

Australian Energy Market Commission

## **DRAFT RULE DETERMINATION**

# **NATIONAL ELECTRICITY AMENDMENT (ENHANCING OPERATIONAL RESILIENCE IN RELATION TO INDISTINCT EVENTS) RULE 2022**

COAG Energy Council

28 OCTOBER 2021

**DETERMINATION**

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## ABOUT THE AEMC

The AEMC reports to the Energy Ministers' Meeting (formerly the Council of Australian Governments Energy Council). We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the Energy Ministers' Meeting.

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## SUMMARY

- 1 The Commission has made a more preferable draft rule that incorporates indistinct events under the existing contingent event framework and refines reporting requirements. This should provide AEMO with the ability to better manage system security while avoiding the cost and potential complexity of introducing a new, parallel framework solely for indistinct events.
- 2 Indistinct events are events that can impact multiple generators or transmission lines in an unpredictable and uncertain manner. Indistinct events may include major storms, widespread fires and cyberattacks. As power system technology evolves and as storms and bushfires become more intense and frequent, 'indistinct' events are becoming an increasing threat to maintaining a secure supply of electricity to customers.
- 3 AEMO already has broad powers to act and issue directions once an event affects the power system.<sup>1</sup> AEMO is also able to manage the risks of credible (or distinct) contingency events, which involve the failure or removal from service of specific generating units or network elements, in advance of such events occurring. However, the AEMC's review of the South Australian Black System Event identified a need for perceived ambiguity in existing frameworks to be addressed to enable AEMO to effectively manage risks from indistinct events, in advance of those events impacting the power system.<sup>2</sup>
- 4 Following that review, the COAG Energy Council submitted a rule change to the AEMC that sought to action that recommendation. This is the subject of this rule change request.
- 5 In response to the request, the Commission has made a more preferable draft rule that makes clear that AEMO has the power to act and to issue directions in order to prepare the power system for the impact of indistinct events in the operational timeframe. Under the draft rule, AEMO is able to manage the risk of indistinct events in a similar manner to the risk of other contingency events, including reclassifying non-credible indistinct events as credible when abnormal conditions such as storms increase the likelihood of the event impacting the power system. The draft rule also clarifies that the Reliability Panel can declare an indistinct event, the risk of which is not condition dependent, to be a protected event.
- 6 The Commission has maintained the delineation between the type of contingency events that apply in the operation timeframe and those in the planning timeframe (such as Schedule 5.1 for network planning) in the context of Chapter 5. The intent is for the changes to apply in the operational timeframe to help AEMO better manage system security. It is not the intent that these changes would impact on how network service providers plan and operate their networks.
- 7 **The current contingent event framework**
- 8 AEMO has a number of power system security responsibilities affecting the manner in which

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<sup>1</sup> NER cl. 4.8.9

<sup>2</sup> AEMC, *Final Report, Mechanisms to enhance resilience in the power system – review of the south Australian black system event*, 12 December 2019

it operates the power system. One of these responsibilities is the need to make sure it has enough ancillary service and reactive power reserves to keep the power system in a satisfactory operating state in the event of a contingency event.

9 This means that AEMO is required to assess events which may affect the power system involving the failure or removal of one or more generating units and/or transmission elements (contingency events). How AEMO plans for and manages these events depends on its assessment of whether or not this event is reasonably possible (credible). When there are abnormal conditions, such as storms or bushfires, AEMO is able to reclassify non-credible contingency events as credible based on these conditions.

10 AEMO's assessment of whether or not a contingency event is credible affects what it can do to prepare for events. If AEMO considers an event to be reasonably likely to occur it can take additional actions, such as impose preemptive constraints or procure additional services, to make sure the system will remain in a satisfactory operating state when the event occurs. This is consistent with AEMO being required to consider the National Energy Objective in all its activities as these additional costs can only be justified when it is reasonably likely that they will be needed to help keep the power system secure.

11 There are some transparency and governance arrangements to help demonstrate and ensure AEMO is operating in a manner consistent with the long term interest of consumers. For example, AEMO is required to review and publish reports on its handling of non-credible contingency events. Also, the AER is able to monitor and review AEMO's compliance with its obligations under the NER and the Reliability Panel has the power to develop and publish principles and guidelines for AEMO.

## 12 **Rule change request**

13 On 26 May 2020, the AEMC received a rule change request from the COAG Energy Council<sup>3</sup> seeking to implement operational mechanisms to allow AEMO to enhance the power system's resilience to indistinct events. Indistinct events occur when abnormal conditions are likely to impact the power system (contingency event) but it is too complex to determine the specific manner in which the event on the power system will occur.<sup>4</sup> This is the third and final rule change arising from the AEMC's 2019 Review of the South Australian black system event, and follows on from the recently completed General power system risk review (GPSRR) and Prioritising arrangements for system security during market suspension rule changes.

14 The rule change request did not contain a draft rule. Rather, it specified desired outcomes and proposed arrangements.

15 The rule change request discussed indistinct events in relation to two types:

<sup>3</sup> Now the Energy Ministers' Meeting (EMM)

<sup>4</sup> It may not be possible to identify the specific plant likely to be affected as there could potentially be many and/or the specific impact on these plants may be too complex to identify. For example, a severe storm could potentially impact a large number of plants but this impact may cause a significant reduction in supply and/or demand or result in failure and removal from service of these plants.

- indistinct events associated with standing risks (standing indistinct events), the occurrence of which are not a strong function of conditions. For example, variability in generation from distributed energy resources with changes in sunlight intensity or wind speeds.
- indistinct events, the risk of which increases under abnormal conditions such as storms (condition dependent indistinct events). For example, a cyclone which passes through Queensland and affects generation, load, and parts of the network.

16 The rule change request is focused on providing AEMO with the ability to take actions to prepare the power system for an incident in advance of it occurring. AEMO already has powers to take actions to maintain power system security once an incident, such as tripping of a transmission line or even tripping of multiple transmission lines, has occurred.

17 The rule change request also set out proposed transparency and governance arrangements. For example, requiring AEMO to publicly consult on the criteria to reclassify non-credible contingency events as credible, outlining the specific points that must be consulted on, and requiring AEMO to report to the Reliability Panel when it uses its ad hoc mechanism.

18 The Commission has made a more preferable draft rule, adopting some elements of the rule change request and varying others. Rather than establishing a new framework to manage indistinct events and additional reporting requirements, the Commission considered incorporating indistinct events under the existing contingent event framework and refining the existing reporting requirements to be a more efficient and effective manner to deliver the long term interest of consumers.

## 19 **Method of implementation**

20 The rule change request proposes two alternative broad methods to allow AEMO to manage indistinct events:

- Introducing a separate, parallel framework in the NER to manage indistinct events; or
- Amending the existing contingency event framework, which is used to manage and classify credible and non-credible contingencies, to explicitly include indistinct events.

21 The Commission's draft decision is to use the second proposed method i.e. to amend the existing contingency event framework to manage indistinct events. The Commission considers that this minimises additional operational complexity for AEMO's control room, avoids possible overlaps with existing frameworks and avoids adding further layers and complexity to the existing rules, while allowing for appropriate transparency and governance that is consistent with existing arrangements.

22 In order to give effect to this, the draft decision amends the definition of contingency event, which is primarily used for operational purposes, so that it includes sudden changes in demand and supply, as might occur in inverter based or other variable output devices, rather than just complete failure or removal from service of units. It does not amend the definition of credible contingency in relation to the planning undertaken by network service providers in the context of Schedule 5.1 of the Rules.

## 23 **Standing indistinct events**

- 24 The draft rule adopts the rule change request proposal to clarify that standing indistinct events can be managed as protected events through the existing protected events mechanism. This is accomplished through amending the definition of contingency events.
- 25 The protected events mechanism allows the Reliability Panel to declare a non-credible contingency event as a protected event, meaning that AEMO can take measures to prevent a cascading failure beyond those it can typically take to manage non-credible contingency events.
- 26 The rule change request also proposed creating an expedited approval process for protected events that are “not controversial or are otherwise straightforward”. However, the Commission was unable to identify what, if any, issue that the expedited approval process was seeking to address, noting that to date there has only been one protected event application. The Commission’s draft decision is therefore not to create an expedited approval process.
- 27 Condition dependent indistinct events**
- 28 The rule change request also proposed two new mechanisms for managing condition dependent indistinct events in operational timeframes through:
- A pre-defined process, where the potential for the indistinct event has been identified and management actions pre-defined ahead of time
  - An ad-hoc process, where the potential for the indistinct event has not been identified ahead of time.
- 29 *Pre-defined condition dependent indistinct events*
- 30 The rule change request proposed that AEMO would:
- ‘pre-identify’ indistinct events in advance of them occurring using the General Power System Risk Review (GPSRR).
  - conduct cost-benefit analysis (in advance) to predetermine the actions it would take to manage indistinct events
  - set out the criteria it would use to determine when and indistinct event is considered likely to occur
- 31 The Commission’s draft rule adopts a different approach.
- 32 The very nature of the sort of extreme abnormal conditions that lead to an indistinct event means that their exact nature (location, strength, etc) cannot be predicted far enough in advance to undertake the steps proposed in the rule change request. Further, the nature of an indistinct event means that it is impossible to determine exactly which combination of power system elements will be impacted. It is not reasonable for AEMO to be required to model and develop plans to manage every possible combination of power system element failures, for every possible extreme abnormal condition, well ahead of time.
- 33 Under the Commission’s draft rule AEMO has the flexibility to determine the necessary actions to manage credible indistinct events – that is, reclassified credible contingency events caused by extreme abnormal conditions. However, the draft rule requires AEMO to set out:

- in the reclassification criteria, the abnormal conditions that would see it use its discretion to manage these indistinct events once reclassified as credible contingency events, or take action in respect of certain classes of assets
- in the power system operating procedures, the actions it would typically take to manage credible contingency events (to the extent practicable).

34 The Commission also considers that including a cost-effectiveness principle, as proposed in the rule change, is unnecessary because the existing obligation in the NEL for AEMO to conduct its activities in line with the NEO provides sufficient direction to manage indistinct events at least cost. This means that there is already an overarching obligation for AEMO to consider the impact of its actions on investment in, operation and use of the power system with respect to the impact on the cost (price) for consumers.

35 Further, while the rule change request contemplates AEMO conducting a cost benefit analysis to justify avoidance of load shedding, the Commission considers that credible indistinct events should be treated no differently to other credible contingencies, with the power system maintained in a secure state to avoid load shedding for the occurrence of a credible indistinct event.

#### 36 *Ad-hoc process for condition dependent indistinct events*

37 The rule change request also set out an 'ad-hoc' mechanism that would allow AEMO to use its discretion to manage indistinct events in instances where it has not pre-identified abnormal conditions, indistinct events, or the actions it would take to manage them. This would be an emergency measure. AEMO would need to report publicly and to the Reliability Panel each time it used the ad-hoc mechanism.

38 The proposed ad-hoc mechanism is broadly consistent with the rule change request. AEMO would need to have regard to the abnormal conditions it has listed in the reclassification criteria and the typical actions it has listed in the power system operating procedures to the extent practicable when using its discretion. However, AEMO could deviate from the reclassification criteria and power system operating procedures if necessary for power system security. If AEMO did deviate from the reclassification criteria, it would need to conduct a review of the event as a reviewable operating incident and (separately) examine these incidents in the GPSRR.

### 39 **Transparency and Governance**

40 The rule change request proposed that:

- public consultation be required on a number of aspects on the indistinct events mechanism, including reclassification criteria, cost benefit analysis, and proposed management actions
- the Reliability Panel be able to elect to review the framework as part of the AMPR
- existing market notice requirements be extended to cover indistinct events
- existing requirements for AEMO to report on its decisions to reclassify contingency events every six months be extended to include decisions on indistinct events.

- if the Reliability Panel considers it necessary or desirable, it can determine guidelines for pre-defined and ad-hoc protected operation.
- AEMO report publicly and to the Reliability Panel each time it uses the ad-hoc mechanism and review any incidents it manages via the ad-hoc mechanism in the next GPSRR.

41 For the reasons stated in the determination the Commission has modified some aspects of the transparency and governance framework proposed in the rule change request, to balance required effort and effectiveness.

42 The requirements of the Commission's draft rule can be summarised as follows:

- AEMO would undertake targeted consultation with appropriate expert stakeholders in accordance with clause 4.2.3B(d), as it is already required to do in order to establish, review or amend the criteria for reclassifying contingency events, in developing and updating the reclassification criteria for contingency events.
- AEMO would also undertake targeted consultation in accordance with clause 4.2.3B(4) on the likely actions it would take to manage credible indistinct events, which would be specified in the power system operating procedures.
- AEMO would be required to issue market notices for credible indistinct events (as it does for reclassified credible contingency events under the current framework).
- AEMO would produce a report every six months for its decisions for managing credible indistinct events (as it currently does for its decisions on reclassifying non-credible contingency events as credible contingency events).
- The ability for the Reliability Panel to produce guidelines regarding how AEMO should maintain system security in response to contingency events, including indistinct events, is maintained with the draft rule clarifying that, in addition to the ex-post management of contingency events, the Reliability Panel may elect to determine guidelines for AEMO's ex-ante management of contingency events.
- if AEMO uses its discretion to manage a credible indistinct event and its response could not reasonably have been expected from the information published by AEMO in the reclassification criteria or power system operating procedures, it would need to review this event as a reviewable operating incident and examine its management of this event in the next GPSRR.

43 The AEMC intends to review the amended contingent event framework within five years to confirm whether the framework is delivering its intended benefits.

#### 44 **Consultation**

45 The AEMC invites submissions on any aspect of this draft determination by **6 January 2022**.

46 Stakeholder input on this draft determination will further inform the AEMC's analysis of the issues and the development of final rules, which will be reflected in a final determination in February 2022.



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# 1 COAG ENERGY COUNCIL'S RULE CHANGE REQUEST

This chapter:

- summarises the rule change request—section 1.1
- outlines current arrangements in the National Energy Law (NEL), National Electricity Rules (NER) and Australian Energy Market Operator (AEMO) procedures—section 1.2
- explains the rationale for the rule change request—section 1.3
- outlines the solution proposed in the rule change request—section 1.4
- provides relevant background to the rule change request, including previous AEMC decisions—section 1.5
- details the rule making process—section 1.6
- outlines the approach to consultation on this draft determination—section 1.7.

## 1.1 Summary of the rule change request

This section provides a high-level summary of the rule change request.

On 26 May 2020, the Council of Australian Governments (COAG) Energy Council<sup>5</sup> made a request to the Australian Energy Market Commission (AEMC or Commission) to amend the National Electricity Rules (NER) to introduce a framework to manage indistinct events in an operational timeframe.<sup>6</sup>

The NER requires AEMO to maintain the power system, to the extent practicable, in a secure state with the technical envelope set, and contingency capacity reserved procured, to avoid load shedding for the occurrence of any credible contingency event.<sup>7</sup> But this obligation also applies to AEMO if abnormal conditions make a non-credible contingency event more likely to occur (i.e. it becomes credible). AEMO is required to monitor abnormal conditions, make reasonable attempts to understand how the power system may be affected, and identify whether a non-credible contingency event should be reclassified as a credible contingency event given the abnormal conditions.<sup>8</sup>

The stated purpose of this rule change request is "to seek amendments to the NER to provide AEMO with mechanisms to enhance power system resilience to indistinct events under abnormal conditions".<sup>9</sup> While indistinct events are not currently defined in the NER, for the purposes of this rule change, an **indistinct event** is an event on the power system security for which it is not possible or reasonable:

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<sup>5</sup> In May 2020 the Prime Minister announced the cessation of the Council of Australian Governments (COAG), including the former COAG Energy Council. The COAG Energy Council has been replaced by the Energy National Cabinet Reform Committee (ENCRC) and the Energy Ministers' Meeting (EMM). See: <https://www.energy.gov.au/government-priorities/energy-markets/energy-ministers>

<sup>6</sup> COAG Energy Council, enhancing operational resilience, rule change request, COAG Secretariat, 26 May 2020. Accessed at: [https://www.aemc.gov.au/sites/default/files/documents/erc0304\\_rule\\_change\\_request\\_pending.pdf](https://www.aemc.gov.au/sites/default/files/documents/erc0304_rule_change_request_pending.pdf)

<sup>7</sup> NER clauses 4.2.6(a), 4.2.4(a), 4.2.4(b)(2) and 4.2.5(c)(2).

<sup>8</sup> NER clause 4.2.3A

<sup>9</sup> Ibid, p. 1.

- to identify the associated threats to the specific power system elements (because the threat is so broad or extreme); or
- to model the possible impact to power system security should the event occur using contingency analysis (because the number of possible asset failures makes the event too computationally difficult to model, particularly during operations).

Broadly, the rule change request proposes to implement a framework for managing indistinct events in the operational timeframe, including to:

- set out a process to provide AEMO with the flexibility to manage indistinct events that become more likely due to abnormal conditions
- clarify that standing risks from indistinct events can be managed via the protected events mechanism
- set appropriate transparency and governance for this framework
- create an expedited approval process for protected events.<sup>10</sup>

The proposed rule change aims to enhance the security and resilience of the power system, and make operating the power system more efficient and effective, by allowing AEMO more flexibility to prepare for and manage indistinct events in the operational timeframe.

The proposed rule change seeks to implement one of the recommendations from the AEMC's *Mechanisms to enhance resilience in the power system—review of the South Australian black system event (BSE review)*. This was work undertaken by the Commission to explore the changing risk profile of the NEM power system and the measures that may need to be implemented to manage these new risks. In the BSE review, the AEMC found that the existing system security framework may be ill-suited to managing indistinct events. The Commission recommended clarifying the obligations for the operational management of indistinct events, which this rule change request seeks to implement.

## 1.2 Current arrangements

This section:

- provides a general overview of the existing contingency event framework in the NER as well as the process AEMO follows to reclassify a non-credible contingency as credible—section 1.2.1
- outlines the existing transparency and governance frameworks for contingency events—section 1.2.2
- briefly discusses other arrangements in place to minimise the likelihood of extreme events impacting the power system—section 1.2.3.

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<sup>10</sup> A protected event is a non-credible contingency event that the Reliability Panel has declared to be a protected event. If the Reliability Panel approves a non-credible contingency event as a protected event, AEMO can take certain ex-ante measures to prevent a cascading failure, which are beyond those it can typically take to manage non-credible contingency events. See NER clause 4.2.3(f).

### 1.2.1 Existing contingency event framework

This section summarises the current framework for AEMO operations to manage contingency events, including protected events and the reclassification mechanism.

Appendix C provides more details on this framework and the operational practices involved in identifying and managing contingency events (including challenges in identifying and managing indistinct events).

#### The contingency event framework

A contingency event is defined in the NER as “an event affecting the power system which AEMO expects would be likely to involve the failure or removal from operational service of one or more generating units and/or transmission elements”.<sup>11</sup>

Broadly, the NER allow AEMO to take necessary action to maintain power system security once a contingency event occurs i.e. 'ex-post'. This rule change request is focused instead on the actions that AEMO may take under the current framework to prepare the power system for an event *in advance of it occurring*, or 'ex-ante'.

In the NER, contingency events are divided into:

- credible contingency events: contingency events AEMO considers to be reasonably possible in the surrounding circumstances, including the technical envelope<sup>12</sup>
- non-credible contingency events: contingency events other than credible contingency events.<sup>13</sup>

An example of a credible contingency event could be the unexpected automatic or manual disconnection of, or the unplanned reduction in capacity from, one operating generating unit as this could be reasonably likely to occur during normal operations.<sup>14</sup> Credible contingency events can also include reclassified non-credible contingency events that have become more likely due to abnormal conditions. For example, multiple transmission towers collapsing in a region may be non-credible during normal operating conditions, but could be considered credible during abnormal conditions, like during a violent storm.

Given non-credible contingency events are “contingency events other than credible contingency events”, examples include everything from a double circuit transmission line failure due to tower collapse during normal operations to sudden unexpected disconnection of multiple generating units during normal operations.<sup>15</sup>

#### Operational actions AEMO can take to manage different contingency events

Broadly, the NER allow AEMO to take necessary action to maintain power system security *once a contingency event occurs* i.e 'ex-post' action.

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11 NER clause 4.2.3(a).

12 NER clause 4.2.3(b). The technical envelope is the technical boundary limits of the power system for achieving and maintaining a secure operating state for a given power system scenario.

13 NER clause 4.2.3(e)

14 NER clause 4.2.3(b)

15 NER clause 4.2.3(e)(2)(ii)

This rule change request is focused instead on the operational actions that AEMO may take under the current framework to prepare the power system for an event *in advance of it occurring*, or 'ex-ante'.

A key difference between credible and non-credible contingencies is the operational actions that AEMO can take to manage them ex-ante. *Non-credible* contingencies can be managed using existing contingency capacity reserves, controlled load shedding arrangements and in some cases special protection schemes. This is part of AEMO managing the power system to arrest the impacts of a range of significant multiple contingency events or protected events.<sup>16</sup> However, the NER allows AEMO to take additional operational actions in advance to manage *credible* contingency events.

These actions include:

- setting constraints
- issuing directions
- obtaining additional ancillary services, for example contingency raise and lower FCAS.

### **The reclassification mechanism**

The NER allow AEMO to re-classify non-credible contingency events to credible contingency events if abnormal conditions (like bushfires or storms) make them more likely.<sup>17</sup> This would allow AEMO to take additional actions (constraints, directions, FCAS) to manage these events. AEMO publishes the Power System Security Guidelines (PSSG) which set out its approach to the reclassification of credible and non-credible contingency events.

### **Protected event framework**

A protected event is a low likelihood, high consequence non-credible contingency event for which AEMO must maintain the power system security standards, including the frequency operation standards, following the occurrence of the event. While AEMO considers these events unlikely, if they do occur they can more easily trigger a major blackout. Classifying these events as protected events entitles AEMO to use additional measures to maintain the power system.

To classify as a protected event the Reliability Panel must declare the non-credible contingency event to be a protected event.<sup>18</sup>

Once the Reliability Panel approves the declaration of a non-credible contingency event as a protected event, AEMO can take certain ex-ante measures to prevent a cascading failure beyond those it can typically take to manage non-credible contingency events.

Further detail on the application process for protected events is in appendix C.

