised markets) will be ultimately technically feasible — and that means that the AEMC cannot determine whether unbundling would be economically efficient and meet the NEO.

AEMO as the system operator is central to developing this technical knowledge. The transition plan will be valuable in explaining to industry the current status of AEMO's knowledge and its future plans to deepen this knowledge, also supported by the learnings obtained through type 2 contracts. This will help progress our understanding on the technical aspects of whether a service can be unbundled — separately specified and managed in operational timeframes.

We consider that the transition plan will improve transparency of system security needs and AEMO's long-term plan to maintain a secure power system. However, we recognise stakeholder concerns regarding the development of this plan and the potential for an independent expert and/or the Panel to play a more substantial role. The outlined engagement process in section 8.4 aims to foster greater collaboration within the industry. However, in the event this engagement

348 CS Energy submission to the update paper, p 3.

does not produce the desired results, the AEMC may propose changes in its review, as detailed in section 8.5.

8.3.2 Setting out AEMO's long-term plan to manage security through the transition will help industry understand the required capabilities of future technology

In the transition plan, AEMO will need to detail its long-term plan to manage security and how it will address security challenges through the transition (point 3 above). This is intended to provide a longer-term view to industry of what changes are necessary in system operations and technologies providing security in order to support the system of the future — and how and when AEMO and others will make these changes. This will help provide industry with more understanding of the required technologies and their capabilities to support security — which will also be required to be outlined in the plan (point 6 above). This, coupled with the requirement for AEMO to outline the number and type of transitional service contracts it intends to enter into, as well as its technical priorities for type 2 contracts (points 4 and 8 above), aims to help incentivise and inform investment decisions in a way that better supports future system security.

To operate the system in the future, AEMO will need to move away from reliance on synchronous generators, many of which are retiring over the coming decade. This means it will need to move away from relying on type 1 contracts to keep the system secure, as it builds knowledge of how to meet those needs without relying on the current providers. AEMO will be required to detail in the transition plan how it intends to move away from using the transitional services framework (point 5 above). There may be instances where AEMO does not know how it will manage the system securely without relying on either type 1 contracts or intervention tools. In these events, we expect AEMO to outline the barriers it is facing (e.g. whether it is due to a lack of knowledge or investment in particular plant types or the need to gain operational experience to test its assumptions), and the plan for how AEMO will overcome these barriers — including the duration it expects to be relying on these tools (e.g. at least X years).

The ability for AEMO to trial new technologies and analyse their outcomes on the power system in a measured way brings significant benefits. This approach provides AEMO with a unique and invaluable ability to systematically test the ability of new technologies to provide security. This measured approach not only allows for careful examination of outcomes but also facilitates the identification of best practices and potential challenges and aims to instil the confidence needed for AEMO to embrace innovation. This deliberate testing mechanism empowers AEMO to make informed decisions, fostering a secure and adaptive power system that aligns with the evolving landscape of technology and energy infrastructure.

We expect that AEMO's plan to manage security will be linked to, and informed by, the trial aspect of the transitional services framework. The outcomes, actions or learnings from these trials and how they are contributing to power system security will be outlined in the transition plan (point 7 above). To provide more clarity to the industry on the types of trials AEMO is focusing on, AEMO will also be required to outline the technical priorities it is seeking through type 2 contracts (point 8 above). AEMO will need to outline how the trial learnings are building AEMO's understanding and confidence to manage security in a low- or zero-emissions system.

While AEMO will not be required to include learnings from previous trials conducted before this rule commences (or trials conducted outside of type 2 contracts), we encourage AEMO to draw on any past or current trial outcomes that may assist industry understanding of emerging security needs and technologies that can meet them.

In response to the update paper proposals, some stakeholders considered that the outcomes of trials should be published as soon as a trial is concluded, rather than delaying publication to publish them as an addendum in the transition plan for system security.[349] In response to this feedback, the Commission notes that when a trial concludes between the publications of the transition plan, AEMO should publish the outcomes of these trials when and where appropriate.

As discussed in chapter 7, the transition plan will also include information on directions trends (point 9). To fully inform the transition plan, the Commission envisages this would include commentary on how directions are being used and, if frequently used, what AEMO plans to do to reduce their use.

To further promote transparency, the transition plan will also include any written commentary provided by the Panel, and AEMO's response, regardless of whether the Panel has also published its feedback (point 10 above).

8.3.3 We consider the required content will increase transparency and industry understanding of security management, while retaining flexibility

We received different feedback from AEMO and industry on how prescriptive the rules should be on the content of the transition plan. AEMO:[350]

> question[ed] the need to define in detail in the NER what must be included in the proposed transition plan for system security....some items are covered, or would typically be covered, in the Engineering Roadmap as they provide analysis and insight on power system needs.

On the other hand, many stakeholders considered there are benefits of specifically codifying the content of the transition plan in the rules.[351] CS Energy considered that such specificity is required to maximise its benefit to the market and promote its integrity.[352]

Ergon Energy Retail also suggested that:[353]

> the transition plan requirements could be enhanced by including transparent disclosure requirements relating to:
>
> a) actions that AEMO plans to take from the learnings captured in relation to new technologies; and
>
> b) its considerations of the emissions objective in type 1 and type 2 contracts.

The Commission recognises AEMO's concerns but considers the level of prescription in the final rule strikes the right balance between giving stakeholders confidence and more transparency in how AEMO will manage system security in the future, while also providing flexibility for AEMO to publish the most up-to-date information it considers valuable to stakeholders. While the Commission has outlined the specific content required in the transition plan (see chapter 5 for more information)[354], AEMO has the flexibility to refer to any other reports or publications where this information is already shared (e.g. the Engineering Roadmap).

349 Submissions to the update paper: CS Energy, p 5; EnergyAustralia, p 2.
350 AEMO submission to the update paper, p 6.
351 Submissions to the update paper: CS Energy, p 5; Ergon Energy Retail, p 2.
352 CS Energy submission to the update paper, p 5.
353 Ergon Energy Retail submission to the update paper, p 2.
354 Final rule, clause 5.20.8(d).

The Commission acknowledges, and wishes to avoid, the impact of unnecessary duplication and the increased administrative burden this brings. To mitigate this, we encourage AEMO to reference existing publications or information sources where pertinent data has already been published.

8.3.4 Annual publication will ensure stakeholders are regularly updated

AEMO will be required to publish the first transition plan for system security by 1 December 2024 and then by 1 December every year after that.[355]

In the update paper, we proposed that the report would include a draft and a final, with the respective reports published in alternate years on a two-year rolling cycle. We also proposed that AEMO would be required to engage with the Panel on the draft plan and take into account any Panel feedback in the final publication.

