Correction:

The Panel wishes to clarify the dates for stakeholder submissions to this draft determination and the date for submitting a written request objecting to the use of the expedited rules consultation procedure for AEMO's request to revoke the South Australian protected event.

Paragraph 5 of the summary and section 1.2.2 should be read as stating that a written request for the Panel to follow the standard consultation procedure for this project must be submitted in writing within 10 days of the publication of this draft determination, by **20 July 2023**, and contain reasons why the person(s) considers that the proposal is not a non-material proposal.

Paragraph 3 of the summary and section 1.2.2 should be read as stating that written submissions to the Panel on the draft determination should be submitted before **3 August 2023**.

RELIABILITY PANEL AEMC

DETERMINATION

Reliability Panel AEMC

DRAFT DETERMINATION

REVOKING THE SOUTH AUSTRALIAN PROTECTED EVENT

6 JULY 2023

INQUIRIES

Reliability Panel
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Reference: REL0088

CITATION

Reliabilty Panel, Revoking the South Australian protected event, 6 July 2023

ABOUT THE RELIABILITY PANEL

The Panel is a specialist body within the Australian Energy Market Commission (AEMC) and comprises industry and consumer representatives. It is responsible for monitoring, reviewing and reporting on reliability, security and safety on the national electricity system, and advising the AEMC in respect of such matters. The Panel's responsibilities are specified in section 38 of the National Electricity Law.

ACKNOWLEDGEMENT OF COUNTRY

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

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RELIABILITY PANEL MEMBERS

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Rachele Williams, General Manager of Project Delivery, Australian Renewable Energy Agency

SUMMARY

1 On 11 April 2023, the Reliability Panel (Panel) received a request from the Australian Energy Market Operator (AEMO) to revoke the South Australian destructive winds protected event.

2 The Panel's draft determination is to revoke the existing protected event for South Australia, consistent with AEMO's request.

3 The Panel considers that AEMO's request is a non-material proposal under clause 8.9.1(a) of the National Electricity Rules (NER) because it is unlikely to have a significant effect on the National Electricity Market (NEM) or the activities of registered participants. This is because AEMO can use the contingency reclassification framework to manage risks associated with the protected event to maintain system security. Therefore, the Panel has commenced consultation on AEMO's request with this draft determination in accordance with the expedited rules consultation procedure, which consists of only one round of consultation before the final determination. Stakeholders can submit written feedback on this draft determination before **20 July 2023**.

4 In response to initial stakeholder discussions, the Panel has published additional information from AEMO, alongside this draft determination, that confirms AEMO's intent to continue to apply the existing operational approach to the management of the risk of destructive winds in South Australia following the revocation of the protected event. AEMO has also provided indicative flow limits that would be applied in dispatch following the synchronisation of stage one of Project Energy Connect (PEC).

5 While the Panel has commenced consultation on AEMO's request by way of this draft determination, if any person considers that AEMO's proposal is not a non-material proposal, they may submit a request that the standard consultation procedure should be used.[1] Such a request must be submitted in writing within 10 business days of the publication of this draft determination, by **6 July 2023**, and contain reasons why the person(s) considers that the proposal is not a non-material proposal. Any request will be published with the Panel's assessment and decision in relation to the request. Subject to consideration of such a request, the Panel may revert to the standard consultation procedure and publish an additional draft determination for stakeholder input if the Panel considers this necessary.[2]

6 The South Australian protected event

7 A "protected event" is a non-credible contingency event that the Reliability Panel has declared to be a protected event under clause 8.8.4 of the NER. Declaring a non-credible contingency event as a protected event supports AEMO taking pre-emptive action to manage the associated risks to the system. These actions can include the coordination of Emergency Frequency Control Schemes (EFCS), purchase of frequency control ancillary services (FCAS) and constraining dispatch. The Panel is tasked to assess the costs and benefits of declaring a non-credible contingency event as a protected event following a request from AEMO.[3]

1 Clause 8.9.3(b) of the NER.
2 Clause 8.9.3(e) of the NER
3 NER clause 8.8.4.

8 The South Australian destructive winds protected event was declared on 20 June 2019 and is defined as "the loss of multiple transmission elements causing generation disconnection in the South Australia region during periods where destructive wind conditions are forecast by the Bureau of Meteorology."

9 The event declaration included target capabilities relating to how AEMO would manage the power system to mitigate the associated risks. These operational arrangements included limiting flow on the Heywood Interconnector (HIC) to 250 MW during destructive wind conditions and the operation of the System Integrity Protection Scheme (SIPS). SIPS is designed to detect power swings on HIC associated with a loss of generation within SA and trigger power injection from SA batteries and/or shed load in SA to stabilise the region and prevent separation.

10 AEMO's request to revoke the existing protected event

11 AEMO considers that the existing protected event arrangements may not be fit for purpose following the connection of PEC Stage 1 and requested that the Panel revoke the protected event prior to the expected connection of Project EnergyConnect (PEC) Stage 1. PEC is a new 330kV AC interconnector between Buronga in South Australia and Wagga Wagga in New South Wales. Stage 1 is expected to be completed in December 2023 and will provide a single circuit connection with an increased transfer capacity between SA and NSW of 150 MW. Stage 2 is expected to be completed in December 2024 and will provide an increased transfer capacity.[4]

12 As noted in its request, AEMO considers that there will be no negative consequences due to the removal of the protected event. AEMO has determined that they can better manage the event under the contingency event framework, as amended by the *Enhancing operational resilience in relation to indistinct events rule 2022.* Further information on the procedure for reclassification of contingency events is available in AEMO's *Power system security guidelines_SO_OP_3715*.

13 AEMO's request is consistent with the recommendations from its 2022 *Power system frequency risk review.* The *Power system frequency risk review* was developed by AEMO in collaboration with the primary TNSPs in each of the NEM regions including: Powerlink, Transgrid, ElectraNet and TasNetworks. AEMO sought submissions from all persons interested in the 2022 PSFRR during a public consultation between 1 June 2022 and 17 June 2022.

14 The Panel's draft determination is to revoke the SA protected event

15 The Panel has made a draft determination to revoke the South Australian protected event and the associated protected event Emergency Frequency Control Scheme (EFCS). This draft determination is consistent with AEMO's request and would help promote the National Electricity Objective (NEO) by maintaining a secure and resilient power system while promoting the long-term interests of consumers by likely avoiding costs from over-constraining the power system following the connection of PEC Stage 1.

16 The Panel considers that based on AEMO's advice there would likely be no negative

4 AEMO, Transmission Augmentation Information - December 2022, 16 December 2022.

consequences due to the revocation of the protected event. The Panel is satisfied that AEMO can use the contingency reclassification framework to maintain system security prior to and following the connection of PEC Stage 1. AEMO has provided a supplementary note setting out further detail on the expected operational outcomes for managing this event as a credible contingency event. This note clarifies that the risk of multiple network failures leading to loss of generation in SA during destructive winds would be managed in accordance with the 'network event' requirements in the Frequency operating standard, which is consistent with the current operational practice for managing the protected event.

17 AEMO has indicated that, following the connection of PEC Stage 1 and subject to final advice from ElectraNet, the current 250 MW SA import limit on HIC would be replaced with SA import limits of 430 MW on HIC and 70 MW on PEC Stage 1. These arrangements are aimed at limiting the risks from a 500 MW generation loss in SA due to destructive winds and are designed to avoid the separation of the SA region following such an event. There would be no change in operational outcomes from managing destructive winds in SA if the protected event is revoked.

18 The Panel notes stakeholder concerns in relation to transparency of the operational measures that will be applied by AEMO to manage the risk of destructive winds in SA following the revocation of the protected event. The existing reporting obligations set out in the NER in relation to contingency reclassification and the General Power System Risk Review (GPSRR) provide transparency to market participants and industry stakeholders in relation to the operational arrangements put in place by AEMO to manage the risk of destructive winds, including the appropriateness of these controls and any how they might change to reflect future changes in the power system. The Panel expects that AEMO would review and report on the effectiveness and appropriateness of the arrangements to manage the risk of destructive winds in South Australia as part of its annual GPSRR. Furthermore, following the revocation of the protected event, the existing reclassification framework requires AEMO to report on the reasons for any reclassification decisions and the appropriateness of the related mitigation measures every six months.

19 The Panel has assessed that revoking the protected event is likely to avoid excessive costs to consumers. The Panel considers that the existing protected event arrangements are likely to over-constrain the network following the connection of PEC Stage 1, which may result in excessive costs being faced by consumers. The Panel considers that revoking the protected event would allow AEMO and ElectraNet to make suitable arrangements to manage events in an efficient and low cost way that avoids excessive costs to consumers.

20 Subject to the Panel's final determination, and consideration of stakeholder feedback to this draft determination (including on the process), the revocation of the existing protected event would take effect on 1 October 2023. This is in accordance with AEMO's request.

CONTENTS

APPENDICES

TABLES

FIGURES

1 THE PANEL HAS MADE A DRAFT DETERMINATION

The Reliability Panel has received a request from AEMO under clause 5.20A.5 of the NER to revoke the South Australian (SA) protected event. The Panel's draft determination is to revoke the SA protected event in accordance with AEMO's request.