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<sup>16</sup> NER cl.4.3.1(k)

<sup>17</sup> NER clause 4.2.3A

<sup>18</sup> Declared by the Reliability panel under clause 8.8.4, and where that declaration has come into effect and has not been revoked. NER clause 4.2.3(f)

### 1.2.2

### Existing transparency and governance arrangements for contingency events

#### Existing consultation requirements

The rules currently require AEMO to develop the criteria for reclassification via *targeted consultation* with relevant stakeholders including Market Participants, TNSPs, Jurisdictional System Security Coordinators (JSSCs), and relevant emergency services agencies.<sup>19</sup> In practice, AEMO conducts this targeted consultation in a number of ways including meeting with JSSCs, as well as meeting with the Power System Security Working Group (PSSWG) and its parent group, the National Electricity Market Operations Committee (NEMOC).

According to the latest minutes, NEMOC comprises representatives from AEMO, the Clean Energy Council, the Australian Energy Council, Energy Networks Australia, and individual generators and TNSPs.<sup>20</sup> The PSSWG, comprises only of representatives from TNSPs (and AEMO).<sup>21</sup>

AEMO outlines its general approach to managing credible contingency events in its *Power system security guidelines*.<sup>22</sup>

The rules do not require AEMO to report on the actions it would take to manage credible contingency events. However, AEMO does outline its general approach to managing credible contingency events in its *Power system security guidelines*.

#### Market Notices

The NER require AEMO to issue a market notice as soon as practicable if it identifies a non-credible contingency event that is more likely to occur due to abnormal conditions.<sup>23</sup> This notification must specify:

- the *abnormal conditions*
- the relevant non-credible contingency event
- whether AEMO has reclassified this non-credible contingency event as a credible contingency event
- information (other than confidential information) AEMO has in its possession that is relevant to determining whether to reclassify, including the source of that information and the time that information was received or confirmed by AEMO
- the time at which the notification has been issued
- the time at which an updated notification is expected to be issued, where this might be necessary.<sup>24</sup>

19 NER clause 4.2.3B(d)

20 AEMO, 2021, *NEMOC minutes for Friday 19 March 2021*. Accessed at: [https://aemo.com.au/-/media/files/stakeholder\\_consultation/working\\_groups/other\\_meetings/nemoc/2021/nemoc-minutes-19-march-2021.pdf?la=en](https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nemoc/2021/nemoc-minutes-19-march-2021.pdf?la=en)

21 AEMO, 2021, Terms of Reference: Power System Security Working Group (PSSWG). Accessed at: [https://aemo.com.au/-/media/files/stakeholder\\_consultation/working\\_groups/other\\_meetings/nemoc/power-system-security-working-group-psswg-terms-of-reference.pdf?la=en](https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nemoc/power-system-security-working-group-psswg-terms-of-reference.pdf?la=en)

22 AEMO, *Power system security guidelines*, p. 12

23 Clause 4.2.3A(c).

24 Clause 4.2.3A(c)(1)-(6)

### **Reviewable operating incidents**

AEMO must conduct a review and produce a report for all reviewable operating incidents.<sup>25</sup> Reviewable operating incidents are major incidents that impact power system security that comprise:

- the occurrence of a non-credible contingency event or multiple contingency events on the transmission system; or
- a black system condition; or
- an event where the frequency of the power system is outside limits specified in the power system security standards; or
- an event where the power system is not in a secure operating state for more than 30 minutes; or
- an event where AEMO issues a clause 4.8.9 instruction for load shedding.<sup>26</sup>

### **Reporting on reasons for reclassification**

AEMO is currently required to report every six months on its reasons for all decisions to re-classify non-credible contingency events to credible contingency events during the relevant period.<sup>27</sup>

The report:

- *must* include an explanation of how AEMO applied the reclassification criteria for each of those decisions; and
- *may* include AEMO's analysis of re-classification trends during the relevant period and its appraisal of the appropriateness and effectiveness of the relevant criteria that were applied in the case of each reclassification decision.

### **Annual Market Performance Review**

Clause 8.8.3(b) of the NER requires the Panel to conduct an Annual Market Performance Review (AMPR) of the performance of certain aspects of the market, at least once every financial year and at other such times as the AEMC may request.<sup>28</sup>

The Panel must conduct the AMPR in terms of its requirements under the NER as set out below as well as standing terms of reference issued by the AEMC:<sup>29</sup>

- reliability of the power system
- the reliability standard
- the power system security standards
- the system restart standard
- the guidelines referred to in clause 8.8.1(a)(3) of the NER

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<sup>25</sup> NER clause 4.8.15(b)-(c)

<sup>26</sup> NER clause 4.8.15(a)(1)

<sup>27</sup> NER cl.4.2.3A(i)

<sup>28</sup> NER clause 8.8.3(b)

<sup>29</sup> NER clause 8.8.3(b)



- the policies and guidelines referred to in clause 8.8.1(a)(4) of the NER
- the guidelines referred to in clause 8.8.1(a)(9) of the NER.

In practice, the AMPR provides observations and commentary on the reliability, security and safety performance of the power system.<sup>30</sup>

The purpose of the report is to:

- provide stakeholders with consolidated information and expert commentary about the performance of the power system and market in a single publication
- highlight emerging trends to help inform the policy and investment decisions of governments, policymakers, market institutions and market participants
- identify the issues for attention relevant to the frameworks or mechanisms used to deliver reliability, security and safety.<sup>31</sup>

The AMPR compiles information primarily collected from a number of public sources including AEMO, the AER, jurisdictional regulators and market participants.

### **The General Power System Risk Review**

On 3 June 2021, the AEMC made a final determination and final rule to amend the NER to implement a holistic General Power System Risk Review (GPSRR) to replace the existing Power System Frequency Risk Review (PSFRR). The final rule implements an annual review that will involve AEMO, in collaboration with Network Service Providers (NSPs), to identify and assess risks to power system security that it expects would be likely to lead to cascading outages or major supply disruptions.

The final rule requires AEMO to review, annually through the GPSRR, in respect of a prioritised set of risks determined by AEMO:

- non-credible contingency events, the occurrence of which AEMO expects would be likely to involve uncontrolled increases or decreases in frequency, alone or in combination, leading to cascading outages, or major supply disruptions, and
- other events and conditions (including contingency events) the occurrence of which AEMO expects, alone or in combination, would be likely to lead to cascading outages, or major supply disruptions.

The final rule requires AEMO to first identify a number of priority risks to be reviewed in the GPSRR and in cooperation with NSPs. In identifying the priority risks, AEMO must have regard to the severity of the likely power system security outcomes if the events or conditions occur, and the likelihood of the event or condition occurring. In respect of these priority risks, and using data inputs provided by NSPs, the rule requires AEMO to review current arrangements and identify options for future management of these events and conditions.

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30 AEMC Reliability Panel, Annual Market Performance Review 2020. Accessed at: [www.aemc.gov.au/market-reviews-advice/annual-market-performance-review-2020#:~:text=30%20June%202020,-,The%20Reliability%20Panel's%202020%20Annual%20Market%20Performance%20Review%20\(AMPR\)%20provides,and%20emerging%20trends%20and%20issues.](http://www.aemc.gov.au/market-reviews-advice/annual-market-performance-review-2020#:~:text=30%20June%202020,-,The%20Reliability%20Panel's%202020%20Annual%20Market%20Performance%20Review%20(AMPR)%20provides,and%20emerging%20trends%20and%20issues.)

31 Ibid.

The Commission expects that only a limited number of priority risks will be assessed in depth through each GPSRR. The GPSRR will be a tool to monitor risks over time and is not intended to present assessments of all potential system risks in detail. The GPSRR will be based on a high-level look at risk arrangements, iterating over time. This means that the selection of risks should be prioritised on a case by case basis reflecting what risks may be more material at a particular point in time. AEMO is also expected to leverage off existing arrangements to ensure resources are managed efficiently and are focused on priority matters.

### **Reliability panel guidelines**

While it has not done so yet, an existing function of the Reliability Panel is to “develop and publish principles and guidelines that determine how AEMO should maintain power system security while taking into account the costs and benefits to the extent practicable” for AEMO’s management of contingency events under clause 4.2.6(b).<sup>32</sup>

Clause 4.2.6(b) relates to AEMO’s ex-post management of contingency events.<sup>33</sup> This therefore may restrict the Panel to considering AEMO’s ex-post management of contingency events, and not its ex-ante management of contingency events using the reclassification framework.

### **Function of the AER**

The AER oversees rule compliance and economic regulation across the NEM. The AER enforces the rules the AEMC makes. Under part 3 of the NEL, the AER has the power and function to monitor the compliance of registered participants, regulated network service providers and AEMO itself.

## **1.2.3**

### **Other arrangements for minimising the likelihood of extreme events from national security threats**

The Commonwealth Government oversees laws and processes for minimising national security risks. These include:

- The Critical Infrastructure Act 2018<sup>34</sup>
- The Australian Energy Sector Cyber Security Framework (AESCSF)<sup>35</sup>
- Department of Industry, Science, Energy and Resources (DISER) cybersecurity reports

These processes are supported by multiple departments, including national security agencies. These national security agencies are best placed to identify these kinds of threats to the power system.

These agencies depend on the expertise of AEMO to identify vulnerabilities to the power system from these national security threats. AEMO has also been closely involved in developing and implementing the AESCSF.

<sup>32</sup> NER clause 8.8.1(2a)

<sup>33</sup> NER clause 4.2.6(b)

<sup>34</sup> Critical Infrastructure Act 2018. Accessed at: [www.homeaffairs.gov.au/about-us/our-portfolios/national-security/security-coordination/security-of-critical-infrastructure-act-2018](http://www.homeaffairs.gov.au/about-us/our-portfolios/national-security/security-coordination/security-of-critical-infrastructure-act-2018)

<sup>35</sup> AESCSF framework and resources 2021. Accessed at: [aemo.com.au/en/initiatives/major-programs/cyber-security/aescsf-framework-and-resources](http://aemo.com.au/en/initiatives/major-programs/cyber-security/aescsf-framework-and-resources)

While these arrangements help minimise the risk of extreme impacts from national security threats to power system security, they do not directly pertain to AEMO's powers to manage contingency events ex-ante during operations (the focus of this rule change).

## 1.3 Rationale for the rule change request

This section summarises the rule change request's rationale for its proposed amendments to the rules.

The rule change request sets out that physical makeup of the NEM is changing rapidly as old thermal generators retire, new renewable generators connect, and customers increasingly take up new demand side options. While these changes bring obvious benefits, they also mean that the power system faces new risks. These risks are exacerbated by changes outside the power system itself, particularly the effects of and need to mitigate and adapt to climate change, which will have a growing impact on an increasingly weather-dependent power system.

As the system transition continues, and storms, heatwaves and fires become more intense and frequent, 'indistinct' events are emerging as an increased threat to power system security and supply of energy to customers. Indistinct events are events that can impact on multiple generators and transmission lines in an unpredictable and uncertain manner. Major storms, widespread bushfires, or cyberattacks all may affect multiple parts of the power system in a hard-to-predict manner.

The rule change request seeks to introduce new frameworks for the management of these indistinct events. The purpose of this rule change request is to seek amendments to the NER to provide AEMO with mechanisms to enhance power system resilience to indistinct events under abnormal conditions.

The key changes proposed within the rule change include:

- "Introduction of the new definition of an indistinct event
- Clarify that standing risks from indistinct events can be managed as a type of protected event and to enhance the protected event approval process
- Implement a new operational tool, protected operation, for AEMO to manage indistinct events, the risk of which are strongly linked to abnormal conditions. Two types of protected operation are proposed:
  - pre-defined protected operation, and ad-hoc protected operation.
- Specify governance arrangements for protected operation"<sup>36</sup>

## 1.4 Solution proposed in the rule change request

This section summarises the rule change request's solution to the issues it has identified with the current framework.

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<sup>36</sup> COAG Energy Council, *Enhancing operational resilience in relation to indistinct events*, rule change request, 26 May 2020, p. 1

#### 1.4.1 Indistinct events (as described in the rule change request)

For the purposes of this rule change, the types of events that AEMO's systems cannot reasonably forecast (because they are so extreme or complex) are called 'indistinct events'. To allow AEMO to expand its assessment of contingency events beyond the failure or removal of assets to include sudden, significant changes in the balance of available supply and demand which may be distributed across multiple assets, including load, indistinct events need to be clearly incorporated into the contingent event (or similar, parallel) framework. This provides AEMO with greater scope to take operational actions in advance of an event it considers likely to threaten the power system.

The rule change request outlines two types of indistinct events:

- **condition-dependent indistinct events**, which increase in likelihood and severity due to abnormal conditions
- **standing indistinct events**, which are a constant but unclear risk.

#### 1.4.2 Proposed rule change request framework for managing indistinct events

The rule change notes that the BSE Review identified a need to amend existing frameworks to allow for management of 'indistinct events'.<sup>37</sup>

The rule change seeks to amend the NER to provide AEMO with mechanisms to enhance power system resilience to indistinct events under abnormal conditions, including by implementing a protected operations framework. The amendments include.<sup>38</sup>

- providing AEMO with mechanisms to enhance power system resilience to indistinct events.
- enhancing the transparency and governance framework for AEMO's management of contingency events via the reclassification framework
- clarifying that standing indistinct events can be managed via the protected events' framework.

##### **Condition-dependent indistinct events**

Under the approach proposed in the rule change request, AEMO would:

- pre-identify abnormal conditions and indistinct events through the GPSRR
- pre-identify the actions it would take to manage indistinct events
- specify and publish:
  - criteria for the abnormal conditions that would see it manage condition-dependent indistinct events
  - its approach for assessing the likelihood and severity of condition-dependent indistinct events.<sup>39</sup>

<sup>37</sup> COAG Energy Council, *Enhancing operational resilience*, rule change request, 26 May 2020, p.1 Accessed at: <https://www.aemc.gov.au/rule-changes/enhancing-operational-resilience-relation-indistinct-events>

<sup>38</sup> Ibid, pp.1-2.

<sup>39</sup> Ibid.

To determine which actions it can take to manage indistinct events, AEMO would need to:

- conduct cost-benefit analysis on possible actions
- follow a cost-minimisation principle, defined in the NER.<sup>40</sup>

AEMO would have the choice to take actions sufficient to avoid a cascading failure or alternatively take additional action to maintain the power system in a secure state. However, it would need to conduct a cost-benefit analysis to justify this additional action.

The rule change request also set out an 'ad-hoc' mechanism that would allow AEMO to use its discretion to manage indistinct events in instances where it has not pre-identified abnormal conditions, indistinct events, or the actions it would take to manage them. This would be an emergency measure. AEMO would need to report publicly and to the Reliability Panel each time it used the ad-hoc mechanism.

### **Standing risks from indistinct events**

The proposed rule in the rule change request would allow AEMO to manage standing indistinct events using the existing protected events framework.<sup>41</sup>

The rule change request also proposes to create an expedited approval process for the protected events' framework for applications that are "not controversial or are otherwise straight forward".

#### **1.4.3**

### **Proposed rule change request transparency and governance framework**

#### **Proposed approach to consultation**

The rule change request proposes that AEMO should publicly consult on the reclassification criteria using the rules consultation procedures in Rule 8.9.<sup>42</sup> Under the proposed rule, the reclassification criteria would also set out the criteria for when AEMO would manage a reclassified credible contingency event as an 'indistinct event'.

The rules do not specify the structure and content of AEMO's consultations on the reclassification criteria.<sup>43</sup> Instead AEMO is given the discretion to develop consultations to establish, review or amend the reclassification criteria in the manner it considers most effective to engage with stakeholders.

For both reclassified and indistinct events, the rule change request proposes to amend the NER to require AEMO to consult on:

1. the nature of abnormal conditions and why these conditions increase risk from an indistinct event sufficiently to justify any use of an ad-hoc protected operation
2. how AEMO will assess the risk arising from indistinct events, including any assumptions used

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<sup>40</sup> Ibid.

<sup>41</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.1

<sup>42</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.4

<sup>43</sup> NER cl.4.2.3B

3. the range of options for managing the risks considered by AEMO and the indicative costs of each
4. the indicative benefits associated with the options considered by AEMO for managing the risk
5. how the chosen option satisfies the principle of cost minimisation, and
6. how AEMO would implement the proposed rule.

#### **The rule change request's proposed approach to review of the indistinct events framework**

The rule change request suggests that the Reliability Panel could elect to review the framework as part of the AMPR.<sup>44</sup>

#### **The rule change request's proposed approach to regular reporting on management of indistinct events**

The rule change request proposes to expand existing requirements for six-monthly reporting on AEMO's decisions for reclassification to include indistinct events.<sup>45</sup>

#### **The rule change request's proposed approach to guidelines for indistinct events**

The rule change request also suggests that the Reliability Panel may elect to determine guidelines for the indistinct events mechanism, if it considers it is necessary or desirable.<sup>46</sup>

## 1.5 Relevant background

Section 1.5 provides the relevant background of this rule change request, including the South Australian black system event in 2016, the findings of the AER's *Black system event compliance report* and the AEMC's 2019 *Black System Event (BSE) Review*.

### 1.5.1 The 2016 South Australian Black System Event

South Australia experienced a 'black system' event at 16:18 AEST on Wednesday 28 September 2016. Approximately 850,000 South Australian customers lost electricity supply including households, businesses, transport, community services, and major industries. Most electricity supply was restored in 8 hours, however the wholesale market in SA was suspended for a total period of 13 days. The total cost of the black system event to South Australian business was estimated at \$367 million.

The South Australian black system event of 28 September 2016 highlighted the fact that the NEM power system was facing a new and pressing set of system security challenges. Significant work has occurred since to address these challenges such that the NEM continues to deliver a secure and reliable supply of energy for customers.

<sup>44</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.5

<sup>45</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.9

<sup>46</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.5

## 1.5.2

### The 2018 AER Black System Event Compliance Report

Following the 2016 Black system in South Australia, the AER published the *Black System Event Compliance Report* in December 2018—a detailed compliance report into the pre- and post-event stages of the black system event.<sup>47</sup> This section summarises the findings related to the contingency event framework.

#### Non-compliance with administrative obligations

The AER's *Black System Event Compliance Report* identified several areas of non-compliance by AEMO with some provisions of the NER during the pre-event period that relate to management of contingency events:<sup>48</sup> These relate to the timeliness and detail of market notices and regular review of the criteria for reclassification.

Despite these administrative breaches, the AER found that "overall AEMO satisfied its obligation to use reasonable endeavours to maintain power system security during the pre-event period considering the various steps it took to maintain a secure operating state."<sup>49</sup> The AER did not consider any of these breaches were material to the black system event that ultimately occurred. It did not recommend formal enforcement action in respect to these areas of non-compliance and noted the unprecedented circumstances of the event as part of its consideration.<sup>50</sup>

#### Differing interpretations of requirements for reclassification

The AER also identified that it and AEMO had a different interpretation of certain provisions in the rules, including for reclassification requirements.<sup>51</sup> The AER states that it and AEMO "clearly hold different interpretations of clauses 4.2.3A(b)(2) and 4.2.3A(c) and how those provisions should be applied in practice."<sup>52</sup> The AER considered that its interpretation of these clauses "allows greater flexibility in planning for and communicating risks to the market and facilitating preparedness for potential major events."<sup>53</sup>

The AER identified that (at least at the time of the black system event) AEMO considered that it must identify threats to specific power system elements before it could consider reclassifying a non-credible contingency event as a credible contingency event. Essentially, AEMO's practice was that:

[w]here it is not possible to establish a direct threat to a specific asset, reclassification is not considered.<sup>54</sup>

As such, although there was a general threat to the power system, AEMO chose not to reclassify because:

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47 AER, *Black system compliance report*, December 2018.

48 Ibid, p. 17.

49 Ibid, p. 17.

50 Ibid, p. 20.

51 Ibid, p. 32.

52 Ibid, p. 64.

53 Ibid, p.61.

54 Ibid, p. 53.

there were no “probable” or “proven” lightning transmission line pairs in SA and although the whole network was at greater risk, it did not know which assets might trip.<sup>55</sup>

The AER notes that “AEMO considers that must identify a particular asset that is more likely to be at risk due to the abnormal conditions, rather than a heightened general risk of a loss of multiple lines or generating units within a region due to abnormal conditions.”<sup>56</sup>

In summary, the AER considered that the existing framework provided AEMO sufficient flexibility to deal with events caused by extreme abnormal conditions.<sup>57</sup> Conversely, AEMO considered that the existing rules did not provide it with sufficient flexibility, stating that “a fit-for purpose framework is needed to address the potential system security risks arising in the power system of today and the future, and the increasing potential for more extreme weather events.”<sup>58</sup>

The AER therefore recommended that the AEMC should potentially consider the scope of the current contingency event framework and “whether it is sufficient to address risks to power system security arising from intermittent generation and other emerging risks.”<sup>59</sup>

The AER required the AEMC to undertake a policy review of the regulatory framework as it relates to the Black System Event.<sup>60</sup>

Further details on the AER's findings as they relate to this rule change is in appendix D.

### 1.5.3

#### The 2019 AEMC Black System Event Review

On 12 December 2019, the AEMC published a final report for the South Australian black system review (the BSE Review). The AEMC's review built on the AER's *Black System Event Compliance Report* and considered the details of the pre and post event periods for the black system event.

The report included several recommendations designed to enhance the resilience of the power system, including:

- giving AEMO greater flexibility to protect the system from severe disturbances, such as major storm systems that threaten an entire region
- create a new risk review process, to allow AEMO, networks and market participants to work together to identify new risks and develop solutions
- provide AEMO with flexibility to prioritise system security actions during a period of market suspension

The *BSE Review* found that the existing system security framework:

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55 Ibid, p. 49.

56 Ibid, p. 53.

57 Ibid, p. 62.

58 Ibid, pp. 62-63..

59 Ibid, p. 63.

60 Ibid, p. 25.



- is focused on managing definable, distinct risks that typically occur under a historical generation mix (traditional contingency events, such as the loss of a single generating unit or transmission line); and
- may be ill-suited to managing 'indistinct' events, such as the wide area effect of a major weather system, as an emerging risk.<sup>61</sup>

In the *BSE review* final report, the Commission, among other things:

- recommended introducing protected operation as a new operational tool for AEMO to enhance the resilience of the power system to indistinct events; and
- set out a proposed framework for protected operations and suggested an associated rule change request.<sup>62</sup>

The Commission included three suggested rule change requests as an appendix to the review, which was sent to the COAG Energy Council for its consideration in December 2019. The COAG Energy Council submitted these rule changes with two having since been completed, and can be found at the AEMC's website. This rule change seeks to implement the final recommendation made by the AEMC as an outcome of the BSE review.

## 1.6 The rule making process

On 17 December 2020, the Commission published a notice advising of its commencement of the rule making process and consultation in respect of the rule change request.<sup>63</sup> A consultation paper identifying specific issues for consultation was also published. Submissions closed on 11 February 2021.