In its response to the update paper, AEMO considered that the two-year reporting cycle creates a lag in the timely delivery of information to the industry. AEMO considered:[356]

> the Update Paper's proposed requirement to publish a draft (year 1) of the transition plan for system security, receive stakeholder feedback (including the Reliability Panel) and publish a final (year 2) may not be the most efficient way to drive stakeholder collaboration. For example, a two-year timeline for draft and final would create a lag in the information being published and consulted in year 1, with the most up to date information available in year 2.

The Commission has considered AEMO's concerns and agrees that the cadence of reporting can be revised to ensure the industry is receiving the most up-to-date information. The final rule is therefore implementing an annual reporting cycle. This timeframe better aligns with AEMO's existing security reports, including the NSCAS, inertia and system strength reports.[357]

We are also not requiring AEMO to publish a draft of the transition plan before the final. Given the pace of the transition and the security work underway, it is appropriate for AEMO to publish the transition plan each year (which is the same frequency as proposed in the update paper), however without the need for an interim draft. We agree with AEMO's concerns above that the previous two-year cadence may be an inefficient way to drive stakeholder collaboration — the annual cadence and removal of the "draft" and "final" will support more agile information updates and stakeholder consultation. As per the update paper, AEMO will still be required to respond to any commentary provided by the Panel on the transition plan in the following plan (see section 8.4 for more information).

8.4 AEMO will engage with the Reliability Panel on the transition plan for system security

To complement and support industry-wide learning and collaboration, AEMO will be required to consider and respond to any Reliability Panel input after the transition plan is published.[358] We also expect that AEMO will undertake stakeholder consultation before the transition plan is published, which could include targeted engagement with specific stakeholder groups required to fulfil the requirements of the transition plan (e.g. NSPs).

355 Final rule, clause 5.20.8(a).

356 AEMO submission to the update paper, p 7.

357 For more information see: https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/system-security-planning.

358 Final rule, clause 5.20.8(e).

The Panel may provide targeted written commentary to AEMO on the transition plan. This input would be public. This could include, for example, requesting AEMO for further information on key issues, offering a different perspective on emerging challenges, or asking questions of AEMO to better understand its security management.[359] The Panel will be required to provide this commentary within six months of AEMO publishing the transition plan, to give time for AEMO to thoroughly respond in its next transition plan. We consider the Panel is best placed to provide this function due to the depth and breadth of industry knowledge across its members and its existing responsibilities to monitor, review, and report on power system security.[360]

AEMO will then be required to respond to any commentary provided by the Panel when publishing the next transition plan for system security. This process will happen each year on a rolling, annual basis. See Figure 8.1 below for a timeline of the transition plan.

We consider this approach to be consistent with existing security reports including:

- The Energy Adequacy Assessment Project (EAAP): where the Reliability Panel can identify scenarios that AEMO should study in the EAAP.[361]
- Review of technical requirements for connection: where AEMO must consult with the Reliability Panel, amongst other parties, when undertaking this review.[362]

Formalising the Panel's role in engaging with this report recognises that collective industry efforts will be crucial as we transition to a low or zero-emissions system.

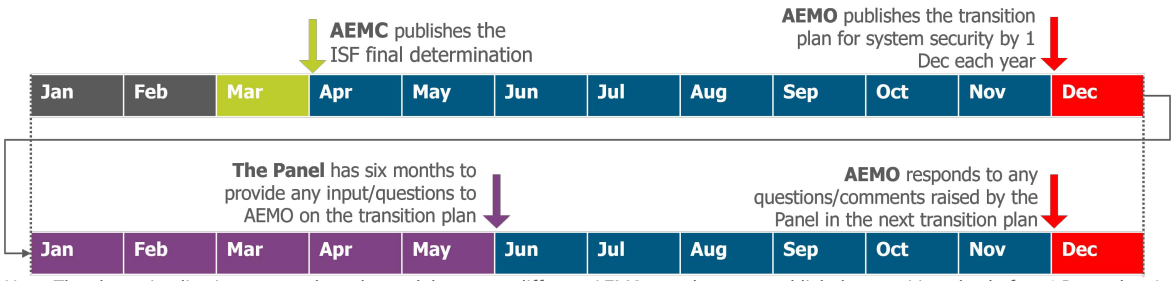
Moreover, having the Panel's input made public reinforces the importance of collaboration. It also helps to further increase transparency about the issues with AEMO, and stakeholders.

While stakeholders were supportive of AEMO engaging with the Panel, some considered that the Panel's role should be expanded beyond a consulting role.[363] For example, CS Energy and Snowy Hydro felt that the Reliability Panel should have a role greater than oversight. [364]

While we recognise this feedback, we consider the Panel's role as outlined above will provide the necessary industry collaboration and independent view on the transition plan. Expanding the Panel's role to more formally review AEMO's progress to unbundling services would also assume an outcome for how security should or will be managed in future before either the technical feasibility or economic rationale has been thoroughly investigated. While the Panel will not be formally reviewing AEMO's progress toward unbundling, it will have the opportunity to comment on the transition plan, which will include AEMO's explanation of its understanding of security services and any progress towards separately defining services. As noted above, the Panel can then ask any questions on this progress to AEMO and also provide targeted comments or questions, which AEMO must consider in the development of the following transition plan.

359 Final rule, clause 5.20.8(d).
360 Section 38(2)(b) of the NEL.
361 NER clause 3.7.
362 NER clause 5.2.6A(b).
363 Submissions to the update paper: AEC, p 2; CS Energy, p 5; Snowy Hydro, p 1; EnergyAustralia, pp 2-3.
364 Submissions to the update paper: CS Energy, p 5; Snowy Hydro, p 1.

Figure 8.1: Timeline of the transition plan for system security



Note: The above timeline is an example and actual dates may differ, as AEMO can choose to publish the transition plan before 1 December. In this event, the Panel will still have six months to respond to AEMO's transition plan.

8.5 The AEMC will review whether the transition plan is achieving its intended outcomes

As part of the review of the transitional services framework (see section 5.9.3), the AEMC will review whether the transition plan is achieving its intended outcomes. This review will therefore occur in year seven (2031) at the latest.[365] The AEMC may decide to review the transition plan process and outcomes earlier, particularly if the consultation process with the Panel is not functioning as intended, or there are difficulties in AEMO obtaining the necessary data to fulfill the plan's requirements (as discussed in section 8.3) that are revealed in the first few years of the report.

