RELIABILITY PANEL AEMC

REVIEW

Reliability Panel AEMC

FINAL REPORT

REVIEW OF THE RELIABILITY STANDARD AND SETTINGS GUIDELINES

1 JULY 2021

INQUIRIES

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ABOUT THE RELIABILITY PANEL

The Panel is a specialist body established by the Australian Energy Market Commission (AEMC) in accordance with section 38 of the National Electricity Law and the National Electricity Rules. The Panel 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.

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EXECUTIVE SUMMARY

1 The *Reliability Standard and Settings Guidelines* (Guidelines) sets out the principles, assessment approach and assumptions that the Reliability Panel (Panel) must comply with when conducting its *Review of the reliability standard and settings* (RSS review). These have been developed in accordance with the National Electricity Rules (NER).[1]

2 The Panel has reviewed and updated these Guidelines, which will guide the Panel in undertaking its future RSS reviews. The Panel's update to the Guidelines is the subject of this determination and final report. The updated Guidelines have been published as a standalone document separate to this final report. These guidelines are effective as of 1 July 2021.

3 Under the NER, the Panel must review the reliability standard and settings every four years, with the next review to be completed by 30 April 2022.[2] The Panel, in undertaking the RSS reviews, is required to take into account other matters as set out in the NER, including any terms of reference provided by the AEMC.[3] The Panel must also undertake the RSS reviews in accordance with the NER and the Rules consultation procedures.[4]

4 This final report provides the Panel's determination on its review of the Guidelines. It sets out the Panel's changes to the 2016 guidelines, specifically, the assessment framework, principles and approach. Neither this final report, nor the Guidelines, form a view or conclusion as to what the Panel's actual assessment of the reliability standard and settings will be. Rather, the purpose of the Guidelines is to set out the principles and assumptions that the Panel will use in conducting RSS reviews. The Panel will consider and assess the reliability standard and settings in its RSS review. The process and next steps for the 2021-22 RSS review is outlined below.

5 The first Guidelines were made in 2016 and have not been reviewed since. The Panel was minded to update the Guidelines at the current time because the Panel considered:

- it was timely and appropriate given the current rapid market transition occurring
- significant changes have occurred since 2016 and when the reliability standard and settings were first introduced, and
- that the Guidelines should remain relevant and applicable as the market continues to evolve.

6 The Panel, in updating the Guidelines, has taken into account the overarching purpose of the Guidelines, which is to provide useful and transparent information to market participants about how it intends to conduct future RSS reviews. The Panel has also had regard to stakeholder responses to the consultation paper, input it received at its public stakeholder meeting held on the guidelines, bilateral meetings that have occurred, and the current market transition and proposed reforms in train.

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1 NER cl 3.9.3A.
2 NER cl 3.9.3A(d).
3 NER cl 3.9.3A(e)(2).
4 NER cl 3.9.3A(d)(1).

7 The Panel has considered the need for:

- the flexibility to review the reliability standard and settings (reliability components) given the changing market, and also
- the importance of stability for participants given the impact that this has on investment decisions.

8 Both elements are important in promoting the long-term interests of consumers: making sure market arrangements are fit for purpose for the transition and minimising unintended costs and consequences, while (given that some electricity assets are long-lived) promoting investment certainty. The Panel is of the view that the updated Guidelines provide a balance between maintaining certainty for participants and allowing the flexibility for the Panel to comprehensively consider the reliability standard and settings in relation to the national electricity objective as required, in future RSS reviews.

9 The updated guidelines provide that the Panel is able to consider the relevant reliability standard and setting components as needed and to determine whether the approach continues to be fit for the intended purpose. However, the guidelines also set out the requirements and processes that the Panel must comply with in its assessment of the reliability components and the materiality threshold for any recommended changes in its final reliability standards and settings review report. It is important to note that any recommended changes to either the standard or the settings must be submitted as rule change request to the AEMC and then considered through the rule change process.

10 The Panel also considered limiting the comprehensive assessment of the reliability components to only the upcoming RSS review, as suggested by some stakeholders, in order to increase future certainty for participants. While acknowledging the importance of certainty the Panel concluded that, on balance, limiting the comprehensive assessment of the reliability components to only the upcoming RSS review in a period of continuing and unprecedented change in the energy sector was not consistent with the intent of the Guidelines and the proposed changes.

11 The updated Guidelines set out in detail the criteria and processes the Panel must follow when undertaking its assessments and in making recommendations to change the reliability standard and settings. The Guidelines include the:

- **Assessment framework,** specifically the key principles it will apply for assessing whether the reliability standard and settings will, or are likely to, contribute to the achievement of the National Electricity Objective (NEO)
- **Assessment approach**, including the requirements and criteria that the Panel must use when undertaking its assessments of the form and level of the reliability standard and settings. The assessment approach also sets out the materiality criteria the Panel must meet before recommending any change to the reliability standard and settings in its final report, and
- **General approach to and principles for the modelling** the Panel will use in each review.

12 These components of the Guidelines are discussed and outlined in more detail below.

13 Assessment framework - guiding principles

14 The Panel is guided by the NEO when it is undertaking its RSS reviews. To achieve the NEO, the Panel will need to make judgements in relation to trade-offs between a number of factors. To that end, the updated Guidelines include a set of key principles the Panel will use when assessing the trade-offs which include:

- Allowing the market to determine efficient price signals while not creating risks that threaten the integrity of the market, by limiting the extent of market participant exposure to periods of prolonged high prices
- Delivering a level of reliability consistent with the value placed on that reliability by customers, and
- Developing predictable and flexible regulatory frameworks that are capable of adjusting to changing market circumstances.

15 These principles largely mirror those in the 2016 guidelines. This is because the Panel considered that those assessment principles are still appropriate and should be maintained in the Guidelines. The Panel made one change, which was to remove stability from the last key principle.

16 As noted, the Panel recognises and understands the importance of maintaining stability in the regulatory framework and that this allows for efficient investment decisions longer term. However, this should not be taken as implying that the Panel is able to directly-influence broader and ongoing market interventions from external government policies and from other processes that are occurring.

17 The Panel is of the view that there is more benefit on having the ability to focus and respond to the changing asset mix, market environment and conditions, as well as the interaction with market reforms and developments; and to consider how these should be dealt with in the RSS reviews. The Panel recognises that potential changes to the reliability standard or settings do need to be balanced against the benefit of providing stability to support investment in the market.

18 Assessment approach

19 The Guidelines provide information on the standard and each of the settings. These are divided into the following components of the reliability regulatory frameworks, which include the **form** and the **level** of the:

- Reliability standard
- Market price cap (MPC)
- Cumulative price threshold (CPT)
- Market floor price (MFP), and
- Administered price cap (APC).

20 The 2016 guidelines included a determination that specified whether the form or level of the reliability standard or settings could be assessed in each RSS review. The Panel has updated this assessment approach in the updated Guidelines.

21 The Panel considered that without any change to the determination made in 2016 guidelines, the Panel will be constrained in its ability to comprehensively review the reliability standard and settings and to determine if the approach continues to be fit for the intended purpose. The Panel considers that it is important that there is flexibility to review the reliability components due to the changes that are occurring in the power system and that are expected to occur over the next decade.

22 As noted, while the Panel updated the approach in the Guidelines, it has not formed a view on whether there is a need to change any of the reliability components. This will be the focus of the RSS reviews.

23 The Panel's update to the assessment approach includes the following:

- Maintaining the existing determinations of the purpose and function of the reliability standard and settings.
- Removing the determination in the 2016 guidelines that the only certain components of the reliability framework can be re-examined in an RSS review. That is, removing the table and approach that states whether each of the reliability components is "open, subject to a materiality assessment or closed for review". This will mean that the reliability components can be at least considered by the Panel. It is important to note that these can only be changed where the change meets the requirements under the Guidelines, and other factors the Panel considers relevant.
- Inclusion of all the NER requirements and criteria the Panel must use for its assessment of the reliability standard and settings, and
- Retaining the existing criteria and factors from the 2016 guidelines that relate to the assessment of the level of the reliability standard and each setting.

24 There are a number of requirements in the Rules that relate to the assessment of the reliability standard and each of the settings. There are other NER requirements that relate only to the reliability standard or a specific setting. The overarching assessment criteria in the NER include that the Panel:[5]

- Must comply with the reliability standard and settings guidelines
- Must have regard to Terms of Reference provided by the AEMC
- Must have regard to the potential impact of any proposed change to a reliability setting on:
  - Spot prices
  - Investment in the National Electricity Market
  - The reliability of the power system, and
  - Market Participants
- Must have regard to any value of customer reliability determined by the AER, which the Reliability Panel considers to be relevant, and

5 NER clause 3.9.3A(e).

- May take into account any other matters specified in the guidelines or which the Panel considers relevant.

25 The Panel has included these requirements and criteria in the updated Guidelines and considers that these, along with those criteria and factors outlined form the materiality assessment for the Panel to assess the reliability standard and settings against.

26 The Panel, has aimed to update the Guidelines to provide the flexibility required, but to also give certainty to market participants on the Panel's approach for any assessment of the reliability standard and settings. On that basis, the Panel has determined that the:

- Guidelines will state the existing form and level descriptions of the reliability standard and settings. These are to apply unless the Panel, guided by the assessment criteria and factors, considers there is a material benefit in assessing the form and level of the reliability standard and settings.
- Any assessment of the reliability components, and hence recommended change by the Panel will, or is likely to, contribute to the achievement of the NEO, the assessment principles and criteria in the guidelines, and take into account other factors such as modelling and stakeholder outcomes, and
- In accordance with the NER, any change to the reliability standard and settings can only be recommended in a rule change request to the AEMC.

27 It is important to recognise that there are interactions in setting the standard and each of the settings. Overall, the value of each of the market settings will affect the achievement of the reliability standard. Within the settings there are further interactions, where changing the value of one setting will affect the optimal value of the other settings. There are also aspects of the framework that sit outside these elements that will affect their operation and the achievement of the reliability standard, for example, the retailer reliability obligation, the reliability and emergency reserve trader and government policies.

28 The Panel will consider the potential interactions between each of the reliability components, and it will consider the aspects that sit outside the framework to the extent the Panel is able to and there is an interaction with the reliability framework going forward. This includes the ESB post 2025 market reforms and current and future market developments. The Panel is collaborating with the ESB so that the processes can dovetail where necessary. In particular, it will be necessary for the Panel to understand what the post 2025 market design recommendations are so that the Panel can consider what the market may look like in order to then consider the form, level and arrangements for the reliability standard and settings. Further the reliability framework should, to the extent possible, be designed holistically so that the different elements work together.