The Commission received submissions from seven stakeholders as part of the first round of consultation. The Commission considered all issues raised by stakeholders in submissions. Issues raised in submissions are discussed and responded to throughout this draft rule determination.

Issues that are not addressed in the body of this document are set out and addressed in Appendix A.

On 22 April 2021 the Commission extended the period of time for making the draft determination to 28 October 2021. The Commission considered this extension to be necessary due to the complex issues raised in the rule change request and feedback received from stakeholders in submissions to the consultation paper requesting extra consultation. This has allowed us to hold a number of technical working group meetings for this project in order to get expert stakeholder input into these complex issues.

61 AEMC, *Mechanisms to enhance resilience in the power system - review of the South Australian black system event*. Accessed at: [www.aemc.gov.au/sites/default/files/documents/aemc\\_-\\_sa\\_black\\_system\\_review\\_-\\_final\\_report.pdf](http://www.aemc.gov.au/sites/default/files/documents/aemc_-_sa_black_system_review_-_final_report.pdf)

62 AEMC, *Mechanisms to enhance resilience in the power system - review of the South Australian black system event*. Accessed at: [www.aemc.gov.au/sites/default/files/documents/aemc\\_-\\_sa\\_black\\_system\\_review\\_-\\_final\\_report.pdf](http://www.aemc.gov.au/sites/default/files/documents/aemc_-_sa_black_system_review_-_final_report.pdf)

63 This notice was published under s.95 of the National Electricity Law (NEL).

## 1.7

### Consultation on draft rule determination

The Commission invites submissions on this draft rule determination, including the more preferable draft rule by **6 January 2022**.

Any person or body may request that the Commission hold a hearing in relation to the draft rule determination. Any request for a hearing must be made in writing and must be received by the Commission no later than **4 November 2021**.

Submissions and requests for a hearing should quote project number ERC0304 and may be lodged online at [www.aemc.gov.au](http://www.aemc.gov.au).

## 2 DRAFT RULE DETERMINATION

This chapter:

- summarises the Commission's draft determination for the indistinct events operational framework—section 2.1
- details the rule making test that the AEMC uses to ensure the more preferable draft rule achieves the National Energy Objective (NEO)—section 2.2
- details the assessment framework and policy considerations for this rule change—section 2.3
- summarises the Commission's reasons for making a more preferable draft rule—section 2.4.

### 2.1 The Commission's draft rule determination

The Commission's draft rule determination is to make a more preferable draft rule (draft rule), which is attached to and published with this draft determination.

The draft rule would expand the existing contingency framework allowing AEMO to manage indistinct events in the operational timeframe. It would expand the definition of a contingency event so that it covers all plant that form part of the power system and the sudden or unplanned change to the input or output of plant, not just the failure or removal of the plant. These changes would appropriately encompass the range of events that should be managed under the contingency events mechanism given the changing nature of the NEM. This would ensure that AEMO can take a broader approach to considering threats to power system security in the operational timeframe in response to uncertainty and complexity, particularly as the energy sector continues to transition.<sup>64</sup> Taking on board the stakeholder feedback and analysis it has done throughout this rule change, the Commission considers this to be a simpler, more cost effective approach than introducing a new framework such as that outlined in the rule change proposal.

The draft rule also would refine the transparency and governance arrangements for the management of indistinct events via the contingency event framework. Chapter 3 clarifies that AEMO already publishes the criteria it uses to reclassify non-credible contingency events to credible in the event of abnormal conditions, as well as reviews of its operational management of non-credible contingency events. However, the draft rule would also require AEMO to review its management of events where it uses its discretion to manage a reclassified credible contingency event where its response could not reasonably have been expected from the information published by AEMO in the reclassification criteria and power system operating procedures. Additionally, if an event meets this criteria, AEMO would also need to review the event as part of the general power system risk review (GPSRR). This would provide a feedback loop to help AEMO systematically review and improve its practices.

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<sup>64</sup> The draft rule does not amend the framework for managing contingent events in the planning timeframe outlined in Schedule 5.1 of the NER.

Additionally, the Commission intends to review the amended contingent event framework within five years. The Commission would seek to involve stakeholders in this review.

Further detail on the Commission's reasons for making this draft determination are set out in section 2.4.

This chapter outlines:

- the rule making test for changes to the NER
- the more preferable rule test
- the assessment framework for considering the rule change request
- the Commission's consideration of the more preferable draft rule (the draft rule) against the national electricity objective
- the Commission's consideration in deciding whether to make a uniform or differential rule in accordance with the Northern Territory legislation adopting the NEL.<sup>65</sup>

Further information on the legal requirements for making this draft rule determination is set out in Appendix B.

## 2.2 Rule making test

### 2.2.1 Achieving the NEO

Under the NEL the Commission may only make a rule if it is satisfied that the rule will, or is likely to, contribute to the achievement of the national electricity objective (NEO).<sup>66</sup> This is the decision-making framework that the Commission must apply.

The NEO is:<sup>67</sup>

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.

### 2.2.2 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 contribute to the achievement of the NEO.

In this instance, the Commission has made a more preferable rule. The reasons are summarised below in section 2.4.

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<sup>65</sup> National Electricity (Northern Territory)(National Uniform Legislation) Act2015.

<sup>66</sup> Section 88 of the NEL.

<sup>67</sup> Section 7 of thence.

### 2.2.3

#### Making a differential Rule

Under the Northern Territory legislation adopting the NEL, 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. 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 s. 91(8) of the NEL.

As the amendments made by the draft rule relates to parts of the NER that currently do not apply in the Northern Territory<sup>68</sup> or will have no practical effect in the Northern Territory<sup>69</sup>, the Commission has not assessed the draft rule against additional elements required by the Northern Territory legislation.<sup>70</sup>

## 2.3

### Assessment framework and policy considerations

This section:

- details the assessment framework principles for this rule change—section 2.3.1
- explains policy considerations the Commission has followed in making the draft rule—section 2.3.2

### 2.3.1

#### Assessment framework principles

The Commission outlined the assessment framework in the consultation paper for this rule change request, with respect to the following principles:

- Efficient investment and operation of the power system
- Technology neutrality
- Flexibility
- Risk allocation
- Effective governance
  - Stability and transparency
  - Appropriate allocation of responsibilities
  - Clear and transparent objectives
  - Accountability

<sup>68</sup> Chapter 4 of the NER.

<sup>69</sup> Amendments made by the draft rule in Chapters 5, 8 and 10 of the NER.

<sup>70</sup> From 1 July 2016, the NER, as amended from time to time, apply in the NT, subject to derogations set out in regulations made under the NT legislation adopting the NEL. Under those regulations, only certain parts of the NER have been adopted in the NT. (See the AEMC website for the NER that applies in the NT.) National Electricity (Northern Territory) (National Uniform Legislation) Act 2015.

The Commission has decided to adopt an additional principle to inform its consideration of the rule change request and the development of the draft rule:

- Implementation matters

PIAC and AEMO suggested additional assessment principles for inclusion in the assessment framework.

AEMO suggested that "any new or amended Rule should impose minimal costs, be simple and integrated into existing frameworks where possible thereby avoiding duplication, inconsistency, and unnecessary administrative burden on the industry."<sup>71</sup>

The Commission agrees with this as an outcome and considers that this is already considered through the principles of effective governance, efficient investment and operation of the market and implementation matters.

PIAC suggested that "the AEMC should consider the efficiency of how risks are allocated and costs are recovered. As the AEMC notes, risks are most efficiently allocated to those parties best placed to manage them. Costs are most efficiently recovered on a beneficiary-pays basis or, where that is impractical, on a causer pays basis."

<sup>72</sup>

The Commission agrees that the Rule should ensure efficient allocation of risks, and will consider this through the proposed additional principle of risk allocation.

However, evaluating the efficiency of the cost-recovery mechanism for the contingency events mechanism is outside of the scope of this rule change. Cost-recovery is not addressed as a specific issue in the rule change request, and the issues the rule change request does identify do not directly pertain to cost-recovery.

The sections below discuss the broad policy consideration to achieve the assessment framework principles.

### 2.3.2

#### **Applying the policy framework principles**

##### **Balancing 'flexibility' with efficiency and effective governance**

Ideally, AEMO should use its reasonable endeavours to identify and quantify the impacts to power system security from contingency events through its modelling systems. This would help it, and the market, better understand risks to the power system and make sure that operational actions to manage power system security are proportional and cost-effective.

However, AEMO also needs the flexibility and discretion to act and manage the operation of the power system in instances where its systems cannot reasonably quantify the impacts to power system security from indistinct events.

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<sup>71</sup> AEMO, submission to the consultation paper, p.5.

<sup>72</sup> PIAC, submission to the consultation paper, p.1

### **Balancing efficiency and effectiveness under uncertainty**

The likelihood and impact to power system security from contingency events (and indistinct events) is uncertain. It is not possible to predict, with absolute certainty, exactly when a contingency event will occur and how much it will impact power system security. The likelihood and impacts to power system security are even harder to predict for indistinct events.

This uncertainty should be taken into account when designing a framework, like the proposed indistinct events' framework, that aims to balance the competing principles of efficiency and effectiveness.

Ideally, to manage indistinct events at least cost, AEMO would only take operational actions to manage indistinct events when it is certain they will occur, and only take just enough action to maintain the system in a secure state. However, in practice, this is extremely difficult to do.

If an indistinct event occurs and AEMO does not act or does not take sufficient action in the operational timeframe to maintain power system security, it may risk a cascading failure. A cascading failure, if it occurs, would have significant costs to the market and consumers that would be many times larger than the costs of actions to manage power system security (constraints, directions, and FCAS).

Given the uncertainty of contingency events (and indistinct events), power system operators, including AEMO, must therefore operate the power system with a 'buffer' of additional actions. Determining the optimal size of this 'buffer' (the amount of action that maximises efficiency and effectiveness) is challenging.

It is possible that taking less action or substituting some operational actions for others could potentially save operational costs. However, given it is not possible to know the optimal set of actions for an indistinct event in advance, these efforts to reduce operational costs could lead to more significant costs from a cascading failure.

Any decisions on the optimal size of this buffer involve making a judgement on the risk appetite of the market and consumers. The framework for contingency events and indistinct events, therefore, needs to account for this when designing mechanisms to target cost-effectiveness.

AEMO also has strong obligations in the NER to maintain system security. The proposed mechanism for reclassified and indistinct events would provide it significant discretionary powers to manage system security. This mechanism would require AEMO to have regard to the reclassification criteria but enables AEMO to use discretion to determine the appropriate operational measures to maintain power system security. This discretion necessitates a set of strong accountability and transparency arrangements to provide market participants with confidence in its application and so the framework appropriately targets costs effectiveness.

The draft rule should therefore set out appropriate transparency and governance arrangements so that:

- the market and regulators have confidence that the framework is functioning efficiently and effectively
- the framework is continually improved in line with the NEO
- the market clearly understands AEMO's decisions on the reclassification criteria and the actions it will take to manage indistinct events so that they can make rational investment and operational decisions.

## 2.4 Summary of reasons

This section summarises the reasons the Commission has made the draft rule.

The draft rule made by the Commission is attached to, and published with, this draft rule determination. The key features of the draft rule are as follows:

- **Definition of 'contingency event':** The definition of 'contingency event' has been amended to include:
  - all 'plant' that form part of the power system, including load and distributed energy resources; and
  - broader types of power system security impacts, such as a sudden and unplanned change to output or consumption from a 'plant'.
- **Discretionary mechanism for AEMO:** The draft rule amends AEMO's power system security responsibilities to include an additional responsibility on AEMO to assess the possible impact of credible contingency events and determine the appropriate response required for the maintenance of power system security. In doing so, AEMO must use contingency event analysis where reasonably practicable, but where it is unable to do so it may determine the appropriate actions using its discretion (discretionary mechanism).
- **Updates to the reclassification criteria and power system operating procedures:** The draft rule requires AEMO to update the:
  - reclassification criteria to detail, to the extent practicable, the abnormal conditions that may lead it to manage a reclassified credible contingency event through the discretionary mechanism or take action in respect of certain classes of assets, and
  - power system operating procedures to detail, to the extent practicable, the actions it would likely take to manage reclassified credible contingency events through the discretionary mechanism.

AEMO would be required to conduct targeted consultation under clause 4.2.3B(d) when updating the reclassification criteria and the power system operating procedures; and
- **AEMO review requirements:** The draft rule expands the definition of 'Reviewable operating incident' to include AEMO's use of the discretionary mechanism to manage a reclassified credible contingency event where its response could not reasonably have been expected having regard to the information published by AEMO in the reclassification criteria and power system operating procedures (as outlined above). This would require AEMO to conduct a review when this criteria is met. Additionally, if an event meets this



criteria, AEMO would also need to review the event as part of the General Power System Risk Review.

The AEMC intend to review the performance of the contingency event framework created by these arrangements within 5 years of the final rule's implementation.<sup>73</sup>

Having regard to the issues raised in the rule change request and during consultation, the Commission is satisfied that the more preferable draft rule will, or is likely to, better contribute to the achievement of the NEO compared to the proposed rule for the following reasons:

- The draft rule would provide flexibility for AEMO to increase power system resilience to extreme abnormal conditions within a robust transparency and governance framework that would ensure it does so at least cost. Amending the current framework would be lower cost than developing and introducing a new, parallel framework as outlined in the rule change proposal.
- Implementing the rule via the existing contingency events framework, rather than through a separate parallel 'protected operations' framework, would eliminate the need for AEMO to choose between different frameworks to manage events during operations and better streamlines the rules. This should contribute to lower costs and provide stakeholders with greater clarity regarding AEMO's operational management of contingency events.
- An AEMC review of the contingency event framework would help confirm the framework for indistinct events is functioning in line with the NEO and identify any potential areas for improvement. This may also help improve market, regulator and consumer confidence in the framework. Stakeholders would have the opportunity to contribute to this review.
- Requiring AEMO to only undertake targeted consultation would minimise regulatory burden on AEMO and stakeholders, allowing AEMO to update these procedures when necessary without conducting full public consultation. This would provide a proportionate approach for AEMO to consider stakeholder views in developing its operational approach to the contingency event framework.

Further detail on the draft rule can be found in chapter 3 below.

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<sup>73</sup> Part 4 of the NEL sets out the functions and powers of the AEMC. Under Division 5 of Part 4, the AEMC has the power to conduct a review into the operation and effectiveness of the NER.

## 3 FRAMEWORK FOR INDISTINCT EVENTS UNDER THE DRAFT RULE

This chapter details:

- the existing framework and background
- stakeholder feedback on the approach proposed in the rule change request
- the Commission's analysis on the elements of the proposed approach
- the Commission's draft decision and reasoning.

The chapter considers the above across five areas:

- the implementation approach for the indistinct events framework—section 3.1
- the proposal to expand the definition of 'contingency event'—section 3.2
- the mechanism for managing indistinct events—section 3.3
- the principle for AEMO to maintain the power system in a secure state to avoid load shedding for credible contingency events (including credible indistinct events)—section 3.4
- the transparency and governance framework—section 3.5
- the approach for managing standing risks from indistinct events and interaction with the protected events framework—section 3.6.

### 3.1 Implementation approach

This section details the Commission's analysis on the different approaches for implementing the indistinct events framework and proposed amendments in the rule change request. Given that the implementation approach changes how rule requirements are described, it is necessary to first consider the implementation approach before discussing other proposed amendments. The Commission has maintained the delineation between the type of contingency events that apply in the operation timeframe and those in the planning timeframe (such as Schedule 5.1 for network planning) in the context of Chapter 5. In the planning timeframe you cannot predict and plan for the exact abnormal conditions that would cause the contingent event to be reclassified as credible or the size of the event that will vary with these conditions.

The draft rule would implement the indistinct events framework via the existing contingency event framework. This would reduce potential overlap of existing frameworks, better streamlines the rules, and means that AEMO does not have to choose between different frameworks to manage power system events during operations.

### 3.1.1 Approach proposed in the rule change request

The rule change request proposes two broad options to implement the proposed rule:<sup>74</sup>

- **Separate framework (Option A):** This approach would create a separate, parallel framework in the NER to manage indistinct events.<sup>75</sup>
- **Existing framework (Option B):** This approach would amend the NER to manage indistinct events using the existing contingency event framework.<sup>76</sup>

### 3.1.2 Stakeholder feedback on the proposed implementation approach in submissions to the consultation paper

AEMO and CS Energy explicitly supported using the existing framework to manage indistinct events.<sup>77</sup> ERM Power/Shell explicitly supported using the proposed protected operations framework to manage indistinct events.<sup>78</sup>

In its submission to the consultation paper, AEMO said that a separate framework "adds unnecessary operational complexity to an existing contingency framework that, with some improvements, could accommodate the changes required to manage indistinct events more effectively."<sup>79</sup>

CS Energy considered that the proposal for a separate protected operations framework "perpetuates the ambiguity in existing frameworks by encasing indistinct events in a standalone framework rather than developing an integrated, fit-for-purpose approach to manage the system's changing dynamics."<sup>80</sup> CS Energy considered that the current framework is "adequate to capture the changing nature of events" and that "condition-dependent indistinct events should be managed via the existing reclassification framework."<sup>81</sup>

TasNetworks and CS Energy considered a separate framework largely "unnecessary"<sup>82</sup> and may be "cumbersome".<sup>83</sup> TasNetworks also stated that "the proposed indistinct events process adds needless complexity" and indicated that it is already possible to manage indistinct events under the existing contingency event framework.<sup>84</sup>

AGL noted that improvements to the existing framework could accommodate management of indistinct events and highlighted the risk potential overlap if the AEMC was to develop a new framework.<sup>85</sup>

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74 COAG Energy Council, *Indistinct events* rule change request, p. 5

75 Ibid.

76 Ibid.

77 Submissions to the consultation paper: AEMO, p.2; CS Energy, p. 2

78 ERM/Shell submission to the consultation paper, p. 1

79 AEMO, submission to the consultation paper, p. 2

80 CS Energy, submission to the consultation paper, p.2

81 CS Energy, submission to the consultation paper, p.2

82 TasNetworks, submission to the consultation paper, p.1

83 CS Energy, submission to the consultation paper, p.6

84 TasNetworks, submission to the consultation paper, p.1

85 AGL, submission to the consultation paper, p.3.

ERM Power/Shell did not support altering the existing contingency framework as it aligns with international best-practice and is well understood by participants.<sup>86</sup> ERM Power/Shell also considered it was not possible to establish appropriate transparency and governance for managing indistinct events.<sup>87</sup>

### 3.1.3

#### Commission's analysis on the elements of the proposed approach

The Commission has evaluated the feasibility, costs and benefits of these two approaches to implementation. Its analysis is summarised in the following table:

**Table 3.1: Condition Dependent Indistinct Events framework**

| CRITERIA  | SEPARATE FRAMEWORK   | EXISTING FRAMEWORK  |
|---|--|---|
| <b>Effectiveness</b><br>Does the approach allow us to address identified issues?  | <b>Yes</b>   | <b>Yes</b>  |
| <b>Transparency and governance</b><br>Can we set appropriate transparency and governance?   | <b>Yes</b>   | <b>Yes</b>  |
| <b>Operational complexity (effective governance — clear and transparent objectives)</b><br>How does the approach impact on AEMO's operations? | <b>Increases operational complexity</b><br>A separate protected operations framework would likely require the AEMO control room to choose between different management frameworks. This would increase operational complexity, which is undesirable. | <b>Same operational complexity as present</b><br>Using the contingency event framework to manage both 'distinct' and indistinct events would likely not require AEMO to choose between different management frameworks. |
| <b>Overlap (effective governance — clear and transparent objectives)</b><br>Will the approach create overlap with existing frameworks?        | <b>Some risk of overlap</b><br>A separate framework may cause confusion if it overlaps with existing frameworks and sets conflicting obligations. The Commission would need to carefully implement the rule to avoid this overlap.                   | <b>Does not create overlap</b><br>...because there is only one framework for managing contingency events.   |

<sup>86</sup> ERM/Shell, submission to the consultation paper, p.6

<sup>87</sup> ERM/Shell, submission to the consultation paper, p.6.

| CRITERIA  | SEPARATE FRAMEWORK   | EXISTING FRAMEWORK  |
|---|--|---|
| <b>Simplicity</b><br>Which approach creates a simpler set of rules? | <b>More complex</b><br>Creates a new framework, which may be more administratively complex, possibly more difficult to interpret and unnecessary | <b>Simpler</b><br>Uses an existing, established framework which may be administratively simpler, easier to interpret and more proportional. |
| <b>Flexibility</b>  | <b>Less flexible</b><br>Adds more layers to rules to adapt to future needs.  | <b>More flexible</b><br>Makes existing frameworks flexible to future needs.   |

### 3.1.4

#### Commission's draft decision on implementation approach for the draft rule

Taking into account stakeholder feedback as well as the analysis undertaken through this rule change request, the Commission's preferred approach is to use the existing contingency event framework (including the reclassification and protected events mechanisms) to manage indistinct events in the operational timeframe. The Commission considers that this approach is likely better than creating a separate protected operations framework for the reasons set out above based on our assessment criteria. In summary, it would:

- not increase operational complexity for AEMO's control room
- avoid the risk of possible overlap with existing frameworks
- make existing frameworks flexible to future needs rather than adding layers to the existing rules
- still allow for appropriate transparency and governance requirements.

## 3.2

### Amending the definition of 'contingency event'

This section considers the need to amend the definition of 'contingency event' in the operational timeframe in the NER, and AEMO's proposal to do so from its submission to the consultation paper.

The draft rule would amend the definition of 'contingency event', primarily in the operational timeframe to clarify that all plant connected to the system and sudden, unexpected changes in demand and supply are included. The Commission considers this is necessary to ensure the potential range of threats to power system security given the changing mix of technologies connected to the system and the range of threats posed by indistinct events are clearly captured.

### 3.2.1 The current definition of 'contingency event'

The current definition of 'contingency event' in NER clause 4.2.3(a) is as follows:<sup>88</sup>

A contingency event means an event affecting the power system which AEMO expects would be likely to involve the failure or removal from operational service of one or more generating units and/or transmission elements.<sup>89</sup>

### 3.2.2 The rule change request description of the definition of a 'contingency event'

The rule change request proposes to define 'indistinct event' but does not propose changes to the definition of 'contingency event'. However, the rule change request states that "the NER defined the term 'contingency event' to capture the set of events that represented material risk to power system security at that time."<sup>90</sup>

### 3.2.3 Stakeholder feedback on the current definition of 'contingency event'

In its submission to the consultation paper, AEMO proposes to expand the definition of 'contingency event' in the operational timeframe to include any event that "AEMO expects would result in a sudden and unplanned change in the availability or operability of plant forming part of the power system or scheduled load."<sup>91</sup>

Principally, this would expand the current definition of contingency event to include:

- sudden demand/supply changes
- all types of plant.