The AEMC review will consider whether:

1. the transition plan is achieving its intended purpose — supporting industry understanding of current and future security needs as articulated in section 8.1 — and the intended outcome of increased transparency to industry on security needs and the work AEMO is doing to better understand these and plan for the future[366]
2. the role of the Panel in providing commentary to AEMO and the process for AEMO to consult with the Panel remains fit for purpose[367]

The AEMC considers that the engagement process with stakeholders and the Panel is an essential element of the transition plan's success, both in ensuring stakeholders have the required clarity on how security will be managed through the transition and ensuring that stakeholders have a voice in the process. The AEMC will therefore assess if this reporting requirement effectively serves as an avenue for stakeholders to actively contribute to and enhance their understanding of the management of security through the transition.

Specifically, the review will look at how AEMO is engaging with the Panel on the report, other engagement AEMO is undertaking, the administrative resourcing for each party, and the outcomes of this consultation, including how AEMO reflects input from stakeholders and the Panel in the transition plan. The review will seek to identify any areas where the process can be strengthened to ensure robust engagement and a comprehensive understanding among all relevant stakeholders.[368]

365 Final rule, clause 11.168.6.
366 Final rule, clause 11.168.6(a)(1).
367 Final rule, clause 11.168.6(a)(2).
368 Final rule, clause 11.168(a)(2).

We do not intend the review to assess the validity or benefit of the actions, analysis, or other content within the transition plan. However, the extent to which these are transparent and detailed, and how they incorporate or respond to stakeholder input may be relevant to the review.

Following this review, the AEMC could recommend changes to the process on how the report is developed. Such recommendations would be developed at the time based on the information found and analysis conducted in the review.

8.5.1 Stakeholders continue to have a preference for unbundling and discrete operational procurement of services

Several stakeholders welcomed this commitment to unbundling, where it is justified and feasible as noted above.[369]

However, throughout the duration of this rule change, we have heard feedback that stakeholders continue to have a preference for unbundling and the discrete procurement of services.[370] While several stakeholders welcomed the Commission's commitment to unbundling, many others considered the Commission should provide more prescription in the Rules to individually define security services.[371] For example, the AEC considered:[372]

> It needs to be established in the rules what AEMO is required to do and when it needs to be completed. AEMO is currently under a range of pressures associated with the transition and implementing government policies and it is the AEC's view that unless there are explicit requirements on AEMO to unbundle ESS they will be considered low priority with respect to resourcing and limited if any progress will be achieved in this important area.

EnergyAustralia also noted:[373]

> We encourage the AEMC to be as prescriptive as possible in its rules codification to ensure full clarity and transparency on AEMO's important role in progressing system service unbundling.

The Commission understands that the technical understanding of system needs is currently insufficient to specify system needs at all times, resulting in an over-reliance on directions. The transitional services framework has been designed to rectify this over-reliance, specifically in circumstances in which the understanding of the nature of the service is inadequate.

The addition of the transition plan for system security aims to address stakeholder feedback that more transparency and industry involvement are required in how AEMO plans to manage system security as we transition to a new operating environment.

We consider shedding light on AEMO's understanding of security needs and any work it is doing to individually define security services is the most appropriate approach to progressing understanding of unbundling, rather than codifying specific milestones or timelines on when AEMO should be individually defining specific security services. The latter approach assumes an outcome before the technical feasibility studies are complete and the economic justification is thoroughly explored.

---

369 Submissions to the update paper: CS Energy, p 6; EnergyAustralia, p 2; AGL, p 2.

370 See chapter 1 for more detail.

371 Submissions to the update paper: AEC, pp 1-2; Snowy Hydro, p 1; Energy Australia, p 2; AGL, p 2; Iberdrola, p 5.

372 AEC submission to the update paper, p 2.

373 EnergyAustralia submission to the update paper, p 2.

Given that the NEM is at the forefront of understanding how to run a large, interconnected power system on high levels of IBR, flexibility is essential to ensure the power system is managed securely and efficiently. However, the Commission considers that the requirements of the transition plan will make it valuable in explaining to industry the current status of AEMO's knowledge on the sepcification of services and its future work to deepen this knowledge. This will help progress our understanding on the technical aspects of whether a service can be unbundled — and facilitate future AEMC consideration of whether unbundling would be economically efficient and meet the NEO.

8.6 The Commission's policy proposals complement AEMO's broader work on security

While the transitional services framework and improvements to the existing security frameworks address security needs in the immediate and medium-term, in the longer term, the transition plan for system security will outline the steps AEMO is taking to manage security through the transition, without the need for type 1 contracts. It will provide more transparency on AEMO's understanding of security services, support industry-wide learning of how security will be managed in the future, and encourage efficient investment in the necessary resources needed to maintain a secure system.

The transition plan complements AEMO's existing responsibilities as market operator to manage and improve the NEM's power system security. This includes its specific obligations to assess the:

- system strength requirements
- inertia requirements
- NSCAS needs.

Each of these frameworks enable TNSPs and sometimes AEMO to procure security services. AEMO is involved in identifying future system security needs, as well as procuring and managing frequency markets. TNSPs generally conduct procurement or invest in network services to meet these needs, and AEMO sometimes has a role in procurement if TNSPs are not able to cover needs.[374]

In addition to these frameworks, the Commission also recognises the importance of broader industry involvement in managing power system security. This includes collaboration between the system operator, regulator, and TNSPs to ensure the system is managed at the least cost to consumers while still remaining secure and reliable. We consider that the transition plan for system security would be an important complementary addition to existing processes and major forward-looking reports including:

1. The Integrated System Plan (ISP), developed by AEMO in consultation with TNSPs and the broader industry to provide a system-wide overview of the NEM.[375]
2. The annual general power system risk review (GPSRR) that outlines events that AEMO expects would lead to major supply disruptions.[376]
3. The annual transmission planning reports (TAPR), developed by TNSPs (AEMO in Victoria) that outlines the risks to the power system over the next 10 years (with an emphasis on the next two-three years), the proposed solutions and expected costs.[377]

374 In Victoria, AEMO generally has the role of a TNSP in network planning and procurement.
375 Clause 5.22 of the NER.
376 Clause 5.20A of the NER.
377 Clause 5.12.1 of the NER.

4. AEMO's Engineering Roadmap, which is a key piece of work setting out AEMO's priorities and progress towards operating the power system at times of 100% renewable penetration. The transition plan for system security could draw on or include the Roadmap, and draw together results of key security workstreams in covering the proposed areas outlined in section 8.3.

8.7 The Commission considers that the transition plan for system security aligns with, and promotes, the assessment criteria

The Commission considers the transition plan for system security promotes the NEO, as it is consistent with the system services objective and assessment criteria. The reasons are summarised below.