29 The Panel will provide a detailed overview of its assessment framework and approach in its upcoming RSS review, including the opportunities for stakeholders to be involved. More detail on the 2021-22 RSS review is provided below.

30 Modelling principles

31 Modelling is a key component of the Panel's analysis in each review. The Panel has made a number of changes to the existing modelling approach to ensure that the guidelines provide

the market with useful and transparent information on how the modelling will be undertaken, without constraining the Panel in the specific approach, which will naturally evolve as the market continues to change over time.

32 The Guidelines have been updated to provide the key principles the Panel will consider in developing modelling for the purposes of informing its assessment of the standard and settings. The general principles reflect those in existing 2016 guidelines as the Panel considered these remain appropriate as an overarching purpose to guide the modelling. They include that:

- The model should consider how a long-term equilibrium between price and reliability can be achieved in the market, and
- In considering long-term equilibrium, the modelling should consider both new investment and the potential for retirement of capacity.

33 The Panel has made changes to the specific model principles that were included in the 2016 guidelines. The Panel considers the changes will allow for market participants to understand the modelling approach, as well as allowing the model to be flexible to respond to the changing market. When designing the specifics of the model, the updated Guidelines state that the Panel will consider the following principles:

- The model should be technology-neutral and assess the settings on the basis of the cheapest available marginal technology that can be used to deliver the standard,
- The assumptions, data and parameters that underpin the model should be transparent to be visible and consulted on by stakeholders, and
- Sensitivity analysis should be applied on assumptions where there exists material uncertainty on the true or forecast value.

34 The Panel has also removed the list of model inputs and model scenario's that were included in the 2016 guidelines. The modelling inputs described in the 2016 guidelines are generic inputs that would be considered for any energy market modelling task and do not provide any specific information to market participants on how the modelling would be undertaken for RSS reviews. Similarly, the listed model scenarios represent a generic set of scenarios that might be tested in any market modelling exercise and do not provide the flexibility to analyse key market dynamics outside of these core set. The Panel considered that the RSS review itself should set out the modelling approach and assumptions that will be undertaken, including the scenario's that would be considered. This would provide more transparency to market participants and provide more opportunities for stakeholders to engage and provide input on this element of the review.

35 2021-22 RSS review - next steps

36 Following the publication of these final Guidelines, the Panel will now turn its mind to conducting the 2021-22 RSS review. The Panel will formally commence this process by publishing an Issues Paper in mid 2021. Under the NER, the Panel must follow the Rules consultation procedures, which consist of the release of the Issues Paper and the first round of stakeholder consultation, followed by the release of a draft report and a second round of stakeholder consultation. As required by the NER, the Panel will include its conclusions and

recommendations in a final report that will be submitted to the AEMC as soon as practicable after the completion of the review.

37 The Panel anticipates that, given the significance of this review, as well as the interest to date from stakeholders, there will be multiple opportunities for stakeholders to engage and participate in the process, including through bilateral meetings, public forums and formal submissions.

38 At the conclusion of the review and in the final report, expected prior to April 2022, the Panel will make its recommendations about what should change (if anything) about the reliability standards and settings. If the Panel recommends that the current standard or settings should change, then it would need to submit a rule change request to the AEMC in order to implement these changes. The AEMC would then consider these proposed changes through the usual rule change process, allowing further opportunities for stakeholder input and consultation.

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1 INTRODUCTION

The *Reliability Standard and Settings Guidelines* (Guidelines) set out the principles and assessment approach that the Reliability Panel (Panel) must use in conducting its *Review of the reliability standard and settings* (RSS review).[6] These guidelines were developed, and have now been updated in accordance with the National Electricity Rules (NER).[7] The Panel's review and update to the Guidelines are the subject of this determination and final report. The updated Guidelines will be used to guide the Panel for the RSS reviews going forward.

Under the NER, the Panel is required to conduct a review of the reliability standard and settings every four years, with the next review to be completed by 30 April 2022.[8]

The Panel, in undertaking the RSS reviews, is also required to take into account other matters as set out in the NER including any terms of reference provided by the AEMC.[9] The Panel must undertake the RSS reviews in accordance with the NER and the Rules consultation procedures.[10]

This final report provides the Panel's determination on its review of the Guidelines. It sets out the Panel's the changes to the 2016 guidelines, specifically, the assessment framework, principles and approach. Neither this final report, nor the updated Guidelines form a view or conclusion as to what the Panel's actual assessment of the reliability standard and settings will be. Rather, the purpose of the Guidelines is to set out how the Panel will go about this work. The Panel will consider and assess the reliability standard and settings in its RSS review. The process for the broader RSS reviews is outlined in Section 1.2.

The Guidelines were developed in December 2016 as required by the NER. They were developed with the overarching purpose to provide useful and transparent information to market participants about how it intends to conduct future RSS reviews. Therefore, the 2016 guidelines set out:

- The function and role of the standard and settings. That is, the purpose of the standard and each setting to guide the review of each component's form and level.
- The assessment framework that the Panel will use when undertaking each review, including the overarching principles and assessment criteria that will be applied.
- The components of the reliability framework that the Panel considers should be re-examined at each review. That is, whether each of the reliability components is "open, subject to a materiality assessment or closed for review", and
- A general approach to and principles for the modelling that the Panel will use when undertaking each review.

Since 2016, the National Electricity Market (NEM) has been undergoing a period of rapid transition, with significant changes in the generation mix towards more diversified variable

6 NER cl 3.9.3A(e)(1).
7 NER cl 3.9.3A(a)-(b).
8 NER cl 3.9.3A(d).
9 NER cl 3.9.3A(e)(2).
10 NER cl 3.9.3A(d)(1).

resources and changes in market dynamics including changes in price distribution and more frequent incidences of low wholesale prices. This is expected to continue over the next decade.

Given the changes occurring in the market, and the pace at which these changes are happening, the Panel considered it was prudent to review the existing 2016 guidelines so that they remain relevant and applicable going forward. That is, the Guidelines provide sufficient flexibility for the reliability standard and settings to be comprehensively assessed, where required, so that the reliability standard and settings remain appropriate for their intended purpose as the market evolves.

The Panel undertook its review of the Guidelines in accordance with the required consultation processes set out in the NER.[11]Table 1.1 sets out the processes followed by the Panel which included publishing a consultation paper that sought stakeholder feedback, holding a public stakeholder meeting at the request of a stakeholder and undertaking some additional bilateral stakeholder consultations in relation to the issues raised in the consultation paper. Appendix A provides a summary of stakeholder responses to the consultation paper and Panel commentary on these. The Panel has published this final report with the updated Guidelines as a standalone document on the AEMC website.

The Panel has determined that the Guidelines should be updated. The Panel has considered the need for flexibility to review the reliability standard and settings given the changing market but also the importance of stability for participants given the impacts that this has on investment decisions. Both elements are important in promoting the long-term interests of consumers: making sure market arrangements are fit for purpose for the transition and minimising unintended costs and consequences, while (given that some electricity assets are long-lived) promoting investment certainty. The Panel considers it has updated the Guidelines in a way that allows them to be applicable for future reviews but also provides the required level of certainty to market participants by setting out the process and criteria the Panel is required to follow for any assessment and change to the reliability standard and setting components.

The Panel, in reaching its determination for the Guidelines as set out in this report, also had regard to the:

- Current changes occurring in the NEM and future market environment
- Stakeholder feedback to the consultation paper, in particular, stakeholder comments about the need for stability and the value and benefits that this provides to the market
- Stakeholder feedback provided at the public stakeholder meeting, as well as at bilateral meetings
- Requirements for next RSS review, and
- Reforms and other government processes occurring.

The following sections set out the background to the reliability standard and settings and the process for reviewing these, including for the upcoming 2021-22 RSS review.

11 NER cl 3.9.3A(b).

Table 1.1: Timeline for the guidelines review

ACTION	DATE
Consultation Paper	4 March 2021
Stakeholder submissions closed	8 April 2021
Public Stakeholder forum	27 May 2021
Final Report and guidelines published	1 July 2021

1.1 Background

The NER sets out the reliability standard (the standard) and the reliability settings (the settings).

The reliability standard is expressed as the maximum expected unserved energy (USE) in a region.[12] It is a measure of the extent to which the electricity generation and transmission system can meet consumer demand. Setting the reliability standard involves balancing the value that consumers place on the supply of electricity with the investment costs required to deliver this level of reliability.

The reliability settings are price mechanisms that are designed to incentivise investment in sufficient generation capacity and demand-side response in order to deliver the reliability standard, while providing limits that protect market participants from periods of very high or very low prices, both temporary and on a sustained basis. The reliability settings consist of the:

- Market Price Cap (MPC), which places an upper limit on high dispatch prices in the wholesale market[13]
- Market Floor Price (MFP), which places a lower limit on low dispatch prices in the wholesale market[14]
- Cumulative Price Threshold (CPT), which is the limit of aggregate dispatch prices over the previous seven days (336 30 minute trading intervals[15]) that, when surpassed, triggers an administered price period,[16] and
- Administered Price Cap (APC), which is the prevailing dispatch price that applies during an administered price period after a set of sustained high dispatch prices exceed the cumulative price threshold.[17]

12 NER clause 3.9.3C(a)
13 NER clause 3.9.4.
14 NER clause 3.9.6.
15 This will change with the introduction of 5 minute settlement on 1 October 2021 to 2,016 5 minute trading intervals.
16 NER clause 3.14.1.
17 NER clause 3.14.1.

1.2 Process for reviewing the reliability standard and settings

The form and level of the standard and each of the settings are specified in chapter three of the NER. These are further outlined and discussed in chapter four of this report. The Panel will undertake an assessment of the form and level of the standard when it reviews these settings in 2021-22 in accordance with the updated Guidelines' assessment approach and criteria. The assessment principles, approach and supporting criteria effectively informs the materiality assessment that the Panel will need to apply. For any proposed changes to the reliability standard and settings, the Panel would need to consider if there is a material benefit in making the change, including if those changes will, or are likely to, contribute to the achievement of the NEO, and meet the NER and requirements in the Guidelines. The Panel would also have regard to any terms of reference provided by the AEMC, stakeholder consultation and responses, modelling outcomes and any other factors the Panel considers relevant.

When the Panel undertakes an assessment of the reliability standard and settings in a review, it must set out its conclusions and recommendations as part of its Final Report. It must submit to the AEMC any rule change proposal that results from a review as soon as practicable after the RSS review is completed.[18] Any change to the form and level of the reliability standard and settings would then be made through an AEMC rule change process. The Panel must also submit its Final Report to the AEMC as soon as practicable after the completion of each RSS review.