This change would allow for AEMO and ElectraNet to update their respective operational arrangements to reflect the changed network configuration following the synchronisation of stage 1 of transmission project, Project Energy Connect (PEC), planned for late 2023.

AEMO recommended that the South Australian protected event be revoked in the 2022 *Power System Frequency Risk Review.* AEMO considers that the event can be managed under the contingency reclassification framework.[5] This recommendation was made to support the connection of Project Energy Connect (PEC) Stage 1 – an AC interconnector between South Australia and New South Wales – which will change the network topology and the suitability of the existing protected event.

On 11 April 2023, AEMO submitted a request to the Reliability Panel to revoke the SA protected event.

This chapter provides:

- Section 1.1 – an overview of the draft determination to revoke the South Australia protected event
- Section 1.2 – an explanation for the use of the expedited procedure and how stakeholders can provide feedback
- Section 1.3 – a summary of AEMO's request to revoke the SA protected event.

The Panel's assessment against the assessment criteria and the NEO is set out in chapter 2. Additional information on the Panel's draft determination is included in chapter 3.

1.1 The Panel has made a draft determination to revoke the South Australian protected event

The Panel's draft determination is to revoke the SA protected event in accordance with AEMO's request.

The SA protected event was declared on 20 June 2019 and is defined as:[6]

> The loss of multiple transmission elements causing generation disconnection in the South Australia region during periods where destructive wind conditions are forecast by the Bureau of Meteorology.

The Panel's determination has been informed by advice from AEMO in accordance with clause 8.8.1(a)(2C) of the NER. The Panel considers that AEMO's request is a non-material Proposal under clause 8.9.1(a) of the NER because it is unlikely to have a significant effect on the NEM

5 AEMO, 2022 Final Report – Power System Frequency Risk Review, July 2022, p.7.

6 Reliability Panel, AEMO Request for Protected Event Declaration – Final determination, 20 June 2019, p.22.

or the activities of registered participants. Following the revocation of the protected event, AEMO considers that there would likely be no negative consequences for system security as AEMO can manage operational risks from destructive wind conditions with the contingency reclassification framework. On this basis, it has chosen to follow the expedited rules consultation procedure outlined in clause 8.9.3 of the NER.

The Panel is satisfied that there would likely be no negative consequences arising from the revocation of the SA protected event as AEMO can manage the associated risk under the revised contingency reclassification process. This change would also provide AEMO with greater operational flexibility and likely avoid costs associated with excessively constraining the power system, following the synchronisation of PEC Stage 1.

In accordance with AEMO's request and subject to the Panel's final determination and consideration of stakeholder feedback, the revocation of the existing protected event would take effect on 1 October 2023. This timing would align with the synchronisation of PEC Stage 1.[7]

1.1.1 AEMO can manage the risk of destructive winds through the contingency reclassification framework

Based on AEMO's advice, the Panel is satisfied that there would likely be no negative consequences as a result of revoking the protected event. AEMO's advice states that they can use the revised contingency reclassification framework to better manage the risks associated with destructive wind conditions in South Australia.[8]

The revised contingency reclassification framework, which commenced on 1 March 2023, allows AEMO to manage a broader range of abnormal conditions and contingency events and reclassify non-credible contingency events as credible contingency events when there is an increased likelihood of the event occurring and implement measures to mitigate risks.

As required by the *Enhancing operational resilience in relation to indistinct events rule 2022,* AEMO recently published a revised *Power system security guidelines_SO_OP_3715* which took effect on 9 March 2023.[9] The Power system security guidelines set out the processes that AEMO employs to meet its power system security responsibilities, including how it approaches the classification and reclassification of contingency events. The revised guidelines include reclassification criteria for managing a range of abnormal conditions, including 'severe winds' similar to the conditions identified under the SA protected event.[10]

Refer to section 3.1 for more information on how the risks associated with the SA protected event would be managed through the contingency reclassification framework.

7 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.4.
8 Ibid, p.4.
9 AEMO, Power System Security Guidelines_SO_OP3715, 8 March 2023.
10 Ibid, p.47.

1.1.2 Revoking the protected event provides greater operational flexibility and avoids the cost of excessively constraining the system

The Panel considers that revoking the protected event would allow AEMO greater operational flexibility and expects that this change would help avoid costs to consumers due to excessively constraining the power system.

AEMO's 2022 *Power system frequency risk review* identified that the connection of PEC Stage 1 will necessitate changes to the operational arrangements currently used to manage the risk of destructive winds to the Heywood interconnector (HIC). The existing protected event included target capabilities for a protected event emergency frequency control scheme (EFCS) to reduce the risk of HIC becoming unstable and tripping. These target capabilities included:

- Applying a pre-contingency limit of 250 MW to imports into SA over HIC
- Utilising the System Integrity Protection Scheme (SIPS) to trigger power injection from SA batteries and/or shed load in SA in response to power swings on HIC associated with a loss of generation within SA.[11]

Following the revocation of the SA protected event, and prior to the connection of PEC Stage 1, AEMO would continue to manage the risk of destructive winds in SA under the contingency reclassification framework.[12]

Subsequently, following the connection of PEC Stage 1, AEMO intends to revise these arrangements through:[13]

- Application of revised transfer limits on the HIC – subject to final technical advice from ElectraNet
- Changes and upgrades to the existing SIPS to account for the changed network topology. The revised scheme will be referred to as the Wide Area Protection Scheme (WAPS).

The Panel notes that under the contingency reclassification process set out in clause 4.2.3A of the NER, AEMO is required to report every six months on all decisions to reclassify a non-credible contingency event as a credible contingency event. These reports must include AEMO's reasons for any reclassification decision made during the reporting period as well as AEMO's appraisal of the appropriateness of the reclassification criteria and the applied risk mitigation measures.[14] The Panel also expects that AEMO would review and report on the effectiveness and appropriateness of the arrangements to manage the risk of destructive winds in South Australia as part of its annual GPSRR. This is based on the understanding that the risk of destructive winds in SA is likely to be a 'priority risk' as it has the potential to lead to cascading outage or a major supply disruption.[15]

The Panel is satisfied that the revocation of the protected event will allow AEMO greater operational flexibility and that this will avoid excessively constraining flows on the HIC during

11 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.8.
12 Ibid, p.13.
13 Ibid.
14 Clause 4.3.2A(i) of the NER.
15 Clause 5.20A.1(a) of the NER.

destructive winds, and following the connection of PEC Stage 1, thereby minimising cost impacts on consumers. The Panel notes that the reporting obligations set out in the NER in relation to contingency reclassification and the GPSRR provide transparency to market participants and industry stakeholders in relation to the operational arrangements put in place by AEMO to manage the risk of destructive winds, including the appropriateness of these controls and any how they might change to reflect future changes in the power system.

Refer to section 3.2 for more information on the flexibility and cost benefits associated with revoking the SA protected event.

1.2 The Panel is following the expedited rules consultation procedure

This section outlines the Panel's reasons for using the expedited rules consultation procedure and the process for stakeholders providing feedback on the draft determination.

1.2.1 The expedited process is being used

The Panel intends to follow the expedited rules consultation procedure as its view is that AEMO's request is a 'Non-material Proposal' under clause 8.9.1(a) of the NER. The Panel considers that the request is a 'Non-material Proposal' under clause 8.9.1(a) of the NER because it is unlikely to have a significant effect on the NEM or the activities of registered participants. AEMO considers that there will be no negative consequences due to the removal of the protected event and that they can better manage the event under the revised contingency re-classification framework.

The Panel has opted to use the expedited procedure as it is satisfied that the revocation of the protected event would not have any adverse impact on power system security or market participants. The expedited process also better aligns with AEMO's requested timing to revoke the protected event on 1 October 2023 prior to the expected completion of PEC Stage 1.

The expedited rules consultation procedure requires one round of public consultation on a draft determination (this document) followed by a final determination.

Objections to the use of the expedited procedure can be made in writing containing reasons why the person considers that the Proposal is not a non-material Proposal. Such a request should contain the reasons why the person considers that the proposal is not a non-material proposal and how it would be likely to have a significant effect on the NEM or on the activities of the Registered Participants. The request may also contain other reasons why the person considers the Panel should use the standard rules consultation procedure.[16]

The Panel must publish any requests to use the standard consultation procedure along with a notice of Panel's decision regarding any requests.[17] If, in response to such a stakeholder request, the Panel decides that AEMO's proposal is not a non-material proposal, the Panel

16 Clause 8.9.3(b) of the NER.

17 Clause 8.9.3(c) of the NER.

must apply the standard procedure and publish an additional draft determination for consultation prior to the publication of a final determination.[18]

1.2.2 Feedback from stakeholders is encouraged

The Panel encourages feedback from stakeholders and welcomes submissions on this draft determination. Written submissions to the Panel on the draft determination should be submitted before **20 July 2023.**

If any person considers that AEMO's proposal is not a non-material proposal, they may submit a request that the proposal is not a non-material proposal and that it should be assessed under the standard consultation procedure.[19] Such a request must be submitted in writing within 10 days of the publication of this draft determination, by **6 July 2023**, and contain reasons why the person(s) considers that the proposal is not a non-material proposal.