8.7.1 The final rule promotes the security of the power system

The transition plan for system security promotes the security of the power system over the transition. It provides transparency on AEMO's forward-looking security plan and requires AEMO to outline the explicit steps it will take to manage system security without the over-use of directions or continued reliance on the type 1 contracts of the transitional services framework. This will provide clarity and certainty to industry on how security will be managed in a low or zero-emissions power system.

8.7.2 The transition plan contributes to the emissions reduction of the power system

The transition plan for system security requires AEMO to outline how it plans to manage system security as we transition and as existing synchronous units retire. Specifically, it will also require AEMO to outline any known capabilities of different technologies (e.g. synchronous condensers) that could participate in managing system security and require AEMO to outline how its type 2 contracts are contributing to its understanding of operating a low- or zero-emissions power system. This will support a broader and more diverse range of technologies being able to contribute to a secure power system.

8.7.3 The final rule supports principles of market efficiency

The transition plan for system security supports longer-term investment signals to industry by outlining AEMO's progress on how it intends to manage system security through the transition, and the resources/capabilities it requires. Reducing the over-use of directions and providing more transparency on its security requirements will support a more efficient market overall, by diversifying the range of technologies that can contribute to system security, rather than relying on a limited number of incumbent generators in some NEM regions.

8.7.4 The transition plan has considered implementation costs

We recognise that there will likely be some costs for AEMO to develop and publish the transition plan for system security. This involves the work needed to meet the requirements of the transition plan, resources to produce and publish it, time needed to consult with the Panel, as well as any additional stakeholder engagement AEMO chooses to undertake. However, we consider the benefits of the plan in increasing industry knowledge and awareness of security management and providing more certainty as we have described in the rest of this section outweighs these implementation costs. AEMO also has the flexibility to draw on its existing work program when developing the transition plan, which we consider will help curb some of the implementation costs.

8.7.5 This rule is underpinned by principles of good regulatory practice

The transition plan for system security has explicit transparency measures to shed light on the security needs of the system and how different technologies can meet them.

The transition plan for system security has also been designed to not require onerous reporting obligations on AEMO as it allows the market operator to report on activities that are already underway, rather than prescribing particular milestones or activities it should be undertaking.

The transition plan for system security has also been designed to provide AEMO the flexibility to manage the system with the knowledge it has today, while increasing its technical understanding to prepare for more long-term solutions.

A Summary of other issues raised in submissions

This section outlines stakeholder feedback raised through submissions to the second directions paper and update paper that has not been discussed in the relevant sections in this final determination. Feedback to the earlier papers in this project was discussed in the second directions paper (Appendix C and throughout the main document) and the draft determination (Appendix D and throughout the main document).

Table A.1: Summary of other issues raised in submissions

Stakeholder	Issue	Response
Energy Australia Australian Energy Council Stanwell CS Energy Origin EUAA CEC Tesla Shell Energy AGL	Several stakeholders considered there was a need for a second draft determination, following the change of direction	The AEMC recognises stakeholder views that further consultation should occur before progressing to a final determination. Given that most of the concerns from these stakeholders related to unbundling and the transitional services framework, the Commission released an update paper focused on these issues in December 2023. This update paper focused on revisions to the transitional services framework and the new addition of the transition plan for system security. The Commission also held two TWGs, presented at various industry forums and engaged with stakeholders in multiple bilateral meetings. The Commission also moved consideration of the compensation for directions to the parallel compensation review process to allow for holistic consideration and further consultation on these issues. While the Commission values the interest of stakeholders in further engagement, we also

Stakeholder	Issue	Response
		recognised the need to progress this rule change in a timely manner to ensure the positive benefits of this rule change can be realised as the system transition. We therefore consider the approach outlined above addressed stakeholders concerns for further consultation, while also balancing the implementation needs of this rule change.
CS Energy	CS Energy considers that a dynamic standard that reflects the operational timeframe inertia requirements is needed to progress towards an inertia spot market.	The AEMC understands the stakeholder desire for a real-time and dynamic standard for inertia, however, as explained in the final determination, we do not consider that the knowledge or operational understanding required to implement this is available at this time. The AEMC notes that the rate of change of frequency limits in the frequency operating standard provide minimum requirements for both credible and non-credible contingency events and are set by the Reliability Panel.
CS Energy	CS Energy suggested that forecast inertia needs should be included in the general power system risk review (GPSRR) alongside other system security needs.	The AEMC has considered this feedback and concluded that the publication of inertia requirements through AEMO's annual inertia reports and the new *transition plan for system security* provide adequate information to inform the system of future inertia requirements. In general, the Commission notes that any additional reporting requirements on AEMO would create a resourcing and administrative burden which

Stakeholder	Issue	Response
		would need to be justified by the benefits of the reporting.
CS Energy	AEMO should be required to justify instances where it does not approve synthetic sources of inertia	The Commission understands the stakeholder intent for greater transparency with respect to the approval of synthetic sources of inertia. However, the Commission considers that the improvements in the final rule, including widening the eligibility of inertia sources and the inertia specification, are meaningful steps that will improve the understanding, specification and deployment of synthetic inertia.

B Rule making process

A standard rule change request includes the following stages:

- a proponent submits a rule change request
- the Commission initiates the rule change process by publishing a consultation paper and seeking stakeholder feedback
  - stakeholders lodge submissions on the consultation paper and engage through other channels to make their views known to the AEMC project team
- the Commission publishes a draft determination and draft rule (if relevant)
  - stakeholders lodge submissions on the draft determination and engage through other channels to make their views known to the AEMC project team
- the Commission publishes a final determination and final rule (if relevant).

You can find more information on the rule change process on our website.[378]

B.1 Hydro Tasmania's rule change request

On 19 November 2019, Hydro Tasmania submitted a rule change request to address the shortage of inertia and related services through the creation of a new market for the procurement of 'synchronous services'.[379] Hydro Tasmania noted that these synchronous services include inertia, voltage control and fault level/system strength.[380]

This rule change request was part of seven rule change requests that the AEMC consulted on relating to the arrangements in the NER for the provision of services that are necessary for the secure and reliable operation of the power system. These are outlined in the System Services rule changes consultation paper, published by the AEMC on 2 July 2020.[381]

B.1.1 Rationale for Hydro Tasmania's rule change request

Hydro Tasmania noted that system services have historically been provided by synchronous generators in abundance and without compensation as a by-product of electricity generation through synchronous machines being online. It also noted the transformation of the power system is seeing a reduction of these services being provided. Hydro Tasmania noted that, while these system services are currently not valued explicitly, they are still required for the secure operation of the power system. As such, there has been a corresponding increase of directions for generators to come online and provide these services to address the shortfall, which Hydro Tasmania noted is not a long-term solution that is consistent with the NEO.[382] Hydro Tasmania also considered that more efficient outcomes for the utilisation and operation of resources could be achieved if a mechanism was introduced to incentivise the provision of synchronous services.[383]

B.1.2 Solution proposed in Hydro Tasmania's rule change request

Hydro Tasmania's proposed solution was to introduce a mechanism that would:[384]

378 See our website for more information on the rule change process: https://www.aemc.gov.au/our-work/changing-energy-rules
379 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019.
380 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p 1.
381 AEMC, System services rule changes, Consultation paper, 2 July 2020.
382 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p 3.
383 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p 4.
384 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, pp 2-3.