1.2.1 2021-22 RSS review

The Panel will be formally commencing the 2021-22 RSS review in mid 2021 with the publication of an Issues Paper inviting stakeholder submissions on the issues raised in that paper. Under the NER, the Panel must follow the AEMC Rules consultation process. This process requires the Panel to then publish a draft report and seek another round of stakeholder input for that report.

The Panel anticipates, given the significance of this review as well as the interest to date from stakeholders, that there will be multiple opportunities for stakeholders to engage and participate in the process, including through bilateral meetings, public forums and formal submissions.

As noted, on the conclusion of the review and in the Final Report, expected prior to April 2022, the Panel is required to set out its conclusions and recommendations, including what should change (if anything) about the reliability standards and settings. If the Panel recommends that the current settings should change, then it would need to submit a rule change request to the AEMC in order to implement these changes. The AEMC would undertake this rule change in accordance with its requirements under the NER. This would provide additional opportunities for stakeholder input and consultation.

A detailed outline of the timeline for the 2021-22 RSS review will be provided for in the Panel's Issues Paper, expected for release mid 2021.

18 NER clause 3.9.3A(i).

1.3 Structure of this paper

The remainder of this paper is structured as follows:

- Chapter 2 outlines power system reliability to date, current drivers of change in the market and reforms occurring in the NEM.
- Chapter 3 sets out the assessment framework and principles that the Panel has included in the Guidelines and will use in RSS reviews.
- Chapter 4 outlines the Panel's assessment approach and criteria included in the updated Guidelines and will use in undertaking its assessment of the reliability standard and each setting. These criteria effectively form the materiality assessment for the Panel to consider and apply when determining to assess and make a change to the reliability standard and settings.
- Chapter 5 sets out the modelling requirements and key principles for any modelling that is undertaken for RSS reviews. These are reflected in the updated Guidelines.

2 POWER SYSTEM RELIABILITY AND MARKET DEVELOPMENTS

The NEM has changed markedly since the guidelines were developed in 2016 and since the most recent reliability standard and settings review in 2018. Broadly, the areas of change in the NEM are related to:

- Advancements in the technology and changes in operational conditions, and
- Market reforms.

This chapter covers power system reliability to date, including recent operating experience from a reliability perspective. This chapter also outlines the current drivers of change and reforms that have been introduced or proposed as part of the ESB's work on the post 2025 market design that will affect the Panel undertaking future RSS reviews.

2.1 Power system reliability to date

A reliable power system has an adequate amount of capacity (generation, demand response and interconnector capacity) to meet consumer needs. This requires adequate investment in capacity, including sufficient investment to cover generator retirements, as well as an appropriate operational framework, so that supply and demand can be maintained in balance at any particular point in time.

The NEM is designed specifically with reliability in mind. It is a gross pool market that does not specifically reward capacity, and instead utilises a high market price cap to incentivise operational and investment decisions during times of supply scarcity. As noted, the design of the NEM also incorporates a series of standards and settings to guide and inform participant decisions, as well as tools AEMO can use to intervene when needed to maintain reliability.

The core objective of the existing reliability framework in the NEM is to deliver efficient reliability outcomes through market mechanisms to the largest extent possible.[19] These mechanisms provide strong financial incentives for participants (generators, retailers, aggregators and customers) to make investment, retirement and operational decisions that support reliability.

The NEM has historically provided a high level of reliability. However, reliability issues sometimes occur when the balance of supply and demand in a region is tight. Further, the transformation means that operational reliability is becoming more challenging for AEMO to manage. Reliability issues have mostly arisen only on very hot days, as hot weather can affect both consumer usage patterns and the power system's ability to provide supply.

More recently, there have been times when reliability issues have been emerging during 'shoulder' and 'winter' periods. This is driven by the fact that maintenance on generators and transmission infrastructure is increasingly occurring in these periods, which reduces supply. In

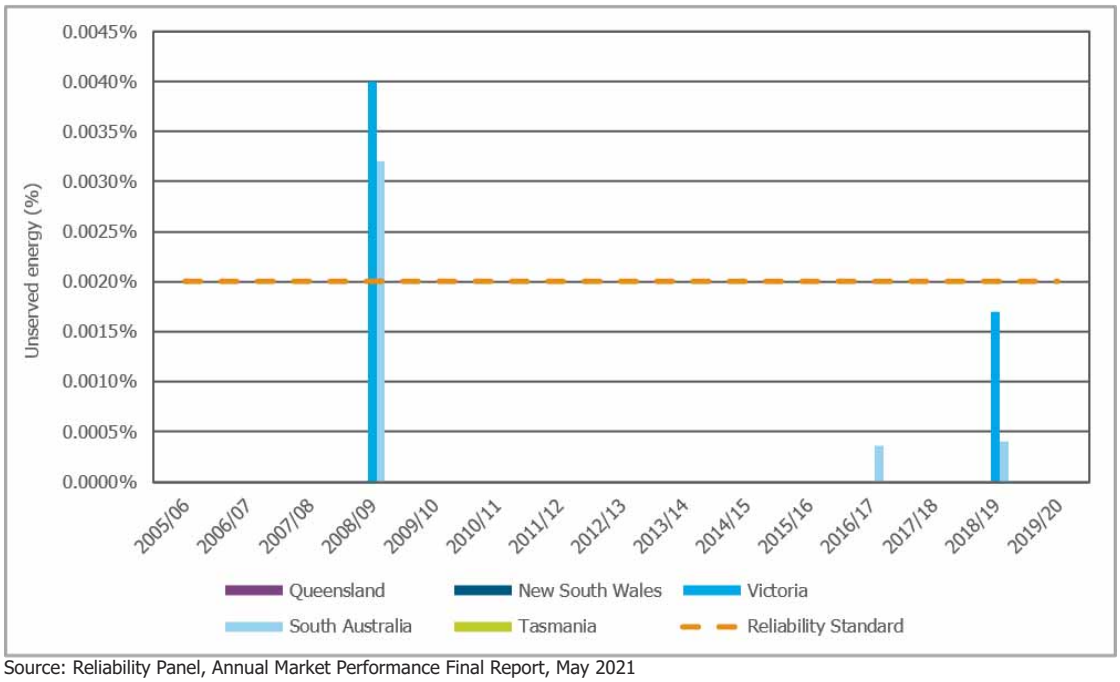
19 Reliability Panel, *Information Paper: The reliability standard, current considerations*, March 2020.

addition, given changing weather patterns and increases in variable renewables, supply and demand during shoulder periods are less predictable than in the past.[20]

2.1.1 Reliability experience in the NEM

Over the past 14 years, interruptions to power supply in the NEM due to a lack of available capacity have been very rare. That is, there have been very low levels of unserved energy across all NEM regions. Figure 2.1 shows that the reliability standard has only been exceeded in 2008-09 in South Australian and Victoria, which was as a consequence of extreme weather conditions and reduced availability of Victorian generators and an interconnector.[21]

Figure 2.1: Historical unserved energy in the NEM



Source: Reliability Panel, Annual Market Performance Final Report, May 2021

The interim reliability measure was put in place by Energy Ministers (formally COAG Energy Council) following advice from the Energy Security Board (ESB) to improve the reliability (resource adequacy) of the electricity system in the short term.[22]

The interim reliability measure is relevant for contracting interim reliability reserves and for the Retailer Reliability Obligation.[23] The interim reliability measure stands apart from the reliability standard and settings, and is not reviewed by the Panel as part of the RSS review.[24]

20 Reliability Panel, *Information Paper: The reliability standard, current considerations*, March 2020.

21 Reliability Panel, *Information Paper: The reliability standard, current considerations*, March 2020, p.17.

22 COAG Energy Council, *Interim Reliability Measures*, https://energyministers.gov.au/reliability-and-security-measures/interim-reliability-measures.

23 NER 3.9.3C(a1), 11.128, 11.132.

24 NER 3.9.3A, 3.9.3B, 3.9.3C.

Looking forward, AEMO's 2020 Electricity Statement of Opportunities (ESOO) report May 2021 update[25] forecasts no breaches of either the reliability standard or interim reliability measure until 2028-29 and 2029-30, which is well beyond the final investment decision horizon. This ESOO update shows that expected USE for Victoria and NSW in 2028-29 and 2029-30 is forecast to exceed both the reliability standard and the interim reliability measure, while expected USE in South Australia is forecast to exceed the interim reliability measure in both years, if further investment in new capacity or demand reduction was not forthcoming by that time.

Other reliability mechanisms

In the NEM, there are buffers that are made available by the market as part of usual operation of the power system and expectations of future price outcomes in the energy market. These buffers are known as reserves and refer to the amount of spare capacity available given amount of generation, demand and demand response at any point in time,[26]and can be:

- 'In market' from generators that are available to run, which is represented in their dispatch offers but, because supply is greater than demand, are not called on to run, and
- 'Out of market' from the emergency reserves that AEMO procures through the reliability and emergency reserve trader (RERT) mechanism to be on standby.

AEMO can also issue reliability instructions and directions to maintain the power system in a reliable operating state and these intersect with lack of reserve notices being issued.[27]

In recent years, there has been an increase in the use of the RERT mechanism and reliability directions. For example, in 2019-20 AEMO issued significantly more directions than in 2018-19 and, while the amount of RERT activated was lower than 2018-19, the RERT was activated on more occasions to address reserve shortfalls. These were a result of extreme temperatures, high demand and environmental factors such as storms[28] and bushfires[29] affecting the capacity of the transmission network.[30] These events were most prevalent in the South Australian separation event and to a lesser extent the Victorian-New South Wales separation event in 2019-20. The Reliability Panel's Annual Market Performance Report published in May 2021 provides more detail on reliability outcomes over the period of 2019-20.

The next section outlines these and other specific market development occurring in the NEM, the challenges they present for operating the power system and for considering any future reliability standard and the reliability settings.

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25 AEMO, *2020 Electricity Statement of Opportunities*, August 2020, p 7; AEMO, *Update: Electricity Statement of Opportunities*, May 2021; and AEMC, *Annual Market Performance Update*, 17 December 2020, p 8.

26 The level of reserves in the market reflects the extent to which the expected supply exceeds the expected demand. This allows the actual demand and supply to be kept in balance, even in the face of shocks to the system and loss of some supply, known as "credible contingencies".