The Panel must publish a procedure change request as soon as practicable after receiving it along with its assessment and the Panel's decision in relation to the request.[20]

Please contact the project leader with questions or feedback at any stage.

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1.3 AEMO's request to revoke the South Australian protected event

The Panel received a request from AEMO on 11 April 2023 to revoke the SA protected event.AEMO recommended that, due to changes to network topology when PEC Stage 1 connects to the grid, the South Australian protected event be revoked because:[21]

- The current arrangements for the protected event may not remain fit for purpose and any change requires the protected event declaration to be revoked
- There would be no negative consequences for the power system as the event could be managed with the contingency reclassification framework instead.

This request was made following a recommendation in the 2022 *Power system frequency risk review* as part of the delivery of PEC Stage 1:[22]

> AEMO will consider whether the existing protected event could be managed under the new NER reclassification framework (from March 2023) and, if so, determine the applicable reclassification criteria and recommend revocation of the protected event.

AEMO's request to revoke the protected event is based on its determination that the protected event could be alternatively managed under the revised contingency

18 Clause 8.9.3(e) of the NER.
19 Clause 8.9.3(b) of the NER.
20 Clause 8.9.3(c-e) of the NER.
21 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.4.
22 AEMO, 2022 Final Report - Power System Frequency Risk Review, July 2022, p.85.

reclassification framework.[23] AEMO noted that the updated reclassification criteria for abnormal conditions includes criteria for "severe winds", which includes the "destructive wind" conditions covered by the protected event definition.[24]

The revocation of the protected event will allow AEMO and Electranet to update the operational arrangements currently used to manage the risk to the Heywood interconnector during destructive wind conditions. AEMO is working with ElectraNet to determine suitable arrangements to apply following the connection of PEC Stage 1 to maintain system security while reflecting the change in network topology.[25]

23 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.4.

24 Ibid. p.10.

25 Ibid, p.9.

2 REVOKING THE PROTECTED EVENT ALIGNS WITH THE NATIONAL ELECTRICITY OBJECTIVE

In making a determination that declares a non-credible contingency event to be a protected event, or revokes that declaration, the Panel must have regard to the National Electricity Objective (NEO).[26]

The NEO is set out under section 7 of the National Electricity Law (NEL) and prescribes that:

> The objective of this law is 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:
>
> - price, quality, safety, reliability and security of supply of electricity; and
> - the reliability, safety and security of the national electricity system.

The aspects of the NEO relating to the security of supply of electricity, and of the national electricity system, are particularly relevant to AEMO's request. Maintaining the power system within technical limits allows it to operate effectively, efficiently and safely.

The SA protected event was declared to support system security by reducing the risk of cascading failures from non-credible contingency events, similar to the 2016 South Australia black system event.[27] The Panel's determination must ensure that power system security is not compromised.

Consideration of emission reductions

The Panel notes that Energy Ministers are consulting on changes to the NEL to include an emissions reduction objective into the NEO.[28] It is understood that this change to the NEO is expected to take effect from late 2023.

The Panel has considered emissions reduction in the context of this request and does not consider that it is a material factor in relation to the revocation of the SA protected event. The Panel's options in relation to this request are either to revoke or maintain the existing protected event declaration, and the Panel does not consider that meeting the emissions reduction objective would be a key determinant in its decision.

The Panel's assessment criteria

In its assessment of AEMO's request to revoke the SA protected event, the Panel has considered how this change would promote the NEO. The Panel identified the following assessment criteria to support that objective:

- Promote power system security with the appropriate allocation of risk

---

26 Clause 8.8.4(e) of the NER

27 For more information on the 2016 black system event, refer to AEMO, Black System in South Australia - Final Integrated Report, 28 March 2017.

28 Department of Climate Change, Energy, Environment and Water, Incorporating an emissions reduction objective into the national energy objectives, 20 December 2022.

- Flexible and efficient investment in, and operation of, energy resources to promote secure supply
- Transparent, predictable and simple regulatory arrangements
- Consumer preferences.

Ultimately, the Panel's responsibility is to identify a reasonable, effective and efficient trade-off between the security benefits against the costs that this would impose on consumers. While it is essential that security and safety are maintained, this should occur at the lowest possible cost for consumers.

The remainder of this chapter explains why the draft determination, when assessed against each criteria, best promotes the long-term interests of consumers.

2.1 Promote power system security with the appropriate allocation of risk

Supporting the maintenance of power system security is central to the protected events framework, which was implemented to assist AEMO in maintaining the power system in a secure operating state where it is efficient to protect against a high-consequence non-credible contingency event. Accordingly, the impact of declaring a protected event on power system security has been a key consideration in the Panel's assessment of AEMO's request.

The power system is in a satisfactory operating state when it is operated within specified technical operating limits and operational risks are allocated to those best placed to manage them.[29] Operating and maintaining the power system within these technical limits supports the safe, secure, efficient and effective operation of the national electricity system. To successfully operate and maintain the power system, operational risks should be appropriately allocated to those who have the capability to manage them.

The Panel considers that system security would be maintained after revoking the protected event as AEMO has the capability to appropriately manage operational risks. The revised contingency classification framework, which was not in place when the protected event was declared in 2018, now allows AEMO to effectively manage risks to the power system during destructive wind conditions without the need for the protected event classification. AEMO has advised that the same measures for managing the protected event can be implemented using the contingency reclassification framework until the connection of PEC Stage 1.[30] Furthermore, AEMO and ElectraNet are working to modify WAPS and identify suitable constraints on SA imports across HIC and PEC following the connection of PEC Stage 1.[31]

Refer to chapter 3 for more information on how revoking the protected event maintains system security.

29 Clause 4.2.2 of the NER.

30 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.11.

31 Ibid, p.9.

2.2 Flexible and efficient investment in, and operation of, energy resources to promote secure supply

Maintaining a secure system while reducing costs incurred by participants and consumers requires flexible and efficient investment in, and operation of, energy resources. Regulatory arrangements must be flexible to changing market and external conditions, while being effective and efficient to achieve the best outcomes for consumers.

The Panel has determined that destructive wind conditions can be best managed by AEMO using the contingency reclassification framework instead of the protected events framework. The contingency reclassification framework has a range of implementable measures to allow AEMO to flexibly adjust arrangements in response to changes in the power system, such as changes to network topology due to the connection of PEC Stage 1.

In comparison to the contingency reclassification framework, the Panel notes AEMO's view that the protected events framework is a less flexible and adaptive framework. Changes to the existing protected event require the event to be revoked and a new protected event declared by the Panel in response to a request from AEMO. AEMO noted in its request that, in relation to the protected events framework:[32]

> As the power system rapidly changes, successive protected event modifications would be required to change the WAPS design, settings and/or interconnector limits. Each change would be an administratively intensive and lengthy process.
>
> AEMO understands that under the current NER, each change would require the Reliability Panel to revoke the previous protected event and declare a new protected event following a recommendation in a General Power System Risk Review (GPSRR) and associated AEMO requests.

The Panel has determined that revoking the protected event is more likely to support efficient investment in, and operation of, energy resources by providing flexible processes that can adapt over time to changes in the power system.

AEMO has assessed that continuing to constrain flows on HIC in accordance with the existing protected event EFCS standard following the connection of PEC Stage 1 would over-constrain South Australian imports.[33] The Panel considers that this would lead to an inefficient outcome as excessive costs would be borne by consumers. Therefore, revoking the protected event would allow efficient arrangements to be made under the more flexible contingency reclassification framework.

Refer to chapter 3 for more information on how flexibility and efficiency are promoted by revoking the protected event.

32 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.12.

33 Ibid, p.14.

2.3 Transparent, predictable and simple regulatory frameworks

Market and regulatory arrangements should promote transparency and be predictable and simple, so market participants can make informed and efficient investment and operational decisions.

The Panel considers that the revised contingency reclassification process provides sufficient transparency with respect to the management of destructive wind conditions in SA. The Panel notes that the contingency reclassification framework has been designed to support predictability and transparency by including a range of reporting obligations for AEMO.

Under the revised reclassification process, AEMO must issue market notices when abnormal conditions arise that make non-credible contingency events more likely. AEMO must update the market as the conditions evolve and notify the market when it considers the event no longer likely. AEMO must also review and explain any reclassification decisions every six months, alerting stakeholders to specific measures implemented to manage reclassified events, and consider potential improvements to the reclassification criteria.[34] The NER also includes mechanisms to encourage learning and improvements to the reclassification criteria, including a requirement to review the reclassification criteria in consultation with relevant stakeholders every two years at a minimum.[35]

AEMO has indicated that, prior to the synchronisation of PEC Stage 1, the contingency reclassification framework would be used to continue to manage destructive wind conditions in SA using the same measures as the protected event. Following the synchronisation of PEC Stage 1, the Panel expects AEMO and ElectraNet to make immediate and suitable alternative arrangements for managing these types of events. There would be no change in operational outcomes from managing destructive winds if the protected event is revoked.