- explicitly value the provision of these system services
- provide dispatch targets for resources to provide these services, and
- coordinate the provision of these services alongside the dispatch of the energy and FCAS markets.

Specifically, Hydro Tasmania's proposed solution would:[385]

- alter NEMDE to shift generators' online status from the input side (the right-hand side - which is currently exogenous and cannot be optimised) of system security constraint equations to the output side (the left-hand side) to allow NEMDE to produce commitment targets for resources
- require resources to provide two additional bid parameters indicating the cost and availability to commit to be online, and
- allow NEMDE to produce dispatch targets for resources to commit online in an efficient manner.[386]

The Commission characterised this approach in its 2021 directions paper as a type of market ancillary service (MAS) approach, where security services are valued and scheduled within the central dispatch engine.

Following the release of the Commission's directions paper in 2021, Hydro Tasmania updated its original rule change request considering feedback received from stakeholders. Under the Rules, we must respond to the rule change request itself. However, we considered this submission to inform the draft rule determination released in September 2022.

Box 11: Hydro Tasmania Revised Approach

On 21 October 2021, Hydro Tasmania provided a revised model in response to the Commission's directions paper.

The submission maintains the position that a MAS approach using co-optimisation in the spot market is more economically efficient than an NMAS approach and better fits into the NEM's decentralised design philosophy and the AEMC's long term vision for system services.

However, Hydro Tasmania identified revisions to the model in response to feedback from the Commission and AEMO. These revisions included:

- Discussion on how system security constraints that are non-linear could be incorporated into the approach with piece-wise linear approximations – including system configuration
- Rules for managing partial commitment decisions, and
- Examples on how the approach would create marginal prices for system security constraints, and how participants would earn revenue through this system.

According to Hydro Tasmania, these revisions meant that the MAS approach could be implemented immediately with the current version of NEMDE with the inclusion of some additional generic constraints.

Source: Hydro Tasmania, Submission to the directions paper, pp 2, 14, 14-16, 21

385 Hydro Tasmania, Synchronous services markets, Rule change proposal, 14 November 2019, p 2.

386 Hydro Tasmania's rule change proposal noted that a resource would be efficiently committed if it lowered the regional reference price. However the current objective function of the dispatch engine is to maximise the gains of trade of dispatch. Refer to clause 3.8.1(a) and (b) of the NER. Conversations with staff from Hydro Tasmania subsequent to the submission of the rule change request have confirmed that its preferred objective function of the proposed mechanism is maximising the gains of trade of dispatch, consistent with the current objective function of the dispatch engine.

Hydro Tasmania's initial proposal stated that generators that come online be paid based on a pay-as-bid framework based on each resource's individual bid, rather than on a market clearing price (which is used for energy and FCAS markets).

Hydro Tasmania stated that, through this proposed approach, the cost of implementation could be minimised by focusing on the system security constraints that bind most frequently in the initial implementation, with the change to the remaining constraints occurring on an ongoing basis.[387]

Hydro Tasmania considered that its rule change proposal contributes to achieving the NEO by supporting a more efficient utilisation and operation of resources, with less need for AEMO to manage system security through directions.[388]

B.2 Delta Electricity's rule change request

On 4 June 2020, Delta Electricity submitted a rule change request relating to capacity commitment for system security and reliability services in the NEM.[389]

As with Hydro Tasmania's proposal, this rule change request was part of seven rule change requests received by the AEMC that relate to the arrangements in the NER for the provision of services that are necessary for the secure and reliable operation of the power system. These are outlined in the System Services rule changes consultation paper, published by the AEMC on 2 July 2020.[390] This rule change proposed changes to the NER to introduce a day ahead, ex-ante capacity commitment mechanism and payment to provide access to operational reserve and other required system security and reliability services.

B.2.1 Rationale for the rule change request

In order to maintain a secure and reliable system, a range of technical and operational needs must be met at all times. As set out in its rule change request, Delta Electricity considered that the current tools for managing the procurement of system services are not sufficient.[391] Delta Electricity set out in its rule change request its view that current market design is incomplete, with increasing levels of intervention from AEMO to achieve or maintain a required level of generation investment.[392] Delta Electricity considered that a key question is how the market can deliver efficient price signals to deliver the optimal level of system security services and reliability while allowing for the continuation of the evolution in the generation fleet of the NEM.[393]

B.2.2 Solution proposed in Delta's rule change request

Delta Electricity proposed to introduce a "day-ahead ex-ante market for capacity commitment" mechanism to address any or all of the system services for which AEMO has forecast a shortfall.[394]

387 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p. 3.
388 Hydro Tasmania, Synchronous services markets, Rule change request, 14 November 2019, p. 4.
389 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020.
390 AEMC, System services rule changes, Consultation paper, 2 July 2020.
391 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020 pp. 5-6.
392 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 6.
393 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 7.
394 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 10.

Delta Electricity considers that the proposed solution offers a number of benefits over the status quo, including technology neutrality, price transparency, price discovery and competitive pressures in relation to the procurement of system services.[395]

Delta Electricity proposes that as part of the day-ahead pre-dispatch process, AEMO should determine the amount of operational reserve and other system services required to meet regional stability and reliability standards.[396]

The day-ahead timetable would allow all current providers of system services to participate. Eligible generators under Delta's proposal are scheduled generators, irrespective of technology type, that can provide the required system services. Delta also proposes that eligible generators are most likely (in the absence of the proposed rule change) to be subject to a direction.

Delta Electricity considered that these are "more likely to be generators that cannot fast start and have a non-zero minimum load on their primary fuel source but could be any generator type" .[397] The proposed changes would allow slow-start thermal generators to take into account the value of the system services they provide in their operating decisions, and could allow them to remain committed and dispatched at their minimum stable operating level, avoiding consequences for system security and reliability.

Under Delta Electricity's proposal, operators of generators could classify one or more of their generating units as a capacity commitment generating unit. Delta Electricity proposes that the ability of this generating unit to provide the relevant system security services would be assessed by AEMO at the time of registration.