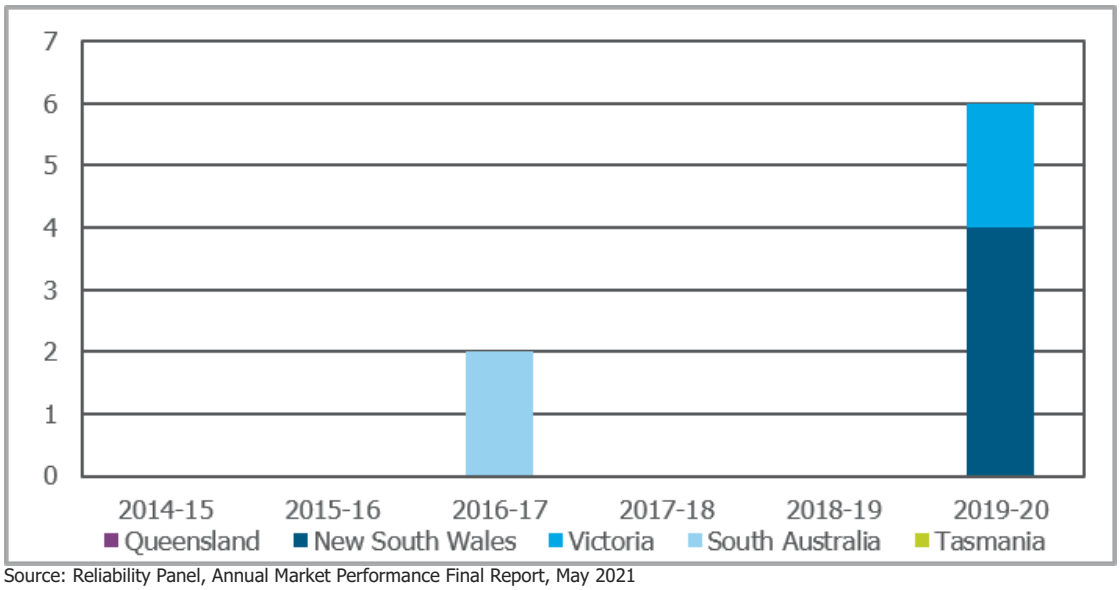
27 AEMO will declare Lack of Reserve (LOR) conditions when there is a non-remote possibility of LOR load shedding due to shortfall of available capacity reserves.

28 Storms on 31 January 2020 led to transmission outages in Victoria and islanding of South Australia.

29 Bushfires on 30 December, 4 January and 23 January 2020.

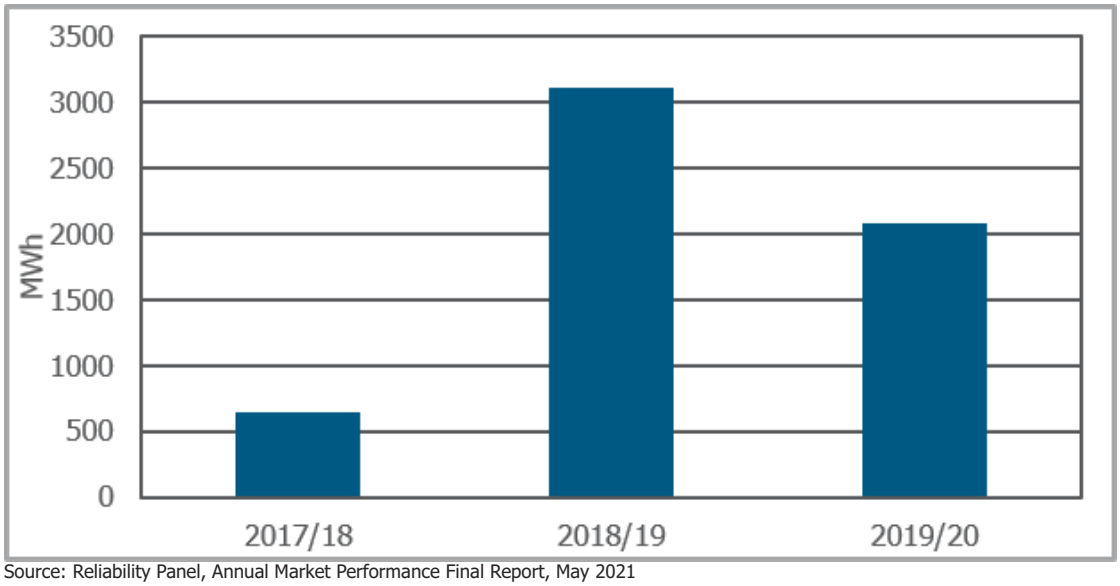
30 Reliability Panel, *2020 Annual Market Performance Final Report*, May 2021, p 63.

Figure 2.2: Number of reliability directions issued by AEMO



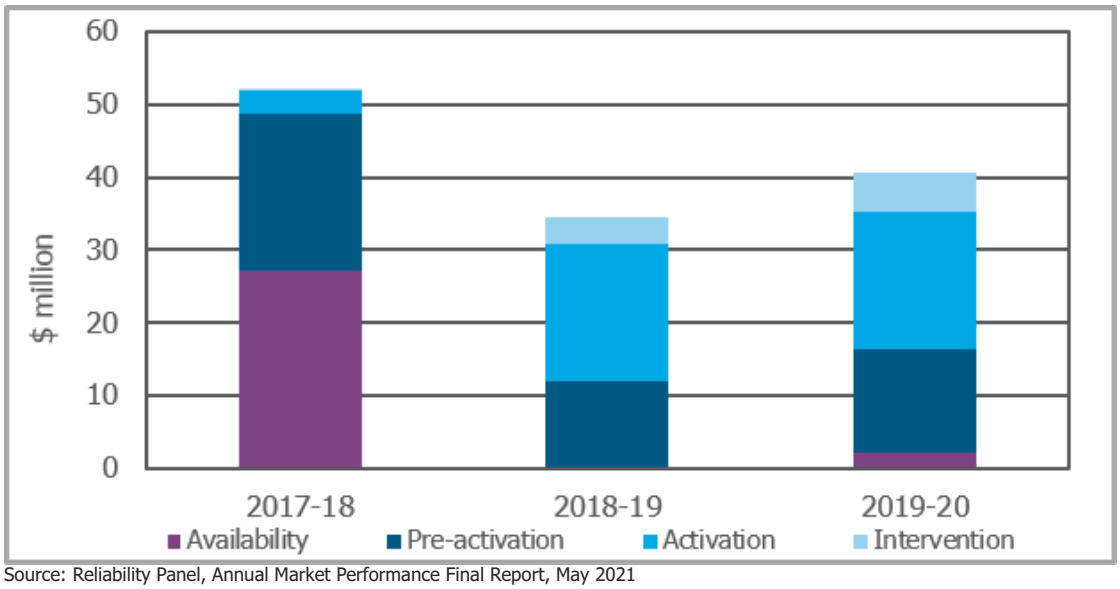
Source: Reliability Panel, Annual Market Performance Final Report, May 2021

Figure 2.3: RERT reserves activated



Source: Reliability Panel, Annual Market Performance Final Report, May 2021

Figure 2.4: RERT costs



Source: Reliability Panel, Annual Market Performance Final Report, May 2021

2.2 Current drivers of change in the NEM

The physical power system is undergoing a period of material change. The generation mix of the wholesale component of the NEM is rapidly changing with more diversified, variable resources, changing market dynamics such as changes in price distribution and higher incidences of low wholesale prices, an increased frequency of severe weather events and global disruptions. Over time, there has been:

- Significant increases in large- and small-scale intermittent, renewable generation (wind and solar) at both the transmission and distribution level
- Exit of thermal, scheduled generation, especially coal-fired capacity, from the NEM
- Increasing battery storage
- An increase in demand-side participation, including demand response
- Increasing price volatility affecting market dynamics for investors and generators
- Increasing congestion on the transmission network
- Proposals for increased interconnection
- Continued uncertainty in relation to emissions policy, and
- Jurisdictional government policies that incentivise new investment into the system.

These changes have been happening at a rapid pace, with many likely to continue over the next two decades.[31] These changes have affected both the supply and demand side of the

31 Energy Security Board, *Post-2025 Market Design Directions Paper,* January 2021.

wholesale market and will affect the Panel's review of the standard and settings by varying degrees.

On the supply side of the market, the increasing investment in battery storage capacity is changing the way that the wholesale market responds to peak wholesale price events. Traditionally, plants with Open Cycle Gas Turbines (OCGT) have been the technology type that responds to peak wholesale prices in times of temporary scarcity. However, battery storage is expected to become increasingly prominent in setting and responding to high prices.

Further, the increasing investment in storage capacity means that intra-day price volatility is becoming a progressively more important revenue source and investment signal. The market price floor places a minimum on the dispatch price and so limits the variability of dispatch prices. In recent times, there has been an increase in the number of market price floor events, particularly in South Australia and Queensland. It is likely that the high penetration of utility-scale renewables and distributed energy resources is driving the increasing number of market price floor events in these jurisdictions.[32]

The demand side of the market is also changing, as consumers continue to adopt distributed energy resources at a rapid pace, faster than many forecasts have predicted.

This is in part driven by advances in remote switching and communication technology as well as new demand response mechanisms. As a result of the rapid growth in rooftop solar, emerging investment in batteries and electric vehicles driven by technology improvements and falling costs, consumers have been progressively making consumption choices that have led to changes in their demand profiles.

The Panel considers that it is important that future RRS reviews take into account the material changes on both the supply and demand sides of the market to ensure that efficient price signals are sent to market participants to achieve the reliable operation of the NEM.

The power system has also been subject to more extreme and frequent events than in the past, such as changing and more severe weather patterns. These more frequent weather events have presented challenges for reliability and security outcomes in the NEM particularly in respect to forecasting and operation of the power system and how such events are considered in future planning.[33] Separate to extreme and more frequent events, the COVID-19 pandemic has introduced some additional uncertainty for investors and changed the demand mix between industrial/commercial and residential sectors as more people work from home. There is some uncertainty surrounding the likely trends following the pandemic.[34]

Further discussion of the recent supply and demand side trends occurring in the market can be found in the Panel's final Annual Market Performance Report.[35]

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32 Reliability Panel, *Annual Market Performance Market Update*, January to June 2020, December 2020.