In its submission to the consultation paper, CS Energy "acknowledges the need to remove ambiguity from the NER and is supportive of changing the definition of contingency events to more explicitly capture indistinct events. This is akin to other definition changes to reflect the changing technology and environment such as the antiquated definition of energy generation requiring mechanical motion."<sup>92</sup>

ERM Power/Shell stated that "we believe for clarity a definition for an indistinct contingency event should be provided in clause 4.2.3. This definition should provide clear discrimination between an indistinct contingency event, a credible contingency event, a non-credible contingency event and a protected event."<sup>93</sup>

88 The *Integrating energy storage systems into the NEM* draft determination proposes to expand the definition of 'contingency event' to include a new participant category, the integrated resource provider (IRP). This would expand the definition to include large-scale storage and aggregated DER in the scope of 'contingency event', but not non-market loads, scheduled loads registered as Customers, or disaggregated DER units. See: AEMC, 2020, *Integrating energy storage systems into the NEM*, draft rule and draft determination. Available at: <https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem>

89 NER clause 4.2.3(a)

90 COAG Energy Council, 2019, *Enhancing operational resilience in relation to indistinct events*, rule change request, p. 5.

91 AEMO, 2020, Submission to *Indistinct events* consultation paper, p. 2.

92 CS Energy, 2020, Submission to *Indistinct events* consultation paper, p. 2.

93 ERM Power, 2020, Submission to *Indistinct events* consultation paper, p. 9.

### 3.2.4

#### Commission's analysis on proposal to amend the definition of 'contingency event'

##### Analysis of the current definition of 'contingency event'

The current definition of 'contingency event' only considers risks to power system security that involve the complete failure or removal from operational service of generating units and transmission elements. Crucially, this definition does not seem to include significant impacts to power system security from:

- sudden changes in demand and supply caused by events other than the complete failure or removal from operational service of power system elements
- loads and distributed energy resources (DER) like rooftop solar PV.

However, AEMO considers the failure or removal from operational service of network elements in the distribution system and the disconnection of loads as part of a contingency event if they have a material effect on security of the transmission network.<sup>94</sup>

##### Sudden changes in demand and supply can potentially impact power system security like a 'contingency event'

The Commission considers that the NEM may be vulnerable to sudden significant reductions or increases in generation or consumption (not just the complete failure of units).

For example, control systems and protection schemes may not simply completely trip or disconnect generating units: they may also act to partially reduce their output. Similarly, unforeseen smoke from a bushfire could substantially reduce the output of solar PV across a region. While these events could have a significant impact to power system security, it is not clear whether they could be considered to be 'contingency events' under the current rules because the generating units involved would still be operational.

##### Failures of other technologies can also impact power system security like a 'contingency event'

Loads and DER can also pose risks to the power system security if they are unexpectedly removed from service (fully or partially). For example, some loads can be larger than the capacity of some individual generating units and changes in large loads can be used to support power system security.<sup>95</sup> When a sudden loss of load occurs it has an opposite effect on system frequency and other operational characteristics of the power system to generation, but the loss of a large individual load or set of loads could still have a significant impact on power system security.

Similarly, sudden failures or changes in operational characteristics of DER, in aggregate, can significantly impact power system security. The total installed capacity of DER (primarily rooftop Solar PV) now totals over 14GW—equivalent to 28% the total nameplate capacity of all large scale generators (see Table 3.2). An event that affects a portion of this DER cohort

<sup>94</sup> AEMO, 2021, *Power System Security Guidelines*, pp. 13-14. Accessed at: [https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/power\\_system\\_ops/procedures/so\\_op\\_3715-power-system-security-guideline.s.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3715-power-system-security-guideline.s.pdf?la=en)

<sup>95</sup> See for example, Tomago's news item on their efforts to help manage a short term energy shortage in the wake of bushfires. Accessed at: <https://www.tomago.com.au/news/2020/tomago-keeps-the-lights-on-across-the-state>

(for example, a cyberattack on small-scale inverters or an operational error at a virtual power plant) could significantly impact system security, resulting in a sudden, unexpected change in the balance of supply and demand.

**Table 3.2: Small generating unit installations and rated output (MW) in the NEM**

| <b>SMALL GENERATING UNIT (SGU)</b> | <b>INSTALLATION QUANTITY</b> | <b>RATED OUTPUT (MW)</b> |
|------------------------------------|------------------------------|--------------------------|
| Solar Photovoltaic (PV) panels     | 2,832,040                    | 14,387                   |
| Wind                               | 424                          | 1.47                     |
| Hydro                              | 20                           | 0.051                    |
| Total SGU installations            | 2,832,484                    | 14,389                   |

Source: [Clean Energy Regulator](https://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Smallscale-installations-by-installation-year), 2021, *Postcode data for small scale installations*, web page. Accessed at: [www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Smallscale-installations-by-installation-year](https://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Smallscale-installations-by-installation-year)

In its *Renewable Integration Study*, AEMO identifies that the disconnection of solar PV could be significant in some circumstances.<sup>96</sup> For example, it identifies that the contingency sizes for the extreme worst case scenarios (where solar PV is not curtailed) are "comparable with (and [will] soon exceed) the maximum size of credible contingency for which the South Australian power system is currently planned and operated."<sup>97</sup>

#### **International jurisdictions are considering DER disconnection in the scope of 'contingency events'**

International jurisdictional authorities have similarly identified that DER can cause events with equivalent impacts to power system security from the failure of transmission and generation elements. For example, the North American Electric Reliability Corporation (NERC), the regulatory authority that develops and enforces reliability standards and assesses long-term reliability for the USA and Canada, has identified that:

the future [North American] grid may be dominated by many more individual generating resources that are smaller than those of the historical power system of large centralized generators... [D]ue to the increase in DERs, there may be a possibility that the largest contingency is no longer a single generating unit but rather the trip of multiple DERs within the same vicinity (e.g. caused by tripping due to bulk power system faults) or multiple DERs over a larger area due to ROCOF or other protection settings.<sup>98</sup>

<sup>96</sup> AEMO, 2020, *Renewable Integration Study Stage 1 Appendix A: High Penetrations of Distributed Solar PV*, p. 31. Accessed at: <https://aemo.com.au/-/media/files/major-publications/ris/2020/ris-stage-1-appendix-a.pdf?la=en>

<sup>97</sup> AEMO, 2020, *Renewable Integration Study Stage 1 Appendix A: High Penetrations of Distributed Solar PV*, p. 33. Accessed at: <https://aemo.com.au/-/media/files/major-publications/ris/2020/ris-stage-1-appendix-a.pdf?la=en>

<sup>98</sup> NERC, 2020, *Fast Frequency Response Concepts and Bulk Power System Reliability Needs; NERC Inverter-Based Resource Performance Task Force (IRPTF) White Paper*, March 2020, p. 4. Accessed at: [https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/FAST\\_Frequency\\_Response\\_Concepts\\_and\\_BPS\\_Reliability\\_Needs\\_White\\_Paper.pdf](https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/FAST_Frequency_Response_Concepts_and_BPS_Reliability_Needs_White_Paper.pdf)



Given this, international jurisdictions are now expanding their contingency event frameworks to encompass threats posed by these technologies. For example, NERC has recommended that contingency analysis should consider aggregated DER loss as a contingency, where applicable.<sup>99</sup>

Similarly, the United Kingdom's Office of Gas and Electricity Markets (Ofgem) has identified the need to increase visibility of DER in order to improve planning for operational contingencies.<sup>100</sup>

### **Western Australia has expanded the definition of 'contingency event'**

Western Australia has recently updated its definition of 'contingency event' to encompass all types of plant and sudden changes in demand and supply like AEMO has suggested for this rule change.

The terms 'contingency event' and 'credible contingency event' are not currently defined in the Western Australian Wholesale Electricity Market (WEM) Rules, but they are defined in the *WEM Power System Security Market Procedure*.<sup>101</sup>

The Western Australian Government Energy Transformation Taskforce (ETT) has identified that these existing definitions:

do not account for large swings in load or unscheduled generation, (including both embedded and non-embedded generation) or other elements of the [South West Interconnected System] (SWIS) that are not specifically registered as facilities, such as communications infrastructure."<sup>102</sup> Given this, the ETT considers that "a contingency event framework needs to be developed and established to support changes to the WEM and related regulatory frameworks being introduced as part of the Strategy."<sup>103</sup>

The Western Australian Government is set to implement this new contingency event framework as part of a suite of amendments to the WEM Rules in October 2022.<sup>104</sup> This new framework will include a new definition of 'contingency event' as "an event affecting the SWIS which AEMO expects would be likely to involve the failure or removal from operational service of one or more Generating Units, Facilities and/or Network elements, or an unplanned change in load, Intermittent Generation or other elements of the SWIS not controlled by AEMO."<sup>105</sup>

<sup>99</sup> NERC, 2020, *Fast Frequency Response Concepts and Bulk Power System Reliability Needs; NERC Inverter-Based Resource Performance Task Force (IRPTF) White Paper*, March 2020, p. 13. Accessed at: [https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/Fast\\_Frequency\\_Response\\_Concepts\\_and\\_BPS\\_Reliability\\_Needs\\_White\\_Paper.pdf](https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/Fast_Frequency_Response_Concepts_and_BPS_Reliability_Needs_White_Paper.pdf)

<sup>100</sup> Ofgem, 2021, *Next steps on visibility of distributed generation connected to the GB distribution networks*, open letter, 26 February 2021, p. 13. Accessed at: [https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/next\\_steps\\_on\\_the\\_visibility\\_of\\_dg.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/next_steps_on_the_visibility_of_dg.pdf)

<sup>101</sup> Energy Transformation Taskforce, 2020, *Revising the Operating States and Contingency Events Frameworks in the SWIS Information Paper*, Government of Western Australia Energy Policy WA, 28 February 2020, p. 10. Accessed at: <https://www.wa.gov.au/organisation/energy-policy-wa>

<sup>102</sup> Ibid, p. 10.

<sup>103</sup> Ibid, p. 2.

<sup>104</sup> Ibid, p. 10.

<sup>105</sup> Ibid, p. 10.

The ETT explains that this definition would encompass "the failure of all types of network elements (not just transmission), allow for different types of facilities (including energy storage devices), and cover non-generator events including significant changes to load or unscheduled generation."<sup>106</sup>

### 3.2.5

#### The draft rule amends the definition of 'contingency event'

The Commission agrees that it is necessary to amend the definition of 'contingency event' in the operational timeframe to cover indistinct events. But the Commission has maintained the delineation between the type of contingency events that apply in the operation timeframe and those in the planning timeframe (such as Schedule 5.1 for network planning) in the context of Chapter 5.

Limiting AEMO to only operationally manage power system security events caused by the complete failure of only some technologies may no longer be appropriate as the NEM continues to change and these new technologies pose significant threats to the power system. AEMO's analysis and analysis from other international jurisdictions has identified that sudden changes in demand and supply from existing and emerging technologies can impact power system security like a 'contingency event'. The approach taken in the Western Australian market suggests there may be benefit in changing o the definition of 'contingency event' in the NEM.

The Commission considers that this amendment is necessary to remove any ambiguity regarding the risks posed by extreme abnormal conditions and managed under the operational contingency events mechanism. While the *Integrating energy storage systems into the NEM* draft rule proposes to expand the definition to include some loads and DER, it is important to further amend the definition so the contingency event framework has comprehensive coverage of all relevant technologies and events given the threats they pose to the power system.

The draft rule therefore proposes to amend the definition of 'contingency event' in the operational timeframe to include all plant connected to the system and sudden, unexpected changes in demand and supply ("loading"). For this reason the reference to generation units and transmission elements has been replaced with plant and network elements and a clear reference to sudden changes has been included alongside removal from operation. The Commission considers this is necessary to ensure the potential range of threats to power system security given the changing mix of technologies connected to the system and the range of threats posed by indistinct events are clearly captured.

The proposed definition of 'contingency event' for operational purposes in the draft rule is as follows:

*A **contingency event** means an event on the power system which AEMO expects would be likely to involve:*

- (1) the failure or removal from operational service of plant; and/or*

<sup>106</sup> Ibid, p. 10.

(2) *a sudden and unplanned change to the loading level of plant.*

This would be supported by an amendment to the definition of plant to include paragraph (g) to specify the intention in relation to the power system<sup>107</sup>

**plant**

- (a) In relation to a *connection point*, includes all equipment involved in generating, utilising or transmitting electrical energy.
- (b) In relation to *dispatch bids and offers*, controllable generating equipment and controllable loads.
- (c) In relation to the *statement of opportunities* prepared by AEMO, individually controllable generating facilities registered or capable of being registered with AEMO.
- (d) In relation to the *regulatory investment test for transmission*, any of the definitions of *plant* in paragraphs (a) to (c) relevant to the application of the *regulatory investment test for transmission* to a RIT-T project.
- (e) In relation to the *regulatory investment test for distribution*, any of the definitions of *plant* in paragraphs (a) to (c) relevant to the application of the *regulatory investment test for distribution* to a RIT-D project.
- (f) In relation to a *system strength remediation scheme*, includes all equipment involved in the implementation of the scheme.
- (g) In relation to the *power system*, includes all equipment involved in the *generation, transmission or distribution of electrical energy*.

### 3.2.6

#### Consequent amendments

The draft rule proposes amendments throughout the NER to clarify the number of power system elements intended to be captured by the term 'contingency event', 'credible contingency event' and 'non-credible contingency event' in the operational timeframe. This is to clarify the scope of power system security obligations under the rules given the proposed expansion of 'contingency event' (as outlined in section 3.2.5, above).

Under the current rules, a contingency event includes the failure of one or more power system elements.<sup>108</sup> A 'credible contingency event' could therefore include whatever number of asset failures that AEMO considers reasonably possible in the surrounding circumstances.

The set of asset failures that these terms refer to is not fixed: it changes depending on what contingency events AEMO considers to be credible or non-credible at any point in time.

Many clauses in the rules use 'contingency event', 'credible contingency event' and 'non-credible contingency event' to set obligations for power system security. Some of these

<sup>107</sup> NER Chapter 10 Glossary

<sup>108</sup> NER clause 4.2.3(a).

clauses use these terms as 'units of measurement' for different impacts to power system security, measured by the number of possible asset failures.

There is a risk that the expansion of 'contingency event' proposed under the draft rule could make some obligations in the rules that use the terms 'contingency event' and 'credible contingency event' broader or more burdensome given they would now include all 'plant' and impacts to power system security caused by sudden and unplanned changes to power output or consumption by plant. However the Commission considers that this risk is minimal given the continuation of the delineation between the type of contingency events that apply in the operation timeframe and those in the planning timeframe (such as Schedule 5.1 for network planning) in the context of Chapter 5.<sup>109</sup>

The draft rule would limit changes to the NER to addressing perceived ambiguity and draws on AEMO's existing reporting obligations to provide stakeholders with greater clarity on how AEMO would apply the contingent event framework (see section 3.5 for more detail).

### 3.3

## Mechanism for identifying and managing indistinct events

#### 3.3.1

### Approach proposed in the rule change request

The rule change request proposes that AEMO would 'pre-identify' indistinct events in advance of them occurring.<sup>110</sup> It would also conduct cost-benefit analysis (in advance) to predetermine the actions it would take to manage indistinct events.<sup>111</sup> In order to pre-identify indistinct events that could impact the power system AEMO would use the General Power System Risk Review (GPSRR).<sup>112</sup> Similar to the current arrangement for reclassification, AEMO would be required to set out the criteria it would use to determine when and an indistinct event is considered likely to occur.<sup>113</sup>

The rule change request also proposes to require AEMO to follow the reclassification criteria, indistinct events criteria and predefined actions for indistinct events to the extent practicable.<sup>114</sup> This would provide AEMO the flexibility to manage the power system ex-ante to prevent a cascading failure from a credible indistinct event in instances where:

- it has not predefined the relevant abnormal conditions (for example, because it has not yet had time to update its procedures)
- predefined actions are not sufficient to prevent a cascading failure.

Broadly, this is what the rule change request describes as the 'ad-hoc mechanism'. If AEMO uses the ad-hoc mechanism, it would need to:

- report publicly, and to the Panel, as soon as practicable following the occasion

<sup>109</sup> For example, NER cl. S5.1.2.1 defines the interpretation of credible contingency events that network service providers are required to use in planning and operating their networks.

<sup>110</sup> COAG Energy Council, *Enhancing operational resilience rule change request*, p.3

<sup>111</sup> COAG Energy Council, *Enhancing operational resilience rule change request*, p.3

<sup>112</sup> COAG Energy Council, *Enhancing operational resilience rule change request*, p.3

<sup>113</sup> COAG Energy Council, *enhancing operational resilience - rule change request*, p.3

<sup>114</sup> COAG Energy Council, *Enhancing operational resilience - rule change request*, p.3

- review the risks it managed in the next GPSRR.<sup>115</sup>

### 3.3.2

#### **Stakeholder feedback on the proposed implementation approach in submissions to the consultation paper**

The project team consulted the Indistinct events Technical Working Group (TWG) on the rule change request's proposed mechanism for identifying and managing indistinct events. The TWG's initial feedback is summarised below.

##### **Stakeholder feedback on risk identification**

In its submission to the consultation paper, AEMO was of the view that "the GPSRR is not an appropriate tool for defining condition-dependent credible indistinct contingency events or their management, for the reasons explained in AEMO's letter. The GPSRR should continue to consider only non-credible contingencies under the protected events framework."<sup>116</sup>

Despite this, ERM Power/Shell stated in its submission to the consultation paper that "[w]e agree that the GPSR should be used to identify potential condition-dependent indistinct contingency events and AEMO should respond to any identified potential condition by applying for a declared protection or standing indistinct contingency event to the Reliability Panel. We believe the Reliability Panel is best placed to consider the technical and economic trade-off with regards to a proposed management plan."<sup>117</sup>

AEMO has taken steps to improve its access to weather forecasting in recent years. This includes forming a strategic partnership with the Bureau of Meteorology in 2018.<sup>118</sup> Since March 2017, a senior Bureau meteorologist has assisted AEMO's control room to prepare for weather events, such as extreme heat, that can have an impact on electricity supply. Bureau data is delivered to AEMO to support its operational decision-making. And Bureau scientists regularly provide briefings about anticipated climate conditions across Australia that could have an impact on energy supply and demand.

##### **Stakeholder feedback on rule change request proposal for pre-defined actions and CBA**

Stakeholders indicated that it is difficult for AEMO to conduct cost-benefit analysis given the power system security impacts from indistinct events cannot be quantified ahead of time. In its submission to the consultation paper, AEMO stated that "it is neither logical nor consistent with the NEO to require the independent system operator to make ex-ante decisions, based on a cost-benefit assessment, that limit the tools available to manage the system for credible risk in real-time."<sup>119</sup>

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115 COAG Energy Council, *Enhancing operational resilience in relation to indistinct events rule change request*, p.4

116 AEMO, submission to the consultation paper, p.7

117 ERM Power/Shell, submission to the consultation paper, p.8

118 AEMO, 2018, AEMO and BOM announce strategic partnership, website article, 30 November 2018. Accessed at: <https://aemo.com.au/en/newsroom/news-updates/bom-partnership>

119 AEMO, submission to the consultation paper, p.7

### **Stakeholder feedback on rule change request proposed approach to criteria for reclassification and indistinct events**

Stakeholders have suggested that the Reliability Panel, rather than AEMO, should determine the criteria for indistinct events and reclassification, or to set these out in the rules.

ERM Power stated that "The actions which AEMO may take during a period of protected operations should be clearly defined in the Rules or set by an unambiguous Standard developed and consulted on in accordance with the rules' consultation procedure by the Reliability Panel."<sup>120</sup>

CS Energy suggested that "responsibility for the guidelines for protected operations and the criteria for determining the events to be protected should sit with the Reliability Panel. The guiding principles for the Reliability Panel will need to facilitate consistent and transparent decision-making. This would give the market more certainty and confidence and will lead to the most efficient outcome."<sup>121</sup>

### **3.3.3**

### **Commission's draft analysis on proposed mechanism for managing indistinct events**

#### **Commission's draft analysis on the rule change request's proposed approach to risk identification in the GPSRR**

The Commission considers that AEMO is the best party to identify risks given its experience, expertise and responsibilities as system operator (no other party possesses comparable levels of experience and expertise). AEMO could use the information and analysis from the GPSRR to develop the reclassification criteria and relevant power system procedures for managing indistinct events.

As per the final GPSRR rule, AEMO is responsible for developing and consulting on the GPSRR.<sup>122</sup> The objective of the GPSRR is to "promptly identify and assess emerging risks to power system security from all possible sources".<sup>123</sup> The scope and function of the GPSRR would seem to allow it to consider emerging threats to the power system that may lead to indistinct events.

Analysis from the GPSRR could help AEMO explore potential indistinct events and emerging threats to the power system. However, under a framework for managing indistinct events, AEMO should be able to use information from any relevant source to help manage indistinct events. It should not be restricted to only consider analysis from the GPSRR as the rule change request implies.

#### **Commission's analysis on the rule change request's proposed approach to 'pre-define' indistinct events and require AEMO set out indistinct event criteria, the actions it would typically take to manage indistinct events, and cost-benefit analysis of proposed actions**

<sup>120</sup> ERM Power/Shell, submission to the consultation paper, p. 4

<sup>121</sup> CS Energy, submission to the consultation paper, p. 8

<sup>122</sup> AEMC, Implementing a general power system risk review (GPSRR), available at: [www.aemc.gov.au/sites/default/files/documents/erc0303\\_gpsrr\\_final\\_determination\\_-\\_final\\_version310521.pdf](http://www.aemc.gov.au/sites/default/files/documents/erc0303_gpsrr_final_determination_-_final_version310521.pdf)

<sup>123</sup> AEMC, *Implementing a general power system risk review*, rule change, p.16

A credible indistinct event is a situation where AEMO considers that extreme abnormal conditions pose a credible threat to power system security, but:

- it is unreasonable to identify the specific elements that these abnormal conditions are likely to impact because the abnormal conditions are so unpredictable and widespread; or
- it is unreasonable to conduct contingency analysis because the computational effort necessary is too great due to the large number of power system elements involved.