Delta Electricity proposed that AEMO would monitor the short-term projected assessment of system adequacy and pre-dispatch schedule outcomes to identify the system services requirements on a regional basis.[398] Delta Electricity did not expect that market participants would be required to provide any additional information to this process.[399]

Delta Electricity proposed that market participants that have registered generating units as capacity commitment generating units would have "the opportunity but not the obligation to provide operational reserve offers". Delta Electricity was of the view that offers would fall into two fundamental categories:

- offers to commit capacity for the entire day (slow start), and
- offers to commit capacity for specific trading intervals in the day (fast start).[400]

The offer to commit capacity for the entire day would "allow AEMO to secure grid formation security services that span the entire day" well in advance of system needs. The offer to commit capacity for a specific trading interval could provide AEMO with access to system security services at particular times when shortfalls are identified.[401]

395 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, pp. 27-28.

396 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 15.

397 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 10.

398 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 11.

399 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, pp. 13-14.

400 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 14.

401 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 14.

The combination of the offers accepted would provide a clearing price for capacity commitment for each trading interval in the day ahead. Delta Electricity proposed that any offer accepted by AEMO would obligate the following:

- the generator to remain committed and available for dispatch for the entirety of the period to which the offer applies
- generators committed under this process would not re-bid energy offers for the entirety of the period to which the offer applies
- AEMO would dispatch the generator at no less than its minimum stable operating level (MSOL) for all trading intervals in the period of the offer, and
- AEMO would pay to the generator the trading interval clearing price for the operational reserve capacity for all time intervals in the period in the offer.[402]

Delta proposed that each capacity commitment generating unit would provide an offer to participate in the operational reserve market that represents the minimum price in $/MWh that a market participant is prepared to accept to maintain the electrical output of that generating unit at the MSOL during the entire period to which the offer applies.[403] Delta noted that the generators would face the risk that the actual prices clear at lower levels than forecast.[404]

Delta proposed that AEMO would select the capacity commitment generating units that would deliver the required capacity commitment at lowest cost. This would occur in the following fashion. Firstly, AEMO would consider the time frame of the system services shortfall. If system services, including grid formation services, are required for the entire day, AEMO would first consider the "all day" offers to commit capacity and select the offers in order of lowest cost to highest cost until the system security objectives are met for all trading intervals where no specific offers are made.[405]

For all trading intervals where system services shortfalls remain, AEMO would then select specific trading interval offers from lowest cost to highest cost until system security objectives are met for each trading interval.

Delta Electricity proposed that in the event that more than one specific security service is needed for a day, then AEMO would co-optimise a solution to meet all required system services at least cost.[406] Delta Electricity notes that offers to provide other security services would reflect the cost to provide the service in appropriate units, for example, inertia offers would be on a $/unit basis for the period of the offer, given the particular properties of that service.

Delta Electricity also proposed that no intervention pricing would apply to capacity commitment generating units dispatched under the proposed mechanism. Instead, the clearing price of the mechanism would be applicable to the MW capacity that is successfully bid into the ex-ante operational reserve market.[407]

402 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 14.

403 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, pp. 14-15.

404 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 15.

405 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 16.

406 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 16.

407 Delta Electricity, Capacity commitment mechanism for operational reserve and other system security services, Rule change request, 4 June 2020, p. 18.

B.3 The rule change process

The key dates for this rule change process, and numbers of submissions to each consultation process, are below. Issues raised in submissions are discussed and responded to throughout this final rule determination, as well as through earlier papers in this project. A summary of other issues raised in submissions to the second directions paper and the Commission's responses is contained in appendix A

- Rule change request received — Hydro Tasmania — **19 November 2019**
- Rule change request received — Delta Electricity — **2 July 2020**
- Consultation paper published — **17 July 2020**
  - Submissions due — **13 August 2020**
  - **43** submissions received
- Directions paper published — **9 September 2021**
  - Submissions due — **21 October 2021**
  - **22** submissions received
- Rule change requests consolidated pursuant to s. 93 of the NEL — **2 February 2022**
- Draft determination and rule published — **22 September 2022**
  - Submissions due - **17 November 2022**
  - **21** submissions received
- s. 107 extension of time granted to publish draft determination and rule (due to complexity of issues) — **24 September 2020, 9 March 2021, 17 June 2021, 24 November 2021, 22 June 2022, 25 August 2022**
- s. 108A report published giving reasoning for a rule not being made within a year of initiation — **17 June 2021**
- Directions paper published — **24 August 2023**
  - Submissions due – **28 September 2023**
  - **22** submissions received
- Transitional services update paper published – **14 December 2023**
  - Submissions due – **1 February 2024**
  - **11** submissions received
- s107 extension of time granted to publish final determination and rule (due to complexity and difficulty of issues raised by stakeholder submissions to draft determination) – **22 December 2022, 25 May 2023, 1 November 2023**
- Final determination and rule – **28 March 2024**

C Regulatory impact analysis

The Commission has undertaken regulatory impact analysis to make its final determination.

C.1 Our regulatory impact analysis methodology

We considered a range of policy options

The Commission compared a range of viable policy options that are within our statutory powers. The Commission analysed these options: the rule proposed in the rule change request; a business-as-usual scenario where we do not make a rule; a more preferable rule that implemented an 'operational security mechanism' (as proposed in the draft determination) and a more preferable final rule as outlined in this final determination which is focused on efficiently and proactively addressing system security issues through the energy transition by:

- aligning the existing inertia and system strength frameworks
- removing the exclusion to procuring inertia network services and system strength in the NSCAS framework
- creating a new transitional NMAS framework for AEMO to procure security services necessary for the energy transition and to trial new sources of security services
- empowering AEMO to enable (or 'schedule') security services with a whole-of-NEM perspective
- improving directions transparency
- introducing a new reporting requirement on AEMO, known as the "transition plan for system security" (or transition plan), in which AEMO will report annually on the steps it will take to manage security through the transition.

We identified who will be affected and assessed the benefits and costs of each policy option

The Commission's regulatory impact analysis for this rule change used qualitative methodologies. It involved identifying the stakeholders impacted and assessing the benefits and costs of policy options. The depth of analysis was commensurate with the potential impacts. Where commensurate and feasible, the Commission has quantified the impacts. The Commission focused on the types of impacts within the scope of the NEO.

Table C.1 summarises the regulatory impact analysis the Commission undertook for this rule change. Based on this regulatory impact analysis, the Commission evaluated the primary potential costs and benefits of policy options against the assessment criteria. The Commission's determination considered the benefits of the options minus the costs.