The Panel also expects that AEMO would review and report on the effectiveness and appropriateness of the arrangements to manage the risk of destructive winds in South Australia as part of its annual General Power System Risk Review (GPSRR). This is based on the understanding that the risk of destructive winds in SA is likely to be a 'priority risk' as it has the potential to lead to cascading outage or a major supply disruption.[36]

The Panel notes that the existing reporting obligations set out in the NER in relation to contingency reclassification and the GPSRR provide transparency to market participants and industry stakeholders in relation to the operational arrangements put in place by AEMO to manage the risk of destructive winds, including the appropriateness of these controls and any how they might change to reflect future changes in the power system.

Refer to appendix A for further information on the protected events framework and indistinct events framework.

34 Clause 4.2.3A of the NER.
35 Clause 4.2.3B(b) of the NER.
36 Clause 5.20A.1(a) of the NER.

2.4 Alignment with consumer preferences

Regulatory arrangements should take into account consumer preferences. This includes the consideration of the costs and benefits to consumers and the impact on the consumer experience from the delivery of power system services.

The Panel considers that revoking the SA protected event would likely avoid excessive costs for consumers while maintaining a secure supply of electricity to consumers. Excessive costs would likely be avoided as the existing arrangements are likely to overly constrain the network following the connection of PEC Stage 1. Alternative arrangements, such as the use of the contingency reclassification framework, can be used to reflect the changes in network topology from the connection of PEC Stage 1 and avoid excessive costs while maintaining system security.

Refer to chapter 3 for more information on how revoking the protected event would benefit consumers.

3 REVOKING THE SOUTH AUSTRALIAN PROTECTED EVENT

The Panel's draft determination is to revoke the existing protected event for South Australia, consistent with AEMO's request. The SA protected event is defined as:[37]

> The loss of multiple transmission elements causing generation disconnection in the South Australia region during periods where destructive wind conditions are forecast by the Bureau of Meteorology.

Subject to the Panel's final determination, the SA protected event would be revoked on 1 October 2023, prior to the expected completion of PEC Stage 1 in December 2023.[38]

The Panel is satisfied that there would be no negative consequences as a result of revoking the protected event, based on AEMO's advice, as AEMO can use the revised contingency reclassification framework to manage the risks associated with destructive wind conditions in South Australia. Furthermore, revoking the SA protected event would likely avoid excessive costs to consumers, when PEC Stage 1 connects to the grid.

Following the revocation of the SA protected event, and prior to the connection of PEC Stage 1, AEMO would continue to manage the risk of destructive winds in SA under the contingency reclassification framework.[39]

Subsequently, following the connection of PEC Stage 1, AEMO intends to apply revised transfer limits on the HIC, subject to final technical advice from ElectraNet. These revised settings will be complemented by changes and upgrades to the existing SIPS EFCS to account for the changed network topology.

This chapter provides information on the Panel's determination and is structured with the following sections:

- Section 3.1 – AEMO can manage system security risks associated with the protected event through the contingency reclassification framework
- Section 3.2 – Revoking the protected event will provide AEMO with greater operational flexibility which is expected to result in the avoidance of excessive costs.

3.1 AEMO can maintain system security after the SA protected event is revoked

The Panel considers, informed by advice from AEMO, that system security would be maintained after revoking the protected event. Following the revocation of the protected event, AEMO can manage the operational risks of destructive winds in SA through the contingency reclassification framework. Therefore, the Panel considers that based on this

37 Reliability Panel, AEMO Request for Protected Event Declaration – Final determination, 20 June 2019, p.22.
38 AEMO, Transmission Augmentation Information - December 2022, 16 December 2022.
39 Ibid, p.13.

advice from AEMO, revoking the protected event is likely to have no negative consequences on the security and reliability of the power system.

3.1.1 AEMO can manage the risk of destructive winds through the revised contingency reclassification framework

The Panel is satisfied that the SA protected event declaration is no longer required as AEMO can now use the revised contingency reclassification framework to manage destructive wind conditions in SA. As noted in the request to revoke the protected event:[40]

> AEMO considers there will be no negative consequences for the power system by ceasing to manage this non-credible contingency event as a protected event after the new contingency reclassification framework comes into effect. In addition, following synchronisation of PEC Stage 1, AEMO considers it will be able to effectively manage this risk, pending the development of import constraints by the transmission network service provider (TNSP).

The revised contingency reclassification framework requires AEMO to develop reclassification criteria to account for abnormal conditions that make a non-credible contingency event more likely.[41]If AEMO determines that the abnormal conditions make a non-credible event reasonably possible, then it must reclassify that non-credible contingency event as a credible contingency event. [42]

The reclassification criteria in clause 4.2.3B of the NER was expanded so that AEMO must include in it information about measures that it may implement to maintain power system security as a result of reclassification decisions including:

- the risks to the power system of different abnormal conditions
- the network elements or plant in relation to which measures may be implemented in response to different abnormal conditions
- other measures or a range of measures that AEMO is likely to consider in different abnormal conditions.

The Panel agrees with AEMO that the destructive wind condition for which the existing protected event applies is more appropriately dealt with under the contingency reclassification framework. This is based on 'destructive winds' being a form of 'abnormal conditions'. As noted by AEMO in its request:[43]

> AEMO considers the destructive winds protected event, as currently declared, is better aligned with the modified contingency reclassification framework, which considers power system security during temporary 'abnormal conditions' and now recognises 'indistinct events' where the specific assets at risk and impacts cannot be explicitly identified.

40 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.4.
41 Clause 4.2.3B(a) of the NER.
42 Clause 4.2.3A(e) of the NER.
43 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.11.

AEMO has now published revised *Power System Security Guidelines* which include revised reclassification criteria for abnormal conditions, including severe winds.[44]

Refer to appendix A for more information on destructive wind conditions in the contingency reclassification framework.

The Panel understands that if this event were reclassified as a credible contingency, it would meet the definition of a network event under the frequency operating standard (FOS) and the expected operational outcomes would be equivalent to AEMO's current management of the existing protected event. AEMO provided a supplementary note (published alongside this document) that clarifies the existing and proposed operational approach to managing this event. AEMO clarified that the proposed management of the event as a credible contingency event would need to meet the FOS requirements for a network event and that AEMO would be required to contain the frequency within the range 49 Hz – 51 Hz.[45] This is consistent with AEMO's current operational approach to managing the SA protected event to contain system frequency above 49 Hz and avoid the separation of the SA region from the rest of the NEM:[46]

> AEMO's proposal to manage the SA destructive winds protected event under the revised NER reclassification framework (following the indistinct events rule) has no material impact on the actions that AEMO will take or the level of system security that AEMO will maintain when managing this risk. Management of this risk under the reclassification framework would (during periods of forecast destructive wind conditions in SA):
>
> - Require AEMO to put in place suitable controls to avoid SA islanding for the loss of 500 MW of generation in SA.
> - Require AEMO to meet the frequency operating standard for a 'network event' (with NEM frequency allowed to reach a minimum of 49 Hz) and avoid UFLS.
>
> Finally, AEMO does not envisage any circumstances under which reclassification of this risk as a credible contingency event would necessitate any additional controls (such as regional FCAS, additional synchronous generation dispatch requirements or directions) in order to maintain power system security.

Further detail on the relevant operational requirements in relation to contingency events and protected events is provided for reference in appendix A.

3.1.2 Revoking the protected event will allow for operational arrangements to be revised to reflect network changes

The revocation of the existing SA protected event will allow for the current operational arrangements to be flexibly adjusted to reflect network changes, including the impending synchronisation of PEC Stage 1 in December 2023. AEMO has indicated its intention to continue to apply the existing operational controls until the connection of PEC Stage 1, and

44 AEMO, Power System Security Guidelines – SO_OP_3715, 8 March 2023, pp.47-48.
45 AEMO, AEMO Request to Revoke Protected Event – Additional information, June 2023, p.3.
46 Ibid.

thereafter to adapt the controls as required. As noted in the request to revoke the protected event AEMO states:[47]

> There will be no negative consequences for the power system by ceasing to manage the non-credible contingency as a protected event following synchronisation of PEC Stage 1. The non-credible contingency risk will continue to be managed by WAPS and constraints, which will be updated as appropriate for the new network topology under NER clause S5.1.8 and the contingency reclassification framework respectively.