Based on this definition, the Commission considers that it is not appropriate to require AEMO to 'pre-identify' an indistinct contingency event or determine the exact set of power system elements that might be impacted by extreme abnormal conditions as the rule change request suggests because:

- extreme abnormal conditions are unpredictable, and, the impact they can have on the power system (i.e. the number of power system elements they may cause failure of) can vary significantly
- it may not be reasonable to model and develop plans to manage every possible combination of power system element failures ahead of time.

However, it is likely reasonable for AEMO to set out the following in advance:

- the most relevant abnormal conditions that may affect the power system
- the criteria that would see AEMO reclassify a non-credible contingency to a credible contingency (for each abnormal condition)
- the criteria that would see AEMO manage a reclassified credible contingency event as an indistinct event (i.e. the point at which it is unreasonable to define the specific assets that are likely to be impacted by abnormal conditions because the abnormal conditions are so extreme).

AEMO is already required to list the criteria for when it would reclassify a non-credible contingency to a credible contingency. It would be reasonable to require AEMO to do the same for indistinct events. Doing so would show the market when AEMO is likely to take action to manage indistinct events.

Furthermore, AEMO already describes the abnormal conditions that would see it reclassify a non-credible contingency event to a credible contingency event. It would seem reasonable for AEMO to take a similar approach for indistinct events, building on these existing definitions.

Given the above, the Commission considers that it is also not reasonable or practical to bind AEMO to take specific actions to manage indistinct events: If it is unreasonable to model every possible combination of asset failures that may comprise an indistinct event, it is also not reasonable to require AEMO to identify the exact actions it would take to manage them. It is therefore also not reasonable to require AEMO to conduct cost-benefit analysis to determine these actions.

However, in the Commission's view it is reasonable for AEMO to outline (at a high-level e.g. not listing the exact power system elements) the typical actions it would take to adjust the technical envelope of the power system for credible indistinct events and consider what



might be the most cost-effective set of actions to manage the power system. This is because AEMO would need to develop its own internal procedures on what actions it should take to manage the indistinct events using its discretion. Publishing this information could help better inform market participants and allow them to make efficient operational and investment decisions. AEMO already sets out the procedures it follows to manage contingency events in its Power System Security Guidelines (PSSG).

This approach would help the market understand the actions AEMO would typically take to manage indistinct events, but would also provide AEMO with the necessary flexibility to manage the power system during very uncertain conditions.

The Commission also considers that including a cost-effectiveness principle, as proposed in the rule change, is unnecessary because the existing obligation in the NEL for AEMO to conduct its activities in line with the NEO provides sufficient direction to manage indistinct events at least cost.<sup>124</sup> This means that there is already an overarching obligation for AEMO to consider the impact of its actions on investment in, operation and use of the power system with respect to the impact on the cost (price) for consumers.

### 3.3.4

#### **Commission's draft decision on mechanism for indistinct events**

AEMO's traditional approach is to use its modelling, monitoring and forecasting systems to identify potential credible contingency events and quantify their impacts to power system security ex-ante. It does this for credible contingency events and non-credible contingency events that it reclassifies as credible contingency events. AEMO then takes action to manage the power system that are proportional to the quantum of impact to power system security it identifies through its modelling.

However, the rule change request identifies that there are circumstances where abnormal conditions are too extreme (unpredictable, complex and severe) for AEMO to reasonably identify the specific assets that might be affected or model the likely impact to power system security through contingency analysis. In the Commission's view, AEMO should not be prevented, or consider themselves to be prevented, from taking necessary action to maintain the security of the system. Excessively rigid requirements or unnecessary ambiguity that could be seen to prevent sufficient flexibility for AEMO to take action to manage obvious emergencies may not be in the long-term interests of consumers. The Commission also considers that it is unreasonable for AEMO to be able to identify specific assets and model the likely impact to power system security during extreme abnormal conditions using traditional contingency analysis.

The draft rule amends AEMO's power system security responsibilities to include an additional responsibility on AEMO to assess the possible impact of credible contingency events and determine the appropriate response required for the maintenance of power system security. In doing so, AEMO must use contingency event analysis where reasonably practicable, but where it is unable to do so it may determine the appropriate actions using its discretion (discretionary mechanism).

<sup>124</sup> NEL cl. 49(3)



AEMO would therefore continue its traditional practice of using contingency analysis to quantify the potential impact to power system security from credible contingency events (including non-credible contingency events it has reclassified).

However, AEMO would have the flexibility to determine the necessary actions to manage credible indistinct events, i.e. reclassified credible contingency events caused by extreme abnormal conditions, in instances where it is not practicable to use contingency analysis due to the severity of the abnormal conditions.

The draft rule would require AEMO to set out:

- in the reclassification criteria, the abnormal conditions that would see it use its discretion to manage reclassified credible indistinct events, or take action in respect of certain classes of assets
- in the power system operating procedures, the actions it would typically take to manage credible contingency events (to the extent practicable).

The draft rule requires AEMO to identify, to the extent practicable, whether certain abnormal conditions would affect certain assets more than others and how it might therefore manage these assets. For example, a severe storm is more likely to affect transmission lines and wind generators than thermal generators and storage. Consequently, AEMO may typically constrain transmission elements and wind generators during a severe storm and rely on reserves provided by thermal generation and storage.

The reclassification criteria for indistinct events would essentially set out the point at which undertaking contingency event analysis becomes impracticable due to the severity of the abnormal conditions. For example, a storm front x km long with wind speeds above y knots.

AEMO would need to have regard to the reclassification criteria and power system operating procedures (which would include how it would manage indistinct events) to the extent practicable. However, the framework would allow AEMO to deviate from the reclassification criteria and power system operating procedures if necessary for power system security. If AEMO did deviate from the reclassification criteria or power system operating procedures in a way that could not reasonably have been expected, it would need to conduct a review of the event as a reviewable operating incident and (separately) examine the event in the GPSRR.

#### **BOX 1: EMERGING TECHNIQUES**

It is difficult to predict the exact set of power system elements that may fail under extreme abnormal conditions. AEMO is developing new systems, including its real-time energy system simulation and 'Next Gen' contingency analysis tools. These will help support its decisions and provide it more oversight of the system during operations.

In time, it may be possible to adopt even more advanced systems that significantly reduce AEMO's discretionary management of the power system through the indistinct events mechanism. However, developing models that can accurately predict how power systems will respond to extreme abnormal conditions remains a challenge.

For example, it may be possible to consider the resilience of each individual power system element to different abnormal conditions and assign it a risk rating (e.g. the wind speed where it is likely that a transmission tower may fall). However, this is a significant undertaking given the number of elements on the power system, the variety of abnormal conditions that may affect them, and the measurement and analysis necessary to determine the actual likelihood of failure.

There are also emerging modelling approaches such as machine learning and artificial intelligence that could help predict and quantify the impacts from contingency events. However, these approaches are the cutting edge of power system security management. Machine learning also requires extensive prior examples to develop accurate predictions, and high impact, low probability events from extreme abnormal conditions are rare.

By implementing the indistinct events mechanism, the Commission recognises that current modelling technologies cannot accurately predict exactly how abnormal conditions will affect the power system, and AEMO needs the flexibility and discretion to manage the power system when it is threatened by extreme abnormal conditions.

Source: Source: AEMO, 2020, Minutes from the 20th meeting of the National Electricity Market Operations Committee (NEMOC), Friday, 11 December 2020. Accessed at: [https://preprod.aemo.com.au/-/media/files/stakeholder\\_consultation/working\\_groups/other\\_meetings/nemoc/2020/nemoc-minutes-11-december-2020.pdf?la=en](https://preprod.aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nemoc/2020/nemoc-minutes-11-december-2020.pdf?la=en)

## 3.4 Maintaining the power system in a secure state

This section considers principles for AEMO to maintain the power system in a secure state and avoid load shedding for credible indistinct events.

### 3.4.1 Current arrangements

Existing arrangements for power system security include that the power system should, to the extent practicable, be maintained in a secure state with the technical envelope set and contingency capacity reserves procured to avoid load shedding for the occurrence of any credible contingency event.<sup>125</sup>

Broadly, this means that AEMO takes steps to avoid load shedding for credible contingency events, but does not take steps to avoid load shedding for non-credible contingency events.

### 3.4.2 Rule change request's proposed approach to maintaining the power system in a secure state

Under the rule change request's proposed approach, AEMO could optionally take additional action to maintain the power system in a secure state and avoid load shedding. However, it would need to conduct a cost-benefit analysis to justify this additional action.<sup>126</sup>

<sup>125</sup> NER clauses 4.2.6(a), 4.2.4(a), 4.2.4(b)(2) and 4.2.5(c)(2).

<sup>126</sup> COAG Energy Council, *Enhancing operational resilience in relation to indistinct events rule change request*, p.4

### 3.4.3 **Stakeholder feedback on the rule change request's proposed approach to maintaining the power system in a secure state**

In its submission to the consultation paper, CS Energy suggests that it is "not necessary" for AEMO to take additional actions to prevent load shedding for credible indistinct events, stating that this "introduces ambiguity and blurs the boundaries between these events and 'normal' contingencies."<sup>127</sup>

ERM Power/Shell writes that taking additional actions to avoid load shedding during credible indistinct events is "unnecessary" and result in "restrictive outcomes that will increase costs for consumers."<sup>128</sup> ERM Power/Shell considers that:

"the power system should be required to maintain at least a satisfactory operating state and return to a secure operating state within a period of 30 minutes. Similarly, where it is economic to do so, load shedding should be an allowed action under a period of protected operation to ensure the power system maintains a satisfactory operating state post an indistinct contingency event or to restore the power system to a secure operating state within 30 minutes."<sup>129</sup>

ERM also writes that the Commission should "be guided by consumer's view in this area as limited duration load shedding may be a preferred and economically efficient option."<sup>130</sup>

### 3.4.4 **Commission's draft analysis on the rule change request's proposed approach to maintaining the power system in a secure state**

Allowing load shedding to occur during credible indistinct events is distressing for those parties involved, but may save some costs (by reducing the amount of procured reserves and directions that might result from managing the power system at more secure level). However, it is not clear that overall this outcome would be in the long-term interests of consumers since it may also reduce resilience during the times that the power system is most at threat (i.e. during extreme abnormal conditions).

The Commission recognises that there is a limit to the amount of additional actions AEMO can take during operations, and it may simply not be possible to maintain a secure system and avoid load shedding following a contingency event caused by extreme abnormal conditions. Given extreme abnormal conditions are the times at which the power system is most at threat of cascading failure, the Commission considers it is reasonable for AEMO to dedicate all necessary resources to maintain power system security during these emergencies.

### 3.4.5 **The approach to maintaining the power system in a secure state in the draft rule**

Credible indistinct events are managed as credible contingency events under the draft rule. This therefore means that existing requirements for credible contingency events would also apply to credible indistinct events: AEMO should try to maintain the power system in a secure

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<sup>127</sup> CS Energy, submission to the consultation paper, p.6

<sup>128</sup> ERM Power/Shell, submission to the consultation paper, p.2

<sup>129</sup> ERM Power/Shell, submission to the consultation paper, p.2

<sup>130</sup> ERM Power/Shell, submission to the consultation paper, p.9

state (by procuring reserves, issuing directions and setting constraints) to avoid load shedding resulting from events caused by extreme abnormal conditions.

The Commission considers this is appropriate given the threat posed by extreme abnormal conditions and that some load shedding is more than likely to occur given the stress the power system is under during these situations.

### 3.5 Transparency and governance framework

This section considers the proposed transparency and governance arrangements for the management of indistinct events via the contingency event framework. It considers the following aspects:

- consultation requirements for developing elements of the framework
- review of the framework's performance
- requirements for market notices
- requirements for AEMO to report on decisions for reclassification and for managing credible indistinct events
- Reliability Panel guidelines for indistinct events
- the 'ad-hoc' mechanism.

The draft rule can be summarised as follows:

- AEMO would undertake targeted (but not public) consultation when amending the reclassification criteria for contingency events. These reclassification criteria would include the existing contingency event reclassification criteria, and the abnormal conditions that may result in it using the discretionary mechanism to manage the power system or taking action in respect of a certain classes of assets.
- AEMO would also undertake targeted consultation when amending the power system operating procedures to include the likely actions it would take to manage credible indistinct events.
- AEMO would be required to issue market notices for reclassified credible indistinct events (as the expanded contingency event definition ensures indistinct events fall under the existing framework for reclassified credible contingency events).
- AEMO would produce a report every six months for its decisions for managing credible indistinct events (as the expanded contingency event definition ensures indistinct events are considered under the same framework as other decisions on reclassifying non-credible contingency events as credible contingency events).
- The ability for the Reliability Panel to produce guidelines regarding how AEMO should maintain system security in response to contingency events, including indistinct events, would be maintained.
- Reviewable operating incidents under clause 4.8.15 have been expanded to include AEMO's use of the discretionary mechanism to manage a credible contingency event where its response could not reasonably have been expected having regard to the information published by AEMO in the reclassification criteria regarding abnormal

conditions or the power system operating procedures regarding the actions it would typically take. If these conditions are met, AEMO would need to review this event as a reviewable operating incident and examine its management of this event in the next GPSRR.

The AEMC intends to review the performance of the amended contingency event framework within five years of implementation of the final rule.

### 3.5.1

#### The Current framework for transparency and governance

##### Current requirements for consultation on the reclassification criteria

The rules currently require AEMO to develop the criteria for reclassification via *targeted consultation* with relevant stakeholders including Market Participants, TNSPs, Jurisdictional System Security Coordinators, and relevant emergency services agencies.<sup>131</sup>

The rules do not require AEMO to report on the actions it would take to manage credible contingency events. However, AEMO does outline its general approach to managing credible contingency events in its *Power system security guidelines*.<sup>132</sup>

##### Current review functions and obligations

There are no requirements to specifically review the current contingency event framework. However, the National Electricity Law (NEL) and NER provide obligations, functions and powers to market bodies. These include the following:

- The AER has functions and powers under the NEL to monitor and enforce compliance with the Rules and Law, including by investigating breaches and instituting proceedings.<sup>133</sup> This would also allow it to monitor and enforce compliance with the proposed indistinct events framework.
- Under the NEL, the AEMC may also elect to conduct a review into the operation and effectiveness of the Rules or any matter relating to the Rules.<sup>134</sup>
- A function of the *Reliability Panel* is to monitor, review and report on the performance of the market in terms of the reliability of the power system.<sup>135</sup>

##### Current approach to market notices

NER clause 4.2.3A(c) requires AEMO to publish a market notice as soon as practicable after it identifies a non-credible contingency event which is more likely to occur because of the existence of abnormal conditions. This notice must specify:

<sup>131</sup> NER clause 4.2.3B(d)

<sup>132</sup> AEMO, *Power system security guidelines*, p. 12

<sup>133</sup> NEL s 15 (1)

<sup>134</sup> NEL s 45 (1)

<sup>135</sup> NER cl.8.8.1 (a)(1)

- (1) the abnormal conditions;
- (2) the relevant non-credible contingency event;
- (3) whether AEMO has reclassified this non-credible contingency event as a credible contingency event under clause 4.2.3A(g);
- (4) information (other than confidential information) in its possession that is relevant to its consideration under clause 4.2.3A(e), the source of that information and the time that information was received or confirmed by AEMO;
- (5) the time at which the notification has been issued; and
- (6) the time at which an updated notification is expected to be issued, where this might be necessary.<sup>136</sup>

#### **Current requirements to report on reclassification decisions**

NER clause 4.2.3A(i) requires AEMO to report on its decisions for reclassification every six months:

Every six months, AEMO must issue a report setting out its reasons for all decisions to re-classify non-credible contingency events to be credible contingency events under clause 4.2.3A(g) during the relevant period. The report:

- (1) must include an explanation of how AEMO applied the criteria established in accordance with clause 4.2.3B for each of those decisions; and
- (2) may also include AEMO's analysis of re-classification trends during the relevant period and its appraisal of the appropriateness and effectiveness of the relevant criteria that were applied in the case of each reclassification decision.<sup>137</sup>

#### **Existing provisions for Reliability Panel Guidelines**

NER clause 4.2.6(b)(2) requires AEMO to adjust operating conditions in accordance with published principles and guidelines "with a view to returning the power system to a secure operating state within at most thirty minutes" following a contingency event.

While none have been determined to date, the Reliability Panel may "develop and publish principles and guidelines that determine how AEMO should maintain power system security while taking into account the costs and benefits to the extent practicable".<sup>138</sup> These guidelines and cl 4.2.6(b) refer to how AEMO should maintain power system security following a contingency event or a significant change in power system conditions (i.e. ex-post actions). (Broadly, once a contingency event occurs, AEMO should take all reasonable actions to return the power system to a secure state within 30 minutes).<sup>139</sup>

<sup>136</sup> NER clause 4.2.3A(c)

<sup>137</sup> NER cl. 4.2.3A(i)(1) and (2)

<sup>138</sup> NER cl.8.8.1(a)(2a)

### 3.5.2

#### Rule change request proposed approach to transparency and governance

##### The rule change request's proposed approach to consultation on aspects of the indistinct events mechanism

The rule change request proposes amendments to implement the enhanced consultation requirements' set out in the *BSE Review*.

For reclassified contingency events (including credible indistinct events), the rule change request proposes to amend the NER to require AEMO to consult on:

- the details of abnormal conditions
- the criteria for reclassification of contingency events and the criteria for credible indistinct events<sup>140</sup>, and its decisions for selecting them
- cost-benefit analysis of actions to manage indistinct events
- the actions it would take to manage credible contingency events, and the reasons why this set of actions is the most cost-effective way to manage them.<sup>141</sup>

AEMO would need to follow the rules consultation procedures in the NER to conduct this consultation.<sup>142</sup> This would include AEMO conducting public consultation, seeking written feedback from stakeholders, and publishing draft and final reports on its decisions. This proposal is based on prior analysis and recommendations from the AEMC and AER.

The *BSE Review* and the rule change request identify that AEMO is currently required to only conduct targeted consultation to develop the reclassification criteria.<sup>143</sup> They also identify that the existing NER requirements do not specify the details AEMO should consult on when developing the reclassification criteria.

The AER's 2016 *Black system event compliance report* and the AEMC's *BSE Review* noted the inadequacy of existing requirements and processes for consultation on AEMO's criteria for reclassification.<sup>144</sup> In the *BSE Review* final report, the Commission considered that, given AEMO's decisions to reclassify contingency events and manage indistinct events will influence market outcomes for all participants, including end users, consultation should be public,<sup>145</sup> rather than targeted.

<sup>139</sup> NER clause 4.3.2

<sup>140</sup> credible indistinct events are called 'condition-dependent indistinct events' in the rule change request

<sup>141</sup> COAG Energy Council, *Enhancing operational resilience in relation to indistinct events rule change request*, p.4

<sup>142</sup> NER Rule 8.9

<sup>143</sup> AEMC, Mechanisms to enhance resilience in the power system - review of the South Australian black system event, available here; COAG Energy Council, *enhancing operational resilience*, p.4

<sup>144</sup> AER, *Black system event compliance report*, accessed at: <https://www.aer.gov.au/system/files/Black%20System%20Event%20Compliance%20Report%20-%20Investigation%20into%20the%20Pre-event%20System%20Restoration%20and%20Market%20Suspension%20aspects%20surrounding%20the%2028%20September%202016%20event.pdf>; AEMC, *BSE Review*, accessed at: [www.aemc.gov.au/sites/default/files/documents/aemc\\_-\\_sa\\_black\\_system\\_review\\_-\\_final\\_report.pdf](http://www.aemc.gov.au/sites/default/files/documents/aemc_-_sa_black_system_review_-_final_report.pdf)

<sup>145</sup> AEMC, 2019, *BSE Review*, final report, p. 114.

### **The rule change request's proposed approach to review of the framework**

The rule change request suggests that the Reliability Panel could elect to review the framework as part of the AMPR.<sup>146</sup>

### **The rule change request's proposed approach to market notices for indistinct events**

The rule change request proposes to extend these existing requirements for market notices to AEMO's management of indistinct events.<sup>147</sup>

Broadly, this would require AEMO to notify the market of abnormal conditions that may threaten power system security, and on its decisions to manage a contingency event as an indistinct event. Under the rule change request's proposed approach, market notices would need to contain the same information as currently required under NER clause 4.2.3A(c), as well as if AEMO intends to use its discretion to manage an indistinct event.

### **The rule change request's proposed approach to regular reporting on management of indistinct events**

The rule change request proposes to extend existing requirements for AEMO to report on its decisions to reclassify contingency events every six months (NER cl.4.2.3A(i)) to include decisions on indistinct events.

Under the rule change request's proposed approach, AEMO would review its management of indistinct events every six months and detail its decisions to use its discretion to manage the power system under the indistinct events framework.

### **The rule change request's proposed approach to guidelines for indistinct events**

The rule change request proposes that "[i]f the Reliability Panel considers it necessary or desirable, it may elect to determine guidelines for pre-defined and ad-hoc protected operation."<sup>148</sup>

### **The rule change request's proposed 'ad hoc' mechanism**

The rule change also set out an 'ad-hoc' mechanism that would allow AEMO to use its discretion to manage indistinct events in instances where it has not pre-identified abnormal conditions, indistinct events, or the actions it would take to manage them. This is intended to be an emergency measure.

AEMO would need to report publicly and to the Reliability Panel each time it uses the ad-hoc mechanism and review any incidents it manages via the ad-hoc mechanism in the next GPSRR.

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<sup>146</sup> COAG Energy Council, *Enhancing operational resilience in relation to indistinct events rule change request*, p.5.

<sup>147</sup> COAG Energy Council, *Enhancing operational resilience in relation to indistinct events rule change request*, p.6.

<sup>148</sup> COAG Energy Council, *enhancing operational resilience*, rule change request, 26 May 2020, p.5



### 3.5.3

#### Stakeholder feedback on transparency and governance

##### Stakeholder feedback on the rule change request's proposed approach to consultation on aspects of the indistinct events mechanism

Broadly, AEMO considers that existing consultation requirements are sufficient and does not support the proposed increase in consultation requirements. In its submission to the consultation paper, AEMO said that:

- "[e]xisting obligations provide the necessary transparency through reclassification reporting and targeted consultation."<sup>149</sup>
- "[o]pening the (existing and new) criteria to a rules consultation procedure is at odds with the NEM's underlying allocation of risks, roles and responsibilities for power system security, and does not align with the urgency of management of the issues that may need to be captured and implemented."<sup>150</sup>

AEMO states that "The application of the existing contingency framework to indistinct contingency events would allow AEMO, as the independent market and system operator for the NEM, to continue to take the action it considers necessary to maintain power system security using the information and tools available to it for that purpose. This does not currently, and should not in the future, require time-consuming and unnecessary administrative measures. Existing obligations provide the necessary transparency through reclassification reporting and targeted consultation."<sup>151</sup>

AGL stated that "[o]n the face of it, the consultation requirements and the additional oversight of the Reliability Panel may prove beneficial to the industry."<sup>152</sup>

CS Energy considered the proposed consultation obligations for AEMO "are proportionate to the benefits as to how its power system operations impact the market, and it is only through consultation and oversight that a proper assessment of the operational and economic trade-offs can be made."<sup>153</sup> CS Energy stated that "the criteria and guidelines for protected operations must have thorough consultation and oversight to ensure they reflect the underlying objectives."