The Commission considers that the greatest costs stemming from the rule will pertain to the procurement of extra security services, conducting trials to determine how new technology (or new application of existing technology) can support security in a low- or zero-emissions system, and implementing operational enablement of long-term contracts to ensure the power system remains within pre-defined limits for technical parameters such as voltage and frequency. We expect the benefits from these measures will far outweigh the costs because they will address system security issues through the transition, reduce the regular and inefficient use of directions, and provide better incentives for participants to invest in providing system security services. It also increases transparency on current system security needs and understanding, and on how AEMO plans to manage system security as we transition to a low- or zero-emissions power system.

Table C.1: Regulatory impact analysis methodology

Assessment criteria	Primary costs Low, medium or high –	Primary benefits Low, medium or high –	Stakeholders affected	Methodology QL = qualitative
Safety, security and reliability	Procurement of additional security services by TNSPs and AEMO to meet known security needs more proactively (inertia, type 1 contracts) Procurement costs for trials of new technologies through type 2 contracts	Keeping the system secure through the transition in a predictable and proactive manner, without relying on directions Building understanding of how to keep the system secure with higher penetrations of IBR	• TNSPs • AEMO • Market participants • All consumers	• QL: AEMO advice on enablement arrangements • QL: stakeholder feedback to the second directions paper and update paper
Emissions reduction	Implementation costs of those components of new AEMO processes that relate to emissions reductions	Transitional services procurement decisions must take emissions into account Enablement principle for stable voltage waveform for system strength will help reduce emissions by miminising curtailment of zero-emissions IBR	• TNSPs • AEMO • Market participants • All consumers	• QL: assessment of options between policy reforms and existing arrangements • QL; stakeholder feedback to the second directions paper and update paper

Assessment criteria	Primary costs Low, medium or high –	Primary benefits Low, medium or high –	Stakeholders affected	Methodology QL = qualitative
		generation Enablement principle for stable voltage waveform will also help avoid adverse emissions impacts in enablement decisions Trials of new technologies through type 2 contracts Reduce direction events		
Principles of market efficiency	System upgrades for AEMO to implement enablement approach Procurement of security services by AEMO and TNSPs (see 'Safety, security and reliability')	Enablement gives AEMO the ability to maintain operational security in an efficient wayy, avoiding the use of directions New inertia procurement arrangements distribute investment around the NEM, reducing the possibility of inefficient under- or over-investment	• TNSPs • AEMO • Market participants • All consumers	• QL: AEMO advice on procurement and enablement arrangements • QL: stakeholder feedback to the second directions paper and update paper to assess all benefits and costs to market bodies, participants, and consumers
Implementation considerations	System upgrades for AEMO to implement	Enablement benefits as above. Greater transparency on	• AEMO • AER • TNSPs	• QL: AEMO and AER advice on system and administrative changes •

Assessment criteria	Primary costs Low, medium or high –	Primary benefits Low, medium or high –	Stakeholders affected	Methodology QL = qualitative
	enablement approach (see above) AEMO implementation costsfor adjusted procurement approaches - including changed inertia forecasting and development of guidelines for transitional services. AEMO implementation of enhanced directions transparency measures AER implementation of changes to transmission pricing timing and new optional ex-	system security needs and market impacts of directions, assisting efficient participant decision-making Changes to TNSP cost recovery promote more efficient consideration of opex options alongside capex options, and promote more efficient contracting and pricing arrangements by: • Better aligning TNSP cost recovery with expenditure, • reducing the magnitude of true-ups and • providing a higher level of comfort that TNSP expenditure will be assessed as efficient and prudent	• Consumers	• QL: stakeholder feedback to the second directions paper and update paper

Assessment criteria	Primary costs Low, medium or high –	Primary benefits Low, medium or high –	Stakeholders affected	Methodology QL = qualitative
	ante process for TNSP system security agreements will involve the development of guidelines and implementing an ongoing determination process for a subset of TNSP agreements, and thus will require additional resourcing			
Principles of good regulatory practice	Costs of AEMO producing the transition plan for system security NSP provision of information to AEMO to inform the report	Provision of ongoing information to participants and market bodies to inform most efficient approaches to managing security over the transition - and inform efficient investment decisions	• AEMO • NSPs • Market participants • Potential investors in energy assets • Consumers	• QL: advice from AEMO on reporting implementation requirements • QL: stakeholder feedback to the second directions paper and update paper

D Legal requirements to make a rule

This appendix sets out the relevant legal requirements under the NEL for the Commission to make a final rule determination and final rule.

D.1 Final rule determination and final rule

In accordance with section 102 of the NEL, the Commission has made this more preferable final rule in relation to rule proposals submitted by Hydro Tasmania and Delta Electricity.

The Commission's reasons for making this final rule determination are set out in chapter 2.

A copy of the more preferable final rule is attached to and published with this final determination.

D.2 Power to make the rule

The Commission is satisfied that the more preferable final rule falls within the subject matter about which the Commission may make rules.

The more preferable final rule falls within section 34(1)(a)(ii) and (iii) of the NEL as it relates to it relates to the:

- operation of the national electricity system for the purposes of the safety, security and reliability of that system
- activities of persons (including Registered participants) participating in the national electricity market or involved in the operation of the national electricity system.

D.3 Commission's considerations

In assessing the rule change request the Commission considered:

- its powers under the NEL to make the final rule
- the rule change requests
- submissions received to the consultation paper, directions paper, draft determination, second directions paper and NMAS update paper
- views expressed by the technical working group (TWG)
- the Commission's analysis as to the ways in which the more preferable final rule will or is likely to contribute to the achievement of the NEO
- the application of the final rule to the Northern Territory.

There is no relevant Ministerial Council on Energy (MCE) statement of policy principles for this rule change request.[408]

D.4 Making a more preferable rule

Under s. 91A of the NEL, the Commission may make a rule that is different (including materially different) to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule will or is likely to better

408 Under s. 33 of the NEL and s. 73 of the NGL the AEMC must have regard to any relevant MCE statement of policy principles in making a rule. The MCE is referenced in the AEMC's governing legislation and is a legally enduring body comprising the Federal, State and Territory Ministers responsible for energy. On 1 July 2011, the MCE was amalgamated with the Ministerial Council on Mineral and Petroleum Resources. In December 2013, it became known as the Council of Australian Government (COAG) Energy Council. In May 2020, the Energy National Cabinet Reform Committee and the Energy Ministers' Meeting were established to replace the former COAG Energy Council.

contribute to the achievement of the NEO. In this instance, the Commission has made a more preferable rule.

D.5 Making a differential rule

The NER, as amended from time to time, apply in the Northern Territory, subject to modifications set out in regulations made under the Northern Territory legislation adopting the NEL.[409] Under those regulations, only certain parts of the NER have been adopted in the Northern Territory.

As the more preferable final rule relates to parts of the NER that apply in the Northern Territory, the Commission is required to assess whether to make a uniform or differential rule (defined below) under Northern Territory legislation.