33 Reliability Panel, *2020 Annual Market Performance Final Report*, May 2021, p.i.

34 Reliability Panel, *Annual Market Performance Market Update*, January-June 2020, December 2020.

35 Reliability Panel, *2020 Annual Market Performance Final Report*, May 2021.

2.3 Market reforms in the NEM

A significant range of reforms have been introduced recently or will be introduced over the next few years. Of particular relevance are those reforms related to:

- Five minute settlement, expected to commence in October 2021
- Wholesale demand response mechanism, expected to start in October 2021
- Notice of closure arrangements, where generators are required to provide at least 42 months' notice of their intention to close, unless exempted by the AER.
- Maintaining reliability and security, such as:
  - The seven system security rule changes that form part of the ESB's essential system services work.[36] These include: frequency control rule changes on fast frequency response and primary frequency response, operating reserves, system strength and synchronous services
  - The interim out of market capacity reserve, that allows AEMO to procure reserves under contract terms up to three years through the RERT. The volume of reserves will be those required[37] to keep unserved energy to no more any 0.0006% in any region in any year for an interim period, and
- Release and actioning of AEMO's Integrated System Plan (ISP).[38]

2.3.1 Post 2025 market design - ESB reform options

The ESB is advising the Energy Ministers on a long-term reform package with the focus on reviewing the market design of the NEM. The ESB is developing advice on alternative, long-term, fit for purpose market design options that could apply from the mid-2020s. In April 2021, the ESB released its options paper for the post 2025 design project.[39] The ESB post 2025 market design key focus areas as outlined in the April 2021 paper include:

- Resource Adequacy Mechanisms and Ageing Thermal Generation Retirement
- Essential System Services and Scheduling and Ahead Mechanisms
- Integration of Distributed Energy Resources and Demand Side Participation, and
- Transmission access reform.

A number of reform pathways have been set out and fall into three categories, immediate reforms to be done now, initial reforms to be developed and implemented in the near term, and next reforms which are longer term and depend on developments in the industry including technical changes. The ESB has noted that any new design would not be introduced at a single point in time but, rather introduced over time.[40]

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36 See: AEMC, *New timeframes set for system services arrangements,* https://www.aemc.gov.au/news-centre/media-releases/new-timeframes-set-system-services-arrangements.

37 Reliability Panel, *Annual Market Performance Market Update*, January to June 2020, December 2020.

38 See: AEMO, *Integrated System Plan (ISP)*, aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2020-integrated-system-plan-isp.

39 ESB, *Post 2025 market design options - a paper for consultation,* 30 April 2021.

40 ESB, *Energy Security Board Post 2025 Market Design Directions Paper*, January 2021, p 12.

There are strong interdependencies between the potential reforms being considered in the post 2025 process and work the Panel will undertake in the RSS review. For example:[41]

- Potential resource adequacy mechanisms, such as an enhanced Retailer Reliability Obligations (RRO), could affect the optimal level of the reliability standard and so, the value of the settings, and
- New markets for system services and essential system services will affect the revenue streams earned by generators, which, in turn, affects the optimal value of the settings.

The Panel notes some stakeholder submissions indicating that there is a need for the Panel's upcoming RSS review to consider and closely align with any reforms that the ESP post 2025 is proposing.[42] The Panel recognises the importance of the Post 2025 work and is collaborating with the ESB so that the processes can dovetail where necessary.

Understanding what the post 2025 market design recommendations will be is a necessary precursor for the Panel to successfully undertake its RSS review so that the Panel can, among other things, consider what the market may look like in order to then consider the form, level and arrangements for the reliability standard and settings. For example, in considering the level of the market price cap it will be important to understand what the form and type the RRO would take given it would likely impact what the purpose of the market price cap is, and potentially the level at which it is set.

The Panel notes that the reliability mechanisms proposed in the post 2025 April options paper interact with existing settings to provide a framework that delivers an overall system reliability outcome. The goal of this framework is to optimise reliability and certainty, and to minimise costs of delivering that optimised outcome.

The Panel's submission to the ESB's April 2021 *Post 2025 market design options* paper noted the strong interdependencies between the potential reforms proposed in the post 2025 process and the work that the Panel is set to undertake in the RSS review and recorded its appreciation of the ESB's engagement with the Panel over the course of the review.

The Panel's submission recognised the importance of the reliability framework being designed holistically so that the different elements work together, and suggested that one way that this could be done would be by having the settings for any new or modified mechanisms included in the Panel's four-yearly RSS review.

The Panel also notes that there are synergies between the quantitative modelling, for the post 2025 process and the RSS review, including modelling inputs and assumptions. The Panel will work with the ESB so that consistent assumptions can be adopted where appropriate.

Chapter three outlines further the assessment framework the Panel will apply in the guidelines and take into account when undertaking RSS reviews.

41 Reliability Panel, *Reliability Panel response to P2025 Market Design Consultation Paper*, p 2.

42 See the responses from the AER and the AAC.

2.3.2 Linkages to other work

There are a number of other market reviews and reforms that intersect with the review of the reliability standard and settings. It is important to take these into account so that the Guidelines are sufficiently general to incorporate them. The other reviews and reforms include the:

- Review of the interim reliability measure in 2023[43]
- Annual Market Performance Report (AMPR) and updates[44]
- Reliability and system security rule changes between 2018 and 2021.
- AER's estimate of the value of customer reliability (VCR)[45]
- Other Reliability Panel work proposed[46], and
- Enhancing operational resilience in relation to indistinct events rule change.[47]

43 ESB, *Interim Reliability Measure, Recommendation for National Electricity Amendment Rule 2020, decision paper*, July 2020.

44 Reliability Panel, *Annual Market Performance Report and market update*,https://www.aemc.gov.au/market-reviews-advice/annual-market-performance-review-2020.

45 AER, *Value of Customer Reliability, Final decision*, December 2019.

46 See: Reliability Panel, *Current Forward Work Program,* https://www.aemc.gov.au/about-us/reliability-panel/current-forward-work-program.

47 AEMC, *Enhancing Operational Resilience In Relation To Indistinct Events,* https://www.aemc.gov.au/rule-changes/enhancing-operational-resilience-relation-indistinct-events.

3 ASSESSMENT FRAMEWORK

This chapter sets out the Panel's determination on the assessment principles that will be included in the updated Guidelines. These principles will be used as the basis and guide for the Panel when undertaking its comprehensive assessment of the reliability standard and settings for each RSS review.

When developing and amending the Guidelines, as well as when conducting the RSS reviews, the Panel is guided by the NEO. The NEO is:[48]

> [T]o promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system.

The Panel's overarching goal in developing and reviewing the Guidelines is to provide the market with useful and transparent information about how it intends to undertake each RSS review. This is in order to support efficient investment in and operation of electricity services to maintain reliability, particularly given the changing power system. The Panel also considers the costs of providing reliability against the value customers place on that reliability.

Box 1 provides the assessment principles that are included in the updated Guidelines. These largely mirror those in the 2016 guidelines. This is because the Panel considered that those assessment principles are still appropriate and should be maintained in the Guidelines.

BOX 1: 2021 RSSR GUIDELINES: ASSESSMENT PRINCIPLES TO MEET THE NEO

1. **Allowing efficient price signals while managing price risk**. The Panel will exercise its judgement in order to allow the market to send efficient price signals while limiting price risk exposure for participants. The settings should:
   - Allow sufficient scope for competition between buyers and sellers in the market to set efficient prices in order to achieve the standard, over the long-run.
   - The settings should be designed to provide a sufficient range to promote this behaviour in the market.
   - The settings should also provide protection from uncapped prices in any given trading interval, and sustained high prices over a defined period, such that wholesale market outcomes do not result in inefficient over-investment, overly high financing costs or excessive price risk for all participants.
2. **Delivering a level of reliability consistent with the value placed on that reliability by customers**. The Panel will have regard to estimates of the value placed on reliability by customers in exercising its judgement as to the level of the standard. The

48 National Electricity Law, s.8 as contained in National Electricity (South Australia) Act 1996 (SA).

settings should be sufficient to support the level of investment necessary to deliver the standard, over the long run.

3. **Providing a predictable and flexible regulatory framework.** The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions, to support efficient investment and operational decisions by participants. The assessment principle, approach and supporting criteria provides the materiality assessment that the Panel will apply in its consideration of the form and level of reliability standard and settings. For any proposed changes to the reliability standard and settings, the Panel would need to consider if those changes will, or are likely to, contribute to the achievement of the NEO, and meet the NER and guideline requirements. The Panel would also have regard to any terms of reference provided by the AEMC, stakeholder consultation and responses, modelling outcomes and any other factors the Panel considers relevant. Following the Panel recommending a change, this would need to be progressed through an AEMC rule change process.

The above principles represent a trade off in which the Panel will need to exercise its judgement. The three inherent trade-offs the Panel must balance, and which form the basis of the assessment principles, are:

- allowing for the market to send efficient price signals while effectively managing price risk for all participants
- delivering a level of reliability consistent with the value placed on that reliability by customers, and
- providing a predictable and flexible regulatory framework that is sufficiently flexible to respond to a changing market and power system, while still maintaining stability which is important to promote investment.

The next section notes stakeholder comments to the consultation paper and the Panel's response and considerations of each principle.

3.1 Stakeholder responses to the consultation paper

Stakeholder submissions to the consultation paper were generally supportive of maintaining the existing assessment principles in the Guidelines with most stakeholders[49] indicating that the 2016 guideline principles are still appropriate for the Panel to apply.

The Australian Energy Council (AEC), Public Interest Advocacy Centre (PIAC), Australian Aluminium Council (AAC), Snowy Hydro and Flow Power, while supportive of the existing principles, noted the need for some additional considerations.[50]

49 Submissions to the consultation paper: Shell Energy, MEU, EUAA, AEC, PIAC, AAC

50 Submissions to the consultation paper: AEC, p.2; PIAC, p.3; AAC, p.2; Snowy Hydro, p.7; Flow Power, p.3.

The AEC stated that they would support the creation of a fourth principle that is, "Supporting the secure operation of the real-time market."[51] The AEC suggested this as, in their view, the current principles do not relate to the real-time operation of the NEM. The Panel notes this suggestion, however considers that it is inherently the role of the reliability standard and settings to provide incentives to ensure the real time market operates securely and efficiently in order to best achieve the NEO.

Some stakeholders highlighted the importance of, and need to maintain stability in the regulatory frameworks, hence the principle of stability should factor in the panels' updated Guidelines.[52] One stakeholder also noted that it is important that the Panel when considering the principles to meet the NEO needs to balance price risk with reliability, but also take into account other risks given large consumers can face a wide range of challenges beyond reliability resulting from the current energy transition.[53]

The Panel recognises and understands the importance of maintaining stability in the regulatory framework and that stability promotes efficient investment decisions longer term. However, this should not be taken as implying that the Panel is able to directly influence broader and ongoing market interventions from external government policies and processes that are occurring which the Panel may need to respond to.

The Panel is of the view that there is more benefit on it focusing on, and responding to, the changing market environment and conditions as well as interaction with market reforms and developments in order to consider how these should be taken into account in the RSS reviews. The Panel acknowledges that this does need to be balanced against the benefits of providing stability to support investment in the market. The Panel's consideration of the third principle of providing a predictable and flexible regulatory approach is discussed in section 3.3 below.