Industry stakeholders (in their submissions to the consultation paper) expressed concerns with AEMO's past consultation. For example, ERM/Shell stated that "[h]istorically our observation is that many AEMO consultation processes have been ineffective with concerns raised and comments provided by consumers and participants largely ignored. Whilst there have been examples of effective AEMO consultation these are infrequent and primarily start with AEMO undertaking early consultation with participants in developing the issue to be consulted on prior to issuing the Stage 1 Issues Paper."<sup>154</sup>

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149 AEMO, submission to the consultation paper, p.5

150 AEMO, submission to the consultation paper, p.2

151 AEMO, submission to the consultation paper, p.5

152 AGL, submission to the consultation paper, p.1

153 CS Energy, submission to the consultation paper, p.8

154 ERM Power/Shell, submission to the consultation paper, p.5

CS Energy stated that "[e]xperience to date with the Power System Frequency Risk Review (PSFRR) has included poor communication about the initiation of consultation and a consultation period of only two weeks. This is reflected in the fact that the 2020 PSFRR Stage 1 received only two submissions and the second stage only three. The market has also had no visibility on the eight key recommendations arising from the 25 August 2018 power system event. These processes will need to reflect diligent consultation for the best outcome for consumers. CS Energy acknowledges that AEMO is striving to improve its engagement process and this is welcomed."<sup>155</sup>

Industry stakeholders expressed a preference for stronger consultation requirements given AEMO's consultation history.

ERM Power/Shell does not support the proposed consultation arrangements. It states that "ERM power's preference is that all major provisions regarding the proposed framework should where possible be set out in the Rules or via a Reliability Panel standard and/or guideline with only minor provisions subject to an AEMO consultation process."<sup>156</sup>

ERM/Shell suggests that the proposed approach for AEMO to publicly consult on the reclassification criteria would be insufficient.<sup>157</sup>

ERM/Shell stated that "Stakeholder views, in particular those from consumers who will ultimately incur the additional costs associated with these proposed new provisions, should receive due consideration in any consultation process."<sup>158</sup>

CS Energy stated that "[t]he consultative obligations on AEMO are proportionate to the benefits as to how its power system operations impact the market, and it is only through consultation and oversight that a proper assessment of the operational and economic trade-offs can be made. However, a framework for consultation is only sufficient if the consultation process itself is inclusive and effective."<sup>159</sup> CS Energy suggests that "the criteria and guidelines for protected operations must have thorough consultation and oversight to ensure they reflect the underlying objectives."<sup>160</sup>

#### **Stakeholder feedback on the rule change request's proposed approach to review of the framework**

ERM Power/Shell states that "whilst the Paper proposes that the Reliability Panel would include details of any protected operations in its Annual Market Performance Review, what has been proposed falls short of a detailed independent review of AEMO's actions. To provide consumers and market participant's confidence in AEMO's actions during a period of protected operations, we recommend that the Rules be amended to provide an obligation on

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155 CS Energy, submission to the consultation paper, p. 8.

156 ERM Power/Shell, submission to the consultation paper, p.

157 ERM Power/Shell, submission to the consultation paper, p.5

158 ERM Power/Shell, submission to the consultation paper, p.5

159 CS Energy, submission to the consultation paper, p. 8.

160 Ibid.

the Australian Energy Regulator to independently review all periods of protected operations."<sup>161</sup>

ERM Power/Shell goes on to state that "[w]ith regards to effective governance, if a rule is to be made then we consider the Rule must include adequate independent review of AEMO's actions. We consider this should include specific provisions for an annual review by the Australian Energy Regulator of all actions taken by AEMO under periods of the proposed protected operations framework."<sup>162</sup>

#### **Stakeholder feedback on proposed approach to market notices**

Industry stakeholders have argued that market notices for reclassified contingency events have not been timely and do not contain sufficient information.

For example, CS Energy said it was "not opposed to the issuance of market notices as per current practice but these need to be complete with the appropriate level of detail and timeliness".<sup>163</sup> CS Energy suggested that details in many market notices are "limited to the generic statement 'Non-credible contingency event more likely to occur due to the existence of abnormal condition/s'".<sup>164</sup> CS Energy indicates that a lack of detail in market notices "proves challenging in identifying what risk was being managed by AEMO and the subsequent signals to the market."<sup>165</sup> CS Energy provided multiple examples of such market notices in Appendix A of its submission.<sup>166</sup>

CS Energy suggested that "[a]ccountability frameworks [for the indistinct event framework] will need to be strengthened given the lack of information on reclassified events that is currently provided to the market and the more nebulous nature of indistinct events."<sup>167</sup>

#### **Stakeholder feedback on the proposed approach to expand existing requirements to report on decisions for reclassification to include indistinct events**

In submissions to the consultation paper, stakeholders did not directly comment on the proposal to expand existing six-monthly reporting requirements on decisions to reclassify contingency events to include indistinct events. However, the Commission did consult the TWG on this issue.

Industry stakeholders suggested that the six-monthly reports on reclassification decisions should include more details and explanation. However, AEMO identified that the reports were already comprehensive and additional information requested by industry stakeholders was already included in these reports.

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<sup>161</sup> ERM Power/Shell, submission to the consultation paper, p.5

<sup>162</sup> ERM Power/Shell, submission to the consultation paper, p.1

<sup>163</sup> CS Energy, submission to the consultation paper, p.9

<sup>164</sup> Ibid, p. 7

<sup>165</sup> Ibid.

<sup>166</sup> Ibid, pp. 7, 10-12.

<sup>167</sup> Ibid, p. 9.

### Stakeholder feedback on Reliability Panel guidelines

CS Energy suggested that responsibility for developing guidelines for indistinct events should rest with the Reliability Panel.<sup>168</sup>

ERM Power/Shell stated "[w]e support the Reliability Panel oversight for assessing and approving [management of indistinct events] including the development of and consultation on standards and guidelines"<sup>169</sup>

### Stakeholder feedback on the 'ad-hoc' mechanism

TWG members expressed concerns that there is a risk that AEMO could favour use of the ad-hoc mechanism unless appropriate oversight and transparency measures were put in place.

In its submission to the consultation paper, ERM/Shell recommended that the AER should independently review all events managed by the ad-hoc mechanism.<sup>170</sup> ERM/Shell considered that this is required "to provide the necessary confidence to consumers and market participants regarding the governance framework for the proposed rule change."<sup>171</sup>

## 3.5.4

### Commission's analysis on proposed approach to transparency and governance

#### Commission's analysis on the rule change request's proposed approach to consultation and the requirements for review

Consistent with the BSE Review, the intended objectives in the rule change request would appear to be to require AEMO to publicly consult with stakeholders to develop and update aspects of the indistinct events framework to:

- increase transparency on AEMO's decisions (to give market confidence and allow market participants to make investment and operational decisions)
- provide confidence to the market that the framework is functioning optimally
- continually improve the efficiency and effectiveness of the indistinct events framework by allowing market participants to provide input to AEMO's procedures.

It is possible that requiring AEMO to publicly consult on the indistinct events framework could help market participants better understand AEMO's decisions and how the framework functions. However, it is not clear that public consultation is feasible or would lead to continuous improvement of the framework.

Firstly, AEMO needs to be able to regularly review and amend the reclassification criteria and its protocols given changes to power system security. Requiring AEMO to publicly consult in line with the rules consultation procedure each time it updates the rules would be arduous and may not provide adequate flexibility.

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<sup>168</sup> CS Energy, submission to the consultation paper, p.8

<sup>169</sup> ERM Power/Shell, submission to the consultation paper, p.10

<sup>170</sup> ERM Power/Shell, submission to the consultation paper, p.1

<sup>171</sup> Ibid.

Secondly, public consultation does not guarantee continuous improvement of the framework because it may not provide adequate oversight because public stakeholders may not have the access, expertise, or resources to adequately analyse the framework.

Managing power system security in line with the NEO is complex. There is always uncertainty about whether a contingency event might occur and how severely it may impact the power system. Actions to reduce the instances where AEMO manages the power system ex-ante or reduce the volume of actions that AEMO takes to do so could reduce costs for consumers and market participants. However, they could also increase the chances of a cascading failure, which would also have significant costs for consumers and market participants.

Determining whether the contingency event framework is functioning in line with the NEO—that it is operating effectively, equitably and efficiently—and whether there are opportunities to improve the framework demands a detailed and thorough assessment of its performance. This would likely involve:

- analysing NER requirements
- accessing and reviewing AEMO's procedures
- analysing past management of events
- conducting cost-benefit analysis of past events and running scenario analysis.

The parties conducting this analysis would need sufficient expertise in economic analysis and managing power system security during operations. This analysis would also need to be conducted in the context that contingency events are inherently uncertain and that managing the power system is very complex. Identifying potential areas for improvement also involves making explicit judgements on the risk appetite of regulators, consumers and market participants for managing contingency events.

Without this review and analysis, it is not clear that public consultation would lead to improvements in the framework. Individual stakeholders (market participants, industry groups and consumer advocates) do not have the resources to analyse these matters in this level of detail. And while it may be possible that stakeholder groups could pool resources to conduct this analysis, the significant effort that would be required to do this poses a barrier to collective action.

The Commission considers that it may be necessary to review the performance of the framework (after several years of operation) to provide confidence that it is functioning in line with the NEO. This is because it is not possible to understand whether the framework is performing in line with the NEO without:

- analysing obligations under the NER, and other processes and systems
- conducting ex-post cost-benefit analysis on the actual actions taken to manage indistinct events that acknowledges the inherent complexity and uncertainty in managing unpredictable risks to the power system
- considering whether these actions are optimal with reference to international best practice.

There are multiple parties that could potentially conduct a more detailed review, and there are advantages and disadvantages with each:

- AEMO is well-placed to review the performance of the framework, as it has the access to data and the technical expertise to conduct this review. However, given AEMO is the system operator, and responsible for managing contingency events, it would not be independent of any review.
- The Reliability Panel could review the performance of the framework. Its existing functions include reviewing aspects of the security and reliability framework. However, it is unlikely to have the capacity and technical expertise to undertake this function without additional support.
- The AER as the regulator for the NEM, is well-placed to conduct this investigation. It already has functions and powers under the NEL to monitor compliance with the Rules and Law, investigate breaches and institute proceedings. It also has economic and technical expertise to review the performance of the framework.
- The AEMC is also well-placed to review the performance of the framework. It has powers under the NEL to conduct reviews into the operation and effectiveness of the Rules, and could do so independently.

Having considered the advantages and disadvantages of assigning responsibility to these parties, as well as feedback from industry stakeholders and market bodies, the AEMC considers that it should conduct a review of this framework in five years time. Of course, the Reliability Panel and the AER would still be able to undertake reviews in accordance with the respective functions under the NEL.

#### **Identified issues with market notices could be resolved under the current rules**

The issues that stakeholders have identified with the current market notices could be resolved under the current framework. The rules already require AEMO to provide information on abnormal conditions and the rules do not prevent AEMO from notifying stakeholders of the presence of abnormal conditions before it makes a decision whether to reclassify.<sup>172</sup>

The Commission acknowledges that power system operations are complex, and it is not always possible to provide timely and detailed information to market on abnormal conditions and contingency events as they occur given the focus for the control room is on maintaining the system. However, the rules do not prevent AEMO from notifying the market of the presence of abnormal conditions before it makes a decision on whether to reclassify (or manage an event using its discretionary powers, under the draft rule). It may be possible to streamline and automate existing procedures to notify market participants of the presence of abnormal conditions when AEMO becomes aware of these.

In particular, the Commission notes that AEMO has previously explained (in the AER's *BSE Compliance Report*) that there are likely to be few instances when it is aware of abnormal conditions but delays a decision on whether to reclassify:

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<sup>172</sup> NER clause 4.2.3A(c)

[I]n most cases, a reclassification decision will be made almost simultaneously with AEMO determining that a particular event is in fact more likely. AEMO adds that usually there will be no reasonable opportunity to inform the market of a “more likely” contingency. According to AEMO, it is likely to be most relevant for bushfires, where a heightened risk to particular assets may well be identified based on the current location of a fire, and the severity of that risk would change as conditions develop, necessitating information updates. [AEMO states that it considers] storms with high wind gusts in areas of wind farms can involve similar risk assessments being made.<sup>173</sup>

#### **Commission's analysis on the rule change request's proposed 'ad-hoc' mechanism**

The Commission recognises that the rules should allow AEMO to take any necessary cost-effective actions to improve power system resilience during operations. However, the Commission respects stakeholder concerns that the ad-hoc mechanism, could, if not carefully implemented, provide inadequate boundaries for managing indistinct events in line with the NEO.

### **3.5.5**

#### **Commission's draft decision on approach to transparency and governance**

##### **Commitment to review the performance of the contingency event framework**

The Commission considers that it is necessary to review the performance of the framework to allow for iterative improvement and provide confidence to the market that the framework is performing optimally.

The Commission considers that existing provisions in the NEL would allow the AER to elect to review the performance of the contingency event framework if it considers it a priority.

The AEMC would also conduct a one-off review of the performance of the contingency event framework within 5 years of the rule's implementation. This review would be conducted under Division 5 of Part 4 of the NEL which provides the AEMC with the power to conduct a review into the operation and effectiveness of the NER.

The scope of this review could involve:

- analysing obligations under the NER, and other processes and systems
- analysing the actions taken by AEMO to manage indistinct events and their cost-effectiveness, while acknowledging the inherent complexity and uncertainty that exists in managing unpredictable risks to the power system
- considering whether these actions are optimal with reference to international best practice.

This review would be undertaken using the Rules consultation procedure which involves public consultation and provides an opportunity to make recommendations to improve the performance of the framework, including further reviews/amendments through rule changes if it identifies significant issues. This could help make sure the actions taken to manage indistinct events are optimal and help build confidence in and support for the framework.

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<sup>173</sup> AER, 2018, *Black System Event Compliance Report*, final report, p. 64



This approach would not impact on the AER's monitoring and compliance functions and would allow the AER to separately review the performance of the framework if it chooses to do so.

#### **Consultation requirements under the draft rule**

As discussed above, NER clause 4.2.3B(d)(1) requires AEMO to undertake targeted consultation to establish, review or amend the criteria for reclassifying contingency events.<sup>174</sup> The draft rule expands the matters that must be contained in the:

- reclassification criteria to include the abnormal conditions that may lead AEMO to manage a reclassified credible indistinct event through the discretionary mechanism, or take action in response to certain classes of assets; and
- power system operating procedures to include the typical actions that AEMO would take to manage reclassified credible indistinct events.

When amending the reclassification criteria to include this information, AEMO would be required to follow the targeted consultation requirements.

The Commission considers that targeted consultation is sufficient given:

- requiring AEMO to publicly consult on the elements of the contingency event framework may be burdensome, given these need to be regularly updated
- targeted consultation still involves input from stakeholders, but allows AEMO to confer and gather information from those stakeholders most closely involved in managing contingency events
- the AEMC's review of the framework would provide:
  - the opportunity for all stakeholders to input on how to efficiently and effectively manage contingency events (including indistinct events)
  - provide an independent assessment of the framework, which could help improve stakeholder confidence that the framework is performing optimally

#### **Reporting on decisions for reclassification and managing indistinct events under the draft rule**

The draft rule does not amend AEMO's existing requirements for six-monthly reporting on the reclassification framework (NER cl.4.2.3A(i)) as suggested in the rule change request. This is because indistinct events have been incorporated into the existing framework and requirements.

The Commission considers that these reports should provide sufficient information on AEMO's discretionary management of the power system in response to indistinct events.

The Commission also notes that many indistinct events are likely to be covered in reviewable operating incident reports as they may involve incidents and actions that trigger AEMO's requirements to produce these reports. For example, indistinct events would be covered in reviewable operating incident reports if they involve the failure of multiple power system elements or involve AEMO issuing directions.

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<sup>174</sup> NER clause 4.2.3B(d)(1)



### **Requirements for Market Notices under the draft rule**

The draft rule would extend existing requirements for market notices to include indistinct events that AEMO reclassifies as credible.

The Commission considers that existing provisions in the NER do not prevent AEMO from improving its reporting to address stakeholder concerns about the timeliness of market notices and the detail that they contain. The Commission suggests that AEMO could work with stakeholders to further explore these issues and determine how to address these.

### **Reliability panel guidelines under the draft rule**

The draft rule would amend NER clause 8.8.1(2a) to clarify that the Reliability Panel may elect to determine guidelines for AEMO's ex-ante management of contingency events (including for indistinct events) as well as ex-post management of contingency events.

#### **The draft rule would require AEMO to report in instances where it does not follow its criteria or pre-defined actions for managing indistinct events**

The draft rule sets out an approach that would provide AEMO adequate flexibility to manage power system security while establishing appropriate transparency and oversight.

If AEMO uses the discretionary mechanism to manage a credible contingency event and its response could not reasonably have been expected having regard to the information published by AEMO in the reclassification criteria or power system operating procedures it would need to:

- report to the market on that event as a reviewable operating incident; and
- review the incident in the next GPSRR.

These requirements are intended to provide appropriate transparency when AEMO uses the discretionary mechanism in a way that could not reasonably have been expected.

## **3.6 Standing risks and protected events**

This section discusses:

- management of standing risks from indistinct events
- interactions with the existing protected event declaration
- the proposal in the rule change request for an expedited approval process for protected events.

### **3.6.1 The rule change request's proposed approach standing risks and the protected events framework**

#### **The rule change request's proposed approach to managing standing risks from indistinct events**

The rule change request proposes to clarify that "standing risks and uncertainty from indistinct events can also be declared as protected events."<sup>175</sup>

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<sup>175</sup> COAG Energy Council, enhancing operational resilience - rule change request, p.5.

The rule change request proposes an expedited approval process for protected events (as discussed below), but otherwise would leave the existing protected event framework unchanged.

#### **The rule change request's proposed approach to Expedited approval process for protected events**

The rule change request proposes to "introduce an expedited approval process for declaring protected events that are not controversial or are otherwise straight forward."<sup>176</sup>

The rule change request explains how the proposed expedited approval process would function: "For such applications the Panel would issue a consultation paper and consult for a minimum of 10 business days. If no objections are raised, the Panel would then publish a single final report setting out its decision."<sup>177</sup>

The rule change request does not describe the issue that this amendment is seeking to address.

The *BSE Review* identified that the process in the protected events framework may be too lengthy to manage some types of non-credible contingencies that are uncontroversial and straightforward. The rule change request therefore proposes to change the protected events framework to include an expedited approval process for these types of non-credible contingencies.

### **3.6.2**

#### **Stakeholder feedback on managing standing risks from indistinct events**

##### **Stakeholder feedback on proposal to manage standing risks from indistinct events via the protected events mechanism in submissions to the consultation paper**

AEMO stated that it "supports the concept for managing condition-dependent indistinct events, but at this stage cannot identify any application for the proposed 'standing indistinct event' category."<sup>178</sup>

##### **Stakeholder feedback proposal to manage standing risks from indistinct events via the protected events mechanism in technical working group**

TWG industry stakeholders identified that the proposed framework may disincentivise AEMO from using the protected events framework. This is because applying for a protected event involves far more administrative effort than simply managing a credible contingency event through operational actions. This may lead to AEMO managing some credible indistinct events in a way that is contrary to the NEO.

Industry stakeholders recommended that the frameworks should require credible contingency events caused by extreme abnormal conditions (including regular credible indistinct events) to be managed as protected events.

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<sup>176</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.2

<sup>177</sup> COAG Energy Council, enhancing operational resilience, rule change request, 26 May 2020, p.2

<sup>178</sup> AEMO, submission to the consultation paper, p.5

### **Stakeholder feedback on the rule change request proposal for an expedited approval process for indistinct events**

Only ERM Power/Shell provided comments on the proposal for an expedited approval process for indistinct events. ERM Power/Shell suggested that AEMO should first consult stakeholders prior to lodging an expedited protected event application: "We recommend a framework where AEMO are required to initially consult with stakeholders regarding a request for a protected contingency event and based on the outcome from this consultation AEMO may lodge a request for an expedited protected contingency event approval. As part of this request, AEMO would be required to advise the Reliability Panel of any objections received from stakeholders during the consultation process and how AEMO responded to any objection."<sup>179</sup>

ERM Power/Shell also suggested that this requirement should be set out in the rules.

### **3.6.3**

#### **Commission's analysis on proposed approach to managing standing risks**

##### **Standing risks from indistinct events can potentially be managed as protected events**

Events caused by extreme abnormal conditions can be managed through operational actions and/or capital investment.

In some instances it may be more cost-effective to manage some regularly occurring credible indistinct events via capital investment, rather than continually using operational actions.

Declaring these events as protected events could provide additional protection schemes to manage these events if it is cost-effective to do so. Under the proposed approach, the rules would allow standing risks from to be declared as protected events.

The service target performance incentive scheme (STPIS) and determination process should provide an adjunct incentive for Network Service Provider to pursue initiatives which will improve their performance and support the efficient management of these events. The Network Service Provider could use its discretion to decide whether operational changes or capital upgrades will provide the most efficient outcome.<sup>180</sup>

The option for AEMO to manage standing risks from indistinct events via the protected events mechanism, combined with existing incentives for network service providers to enhance system resilience, would contribute to managing indistinct events at least cost.

##### **Expedited approval process for protected events**

The rule change request does not specifically describe the issues that this amendment is seeking to address.

Therefore, the Commission does not consider that it is appropriate to deal with this issue as part of this rule change. The Commission also considers that this issue is a much larger issue to do with the efficiency of the protected events framework. To date there has only been one

<sup>179</sup> ERM Power/Shell, submission to the consultation paper, p.7

<sup>180</sup> The distinction between operating expenditure (opex) and capital expenditure (capex) will also depend on the Network Service Provider's capitalisation policy which classifies which costs are considered to be capex (and thus incorporated into their asset base), rather than opex.

protected event application, and the Panel has taken on learning from its use of this framework. There may be merit in looking more holistic at the protected event framework once several more protected event applications have been assessed. It anticipates that there may be more applications in the coming years. It would be more appropriate for such changes to be the protected event framework to be considered after that time.