AEMO's proposed approach to managing the risk of destructive winds for HIC and the SA region

AEMO has indicated that, following the revocation of the SA protected event and prior to the connection of PEC Stage 1, it would continue with its current operational arrangement to manage the risk of destructive winds in SA under the contingency reclassification framework.[48] This includes:

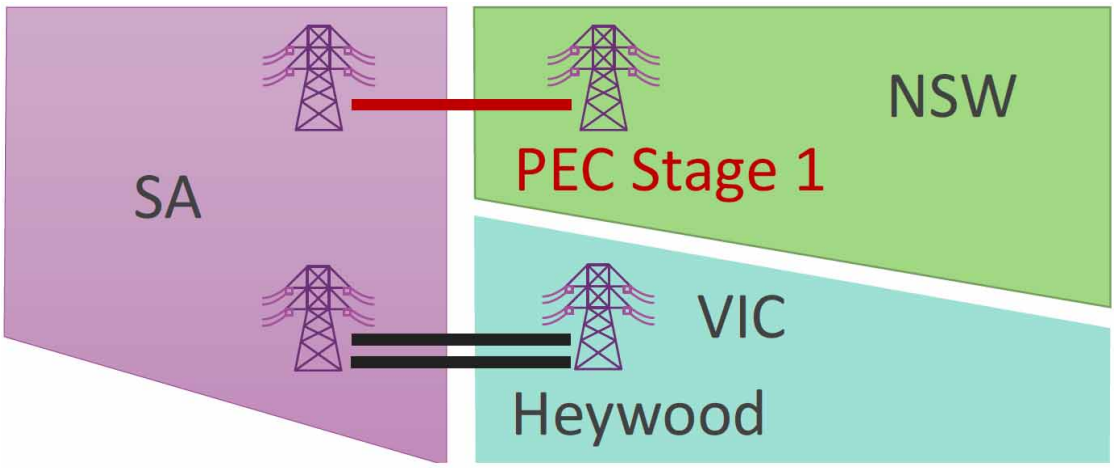
- Applying a pre-contingency limit of 250 MW to imports into SA over HIC (during destructive wind conditions)
- Utilising SIPS to trigger power injection from SA batteries and/or shed load in SA in response to power swings on HIC associated with a loss of generation within SA.[49]

Subsequently, following the connection of PEC Stage 1 AEMO intends to revise these arrangements. In the 2022 Power System Frequency Risk Review (PSFRR), AEMO provided analysis and a cost-benefit assessment on proposed operational arrangements to manage destructive wind conditions in SA.[50] This cost-benefit assessment showed net benefits for AEMO's proposed arrangements.

The change in network topology due to the connection of PEC Stage 1 is illustrated in a simplified diagram in Figure 3.1.

47 AEMO, AEMO Request to Revoke Protected Event, April 2023, p13.
48 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.13.
49 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.8.
50 AEMO, Power System Frequency Risk Review, July 2022, p.75.

Figure 3.1: Simplified diagram of South Australian connection to rest of NEM via HIC and PEC Stage 1



Source: AEMO, AEMO Request to Revoke Protected Event, April 2023, p.8.
Note: HIC is a double circuit connection between SA and Victoria represented by two black lines. PEC Stage 1, currently under construction, will be a single circuit connection between SA and NSW, represented by a single red line.

AEMO noted that, following the connection of PEC Stage 1, SIPS would continue to be managed and maintained by ElectraNet under clause S5.1.8 of the NER. SIPS is a remedial action scheme that reduces the risk of HIC tripping due to loss of SA generation. It acts by triggering power injection from SA batteries and/or load shedding in SA when it detects a large power swing on HIC.[51] An upgraded version of SIPS, known as WAPS, will improve its effectiveness and is planned for implementation by ElectraNet in 2023.[52]

AEMO notes that they are in consultation with ElectraNet to determine suitable arrangements for when PEC Stage 1 connects to the grid.[53] AEMO's request presented preliminary alternative arrangements:[54]

- Modifications to SIPS to account for changes in network topology following the connection of PEC Stage 1
- During destructive wind conditions, the current 250 MW SA import limit on HIC would be replaced with SA import limits of 430 MW on HIC and 70 MW on PEC Stage 1.

SIPS is designed to operate in three progressive stages, that escalate the level of intervention in the power system, to reduce interconnector flow into SA:[55]

- Stage one triggers power injection from SA batteries when imports into SA across HIC substantially increase beyond reasonably foreseeable load increases or if imports across HIC exceed a defined threshold

51 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.3.
52 Ibid, p.8.
53 Ibid.
54 Ibid, p.9.
55 ElectraNet, Transmission Annual Planning Report 2022, October 2022, p.63.

- Stage two triggers load shedding at select transmission substations if an unstable power swing is detected at Tailem Bend or if imports across HIC exceed a defined threshold
- Stage three trips 275 kV circuit breakers at South East substation and islands SA from the NEM if a loss of synchronism is detected at South East substation.

WAPS would, as indicated by current plans from AEMO and ElectraNet, improve on stages one and two of SIPS with:[56]

- More accurate detection and rapid triggering of battery energy storage system and load response elements, minimising the risk of a trip of the Heywood Interconnector
- Real time measurement of the available response
- Initiation of a proportionate load shedding response when triggered.

The Panel notes that ElectraNet is currently completing studies to confirm and advise AEMO of the operational limits that will apply following the connection of PEC Stage 1.[57] AEMO plans to continue to apply the current flow limits until suitable alternative arrangements are determined.[58]

The Panel expects that AEMO would review and report on the effectiveness and appropriateness of the arrangements to manage the risk of destructive winds in South Australia as part of its annual GPSRR. Furthermore, following the revocation of the protected event, AEMO would be required to report on the reasons for any reclassification decisions and the appropriateness of related mitigation measures in their six-monthly reports on reclassification decisions.[59] These reporting obligations provide transparency to market participants and industry stakeholders in relation to the appropriateness of the operational arrangements put in place by AEMO to manage the risk of destructive winds and any how they might change to reflect future changes in the power system.

Refer to appendix A for more information on the SA protected event and on the contingency reclassification framework.

3.2 Revoking the protected event provides greater operational flexibility and would be likely to avoid excessive costs for consumers

The Panel considers that revoking the SA protected event would provide AEMO with greater operational flexibility to manage system security during destructive wind conditions in SA. This would be likely to avoid excessive costs for consumers and support the NEO. If the protected event is not revoked, consumers may incur costs from over-constrained SA imports following the connection of PEC Stage 1, planned for December 2023.

56 Ibid.
57 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.9.
58 Ibid.
59 Clause 4.3.2A(i) of the NER.

3.2.1 Revoking the protected event allows operational flexibility and would likely avoid excessive costs

The Panel has determined that revoking the protected event would support the efficient operation of the NEM during destructive wind conditions by providing AEMO with greater flexibility to adapt its operational arrangements as the network conditions change.

The Panel considers that the increased operational flexibility under the contingency reclassification process would allow AEMO to adjust arrangements to reflect changes in network topology, including the connection of PEC Stage 1. Under the existing protected event declaration, AEMO is restricted to implementing a 250 MW SA import limit on HIC during destructive wind conditions and utilising WAPS. However, under the contingency reclassification framework, AEMO can apply a range of unspecified measures that can be adjusted to reflect changes in the power system and promote efficient outcomes.[60]

The Panel notes that it would be possible for AEMO to request that a new protected event be declared to replace the existing protected event, including revised target capabilities for the associated controls and protected event EFCS standard. AEMO stated that it does not intend to recommend the declaration of an updated protected event to replace the existing destructive winds protected event. AEMO considers that declaring a replacement protected event would have a number of negative consequences and ultimately limit the actions that it can take to effectively manage power system risk. As noted in the request to revoke the protected event:[61]

1. As the power system rapidly changes, successive protected event modifications would be required to change the WAPS design, settings and/or interconnector limits. Each change would be an administratively intensive and lengthy process.

   AEMO understands that under the current NER, each change would require the Reliability Panel to revoke the previous protected event and declare a new protected event following a recommendation in a General Power System Risk Review (GPSRR) and associated AEMO requests.
2. Given the sequence of steps required to implement a new protected event noted above, and the consultation requirements for each associated process, it is unlikely this could be achieved before expected PEC Stage 1 synchronisation, or that any future control scheme modifications required to operate efficiently for system changes could be implemented in a timely way.
3. Applying the protected event alone may have the potential to limit actions AEMO can take to effectively manage particular risks, compared to the reclassification framework which allows a broader set of actions to be taken, where appropriate.

The Panel considers that revoking the protected event and utilising more flexible methods to manage operational risks would be likely to avoid excessive costs for consumers.

60 Refer to Appendix B for more information on the measures AEMO can implement with the contingency reclassification framework.
61 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.12.

3.2.2 The continued use of the existing protected event to manage the risk of destructive winds for HIC would be inefficient

The Panel considers that the continued use of the existing protected event to manage the risk of destructive winds to HIC would lead to inefficient outcomes. While the protected event declaration has supported the secure operation of the system with respect to this risk since June 2019, the upcoming connection of PEC Stage 1, and associated changes in network topology, necessitate changes to the target capabilities and constraints used to mitigate the risk of destructive winds for HIC. Therefore, the existing protected event would need to be revised, or revoked, to allow for these changes.

The Panel notes that the revision of the existing protected event would likely avoid excessive costs for consumers due to excessively constraining flows on HIC following the connection of PEC Stage 1. AEMO outlined in their request to revoke the protected event that the existing protected event arrangements would not remain fit for purpose following the connection of PEC Stage 1, as:[62]

> PEC Stage 1 will modify power flows in ways not accounted for by the WAPS target capabilities or the 250 MW HIC constraint defined in the destructive winds protected event.

While the potential impact of PEC was noted during the declaration of the protected event, the existing protected event arrangements were designed with only HIC connecting SA to the rest of the NEM.[63] The changes to the network topology due to PEC Stage 1 are illustrated in Figure 3.1, and AEMO proposed revised operational arrangements are described in section 3.1.2.

Therefore, the existing protected event and associated control measures would be likely to produce inefficient outcomes by excessively constraining the system following the connection of PEC Stage 1. This would ultimately lead to increased wholesale electricity costs in South Australia as import flows over HIC would be constrained to 250MW vs the proposed 430MW under AEMO's proposed revised approach using the contingency reclassification process. Correspondingly, the Panel considers that the existing protected event needs to be revised, or revoked, to avoid these excessive costs for consumers.