Under the NT Act, the Commission may make a differential rule if, having regard to any relevant MCE statement of policy principles, a different rule will, or is likely to, better contribute to the achievement of the NEO than a uniform rule.[410] A differential rule is a rule that:

- varies in its term as between:
  - the national electricity system, and
  - one or more, or all, of the local electricity systems, or
- does not have effect with respect to one or more of those systems,

but is not a jurisdictional derogation, participant derogation or rule that has effect with respect to an adoptive jurisdiction for the purpose of section 91(8) of the NEL.

A uniform rule is a rule that does not vary in its terms between the national electricity system and one or more, or all, of the local electricity systems, and has effect with respect to all of those systems.[411]

The Commission has determined to make a uniform rule as it does not consider that a differential rule will, or is likely to, better contribute to the achievement of the NEO than a uniform rule.

D.6 Civil penalty provisions and conduct provisions

The Commission cannot create new civil penalty provisions or conduct provisions. However, it may recommend to the Energy Ministers' Meeting that new or existing provisions of the NER be classified as civil penalty provisions or conduct provisions.

The NEL sets out a three-tier penalty structure for civil penalty provisions in the NEL and the NER.[412] A Decision Matrix and Concepts Table,[413] approved by Energy Ministers, provide a decision-making framework that the Commission applies, in consultation with the AER, when assessing whether to recommend that provisions of the NER should be classified as civil penalty provisions, and if so, under which tier.

The Commission proposes to make the following civil penalty recommendations to the Energy Ministers' Meeting in relation to the final rule. The Commission has consulted with the AER on these changes, and the AER supports these decisions.

409 These regulations under the NT Act are the National Electricity (Northern Territory) (National Uniform Legislation) (Modifications)Regulations 2016.

410 Clause 14B of Schedule 1 to the NT Act, inserting section 88AA into the NEL as it applies in the Northern Territory.

411 Clause 14 of Schedule 1 to the NT Act, inserting the definitions of "differential Rule" and "uniform Rule" into section 87 of theNEL as it applies in the Northern Territory.

412 Further information is available at https://www.aemc.gov.au/regulation/energy-rules/civil-penalty-tools

413 The Decision Matrix and Concepts Table is available at: https://web.archive.org.au/awa/20210603104757mp_/https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Final%20-%20Civil%20Penalties%20Decision%20Matrix%20and%20Concepts%20Table_Jan%202021.pdf

Table D.1: Civil penalty recommendation

Rule	Description of rule	Proposed classification	Reason
3.9.7(c)	Pricing for constrained-on units under transitional service or NSCAS agreements	Tier 1	Alignment of transitional services and NSCAS with existing obligations for units enabled through non-market ancillary service contracts
3.11.3(b1)	Acquisition of Network Support and Control Ancillary Service	Tier 2	Align with obligations for TNSPs entering into NSCAS contracts with existing provisions for inertia and system strength contracts
3.11.11(p)	Acquisition of transitional services	Tier 2	Requirement for Transitional Service Providers to comply with the requirements set out in ancillary service agreements.
4.4A.5(g)	Instruction to enable system security services	Tier 1	Ensuring that affected units adjust inputs to central dispatch in accordance with the system security service instruction
5.20B.4(a1)	Inertia Service Provider to make inertia services available	Tier 1	To ensure that the relevant ISP makes their allocation of the binding minimum inertia level available, mirroring penalties for other required levels of security service procurement

Where the final rule amends provisions that are currently classified as civil penalty provisions, the Commission does not propose to recommend to the Energy Ministers' Meeting any changes to the classification of those provisions.

Table D.2: Recommended amendments to existing clauses to civil penalty provisions

Rule	Subject of clause (as amended)	Proposed change	Current classification
4.3.4(j)	Inertia Service Provider making available inertia network services available to AEMO	Minor change to account for revisions to the structure of the inertia section	Tier 1
4.3.4(l)	System Strength Service Provider making system strength services available to AEMO	Minor change to account for revisions to the structure of the system strength section	Tier 1
4.4A.5(e)	Compliance with AEMO instructions to enable system security services	Simplification to consolidate the requirements for system security services including system strength and inertia	Tier 1
4.4A.5(f)	Ensuring appropriate personnel or electricity facilities are available at all times	Simplification to consolidate the requirements for system security services including system strength and inertia	Tier 1
4.11.1(b)	Remote control and monitoring devices - adjustment to consolidate inertia services and system strength services into system security services	Simplification to consolidate the requirements for system security services including system strength and inertia	Tier 3
5.20B.4(b)	Obligation on Inertia Service Provider to make inertia network service available for islanded operation	Simplification of the chapter and revision to a 3-year advance procurement arrangement	Tier 1

The final rule does not amend any rules that are currently classified as conduct provisions under the NEL or National Electricity (South Australia) Regulations. The Commission does not propose to recommend to the Energy Ministers' Meeting that any of the proposed amendments made by the final rule be classified as conduct provisions.

Abbreviations and defined terms

AARR	Aggregated annual revenue requirement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Capex	Capital expenditure
CESS	Capital efficiency sharing scheme
COAG	Council of Australian Government
Commission	See AEMC
EAAP	Energy assessment adequacy project
EBSS	Efficiency benefits sharing scheme
ESB	Energy Security Board
ESS	Essential system services
Hz	Hertz
FCAS	Frequency control ancillary service
FOS	Frequency operating standard
GPSRR	General power system risk review
IBR	Inverter-based resources
ISP	Integrated system plan
MAR	Maximum allowed revenue
MAS	Market ancillary service
MCE	Ministerial Council on Energy
MSOL	Minimum stable operating level
MWs	Megawatts
NEL	National Electricity Law
NEMDE	National energy market dispatch engine
NEO	National Electricity Objective
NER	National Electricity Rules
NMAS	Non-market ancillary service
NSCAS	Network support and control ancillary services
NSPs	Network service providers
NT Act	*National Electricity (Northern Territory) (National Uniform Legislation) Act 2015*
OEMs	Original equipment manufacturers
Opex	Operating expenditure
OSM	Operational security mechanism
Proponent	The individual / organisation who submitted the rule change request to the Commission
QED	Quarterly energy dynamics
RIT-T	Regulatory investment test - transmission
RoCoF	Rate of change of frequency
RTO	Real-time operations

SRMC	Short-run marginal costs
SSSP	System strength service providers
TAPR	Transmission annual planning report
TNSP	Transmission network service providers
TUOS	Transmission use of system
TWG	Technical working group
UFLS	Under-frequency load shedding
VRE	Variable renewable energy
WACC	Weighted average cost of capital