As noted, the Panel must apply the assessment principles and assessment approach that is set out in the guidelines. Together, these will inform the materiality assessment that the Panel will consider when considering the reliability standard and settings. As part of the assessment principles and approach, the Panel has also set out the factors the Panel will consider when determining whether any changes are required to the relevant components of the reliability standard and settings.

The Panel considers that the criteria and requirements outlined in the updated Guidelines should provide greater transparency in the circumstances where the Panel may assess and provide recommendations for any change in the form or level of the reliability standard and reliability settings in the RSS reviews. Further, if the Panel recommends, as part of its RSS reviews, that the current standard or settings should change, then it would need to submit a rule change request to the AEMC in order to implement these changes.[54] The AEMC would assess the rule change request against the NEO and process it through the rule change process set out in the NEL and NER.

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51 AEC, submission to the consultation paper, p. 3.

52 MEU, EUAA, Shell Energy, AEC, EA submissions to the consultation paper.

53 AAC.

54 NER clause 3.9.3A(i).

3.2 Managing price signals and price risk

Allowing efficient price signals while managing price risk.

The Panel will exercise its judgement to allow for efficient price signals in the market while limiting price risk exposure for participants.

The settings determine the boundaries of potential market prices. These include the maximum possible spot price in a trading interval (MPC), the maximum cumulative price in a given period (CPT) and the Market Floor Price (MFP). Price signals in the form of spot prices are important signals, which guide operational and investment decisions in the market.

These signals provide incentives to enter into contractual arrangements with counter parties to hedge risk, as well as to invest in and maintain capacity and demand side response mechanisms to reliably balance supply and demand. These prices may also signal when it may be efficient for a generating unit to retire.

The settings should allow sufficient scope for competition between buyers and sellers in the market to set efficient prices to achieve the standard, over the long run.

They also should provide protection from high prices in any given trading interval, and sustained high prices over a defined period, such that market outcomes do not result in inefficient over-investment, overly high financing costs or excessive price risk for all participants.

Limiting the maximum potential price also manages the potential for over-investment or inefficient operation of assets. Excessive prices may send overly strong signals, resulting in levels of investment in excess of those needed to meet the standard, or operation of assets in a way that is not productively efficient.[55]

Under the NER, the Panel is bound to specific outcomes regarding price signals such as the MPC, CPT and MFP. With regard to MPC and CPT, the Panel may only recommend these price settings be set at a level that allows the reliability standard to be met without AEMO using its reserve powers and also at a level that does not threaten the overall integrity of the market.[56] Further, the NER also states that the Panel may only suggest a decrease to the MPC if it has considered alternative arrangements to maintain the reliability standard.[57] In relation to the MFP, its level must allow the market to clear in most circumstances while not creating substantial risks that threaten the overall stability and integrity of the market.[58]

The assessment criteria set out in the guidelines reflect the trade-offs the Panel will consider between these two functions of the settings, the maintenance of investment signals as well as managing risk.

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55 The Panel notes that actual market prices are determined by supply / demand dynamics, the degree of competition in a market and the behaviours of individual market participants. The presence of a high price cap does not automatically result in high market prices. Nor does it automatically result in over-investment, as those investment decisions also factor in a range of complex considerations other than the presence of a market price cap at a particular level.

56 Clause 3.9.3A(f) of the NER.

57 Clause 3.9.3A(g) in the NER.

58 Clause 3.9.3A(h) of the NER.

3.3 Delivering reliability consistent with customers value of reliability

Delivering a level of reliability consistent with the value placed on that reliability by customers.

The value that customers place on reliability will differ between customer groups, reflecting the way they use electricity. Residential customers using electricity for powering appliances may value reliability differently to large customers who use it to run a smelter or production line. However, in all cases there is a direct trade-off between the level of reliability and the price that customers are willing to pay for that reliability.[59]

Generally, a more reliable power system will require greater levels of investment in generation and/or demand management capacity. Generators or demand-management providers will invest when they have expectations of higher future prices and profitability. Therefore, there is a direct relationship between higher levels of reliability and higher expected prices for consumers.[60]

The Panel is required to have regard to estimates of the value placed on reliability by customers to exercise its judgement as to the level of the standard. The settings should be sufficient to support the level of investment necessary to deliver the standard, over the long run.

The intent is to protect the long term integrity of the market by limiting the extent to which wholesale prices can rise and fall, to limit market participants' exposure to prices that could threaten the financial viability of a prudent market participant. The settings support long-term investment to achieve the reliability standard by incentivising sufficient investment in generation capacity to keep the level of USE below the reliability standard. In reality, investment in generation capacity is also supported through the secondary contract market and through vertical integration, which provides the stable cash flows needed to underpin the financing of high capital cost, long life, generation assets.

The settings should also deliver a level of reliability that is commensurate with the value that customers place on that reliability as reflected by measures including, but not limited to, the AER measure of VCR. As noted, the NER states that, when conducting the RSS Review, the Panel must have regard for the level of VCR.[61]

3.4 Providing a predictable and flexible regulatory framework

Providing a predictable and flexible regulatory framework.

The Panel will exercise its judgement to achieve predictable outcomes while reflecting significant changes in market conditions, to support efficient investment and operational decisions by participants. Changes to the standard and settings that are transparent, predictable and well justified will enable market participants to make informed decisions that would maintain the reliability of supply. At the same time, regulatory frameworks must be

59 PIAC, submission to the consultation paper, pp.2-3.

60 Final Determination, *Reliability Standard and Settings Guidelines*, 2016, p.8.

61 Clause 3.9.3A(e)(4) in the NER.

capable of adapting to changing market conditions. It is important the Panel is able to assess the standard and settings so that these can remain appropriate for the purpose they serve, particularly given the rapid and material changes in the energy sector.

Factors such as jurisdictional policies, and the uncertainty around an integrated energy and emissions reduction policy are having significant impacts on the market. There has been an increasing number of jurisdictional schemes designed, among other things, to encourage investment in renewable energy such as NSW's Electricity Infrastructure Roadmap, SA's Energy and Emissions Reduction Agreement with the Commonwealth and Victoria's Climate Change Strategy. These government programs impact the investment signals within the NEM.

This means the market will continue to be impacted by factors external to the Panel's influence. As noted, the Panel recognises the importance of stability in regulatory frameworks as a key guiding principle as this allows for efficient investment decisions longer term. However, the Panel also considers that it is equally important, in the face of a constantly changing environment for the regulatory frameworks to have flexibility to be able to consider and respond to the changing market conditions.

The Panel considers that transparency, predictability and flexibility is provided by setting out the approach and criteria the Panel must consider when undertaking a review of the reliability standard and settings and the process to initiate a change

The approach set out by the Panel aims to provide flexibility but also aims to provide transparency on the factors the Panel will use for its RSS reviews. Chapter four sets out the requirements and criteria the Panel must consider when undertaking an assessment of the reliability standard and settings. As noted, these requirements inform the materiality assessment that the Panel will apply. It is important to note, that for any recommended changes to the reliability standard and settings the Panel would need to consider if those changes will, or are likely to, contribute to the achievement of the NEO and meet the NER and guideline requirements. The Panel would also have regard to any terms of reference provided by the AEMC, stakeholder consultation and responses, modelling outcomes and any other factors the Panel considers relevant. As noted, where the Panel recommends any change to the reliability standard or settings, this would need to be progressed through an AEMC rule change process.

4 ASSESSMENT APPROACH FOR THE RELIABILITY COMPONENTS

As outlined, the NER requires that the Guidelines set out the principles and assumptions that the Panel will use for each reliability standard and settings review.

This chapter sets out the:

- existing approach that was included in the 2016 guidelines
- amendments the Panel has made to the 2016 assessment approach, and
- the NER criteria that has included in the updated Guidelines generally and specifically to the reliability standard and each setting. The criteria and factors included in the Guidelines will form the materiality assessment that the Panel must consider when undertaking any assessment of the reliability standard and each setting.

4.1 The 2016 guidelines assessment approach

In 2016, an assessment was undertaken on each of the reliability components and a determination was made that it would be prudent for only certain components of the reliability standard and reliability settings to be reassessed every four years. The 2016 guidelines also outlined explanations for the key function of each setting and factors that the Panel must take into account for any reassessment of the reliability standard and each setting.

Table 4.1 sets out the determination from the 2016 guidelines in terms of which components of the reliability settings could be reviewed every four years. That is, whether they were:

- **Open,** where the form or level could be reviewed at each reliability standard and settings review, and changes could be recommended
- **Closed,** where the form or level of the standard or setting is not open for review in future reviews, or
- **Subject to materiality assessment,** where the form or level could be reviewed only if the Panel considered there may be a material benefit to assessing it during the review.

Table 4.1: Ability to review reliability components under the 2016 guidelines

	RELIABILITY STANDARD	MARKET PRICE CAP	CUMULATIVE PRICE THRESHOLD	MARKET FLOOR PRICE	ADMINIS-TERED PRICE CAP
Form	Closed	Closed	Closed	Closed	Closed
Level	Materiality assessment	Open	Open	Materiality assessment	Materiality assessment
Applica tion of indexa	NA	Closed (indexation is to apply)	Closed (indexation is to apply)	Closed (indexation is not to be	Closed (indexation is not to be

	RELIABILITY STANDARD	MARKET PRICE CAP	CUMULATIVE PRICE THRESHOLD	MARKET FLOOR PRICE	ADMINIS-TERED PRICE CAP
tion				applied)	applied)
Form of indexation	NA	Materiality assessment	Materiality assessment	NA	NA

Source: Reliability Panel, *Review of reliability standard and settings guidelines, final guidelines*, 1 December 2016, Sydney, p 5.

The determination of reliability components being open, closed, or subject to a materiality assessment, was based on the 2016 development of the guidelines and a need to at the time to:

- Balance and deliver both a stable and flexible regulatory framework for system reliability, and
- Focus on the most important components that should be subject to regular assessment that would result in material market benefit and reduce complexity.[62]

The Panel has considered the determination and approach set out the 2016 guidelines, taking into account the:

- rapid transition occurring in the market and associated reforms occurring
- stakeholder views and input to the consultation paper and stakeholder meetings, and
- the Panel's overarching objectives, including that the guideline remains relevant and flexible given the evolving market and there is transparent information on the criteria and factors the Panel will apply for its future RSS reviews.

Section 4.2 sets out the Panel's final decision and changes to the existing approach as outlined in the 2106 guidelines and the relevant factors the Panel will apply for any assessment, and change to the reliability standard and settings going forward.

4.2 Final decision

As noted above, the Panel has considered the 2016 determination, current market environment, stakeholder responses to the consultation and concluded that it is timely and appropriate that the approach in the 2016 guidelines is updated.