As discussed in section 3.1.1, the revised contingency reclassification framework provides an alternative framework to manage the risks to HIC during destructive wind conditions. Therefore, the Panel's draft determination is to revoke the existing protected event declaration, consistent with AEMO's request.

62 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.8.

63 Reliability Panel, AEMO request for protected event declaration, Final report, 20 June 2019, p.19.

ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Commission	See AEMC
DPV	Distributed photovoltaics
FCAS	Frequency Control Ancillary Services
FOS	Frequency operating standard
GPSRR	General Power System Risk Review
HIC	Heywood interconnector
MCE	Ministerial Council on Energy
NEL	National Electricity Law
NEO	National electricity objective
NSP	Network service provider
Panel	Reliability Panel
PEC	Project Energy Connect
PSFRR	Power System Frequency Risk Review
SA	South Australia
SCADA	Supervisory Control and Data Acquisition
SIPS	System Integrity Protection Scheme
TNSP	Transmission network service provider
WAPS	Wide Area Protection Scheme

GLOSSARY

Cascading outage	The occurrence of a succession of outages, each of which is initiated by conditions (e.g. instability or overloading) arising or made worse as a result of the event preceding it.
Contingency events	These are events that affect the power system's operation, such as the failure or removal from operational service of a generating unit or transmission element. There are several categories of contingency event, as described below: • credible contingency event is a contingency event whose occurrence is considered "reasonably possible" in the circumstances. For example: the unexpected disconnection or unplanned reduction in capacity of one operating generating unit; or the unexpected disconnection of one major item of transmission plant • non-credible contingency event is a contingency event whose occurrence is not considered "reasonably possible" in the circumstances. Typically a non-credible contingency event involves simultaneous multiple disruptions, such as the failure of several generating units at the same time.
Interconnector	A transmission line or group of transmission lines that connect the transmission networks in adjacent regions.
Load shedding	Reducing or disconnecting load from the power system either by automatic control systems or under instructions from AEMO. Load shedding will cause interruptions to some energy consumers' supplies.
Operating state	The operating state of the power system is defined as satisfactory, secure or reliable, as described below. The power system is in a **satisfactory** operating state when: • it is operating within its technical limits (i.e. frequency, voltage, current etc are within the relevant standards and ratings) • the severity of any potential fault is within the capability of circuit breakers to disconnect the faulted circuit or equipment. The power system is in a **secure** operating state when: • it is in a satisfactory operating state • it will return to a satisfactory operating state following a single credible contingency event. The power system is in a **reliable** operating state when:

	• AEMO has not disconnected, and does not expect to disconnect, any points of load connection under NER clause 4.8.9 • no load shedding is occurring or expected to occur anywhere on the power system under NER clause 4.8.9 • in AEMO's reasonable opinion the levels of short term and medium term capacity reserves available to the power system are at least equal to the required levels determined in accordance with the power system security and reliability standards.
Participant	An entity that participates in the national electricity market.
Power system reliability	The measure of the power system's ability to supply adequate power to satisfy demand, allowing for unplanned losses of generation capacity.
Power system security	The safe scheduling, operation and control of the power system on a continuous basis.
Technical envelope	The power system's technical boundary limits for achieving and maintaining a secure operating state for a given demand and power system scenario.

A APPENDIX

This appendix provides further information on:

- The protected event framework – appendix A.1
- The contingency reclassification framework – appendix A.2
- Operational arrangements for managing the risk of destructive winds in South Australia – appendix A.3
- AEMO's general system security obligations under the NER and the FOS – appendix A.4.

A.1 The protected event framework

The AEMC published the *Emergency frequency control schemes* rule change on 30 March 2017, which included a new classification of non-credible events, called "protected events". A protected event is a non-credible contingency event the Panel has declared to be a protected event.[64] The category of protected event was introduced to give AEMO additional tools to manage certain high-consequence non-credible contingency events. AEMO must maintain the power system in a secure operating state in relation to protected events, including by managing power system frequency within the frequency operating standard following the occurrence of the event.[65] Protected events can be managed using ex-ante measurements, as well as limited generation or load shedding, in order to maintain power system security.

The EFCS Rule introduced a requirement for AEMO to undertake, in collaboration with transmission network service providers (TNSPs), an integrated, periodic review of power system frequency risks associated with non-credible contingency events – the Power System Frequency Risk Review (PSFRR). Subsequently, on 3 June 2021 the AEMC amended NER to replace the PSRRR obligation with a more holistic General Power System Risk Review (GPSRR). The GPSRR is an annual review lead by 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.

If AEMO determines in a GPSRR that a non-credible contingency event can be efficiently managed using ex-ante operational measures, AEMO must submit a request to the Panel to declare the event as a protected event.[66] Similarly, if AEMO recommends in a GPSRR that a protected event should be revoked, they must request the Panel to revoke the protected event.

The Panel does not have the discretion to declare a different protected event to that which is requested by AEMO. To amend the determination of a protected event, in accordance with relevant recommendations from a GPSRR:[67]

64 Clause 4.2.3(f) of the NER.
65 Clause 4.2.4(a) of the NER.
66 Clause 5.20A.4(a) of the NER.
67 Clause 8.8.4 of the NER.

- AEMO must request to revoke the protected event in accordance with clause 5.20A.5 of the NER; and
- AEMO must request to declare a new protected event following recommendations in a GPSRR in accordance with NER clause 5.20A.4.

The Panel must assess requests to declare or revoke protected events in accordance with clause 8.8.4 of the NER. The Panel's assessment must have regard to information provided by AEMO while allowing for information requests from other relevant parties. The Panel should declare a non-credible contingency event a protected event when the benefits of managing the event as a protected event outweighs the costs of the recommended option(s).

AEMO may use a mixture of ex-ante actions to manage a protected event declared by the Panel. These actions include the purchase of FCAS, constraining generation dispatch, and the use of an EFCS in order to maintain the frequency operating standards applicable to protected events. As part of the declaration of a protected event, the Panel determines the range of ex-ante actions to be used by AEMO in managing the event.

A.1.1 The declaration of the South Australian protected event

The SA protected event was declared by the Panel on 20 June 2019 following a request from AEMO. This is the only protected event to be declared by the Panel to date. The protected event is defined as:[68]

> The loss of multiple transmission elements causing generation disconnection in the South Australia region during periods where destructive wind conditions are forecast by the Bureau of Meteorology.

In the determination to declare the SA protected event, the Panel considered that the protected event framework was the most effective and efficient way to manage the event.[69] The Panel determined that, in agreement with AEMO's recommended approach, a modified EFCS was required to manage the event and involved:[70]

- setting an import limit of 250 MW on HIC during destructive wind conditions
- enhancing the System Integrity Protection Scheme (SIPS).

The System Integrity Protection Scheme (SIPS) is a scheme that reduces the risk of HIC tripping when up to 500 MW of generation in SA is lost. In declaring the SA protected event, the target capabilities of associated protected event EFCS were set for SIPS to manage the risks.[71] When SIPS detects a large power swing on HIC, power is injected from batteries is SA and/or load is shed in SA. It is worth noting that an upgraded version of SIPS called the Wide Area Protection Scheme (WAPS) is planned to be implemented by ElectraNet in 2023.[72]

68 Reliability Panel, AEMO Request for Protected Event Declaration – Final determination, 20 June 2019, p.22.
69 Ibid, p.ii.
70 Ibid.
71 Ibid, p.24.
72 AEMO, AEMO Request to Revoke Protected Event, April 2023, p.8.

In the Panel's determination to declare the protected event, the impact of PEC and its potential interactions with the protected event were considered.[73] PEC had been proposed at the time and its construction was not confirmed. The Panel determined that, while the construction of PEC would not strand the capital used to enhance SIPS, PEC may necessitate changes to the SA protected event:[74]

> This scenario may therefore require the revocation of any existing protected event declaration and the making of a new protected event declaration by the Panel, at AEMO's request.

A.2 The contingency reclassification framework

rom time to time, the power system may experience significant abnormal conditions (such as storms or high winds) that result in the unexpected or unplanned failure of power system plant, including generation or transmission equipment. These events are referred to in the NER as contingency events as defined in Clause 4.2.3 of the NER.

> 4.2.3
>
> (a) 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; or
>
> (2) a sudden and unplanned change to the level of output, consumption or power flow of plant.

Contingency events are divided into:

- *credible contingency events*: contingency events AEMO considers to be reasonably possible in the surrounding circumstances, including the technical envelope.[75]
- *non-credible contingency events*: contingency events other than credible contingency events.[76]

A key difference between credible and non-credible contingencies is the operational actions that AEMO can take to manage them ex-ante.

Operational requirements for credible contingency events

Following a credible contingency event, AEMO is required to maintain the power system frequency within the applicable contingency containment band in the frequency operating standard when these kinds of events occur, and must return the frequency to the normal operating frequency band within a specified time period. To do so, it procures contingency

73 Reliability Panel, AEMO request for protected event declaration, Final report, 20 June 2019, p.19.

74 Ibid.

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

76 Clause 4.2.3(e) of the NER.

raise and lower FCAS, which act to rebalance supply and demand and stabilise system frequency

Non-credible contingencies can be managed using:

- controlled load shedding arrangements; and
- in some cases, special protection schemes.