#### **Overlap with the existing protected events declaration**

Following the declaration of a protected event covering high winds in South Australia In its 2018 PSFR, AEMO concluded that the risk of significant loss of generation leading to the loss of the Heywood interconnector is heightened during periods where “destructive wind conditions” (i.e. wind speeds above 140km/h) are forecast in the region. In 2018, AEMO applied to the Reliability Panel for the declaration of a protected event, defined as “the loss of multiple transmission elements causing generation disconnection in the South Australian region during forecast destructive wind conditions”.<sup>181</sup>

The Reliability Panel declared this as a protected event in 2019.<sup>182</sup>

The protected event declaration provided AEMO with approval to undertake the combination of actions it proposed to manage destructive wind conditions in South Australia. These actions are:

- upgrading the existing protection scheme
- limiting total import capacity over the Heywood interconnector to 250 MW during destructive wind conditions.

Consistent with the approved protected event declaration, AEMO will determine the measures to manage the risk of a cascading failure arising from destructive wind conditions on the basis of forecast wind conditions in South Australia. This means AEMO will take actions including constraining flows on the Heywood interconnector to 250 MW based on weather forecasts issued by the Bureau of Meteorology. The actions taken by AEMO are therefore condition-dependent: they recognise that the probability of losing the Heywood interconnector, while not becoming credible, nevertheless increase during high wind conditions.

### **3.6.4**

#### **Commission's draft decision**

##### **The draft rule allows indistinct events to be managed as protected events**

The draft rule implements the rule by clarifying that indistinct events can be managed via the current contingency event framework. This would therefore allow AEMO to apply to the Reliability Panel to manage indistinct events as protected events. This would allow AEMO to pursue additional capital upgrades to manage these standing risks if the Reliability Panel considers it cost-effective to do so.

<sup>181</sup> AEMC Reliability Panel, AEMO request for protected event declaration, Consultation paper, p. 7. Accessed at: <https://www.aemc.gov.au/market-reviews-advice/request-declaration-protected-event-november-2018>

<sup>182</sup> AEMC, Reliability Panel final determination on AEMO's request for a "protected event" declaration. Accessed at: <https://www.aemc.gov.au/news-centre/media-releases/reliability-panel-final-determination-aemos-request-protected-event>

The existing regulatory determination process and service target performance incentive scheme (STPIS) should also provide an incentive for NSPs to pursue initiatives, such as operational changes or capital upgrades, that could also manage aspects of indistinct events (where this is cost-effective to do so). The Commission considers that this arrangement could help make sure that indistinct events are managed at least cost.

**The draft rule does not implement an expedited approval process for protected events**

The Commission considers that applications to manage standing risks from indistinct events as protected events should be considered using the standard assessment process for protected events. As such, it has not implemented the expedited approval process for protected events as part of this draft rule. The Commission instead recommends that it should consider this proposal as part of a future rule change that addresses issues with the protected events application process.

**The protected events declaration is compatible with the discretionary mechanism in this draft rule**

The Commission considers that the protected events declaration is compatible with the discretionary mechanism set out in the draft rule. Essentially, the existing protected events declaration sets out the 'baseline' for actions AEMO would take to manage a specific indistinct event, and the indistinct events mechanism could allow it to take additional actions beyond what it specified in the protected events application, if it considers it is necessary to do so.

For consistency with the approved protected event declaration, AEMO would continue to limit the Heywood interconnector to 250MW if wind speeds over 140km/h are forecast (as per the protected events declaration). However, if AEMO considers that it is necessary to do so, it could potentially use the indistinct events mechanism to manage the impacts from destructive winds in South Australia, if the impacts from these winds meet the criteria of an indistinct event.

If the impacts from destructive winds meet the criteria for a credible indistinct event, AEMO could potentially take other operational actions such as setting constraints, issuing directions and procuring FCAS reserves. To clarify, the indistinct events mechanism could also potentially allow AEMO to limit the Haywood interconnector at a lower wind speed (for example, 120km/h), or limit it to a lower threshold (for example, 200MW). AEMO could also consider alternative operational actions, for example if experience in another state or alternative abnormal conditions suggested another approach was preferable. To do this, AEMO would be required to follow the process for managing credible indistinct events. This includes setting out the criteria for credible indistinct events, setting out typical actions to manage them, and consulting with targeted stakeholders to develop these.

The Commission considers that this approach should provide AEMO the adequate flexibility to manage the power system to manage indistinct events in the South Australian region while maintaining the existing requirements established under the protected events mechanism. The Commission considers that no rule amendments are required to accommodate the indistinct events mechanism in the context of this protected events declaration.

## ABBREVIATIONS

|            |   |
|------------|---|
| AEMC       | Australian Energy Market Commission                   |
| AEMO       | Australian Energy Market Operator                     |
| AER        | Australian Energy Regulator                           |
| AESCSF     | Australian Energy Sector Cyber Security Framework     |
| AMPR       | Annual Market Performance Review                      |
| BSE        | Black System Event                                    |
| COAG       | Council of Australian Governments                     |
| Commission | See AEMC  |
| DER        | Distributed Energy Resource                           |
| DISER      | Department of Industry, Science, Energy and Resources |
| EFCS       | Emergency Frequency Control Scheme                    |
| ENCRC      | Energy National Cabinet Reform Committee              |
| ETT        | Energy Transformation Taskforce                       |
| FCAS       | Frequency Control Ancillary Services                  |
| GPSRR      | General Power System Risk Review                      |
| JSSC       | Jurisdictional System Security Coordinators           |
| MCE        | Ministerial Council on Energy                         |
| NEL        | National Electricity Law                              |
| NEM        | National Electricity Market                           |
| NEMDE      | National Electricity Market Dispatch Engine           |
| NEMOC      | National Electricity Market Operations Committee      |
| NEO        | National electricity objective                        |
| NER        | National electricity rules                            |
| NERC       | North American Electric Reliability Corporation       |
| NSP        | Network Service Provider                              |
| Ofgem      | Office of Gas and Electricity Markets                 |
| PSFRR      | Power System Frequency Risk Review                    |
| PSSG       | Power System Security Guidelines                      |
| PSSWG      | Power System Security Working Group                   |
| PV         | Photovoltaic  |
| RIT-D      | Regulatory Investment Test for Distribution           |
| RIT-T      | Regulatory Investment Test for Transmission           |
| RoCoF      | Rate of Change of Frequency                           |
| STPIS      | Service Target Performance Incentive Scheme           |
| SWIS       | South West Interconnected System                      |
| TNSP       | Transmission Network Service Provider                 |

TWG  
WEM

Technical Working Group  
Wholesale Electricity Market

## A SUMMARY OF OTHER ISSUES RAISED IN SUBMISSIONS

This appendix sets out the issues raised in the first round of consultation on this rule change request and the AEMC's response to each issue.

**Table A.1:** Summary of other issues raised in submissions

| STAKEHOLDER     | ISSUE  | AEMC RESPONSE   |
|-----------------|--|---|
| AEMO            | The current protected event framework could be considered too restrictive for seeking declarations and managing non-credible contingency events that are declared to be protected events. The current protect event framework needs to be amended to allow flexibility for appropriate management and targeted outcomes of a protected event.  | The Commission notes that the Technical Working Group also provided commentary around potential challenges presented by the protected events framework and ways to address these challenges.<br><br>The Commission considered interactions with the contingent event framework (see Section 3.6) in considering the appropriate modifications to manage indistinct events. However, the protected events framework is broader than just standing indistinct events. |
| CS Energy       | Current frameworks, including the efficacy of the protected events framework and broader protection schemes, can be utilised to manage indistinct events. These frameworks, with appropriate accountability on their operational management, represent the most efficient, effective and flexible means to maintain the resilience of the NEM. | The Commission considers that the concerns raised relate to the broader operation of the protected events framework rather than the application to standing indistinct events. So no changes to this framework have been pursued in the context of addressing ambiguity regarding the management of indistinct events in the contingent event framework.  |
| ERM Power/Shell | The existing protected contingency event framework is not necessarily challenging or a barrier to justifying the declaration of a protected contingency event. While AEMO's may view challenges from its obligation to assess  | Stakeholders are able to submit a rule change   |



| STAKEHOLDER | ISSUE  | AEMC RESPONSE   |
|-------------|--|---|
|             | potential non-credible contingency events and submit management plans to the Reliability Panel for assessment and approval. The Reliability Panel is best placed to make this assessment as opposed to AEMO. | proposal on this topic if they consider changes to the protected events framework would better contribute to the long term interest of consumers.   |
| PIAC        | The AEMC should expand assessment criteria to consider the efficiency of how risks are allocated and costs are recovered in addition to analysing the costs and benefits of particular reforms.              | The Commission is conscious of the importance of considering all the costs and benefits associated with specific reforms. However, as referenced in Section 2.3.1, the cost allocation mechanism to recover the costs of AEMO's actions to manage credible contingency events is out of scope for this rule change. |

## B LEGAL REQUIREMENTS UNDER THE NEL

This appendix sets out the relevant legal requirements under the NEL for the AEMC to make this draft rule determination.

### B.1 Draft rule determination

In accordance with s. 99 of the NEL the Commission has made this draft rule determination in relation to the rule proposed by the COAG Energy Council.

The Commission's reasons for making this draft rule determination are set out in section 2.4.

A copy of the more preferable draft rule is attached to and published with this draft rule determination. Its key features are described in section 2.4.

### B.2 Power to make the rule

The Commission is satisfied that the more preferable draft rule falls within the subject matter about which the Commission may make rules. The more preferable draft rule falls within s. 34 of the NEL as it relates to the operation of the national electricity system for the purposes of the safety, security and reliability of that system (NEL 34(1)(a)(ii)).

### B.3 Commission's considerations

In assessing the rule change request the Commission considered:

- it's powers under the NEL to make the rule
- the rule change request
- submissions received during first round consultation
- the Commission's analysis as to the ways in which the proposed more preferable draft rule will or is likely to, contribute to the NEO.

There is no relevant Ministerial Council on Energy (MCE) statement of policy principles for this rule change request.<sup>183</sup>

The Commission may only make a rule that has effect with respect to an adoptive jurisdiction if satisfied that the proposed rule is compatible with the proper performance of Australian Energy Market Operator (AEMO)'s declared network functions.<sup>184</sup> The more preferable draft rule is compatible with AEMO's declared network functions because it would not affect those functions.

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<sup>183</sup> Under s. 33 of the NEL 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. The amalgamated council is now called the Energy Ministers Meeting.

<sup>184</sup> Section 91(8) of the NEL.

## B.4 Civil penalties

The Commission cannot create new civil penalty provisions. However, it may recommend to the Energy Ministers Meeting that new or existing provisions of the NER be classified as civil penalty provisions.

The more preferable draft rule does not amend any clauses that are currently classified as civil penalty 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 more preferable draft rule be classified as civil penalty provisions.

## B.5 Conduct provisions

The Commission cannot create new conduct provisions. However, it may recommend to the Energy Ministers Meeting that new or existing provisions of the NER be classified as conduct provisions.

The more preferable draft 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 more preferable draft rule be classified as conduct provisions.

## C OPERATIONAL PROCESSES FOR MANAGING CONTINGENCY EVENTS

This Appendix provides further details on the current obligations and operational challenges for managing contingency events.

### C.1 Understanding how power system operators manage risks from extreme abnormal conditions

#### C.1.1 The contingency event framework

A contingency event is defined in the NER as “an event affecting the power system which AEMO expects would be likely to involve the failure or removal from operational service of one or more generating units and/or transmission elements.”<sup>185</sup>

In the NER, contingency events are divided into:

- **credible contingency events:** events AEMO considers to be reasonably possible in the surrounding circumstances, including the technical envelope<sup>186</sup>
- **non-credible contingency events:** contingency events other than credible contingency events.<sup>187</sup>

An example of a credible contingency event could be the unexpected automatic or manual disconnection of, or the unplanned reduction in capacity or, one operating generating unit, as this could be reasonably likely to occur during normal operations.<sup>188</sup> Credible contingency events can also include reclassified non-credible contingency events that have become more likely due to abnormal conditions: For example, multiple transmission towers collapsing in a region may be non-credible during normal operating conditions, but could be considered credible during abnormal conditions, like during a violent storm.

Given non-credible contingencies are “contingency events other than credible contingency events”, they could include everything from a double circuit transmission line failure due to tower collapse during normal operations to unexpected disconnection of multiple generating units during normal operations.<sup>189</sup>

#### C.1.2 Actions AEMO can take to manage different contingency events

Broadly, the NER allow AEMO to take necessary action to maintain power system security once a contingency event occurs i.e ‘ex-post’ action.

<sup>185</sup> NER clause 4.2.3(a).

<sup>186</sup> NER clause 4.2.3(b). The technical envelope is the technical boundary limits of the power system for achieving and maintaining a secure operating state for a given power system scenario.

<sup>187</sup> NER clause 4.2.3(e)

<sup>188</sup> NER clause 4.2.3(a)

<sup>189</sup> NER clause 4.3.3(e)(2)(ii)

This rule change request is focused instead on the actions that AEMO may take under the current framework to prepare the power system for an event in advance of it occurring, or 'ex-ante'.

A key difference between credible and non-credible contingencies is the actions that AEMO can take to manage them ex-ante. Non-credible contingencies can be managed using existing contingency capacity reserves, controlled load shedding arrangements and in some cases special protection schemes. This is part of AEMO managing the power system to arrest the impacts of a range of significant multiple contingency events or protected events (NER cl.4.3.1(k)). However, the NER allows AEMO to take additional actions in advance (ex-ante) to manage credible contingency events. These actions include:

- setting constraints
- issuing directions
- obtaining additional ancillary services

### C.1.3

#### The reclassification mechanism

This section provides more details on the current requirements and principles for the contingency event framework, including the process and requirements for reclassification.

The NER allow AEMO to re-classify non-credible contingency events to credible contingency events if abnormal conditions (like bushfires or storms) make them more likely. This would allow AEMO to take additional actions (constraints, directions, FCAS) to manage these events.

AEMO publishes the Power System Security Guidelines (PSSG) which set out its approach to the reclassification of credible and non-credible contingency events.

AEMO must use its reasonable endeavours to maintain power system security in accordance with the principle that the power system will return to a satisfactory operating state following the occurrence of any credible contingency event or protected event in line with the power system security standards.<sup>190</sup>

This includes assessing the availability and adequacy, including the dynamic response, of contingency capacity reserves and reactive power reserves in accordance with the power system security standards and to ensure that appropriate levels of contingency capacity reserves and reactive power reserves are available:

- to ensure the power system is, and is maintained, in a satisfactory operating state; and
- to arrest the impacts of a range of significant multiple contingency events (affecting up to 60% of the total power system load) or protected events to allow a prompt restoration or recovery of power system security, taking into account under-frequency initiated load shedding capability provided under connection agreements, by emergency frequency control schemes or otherwise;<sup>191</sup>

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<sup>190</sup> NER clause 4.3.1

<sup>191</sup> NER clause 4.3.1(k(2))

A credible contingency event means a contingency event the occurrence of which AEMO considers to be reasonably possible in the surrounding circumstances including the technical envelope. The technical envelope is the technical boundary limits of the power system for achieving and maintaining a secure operating state for a given power system scenario.<sup>192</sup> AEMO must determine and revise the technical envelope (as may be necessary from time to time) by taking into account the prevailing power system and plant conditions.<sup>193</sup> It is this technical envelope that is used as the basis for determining whether a contingency event is considered to be credible at that time.

If AEMO identifies a non-credible contingency event which is more likely to occur because of the existence of abnormal conditions (e.g. severe weather events, bush fires) it must, on a regular basis, consider whether the occurrence of that non-credible contingency event is reasonably possible. In undertaking its consideration AEMO must have regard to the criteria it has established and published ahead of time.<sup>194</sup> If AEMO decides that the existence of the abnormal conditions make the occurrence of a non-credible contingency event reasonably possible, it must reclassify that event to be a credible contingency event and notify Market Participants as soon as practicable.<sup>195</sup> By reclassifying a non-credible contingency event as credible, AEMO is able to take ex-ante actions to mitigate the impacts to the power system and ensure the NEM remains within the technical envelope following the now re-classified credible contingency. These actions include the sourcing of contingency capacity reserve (both active and reactive energy) and frequency control ancillary services (FCAS) as well as issuing directions and setting constraints.

This framework was initially implemented in the 2008 Reclassification of contingency events rule change. For further information, the AEMC Black System Event review provides a summary of this 2008 rule change and the historical development of the current framework. The existing framework is shown in the figure below:

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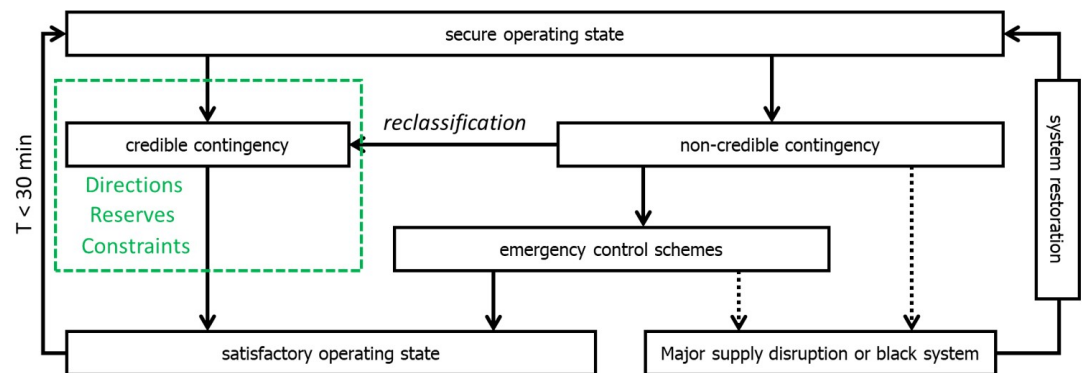
<sup>192</sup> NER clause 4.2.5(a)

<sup>193</sup> NER clause 4.2.5(c)

<sup>194</sup> NER clause 4.2.3B

<sup>195</sup> NER clause 4.2.3A

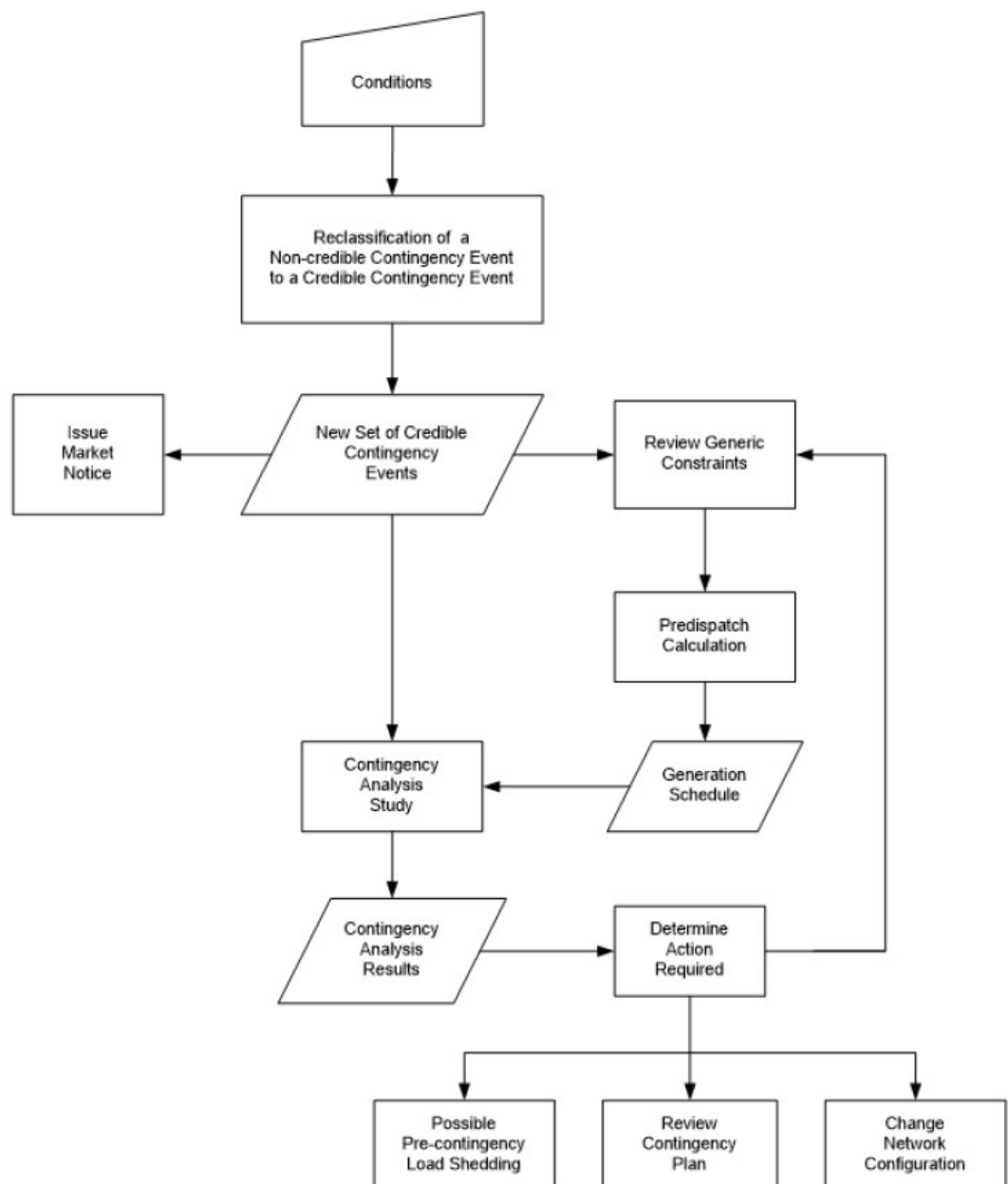
**Figure C.1: Existing contingency framework**



Note: A satisfactory operating state is where the power system is operating within its technical limits, including frequency limits. A secure operating state is a state in which the power system will return to a satisfactory operating state following the occurrence of any credible contingency event (or protected event) according to NER s. 4.2.2 and 4.2.4

The figure below, taken from the AEMO's *Power System Security Guidelines*, outlines the operational process that AEMO follows when reclassifying a contingency event.