The Panel is of the view that without any change to the existing approach (as outlined in the Guideline), the Panel will be constrained going forward, in its ability to comprehensively review the reliability standard and settings and to determine if the approach continues to be fit for the intended purpose. The Panel considers it is important that there is flexibility to review the reliability components due to the changes that are occurring in the power system and that expected to occur over the next decade.

62 Reliability Panel, R*eview of Reliability Standard and Settings Guidelines, Final Determination,* 1 December 2016, pp i-ii.

While the Panel is updating the Guidelines, it has not formed a view on whether there is a need to change any of the reliability components. This will be the focus of the RSS reviews. It is important to note that the Panel can only recommend changes to the reliability standard and settings and any change to the reliability standard and settings can only be recommended through a rule change request to the AEMC.

The Panel's update to the assessment approach in the Guidelines includes the following:

- Maintaining the existing determinations of the purpose and function of the reliability standard and settings.
- Removing the determination in the 2016 guidelines that the only certain components of the reliability framework can be re-examined in an RSS review. That is, removing the table and approach that states whether each of the reliability components is "open, subject to a materiality assessment or closed for review". This will mean that the reliability components, can be at least considered by the Panel, but only where they meet the requirements under the Guidelines, and other factors the Panel considers relevant.
- Inclusion of all the NER requirements and criteria the Panel must use for its assessment of the reliability standard and settings, and
- Retaining the existing criteria and factors from the 2016 guidelines that relate to the assessment of the level of the reliability standard and each setting.

Collectively, these form the obligations for the Panel and the materiality assessment the Panel will apply for assessing the reliability standard and each setting in each review. For any proposed changes to the reliability standard and settings, the Panel would need to consider if there is a material benefit in making the change, including if those changes will, or are likely to, contribute to the achievement of the NEO, and meet the NER and requirements in the Guidelines. The Panel would also have regard to any terms of reference provided by the AEMC, stakeholder consultation and responses, modelling outcomes and any other factors the Panel considers relevant. As outlined, any recommended changes by the Panel must be submitted as rule change request to the AEMC.

The NER requirements and materiality assessment is further outlined in section 4.2.2, specifically the key principles it will apply for assessing whether the reliability standard and settings will, or are likely to, contribute to the achievement of the NEO.

4.2.1 Stakeholder responses to consultation paper

The Panel notes that there was a number of stakeholders submissions to the consultation paper and subsequent input to the review that did not consider there was a need to change the approach in the 2016 guidelines.[63] Specifically these stakeholders did not support an automatic review of form of the reliability standard and each setting at each review.[64] Some stakeholders considered that any update may add more uncertainty and potential cost

63 Submissions to the consultation paper: MEU, p.2; Shell Energy, p.1; Energy Australia, p.2; AEC.

64 EUAA, p.2

increases[65] and the changes in the NEM are not significant enough to warrant a more flexible approach in the Guidelines.[66]

As outlined in Chapter three, these stakeholders considered that regulatory stability for the market was important, particularly for investment in current market context. Some of these stakeholders[67] also considered that there were other existing mechanisms for the Panel to consider the form of the reliability standard or settings, for example, through a direction in terms of reference issued by the AEMC.[68]

In contrast, there were a number of stakeholder submissions[69] that considered removing the limitations and having flexibility to consider the reliability components in a holistic and comprehensive manner is appropriate. One stakeholder[70] noted that this preference is on the basis that there is a strong governance framework to ensure the Panel has the appropriate risk appetite that reflects the needs of consumers.

Some stakeholders suggested that it would be preferable if the Guidelines were to restrict the opening up of the form of the reliability standard and settings for only the next review, but not on an enduring basis.[71] The Panel considered this carefully as an approach to increasing the certainty for participants in the future. The Panel ultimately concluded that limiting the comprehensive assessment of the reliability components to only the upcoming RSS review in a period of continuing and unprecedented change in the energy sector was not consistent with the intent of the Guidelines and the proposed changes. While acknowledging the importance of future stability it is felt this is best provided by the need to demonstrate material benefits in suggesting any future changes in reliability settings, coupled with the rigorous analysis and consultation that are an integral part of the review process.

The Panel is of the view that the updated Guidelines provide the flexibility necessary for the Panel to consider and accommodate where required the rapid market changes and greater transparency and certainty about how the RSS reviews are to be undertaken going forward. Section 4.2.2 sets out the Panel's requirements that will apply for the Panel's assessment of the reliability standard and settings.

4.2.2 NER requirements and materiality assessment to apply for future RSS reviews

As stated in Chapter one, there are a number of requirements in the Rules that relate to the assessment of the reliability standard and each of the settings. There are other NER requirements that relate only to the reliability standard or a specific setting. These are outlined in section 4.3 and 4.4.

65 EUAA, p.2

66 EUAA, p.2., Shell Energy, p.6, MEU, p.3.

67 Shell Energy, p.2, MEU and EUAA subsequent presentations at the stakeholder meeting on the 27 May 2021

68 The Panel cannot review the form or level of the reliability standard from any AEMC terms of reference unless the guideline allows it. That is, the Panel must comply with the guidelines for its broader RSS reviews (NER clause 3.9.3A.) and those guideline requirements over-ride any contradictory AEMC terms of reference.

69 AAC p.2; Snowy Hydro p.3; CS Energy p.2, Origin Energy, and PIAC, p.3

70 AAC, p.2

71 Shell, MEU and EUAA at the public stakeholder meeting 27 May 2021.

The overarching assessment criteria in the NER[72] include that the Panel:

- Must comply with the reliability standard and settings guidelines
- Must have regard to Terms of Reference provided by the AEMC
- Must have regard to the potential impact of any proposed change to a reliability setting on:
  - spot prices
  - investment in the National Electricity Market
  - the reliability of the power system, and
  - Market Participants
- Must have regard to any value of customer reliability determined by the AER, which the Reliability Panel considers to be relevant, and
- May take into account any other matters specified in the guidelines or which the Panel considers relevant.

The Panel has included these requirements and criteria in the updated guideline and considers that these, along with those criteria and factors outlined in sections 4.3 and 4.4 collectively inform the materiality assessment for the Panel to assess the reliability standard and settings. Further discussion of the materiality assessment and threshold for any change is provided below.

Materiality assessment and threshold for any change

The Panel, as noted, recognises some stakeholder concerns about the need to maintain stability in the regulatory framework and that this supports market confidence, reduces regulatory risk and supports efficient investment decisions. As outlined above, the Panel considers it is equally important to balance stability with flexibility as the market evolves. Noting this, the Panel, has aimed to update the guidelines to provide the flexibility required, but also give certainty to market participants on the Panel's approach for any assessment of the reliability standard and settings.

On this basis, the Panel has determined that the:

- Guidelines will state the existing form and level of the reliability standard and settings. These will apply unless the Panel guided by the assessment criteria and factors considers there is a material benefit in reviewing the form and level of the reliability standard and settings.
- Any assessment of the reliability components, and hence recommended change by the Panel need to consider if those changes will, or are likely to, contribute to the achievement of the NEO, and meet the NER and Guideline requirements. The Panel would also have regard to any terms of reference provided by the AEMC, stakeholder consultation and responses, modelling outcomes and any other factors the Panel considers relevant, and

72 NER clause 3.9.3A(e).

- In accordance with the NER, any change to the reliability standards and settings can only be recommended in a rule change request to the AEMC.

It is important to recognise that there are interactions in setting the standard and each of the settings. Overall, the value of each of the market settings will affect the achievement of the reliability standard. Within the settings, there are further interactions, where changing the value of one setting will affect the optimal value of the other settings. There are also aspects of the framework that sit outside these elements that will affect their operation and the achievement of the reliability standard, for example, the RRO, RERT, and government policies.

The Panel will consider the potential interactions between each of the reliability components, and it will consider the aspects that sit outside the framework to the extent the Panel is able to and there is an interaction with the reliability framework going forward. This includes the ESB post 2025 market reforms and current and future market developments.

As noted in Chapter two, the Panel recognises the importance of the Post 2025 work and is collaborating with the ESB so that the processes can dovetail where necessary. In particular, it will be necessary for the Panel to understand what the post 2025 market design recommendations are so that the Panel can consider what the market may look like in order to then consider the form, level and arrangements for the reliability standard and settings. Further the reliability framework should, to the extent possible, designed holistically so that the different elements work together.

The Panel will provide a detailed overview of its assessment framework and approach in its upcoming RSS review, including how stakeholders will have opportunities to be involved, in order to provide the market with useful and transparent information about how it intends to conduct that review.

4.3 Reliability standard

The reliability standard is an ex-ante planning standard used to indicate to the market the required level of supply to meet demand on a regional basis. All NEM planning processes must seek to satisfy the reliability standard. For instance, the standard drives the planning and operational decisions of the AEMO.

The concept of a reliability standard essentially is a trade-off, made on behalf of consumers, between meeting a given level of consumer demand for electricity and the cost of meeting that level of demand (being the cost of generation and interconnector capability). The cost of providing that capability is reflected in wholesale market prices and network costs, and ultimately the prices that consumers pay for electricity.

4.3.1 Assessment of the form and level of the standard

The current form and level of the reliability standard is specified in the NER.[73] The reliability standard for generation and inter-regional transmission elements in the NEM is the expected unserved energy[74] (USE) in a region of 0.002% of the total energy demanded in that region for a given financial year.

The 2016 guidelines indicated that the form of the standard, that is, the measure of USE was not open for reconsideration in RSS reviews. This was based on the view that a volumetric measure of energy demand met, such as USE, provides an optimal measure of the relative effectiveness of the NEM to meet customer demand given limitations of other alternatives[75] and that there was no identifiable benefit, at the time, of changing the form that had been in place.[76]

The 2016 guidelines also stated that level was also to remain the same, unless the Panel considered that there was a material benefit in reassessing it, taking into account a number of key factors.

As outlined above, the Panel has determined that the general assessment approach in the 2016 guidelines should be updated. That is, the existing guideline requirement that some reliability components cannot be considered in future RSS reviews is removed. The Panel has however included in the Guidelines the NER requirements and criteria that it must use to inform any assessment and decision on the reliability standard. These NER requirements are:

That the Panel:

- must have regard to any value of customer reliability determined by the AER which the Reliability Panel considers to be relevant, and
- may take into account any other matters specified in the guidelines or which the Panel considers relevant.[77]

The Panel has also included in the Guidelines those factors from the 2016 guidelines for when assessing the level of the reliability standard.[78] These are that the Panel consider:

- any changes made to the AER's measure of the value of customer reliability (AER's VCR), and
- any marked changes to the way consumers use electricity, particularly through the use of new technology, that suggest a large number of consumers may place a lower value on a reliable supply of electricity from the NEM.[79]

In addition to including the NER requirements to form the basis of the Panel's assessment criteria, the Panel has also set out that the existing form of the reliability standard is to be

73 NER clause 3.9.3C (a).

74 Unserved energy includes those parameters as defined in NER clause 3.9.3C(a).

75 A list of other potential forms of the reliability standard was provided in Appendix A of the Consultation Paper for this review.