These actions are part of AEMO managing the power system to arrest the impacts of a range of significant multiple contingency events or protected events.[77] The NER allows AEMO to take additional operational actions in advance to manage credible contingency events and protected events. These actions include:

- setting constraints on dispatch
- issuing directions
- procuring ancillary services, for example, contingency raise and lower FCAS.

The AEMC revised the contingency reclassification framework in its *Enhancing operational resilience in relation to indistinct events* rule, which commenced on 9 March 2023, to:

- integrate 'indistinct events' into the existing contingency event framework by expanding the definition of 'contingency event' and expanding the scope of the reclassification criteria[78]
- introduce a new power system security principle requiring AEMO, where practicable, to make decisions about reclassification and measures to mitigate heightened risks that are predictable and consistent with the reclassification criteria
- strengthen transparency and predictability for the expanded contingency event framework, including introducing a requirement for AEMO to consider improvements to the reclassification criteria through its regular reporting, and a requirement for specific reporting when it is not practicable for AEMO to act in a manner consistent with the reclassification criteria.

The contingency reclassification framework allows AEMO to reclassify non-credible contingency events as credible contingency events if the event becomes reasonably possible due to abnormal conditions.[79]

AEMO must develop and publish reclassification criteria which set out the criteria and process used by AEMO to reclassify a non-credible contingency event as a credible contingency event. These reclassification criteria are included in AEMO's Power System Security Guidelines, to make reclassification decisions and identify a range of abnormal conditions that could increase the likelihood of non-credible contingency events, such as bushfires, lightning and severe winds. The reclassification criteria also specify the measures available to AEMO for

77 NER cl. 4.3.1(k).

78 Indistinct events are not defined in the NER but are generally events on the power system for which it is not possible or reasonable to identify (a) the associated threats to the specific power system elements because the threat is so broad or extreme and/or (b) the specific assets likely to be affected because the broad nature of the threats means there are a large number of possible outcomes.

79 Clause 4.2.3A if the NER.

each abnormal condition to manage operational risks following the reclassification of a contingency event.

The contingency reclassification framework includes transparent reporting requirements to inform market participants and other stakeholder to any reclassification decisions and any measures implemented by AEMO. Transparency in the contingency reclassification framework is discussed further in appendix A.2.1.

Destructive wind conditions, such as the conditions covered by the South Australian protected event, are included as an abnormal condition.[80] This means that AEMO can reclassify non-credible contingency events during destructive wind conditions in Australia and implement measures to maintain system security. Refer to appendix A.2.2 for more information on destructive wind conditions in the contingency reclassification framework.

A.2.1 Transparency and reporting arrangements under the contingency reclassification framework

The revised contingency reclassification framework includes expanded reporting obligations to support transparency and predictability for market participants on AEMO's management of abnormal conditions. The Commission concluded in the final determination of the indistinct events rule change that:[81]

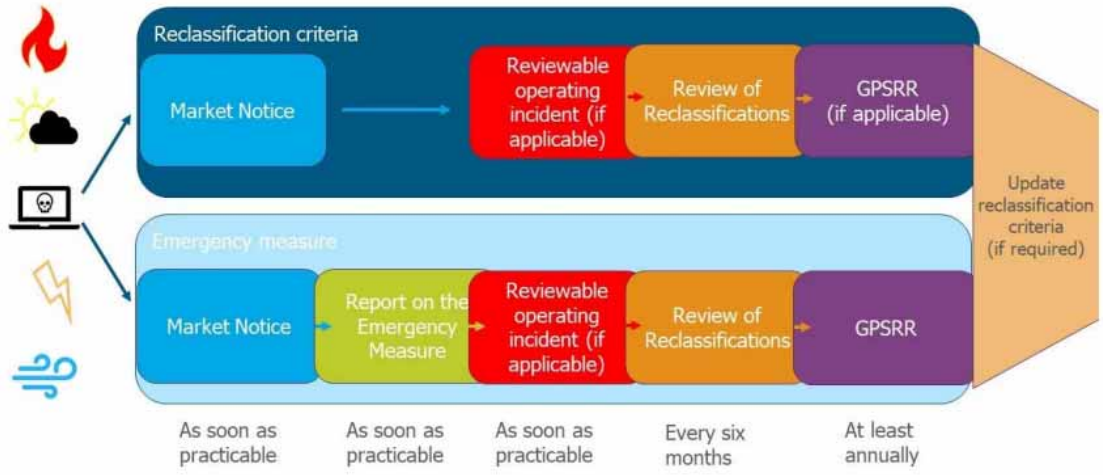
> While indistinct events may involve challenges in identifying the specific asset(s) affected, as well as identifying the specific impact, market participants should have confidence and clarity regarding AEMO's management of these events.

A graphical summary of the reporting obligations for the contingency reclassification framework is presented in Figure A.1.

80 AEMO, Power System Security Guidelines – SO_OP_3715, 8 March 2023, p.47.

81 AEMC, Enhancing operational resilience in relation to indistinct events, Rule determination, 3 March 2022, p.25.

Figure A.1: Reporting framework for indistinct events



Source: AEMC, Enhancing operational resilience in relation to indistinct events, Rule determination, 3 March 2022, p.26.

Market notices

AEMO is required to publish market notices as soon as practicable to update market participants on reclassification decisions and actions when abnormal conditions increase the likelihood of a non-credible contingency event. These market notices must be updated as AEMO becomes aware of new information and if the abnormal conditions have ceased to increase the likelihood of the non-credible contingency event. This live-chain of market notices provides transparent, up-to-date information for market participants to manage their risk exposure. Under clause 4.2.3A(c) of the NER, the market notices must specify:

(1) the *abnormal conditions*;

(2) the *non-credible contingency event*;

(3) whether *AEMO* has reclassified the *non-credible contingency event* as a *credible contingency event* under clause 4.2.3A(g), and, if so, any additional measures implemented to maintain *power system security*;

(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.

Reporting on the emergency measure

While AEMO is required to consider the reclassification criteria in making reclassification decisions, the Commission determined that:[82]

> ...AEMO may only use its discretion when it is not practicable to manage the risks posed by abnormal conditions in a manner consistent with the reclassification criteria.

If AEMO reclassifies a contingency event and implements measures not reasonably expected through the reclassification criteria, AEMO must publish a report as soon as practicable after the event in addition to meeting the other reporting obligations.[83] This report will inform stakeholders on unexpected reclassification decisions. Under clause 4.2.3A(k) of the NER, the report must include:

> (1) a list of the notices relating to the event given by *AEMO* under this clause;
>
> (2) information about the risk the *abnormal condition* posed to the *power system*;
>
> (3) an explanation of the basis on which *AEMO* determined the measures implemented; and
>
> (4) other explanatory information or material *AEMO* considers appropriate.

Reviewable operating incidents

AEMO must also have regard to the reviewable operating incident framework for indistinct events.[84] When an unusual or significant event on the power system impacts system security, AEMO should investigate and publish a report on each incident. This supports transparency and predictability by using an existing framework stakeholders are familiar with to report on notable indistinct events.

Review of reclassifications

AEMO must publish six-monthly reports on all reclassification decisions.[85] These reports must explain AEMO's use of the reclassification criteria in decisions, the effectiveness of the reclassification criteria and any implemented measures. AEMO should also consider whether any changes are required to the reclassification criteria. AEMO is also required to analyse reclassification trends in each report, which will support predictability for AEMO's management of abnormal conditions. In totality, the reports should provide transparent information on AEMO's decisions and actions for market participants and other stakeholders.

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82 AEMC, Enhancing operational resilience in relation to indistinct events, Rule determination, 3 March 2022, p.12.

83 Clause 4.2.3A(j) of the NER.

84 For more information, refer to the 2022 Review of the guidelines for identifying reviewable operating incidents.

85 Clause 4.2.3A(i) of the NER.

General Power System Risk Review

To provide transparency and predictability on future management, AEMO must develop a list of priority risks to the power system in the GPSRR, including risks from indistinct events. For each priority risk, AEMO should assess and recommend options for future management of the event with consideration to the expected costs and time to implement each option.[86]

Updating reclassification criteria

In determining if a non-credible contingency event should be reclassified due to abnormal conditions, AEMO must have regard to the reclassification criteria. The reclassification criteria are outlined in the Power System Security Guidelines and must be reviewed every two years.[87] In reviewing or amending the reclassification criteria, AEMO must consult with relevant stakeholders, supporting transparency by providing opportunities for stakeholders to have input into the reclassification criteria used by AEMO.[88]

A.2.2 The reclassification criteria includes destructive wind conditions

AEMO published the reclassification criteria in the Power System Security Guidelines – SO_OP_3715, with Appendix D outlining the reclassification criteria for severe winds. Information is included on the risks to the power system from severe winds and the measures available to AEMO to manage risks during these conditions.

AEMO considers information and classifications from the Bureau of Meteorology when determining severe wind conditions.[89] Wind classifications determined by the Bureau, as presented in Table A.1, include destructive winds. This produces some overlap with the existing South Australian protected event, which refers to destructive winds forecast by the Bureau.