**Figure C.2:** Summary of action required for reclassification of a non-credible contingency event to a credible contingency event (from AEMO's Power System Security Guidelines)

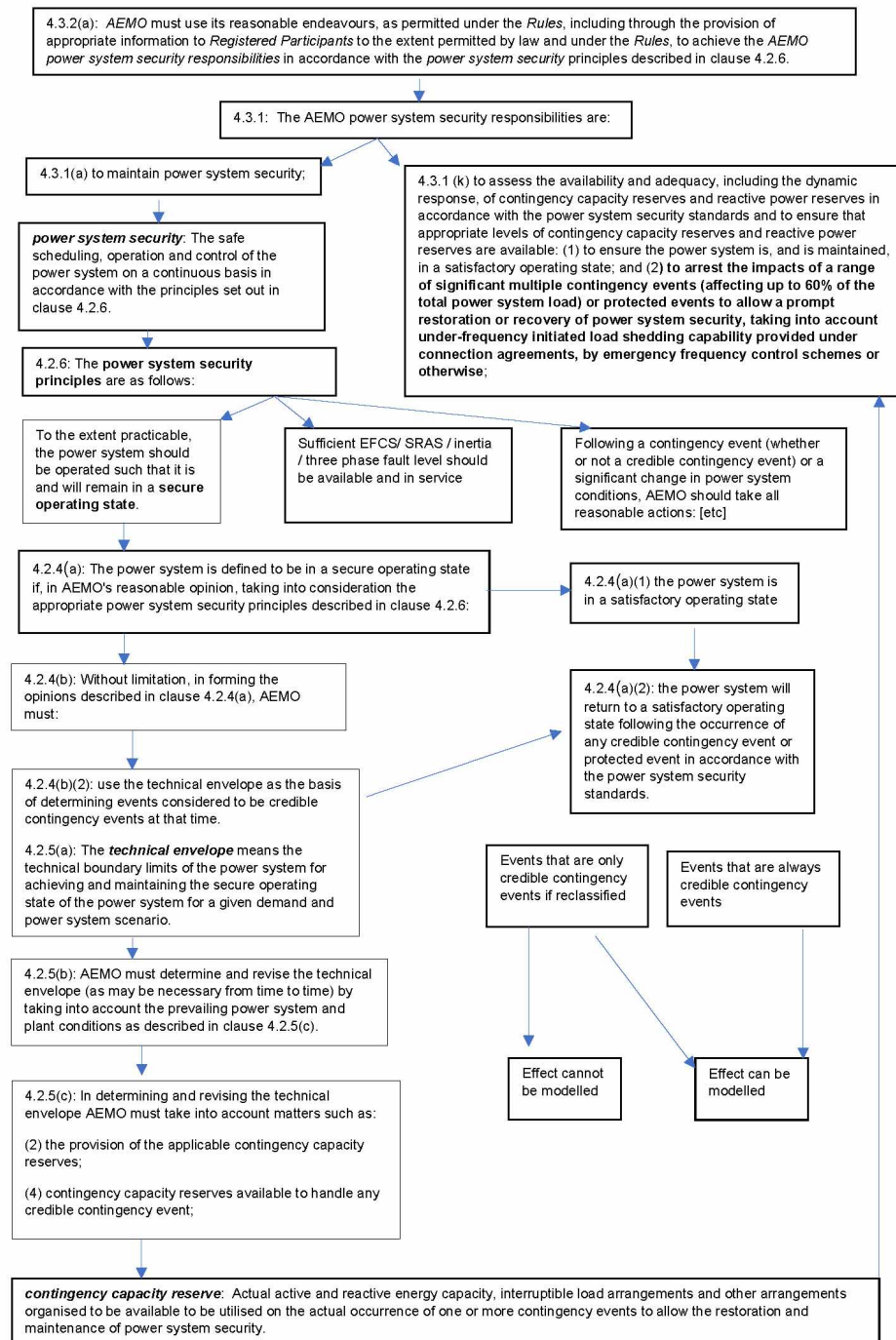


Source: Source: AEMO, 2021, Power System Security Guidelines, version 96, 7 April 2021, figure 1, p. 16

The flowchart below describes the obligations in the rules for managing power system security.



**Figure C.3: Flow chart of the obligations for managing power system security in the NER**



#### C.1.4

##### The protected event framework

A protected event means a non-credible contingency event that the Reliability Panel has declared to be a protected event.<sup>196</sup> Protected events are a category of non-credible contingency events.<sup>197</sup>

AEMO can take a mix of ex-ante and ex-post measures to prevent a cascading failure from a non-credible contingency event which the Reliability Panel has approved as a protected event.

If AEMO identifies through the General Power System Risk Review (GPSRR) one or more non-credible contingency events which it considers it may be economically efficient to manage using existing ex-ante operational measures:

- AEMO can submit a request to the Reliability Panel to have the event declared to be a 'protected event'
- such ex-ante measures may be used to manage an event either alone or in combination with a new or modified emergency frequency control scheme
- the Reliability Panel undertakes an economic assessment of the request by weighing the costs of the options for managing the event against the benefits of avoiding the consequences of the non-credible contingency event should it occur
- where the benefits of managing the event outweigh the costs of doing so, the Reliability Panel would declare the event a protected event, and
- where the efficient management option includes a new or modified emergency frequency control scheme, the Reliability Panel would set a 'protected event Emergency Frequency Control Scheme (EFCS) standard' which is a set of target capabilities for the scheme.

## C.2

### Understanding how power system operators manage risks from extreme abnormal conditions

To understand the current framework for contingency events and the issues the rule change request has identified, it is necessary to understand the challenges power system engineers face in quantifying and managing impacts from extreme events.

Extreme conditions pose a threat to power system security and can lead to blackouts and severe supply interruptions. System operators can take steps to prepare the power system to withstand these extreme conditions by changing the technical envelope of the power system. They can constrain generators or network elements, direct more resources to come online, and obtain reserves.

These actions can involve costs to market participants and consumers. Given this, system operators should use reasonable endeavours to quantify the likelihood and severity of impacts to power system.

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<sup>196</sup> Declared by the Reliability Panel under clause 8.8.4, and where that declaration has come into effect and has not been revoked. NER clause 4.2.3f

<sup>197</sup> Ibid, p.1

Power system operators and networks have traditionally used 'contingency analysis' to quantify the impact from contingency events. Contingency analysis is a computer simulation of the power system that raises an alarm if any pre-set limit would be exceeded following the outage of any individual system component, or a set of system components that have been reclassified to represent a single system component. During operations, it allows system operators to identify problems that might occur in the immediate future and take steps to manage them.

This modelling is very granular and detailed and is primarily designed to model the failure of only one (n-1) system components. Modelling any more than a few combinations of asset failures exponentially increases computational effort.

Importantly, contingency analysis cannot reasonably quantify the impacts of events caused by extreme conditions. This is because contingency analysis cannot quickly simulate all the possible combinations of impacts that could result from extreme conditions. Contingency analysis does not account for environmental or external impacts as the purpose of this tool is to help identify if pre-set limits would be expected to be breached following the removal of a single component rather than to dynamically assess the context in which the system operates.

For example, a massive storm (extreme conditions) could potentially cause dozens of assets to fail (the contingency event). However, it is extremely difficult to determine the exact size of the event as a result of these extreme conditions. Contingency analysis will only look at the power system reconfiguration every 5 minutes, remove (and return) each component and raise an alarm if the removal of a single component will breach any of the pre-set limits.

There is a point at which the nature of the abnormal event means that a large number of power system elements could be affected but it is not possible to identify specifically which elements will be affected and thus should be reclassified to represent a single power system component for the purposes of contingency analysis. There is also the possibility that events become so extreme or complex that AEMO's existing systems cannot quantify how they will impact the power system. System operators (for example, the system operators controlling regional grids in Australia before the NEM was created) would take discretionary actions based on their professional judgement and experience to manage these types of situations. For example, they might constrain the interconnector between regions or major intra-regional connections and bring additional generators online to make sure there is additional headroom in case the event occurs and significantly reduces supply or interconnection.

Although these actions may be less 'precise' than actions taken based on modelling calculations, they are appropriate actions to take in instances where there is a clear threat to power system security caused by extreme conditions, for example, gale force or cyclonic winds.

AEMO needs to determine what actions it needs to take to manage reclassified credible contingency events. To do this, it has traditionally used the following process:

1. uses computer modelling software (contingency analysis) to identify if the removal of a single element would breach pre-set limits and thus pose a threat to power system security
2. inputs the results from this contingency analysis into NEMDE to determine the actions AEMO needs to take.

Once a contingency event has been deemed (or reclassified) as credible, AEMO will employ the approach it has outlined in its Policy on the management of secure and satisfactory limits.<sup>198</sup>

However, it is not always reasonable or practical to use contingency analysis to quantify impacts to power system security for events caused by extreme abnormal conditions. This is because it is not possible to identify which of the many power system elements potentially affected by the abnormal conditions need to be reclassified as a single power system element for the purposes of contingency analysis following the reclassification of a non-credible contingency event as credible in these abnormal conditions. There are millions of possible ways that extreme abnormal conditions may impact the power system and there is not enough time or computing power available during operations to model or certainty that managing a simulated outcome would provide the best outcome.

AEMO needs to have the flexibility to take actions to make the power system resilient and manage possible credible contingency events when faced with extreme abnormal conditions.

This rule change would allow AEMO to use discretion alongside contingency analysis for extreme abnormal conditions. Instead, it would estimate the possible impact to power system security (without modelling) from extreme abnormal conditions and take proportional action to prepare the power system.

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<sup>198</sup> This policy is outline in Section 2 of the Power system Security Guidelines. Accessed at: [https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/power\\_system\\_ops/procedures/so\\_op\\_3715-power-system-security-guidelines.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3715-power-system-security-guidelines.pdf?la=en)

## D FINDINGS AND RECOMMENDATIONS FROM THE AER'S *BLACK SYSTEM EVENT COMPLIANCE REPORT*

Following the 2016 Black system in South Australia, the AER published the *Black System Event Compliance Report* in December 2018—a detailed compliance report into the pre- and post-event stages of the black system event.<sup>199</sup> This appendix details the findings and recommendations related to the contingency event framework.

### D.1 Non-compliance with administrative obligations

The AER's *Black System Event Compliance Report* identified several areas of non-compliance by AEMO with some provisions of the NER during the pre-event period that relate to management of contingency events:<sup>200</sup>

1. **Abnormal conditions (NER clause 4.2.3A(b)):** Failure to take all reasonable steps to keep itself informed of abnormal conditions. While AEMO took several steps to keep itself promptly informed about the abnormal conditions on the day, we consider an additional reasonable step could have been taken.
2. **Notification to market participants (NER clause 4.2.3A(c)):** Failure to provide formal notification to market participants that the loss of multiple generating units or transmission elements, which would not be a credible risk in normal operating circumstances, was more likely to occur because of the abnormal weather conditions on the day. Although the evidence indicates AEMO considered this and communicated with some market participants about it, it failed to provide the appropriate notification as required by the NER.
3. **Review of criteria for reclassifying contingency events (NER clause 4.2.3B):** Failure to conduct formal reviews of the reclassification criteria in the manner required by the NER in the three years prior to the Black System Event. The specific consultation documents we have reviewed are limited in scope to bushfires and lightning, and do not invite relevant stakeholders to comment on other criteria in the Power System Security Guidelines or criteria that could potentially be included. Ibid, p. 17.

Despite these administrative breaches, the AER found that "overall AEMO satisfied its obligation to use reasonable endeavours to maintain power system security during the pre-event period considering the various steps it took to maintain a secure operating state."<sup>201</sup> The AER did not consider any of these breaches were material to the black system event that ultimately occurred. It did not recommend formal enforcement action in respect to these areas of non-compliance and noted the unprecedented circumstances of the event as part of its consideration.<sup>202</sup>

<sup>199</sup> AER, *Black system compliance report*, December 2018.

<sup>200</sup> Ibid, p. 17.

<sup>201</sup> Ibid, p. 17.

<sup>202</sup> Ibid, p. 20.

## D.2 Differing interpretations of requirements for reclassification

The AER also identified that it and AEMO had a different interpretation of certain provisions in the rules, including for reclassification requirements:<sup>203</sup>

The AER states that it and AEMO "clearly hold different interpretations of clauses 4.2.3A(b)(2) and 4.2.3A(c) and how those provisions should be applied in practice."<sup>204</sup> The AER considered that its interpretation of these clauses "allows greater flexibility in planning for and communicating risks to the market and facilitating preparedness for potential major events."<sup>205</sup>

The key area where AER's and AEMO's respective interpretations of the NER provisions (as relevant to the pre-event) diverge relates to what can constitute a 'contingency event'. We consider AEMO has a broad, flexible discretion to decide what constitutes a contingency event. A contingency event is any event affecting the power system which AEMO expects would be likely to involve the failure or removal from operational service of one or more generating units and/or transmission elements. High wind speeds can potentially cause a loss or failure of wind farm output (including through the removal or material reduction in output of generating units, such as wind turbines within a wind farm due to feathering) or transmission elements. Hence, we conclude that it is open for AEMO to form the view that high wind speeds can affect the power system as a contingency event. We consider that the current reclassification framework allows AEMO sufficient flexibility to deal with new risks as they arise.<sup>206</sup>

The AER's *BSE Compliance Report* identifies that AEMO has a different interpretation to the AER of what can constitute a 'contingency event':

[AEMO considers that] [t]he contingency event framework caters for the loss of large generating units or transmission elements, which are sudden, completely unpredictable and cannot otherwise be managed. Dispersed and non-instantaneous variations in supply or demand, like feathering, are addressed by AEMO's dispatch process and are not considered a security issue.<sup>207</sup>

The AER's *BSE Compliance Report* identifies that, given its different interpretation of what constitutes a 'contingency event', AEMO considers that:

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203 Ibid, p. 32

204 Ibid, p. 64

205 Ibid.

206 Ibid.

207 Ibid.

the current reclassification framework does not provide [AEMO] with enough flexibility to deal with new and emerging potential security risks... AEMO advises: "A fit-for-purpose regulatory framework is needed to address the potential system security risks arising in the power system of today and the future, and the increasing potential for more extreme weather events. Using the existing contingency framework to expand contingency sizes comes at a very high cost to consumers, and a potentially unacceptable impact on the reliability of supply... AEMO considers that additional, detailed and accurate information combined with flexible adaptive processes will be central to maintaining a secure and reliable system."<sup>208</sup>

The AER's BSE Review Compliance Report highlights that (at least at the time of the black system event) AEMO considered it must identify threats to specific power system elements before it could consider reclassifying a non-credible contingency event as a credible contingency event. Essentially, AEMO's practice was that:

[w]here it is not possible to establish a direct threat to a specific asset, reclassification is not considered.<sup>209</sup>

In the early morning risk assessment prior to the black system event, AEMO raised internally the issue of reclassifying the loss of the double circuit Heywood Interconnector as credible due to lightning strikes in SA, but concluded there was no basis to reclassify because Heywood was not listed as vulnerable to lightning in the Power System Security Guidelines.<sup>210</sup> AEMO states that it chose not to reclassify because:

there were no "probable" or "proven" lightning transmission line pairs in SA and although the whole network was at greater risk, it did not know which assets might trip.<sup>211</sup>

AEMO therefore placed no additional constraints on the operation of the Victorian and SA transmission network during the pre-event period.<sup>212</sup>

The AER considered that AEMO "correctly identified that there was a heightened risk of a non-credible contingency event, such as the loss of multiple lines or generating units, but that the information they did take into account did not necessarily indicate that any specific assets were threatened or that anon-credible contingency event was reasonably possible and should therefore be reclassified."<sup>213</sup> The AER notes that "AEMO considers that must identify a particular asset that is more likely to be at risk due to the abnormal conditions, rather than a heightened general risk of a loss of multiple lines or generating units within a region due to abnormal conditions."<sup>214</sup>

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208 Ibid.

209 Ibid, p. 53

210 Ibid, p. 48

211 Ibid, p. 49.

212 Ibid.

213 Ibid, p. 43

214 Ibid, p. 53



In summary, the AER considered that the existing framework provided AEMO sufficient flexibility to deal with events caused by extreme abnormal conditions.<sup>215</sup> Conversely, AEMO considered that the existing rules did not provide it with sufficient flexibility, stating that "a fit-for purpose framework is needed to address the potential system security risks arising in the power system of today and the future, and the increasing potential for more extreme weather events."<sup>216</sup>

The AER therefore recommended that the AEMC should potentially consider the scope of the current contingency event framework and "whether it is sufficient to address risks to power system security arising from intermittent generation and other emerging risks."<sup>217</sup>

The AER required the AEMC to undertake a policy review of the regulatory framework as it relates to the Black System Event.<sup>218</sup> The AER states:

Through the course of our investigation we have identified issues with the regulatory framework that warrant further policy consideration and assessment. This includes providing greater clarity and transparency about roles and responsibilities, not only to address gaps in the framework but also to address areas in which the AER and AEMO have differing viewpoints as to what the framework requires.

Where the Rules provide parties such as AEMO with the flexibility to apply judgement and expertise, this power is usually accompanied by a requirement to establish a decision-making process in consultation with affected participants and by obligations ensuring transparency of decision-making. This recognises that participants require certainty and transparency around decisions that may fundamentally impact their investment and operational outcomes, as well as the overall efficiency of the market. More broadly, the basis of having rules such as the NER is that the stakeholders — in this case, AEMO and participants alike — are aware of the governing framework in which they operate. If there is doubt about how the Rules should be applied in a particular set of circumstances, this needs to be resolved to provide clarity both to the person(s) on whom the obligation is imposed and to other affected participants. It is also necessary for the market framework to be reviewed to enable it to better accommodate the rapid changes in technologies currently being experienced, and in changing the Rules where required.

The AER's recommendations and their implementation status are outlined in Table D.1, below.

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<sup>215</sup> Ibid, p. 62

<sup>216</sup> Ibid, pp. 62-63.

<sup>217</sup> Ibid, p. 63

<sup>218</sup> Ibid, p. 25



**Table D.1:** Summary of the AER's recommendations in relation to enhancing operational resilience and their status to date

| RECOMMENDATION  | IMPLEMENTATION STATUS  |
|---|--|
| <p><b>AEMO to take all reasonable steps to keep itself informed of abnormal conditions (Clause 4.2.3A(b))</b></p> <p>AEMO is to keep itself promptly informed of abnormal conditions, AEMO to put in place more rigorous processes to monitor weather warnings and forecasts at all times, not just at times of extreme weather.</p>  | <p><b>COMPLETED</b></p> <p>AEMO has updated its monitoring and forecasting systems to make sure it is informed of abnormal conditions when they occur.</p>                                       |
| <p><b>Notifications to Market Participants (clause 4.2.3A(c))</b></p> <p>AEMO to review its processes for issuing notifications to Market Participants during abnormal conditions. AEMO's processes should be standardised and clearly communicated to Market Participants, such that if AEMO is of the view that:</p> <ul style="list-style-type: none"> <li>• a non-credible contingency event is more likely to occur due to abnormal conditions, it must issue a notification to Market Participants in accordance with clause 4.2.3A(c)</li> <li>• material new information has arisen relevant to its consideration of whether the event is reasonably possible, it must update the notification in accordance with clause 4.2.3A(d), or</li> <li>• abnormal conditions are no longer materially affecting the likelihood of a non-credible contingency event, it must issue a notification to Market Participants to this effect.</li> </ul> | <p><b>COMPLETED</b></p> <p>AEMO advises that it has reviewed its processes for issuing notifications to market participants during abnormal conditions.</p>                                      |
| <p><b>Reclassification criteria - regular review (clause 4.2.3B)</b></p> <p>AEMO to holistically review the criteria at least once every two years and in that process consult with Market Participants, Transmission Network Service Providers (TNSPs), Jurisdictional System Security</p>   | <p><b>COMPLETED</b></p> <p>AEMO has reviewed and updated the reclassification criteria in the <i>Power System Security Guidelines</i>. The latest update at time of writing is October 2021.</p> |

| RECOMMENDATION   | IMPLEMENTATION STATUS   |
|--|---|
| <p>Coordinators, relevant emergency services agencies and other relevant stakeholders such as BOM. In conducting this review, AEMO should not only assess whether existing criteria are adequate, but also whether there are any gaps in the criteria. This also includes assessing any non-credible contingency events that have happened and considering whether the criteria need to be adjusted, developed, expanded or explained in more detail, in light of that experience.</p> |   |
| <p><b>Reclassification criteria - risks associated with abnormal conditions (clause 4.2.3B)</b></p> <p>AEMO to ensure that the criteria include a requirement to have regard to the particulars of any risk(s) associated with any abnormal conditions that AEMO and relevant stakeholders identify through the consultation process.</p>  | <p><b>COMPLETED</b></p> <p>The reclassification criteria in the Power System Security Guidelines consider the risks associated with different abnormal conditions.</p>  |
| <p><b>Reclassification criteria - (clause 4.2.3B)</b></p> <p>AEMO to introduce a framework and criteria regarding its approach to the reclassification of non-credible contingencies due to abnormal conditions that are not explicitly identified in the Power System Security Guidelines (PSSG), including a risk assessment framework.</p>  | <p><b>COMPLETED</b></p> <p>The reclassification criteria in the Power System Security Guidelines considers the approach to severe weather conditions in addition to the explicitly identified conditions associated with Bushfires and Lightning.</p> |
| <p><b>Market Notices (Clause 4.8.5A) - AEMO to publish a notice without delay when it may need to intervene</b></p> <p>Improved training for AEMO operators regarding the specific language used to ensure operators clearly state whether they are making a request, issuing instructions, or otherwise issuing clause 4.8.9 directions.</p> <p>AEMO ensures that it publishes market notices, without delay, after it becomes aware of any foreseeable circumstances that may</p>    | <p><b>COMPLETED</b></p> <p>AEMO advises that it has established a process to publish these notices without delay.</p>   |

| RECOMMENDATION   | IMPLEMENTATION STATUS  |
|--|--|
| require AEMO to implement an intervention event and that it updates its procedures and guidelines accordingly.               |  |
| <b>AEMC review</b><br>AEMC to undertake a policy review of the regulatory framework as it relates to the Black System Event. | <b>COMPLETED</b><br>The AEMC completed its <i>Black System Event Review</i> in 2019. |

Source: AER, 2020, *Black System Event Compliance Report*, pp. 21-23

Note: The AER noted in its 2018 Compliance Report that AEMO had already undertaken measures that may satisfy the requirements of a particular recommendation.