Table A.1: **Wind classifications**

WIND CLASSIFICATION	WIND GUSTS (KM/H)	CYCLONE CATEGORY	SUSTAINED WIND (KM/H)
Damaging	Below 125	1	63 – 88
Destructive	125 – 164	2	89 – 117
Very Destructive	165 – 224	3	118 – 159

Source: AEMO, Power System Security Guidelines – SO_OP_3715, 8 March 2023, p.47.

To manage risks to the power system from severe wind conditions, AEMO may implement one or more of the following measures:[90]

86 AEMC, Enhancing operational resilience in relation to indistinct events, Rule determination, 3 March 2022, p.27.
87 Clause 4.2.3B(b) of the NER.
88 Clause 4.2.3B(d) of the NER.
89 AEMO, Power System Security Guidelines – SO_OP_3715, 8 March 2023, p.47.
90 Ibid, p.19.

- constraining the dispatch of scheduled plant
- limiting interconnector flows
- issuing directions or clause 4.8.9 instructions for the purpose of managing system strength, voltage, frequency or inertia requirements
- procuring additional market ancillary services
- reconfiguring the network (including sacrificial switching)
- recalling planned network outages
- recalling planned generation outages
- maximising reactive power reserves
- activating contingency plans
- implementing temporary limits in Supervisory Control and Data Acquisition (SCADA) systems
- distributed photovoltaics (DPV) curtailment
- pre-contingent and/or post-contingent load shedding.

A.3 Operational arrangements for managing the risk of destructive winds in South Australia

This appendix outlines the relevant operational requirements that apply for the management of the risk defined under the existing protected event as well as the operational outcomes that would apply for the same event if AEMO was to reclassify it as a credible contingency event in accordance with clause 4.2.3A of the NER. If the existing protected event is revoked, AEMO proposes to manage the associated risk as a credible contingency event.

For reference, the protected event is defined as:[91]

> The loss of multiple transmission elements causing generation disconnection in the South Australia region during periods where destructive wind conditions are forecast by the Bureau of Meteorology

The Panel understands that, in the absence of the protected event, this event would meet the definition of a network event in accordance with the frequency operating standard (FOS) and that the relevant frequency bands for a network event would apply.

The FOS defines a network event as:

> A *credible contingency event* other than a **generation event**, **load event**, **separation event** or part of a **multiple contingency event**.

In reclassifying the loss of multiple transmission elements during destructive winds as credible, AEMO would be required to apply constraints and procure ancillary services to meet the requirements in the FOS for a network event. For a network event, the FOS specifies

91 Reliability Panel AEMC, Final report AEMO request for protected event declaration, 20 June 2019, p.22.

that AEMO must contain the frequency within operational frequency tolerance band, which for the mainland NEM is the range 49 Hz to 51 Hz. The frequency must be returned to the generation and load change band (49.5 Hz to 50.5 Hz) within 2 minutes and the normal operating frequency band within 10 minutes.

The Panel notes that, the required operational outcomes under for managing this event on the mainland as a credible contingency network event are more stringent than the required operational outcomes for the protected event. The FOS requirement for a protected event allows for frequency to fall to as low as 47 Hz. This broader requirement would allow for the operation of emergency UFLS, that typically operate when the power system frequency falls below 49 Hz.

A.3.1 Additional information from AEMO

AEMO provided a supplementary note with additional information on AEMO's existing and proposed arrangements to manage the risks associated with destructive wind conditions in SA. This note has been published alongside this draft determination.

AEMO clarified that managing the risk under the contingency reclassification framework would classify as a network event under the FOS, such that frequency would fall as low as 49 Hz and UFLS would be avoided.[92] This is consistent with AEMO's current management of the protected event to avoid the separation of SA by maintaining frequency above 49 Hz (compared to 47 Hz typically expected for a protected event under the FOS) and avoid UFLS:[93]

> The protected events framework in conjunction with the frequency operating standard would allow frequency to fall to levels as low as 47 Hz, However, the existing actions AEMO takes under the SA protected event to avoid SA separation mean that this additional allowance is not required. If SA islanding is avoided, system frequency would be expected to remain above 49 Hz, with no activation of under-frequency load shedding (UFLS).

AEMO also clarified that additional controls, beyond those currently used to manage the existing protected event, would not be expected to be used to manage the event under the contingency reclassification framework:[94]

> Finally, AEMO does not envisage any circumstances under which reclassification of this risk as a credible contingency event would necessitate any additional controls (such as regional FCAS, additional synchronous generation dispatch requirements or directions) in order to maintain power system security.

92 AEMO, AEMO Request to Revoke Protected Event – Additional information, June 2023, p.3.
93 Ibid.
94 Ibid.

A.4 System security obligations under the NER and the FOS

The operational requirements in relation to power system security and the required frequency outcomes during different operational states, including following contingency events, are set out in the NER and the FOS.

A.4.1 Overview of the system security obligations in the NER

AEMO has a general responsibility to maintain the power system in a secure operating state.[95] Furthermore, AEMO must operate central dispatch in order to meet its system security obligations and meet the requirements of the power system security standards (the frequency operating standard).[96] The power system is defined to be in a secure operating state if it is in a satisfactory operating state and it will return to a satisfactory operating state following a credible contingency event or a protected event.[97]

The power system is defined to be in a satisfactory operating state when all transmission elements and other power system plant are operating within their rated technical limits and the frequency of the power system is within the normal operating frequency band defined in the frequency operating standard.[98]

A.4.2 Overview of the expected frequency outcomes defined in the FOS

The operational requirements in the mainland under the FOS for an interconnected system are presented in Table A.2.

Table A.2: **Summary of mainland system frequency outcomes for an interconnected system**

CONDITION	CONTAINMENT BAND (HZ)	STABILISATION BAND (HZ)	RECOVERY BAND (HZ)	RATE OF CHANGE OF FREQUENCY
No *contingency event* or **load event**	49.75 – 50.25 49.85 – 50.15[1]	49.85 – 50.15 within 5 minutes		±1Hz/s (measured over any 500ms period)
Generation event or **load event**	49.5 – 50.5	49.85 – 50.15 within 5 minutes		
Network event	49.0 – 51.0	49.5 – 50.5 within 1 minute	49.85 – 50.15 within 5 minutes	
Separation event	49.0 – 51.0	49.5 – 50.5 within 2 minutes	49.85 – 50.15 within 10 minutes	

95 Clause 4.2.6 of the NER.
96 Clause 3.8.1(b)(4) of the NER.
97 Clause 4.2.4(a) of the NER.
98 Clause 4.2.2 of the NER.

CONDITION	CONTAINMENT BAND (HZ)	STABILISA-TION BAND (HZ)	RECOVERY BAND (HZ)	RATE OF CHANGE OF FREQUENCY
Protected event	47.0 – 52.0	49.5 – 50.5 within 2 minutes	49.85 – 50.15 within 10 minutes	As per the protected event declaration
Multiple contingency event	47.0 – 52.0 (reasonable endeavours)	49.5 – 50.5 within 2 minutes (reasonable endeavours)	49.85 – 50.15 within 10 minutes (reasonable endeavours)	±3Hz/s (measured over any 300ms period) (reasonable endeavours)

Source: Reliability Panel, Frequency operating standard – effective 9 October 2023, p.5.
Note: 1. System frequency must not be outside the NOFB for more than 1% of the time over any 30-day period.

The contingency events listed in Table A.2, other than a protected event, are defined in the FOS and presented in Table A.3.[99]

Table A.3: Definitions of contingency events in the frequency operating standard

TERM	DEFINITION
generation event	1. a *synchronisation* of a *generating unit* of more than the generation event threshold of: a. for the **Mainland**: 50MW b. for **Tasmania**: 20MW. 2. an event that results in the sudden, unexpected and significant increase or decrease in the generation of one or more *generating systems* totalling more than the generation event threshold for the region in aggregate within no more than 30 seconds; or 3. the *disconnection* of *generation* as the result of a *credible* contingency event (not arising from a **load event**, a **network event**, a **separation event** or part of a **multiple contingency event**), in respect of either a single *generating system* or a single *dedicated connection asset* providing *connection* to one or more *generating systems*
load event	For the **Mainland**: *connection* or *disconnection* of more than 50 MW of *load* not resulting from a **network event**, **generation event**, **separation event** or part of a **multiple contingency event.**

99 Table A.8 of the FOS, effective 9 October 2023.

TERM	DEFINITION
	For **Tasmania**: either a change of more than 20 MW of *load*, or a rapid change of flow by a *high voltage* direct current *interconnector* to or from 0 MW to start, stop or reverse its power flow, not arising from a **network event**, **generation event**, **separation event** or part of a **multiple contingency event**.
multiple contingency event	Either a *contingency event* other than a *credible contingency event*, a sequence of *credible contingency events* within 5 minutes, or a further **separation event** in an **island**.
network event	A *credible contingency event* other than a **generation event**, **load event**, **separation event** or part of a **multiple contingency event**.
separation event	A *credible contingency event* affecting a *transmission element* that results in an **island**.

Source: Reliability Panel, Frequency operating standard – effective 9 October 2023, pp.10-11.