76 Final Determination, *Review of the reliability standard and settings guidelines*, December 2016,p.22

77 NER clauses 3.9.3 A(e) (4) and (5).

78 Reliability Panel, *2016 Reliability Standard and Settings Guidelines*, December 2016, p.5.

79 2016 Final Guidelines, *Review of the reliability Standard and Settings Guidelines*, section 3.2.2, pg 5.

maintained unless there is a material benefit to changing it. That is, the Panel considers that the change will, or is likely to contribute to the achievement of the NEO, meet the requirements under the guidelines and has considered other factors such as, but not limited to modelling and stakeholder outcomes. The level of the reliability standard will be also assessed in accordance with the NER requirements outlined above and other factors the Panel considers relevant.

4.3.2 Stakeholder responses

The Panel notes that there were some stakeholder submissions that considered the form of the reliability standard should not be re-opened or changed, including that the USE approach is now well-established and should remain as it is a clear, outcomes-based metric.[80] Further, it was submitted that the ability to change the form of the standard or settings may give rise to an excessively stringent reliability regime with costs higher than what consumers are willing to pay.[81] The Panel notes in response to this particular concern that when setting the VCR, they are bound by the NER and the guidelines to consider the standard VCR when setting the reliability standard.

Some stakeholders[82] also commented on the function of the interim reliability standard, stating that it should be within the scope of the Panel's 2022 review with the conclusion that there should be only one permanent reliability standard recommended. The Panel highlights that its role is to set the reliability standard for the period of 2024-2028. Under the NER a review of the interim reliability measure does not form part of the RSS review. As outlined in Chapter 2, the interim reliability measure is set to expire on 31 March 2025, prior to which it will be subject to a separate review by the AEMC.

The Panel has not formed a view in this report on whether any changes are needed to the form or level of the reliability standard. It will undertake this assessment, in accordance with the updated Guidelines in the RSS review. The Panel notes stakeholder comments on USE as a metric and also notes that there may be other forms of the reliability standard that could be considered, either individually or in combination with the current standard, as a way to minimise the total cost of reliability.[83] The Panel also notes that there are also a number of issues related to the transition occurring in the market that will need to be considered such as changes in the marginal generator, forecast exit of thermal generation capacity, fuel supply uncertainty, and interaction with existing and proposed ESB reforms. This is particularly important to ensure that any recommendations from the Panel are aligned to the extent possible with market reforms being proposed. As indicated, even if the Panel considers and recommends a change, the Panel will need to submit a rule change to the AEMC. The AEMC rule change process under the NER will need to be followed before any change is made.

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80 Shell Energy, AEC, Flow Power, MEU commented that the form of the reliability standard should not be reassessed, while PIAC indicated while there is merit in having a look at the form of the standard, it did not see a need to move away from the value of 0.002% at this time.

81 Shell Energy, p.4.

82 AEC, p.1, CS Energy, p.2.

83 *The Consultation Paper outlined a number of alternative options related to the form for the reliability standard and the Panel understands the NSW Roadmap also outlined some alternatives.*

4.4 Reliability Settings

4.4.1 Market Price Cap

The market price cap (MPC) is the maximum market price that can be reached in any dispatch interval and in any trading interval. The purpose of the MPC is to:

- enable the market to achieve and send efficient price signals, to support the efficient operation of and investment in electricity services over the long run, and
- manage participant exposure to price risk.

The MPC is currently set at $15,100/MWh.[84] Under NER clause 3.9.4, the Commission is required to adjust the market price cap in line with the consumer price index by 28 February each year.

Assessment of the form and level of the MPC

The 2016 guidelines indicated that, like the reliability standard, the form of the MPC (ie $/MWh value) was not open for reassessment in future RSS reviews. This was based on the Panel's reasoning, at the time, that this is the unit of measurement upon which an energy only market is dispatched and settled and there was no alternative form that could be applied to the MPC. The level of the MPC was subject to materiality assessment by the Panel at each review.

The updated Guidelines will specify the NER requirements and factors for assessing the form and the level. However, similar to the reliability standard, the form of the MPC will remain unless the Panel considers there is material benefit to changing it and it meets the requirements as outlined. The level of the MPC will be assessed in the context of the principles and assessment criteria in the guidelines and other relevant factors the Panel considers necessary.

The NER requirements that have been included the Guidelines include that the Panel can only recommend an MPC which the Panel considers will:

- allow the reliability standard to be satisfied without use of AEMO's powers to intervene,[85] and
- not create risks which threaten the overall integrity of the market.[86]

The Guidelines also require, as per the NER, that if the Panel is of the view that a decrease in either the market price cap or the cumulative price threshold may mean the reliability standard is not maintained, the Panel may only recommend such a decrease where it has considered any alternative arrangements necessary to maintain the reliability standard.[87]

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84 Australian Energy Market Commission, *Schedule of reliability settings,* 25 February 2021. The AEMC is required to adjust the market price cap and cumulative price threshold for the National electricity market, in line with the consumer price index, by 28 February each year. This value for the market price cap is for the 2021-22 financial year.

85 NER clauses 3.20.7(a) and 4.8.9(a).

86 NER clause 3.9.3A(f).

87 NER clause 3.9.3A(g).

The Panel will retain the principles in the 2016 guidelines for considering the level of the MPC:[88]

- The MPC should not be used to actively steer the market into a short-run equilibrium position, or to actively drive disinvestment decisions.
- While the MPC may move either up or down over time, these movements should be gradual. These movements should occur over a period of several review periods.
- When setting the MPC, the Panel should give secondary consideration to the MPC's effect on the financial burden faced by participants from high market prices, including price volatility and impacts on retailers.

Stakeholder responses to the consultation paper

Stakeholder submissions and comments to the issues raised in the consultation paper focused more on whether the Panel should consider and assess the form of the MPC and whether a change was needed. A number of stakeholders indicated that they did not see value in changing the form or level of the MPC as they did not see a practical alternative to the current simple cap and floor on a five-minute dispatch and settlement price.[89] Shell Australia, in particular highlighted that other forms of the MPC such as a regional MPC had been considered in the past but concluded to be inferior to a single MPC applicable in all regions.[90] PIAC noted that the primacy of the MPC as an investment signal could be reconsidered, and offered alternative forms and levels of the MPC for each jurisdiction as well as a moderate increase in MPC to support investment in dispatchable capacity.[91]

The Panel notes stakeholder positions related to the form of the MPC and notes it has not formed a view in this report on whether the form or level of the MPC requires any change or adjustment. The Panel however does consider that there are a number of material changes in the NEM as outlined in Chapter two that the may affect the setting of the MPC. These include, but not limited to:

- The changes in demand-side participation, especially the provision of efficient price signals to demand-side participants
- The transition to batteries (and other forms of energy storage) supporting peak demand
- Little investment in OCGT's, previously considered the default 'new entrant'
- Forced outage rates of plants
- Contracting strategies
- New non-energy markets, and
- Jurisdictional initiatives and policies.

The Panel also notes that current market price cap creates investment incentives that are identical for each market region. There are different drivers for investment in each region. It may, for example, be beneficial to consider these issues and whether there is a need to have

88 Reliability Panel, *2016 Reliability Standard and Settings Guidelines,* December 2016, p. 6.
89 AEC p.3, Shell Energy p.9, MEU p.5.
90 Shell Energy, p.8
91 PIAC p.4; Shell p.8.

relatively higher or lower market price cap in various regions to elicit efficient investment outcomes. The Panel will outline these issues, including how stakeholders can be involved, and other considerations related to requirements for modelling in more detail in its upcoming RSS review.

4.4.2 Cumulative Price Threshold

The form of the CPT is described in the NER.[92] The CPT is the maximum total energy price that can be reached in a time period of 33630 minute trading intervals[93], and the maximum total frequency control ancillary services (FCAS) price that can be reached in a period of 2016 dispatch intervals, before an administered price period (APP) commences and the APC is applied to market prices.

The primary purpose of the CPT is to cap the total price risk to which market participants are exposed over a given time period. The secondary purpose of the CPT is to maintain the effectiveness of the MPC, by not hindering the market price signals for efficient operational decisions and efficient investment in generation capacity and/or demand-side response.

The CPT is currently set at $226,500 for the energy market, approximately fifteen times that of the value of the market price cap.

Under NER clause 3.14.1, the Commission is required to adjust the market price cap and cumulative price threshold in line with the consumer price index by 28 February each year. Following the commencement of five minute settlement on 1 October 2021, the value of the CPT will change to $1,359,100 while the market price cap will remain the same.

The CPT restricts the price signals that generators receive and so, if it is set too low, it could limit the investment required to meet the standard. If set too high, it may result in inefficient over-investment or excessive price risk for all participants in the market.

Assessment of the form and level of the CPT

The form of the CPT was also closed for review in the previous RSSR, as per the direction in the 2016 guidelines. As noted above, the Panel has removed this categorisation and the guidelines has included the NER requirements and existing factors for undertaking any assessing the CPT. These effectively provide the materiality threshold for any review and change.

The NER states that the Panel can only recommend a CPT that allows the reliability standard to be satisfied without use of AEMO's powers and that does not create additional risks that threaten the overall integrity of the market.[94] Similar to the MPC, the Panel may only recommend a decrease to the CPT where it has considered alternative arrangements to maintain the reliability standard.[95]

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92 NER clause 3.14.1.

93 This will change with the introduction of 5 minute settlement on 1 October 2021 to 2,016 5 minute trading intervals. See Australian Energy Market Commission, *Schedule of reliability settings*, 25 February 2021 and National Electricity Amendment (Five Minute Settlement) Rule 2017 No. 15, cl 3.14.2.

94 NER clause 3.9.3A(f).

95 NER clauses 3.9.3A(g).

The Panel has also included in the guidelines, as with other settings, that the form of the CPT will remain unchanged unless there are material benefits to changing it. The level of the CPT will be assessed in the context of the principles, assessment criteria in the guidelines and other relevant factors the Panel considers necessary. For its assessment of the level of the CPT, the Panel will continue to consider the following factors from the 2016 guidelines, that:[96]

- The CPT should protect all market participants from prolonged periods of high market prices, with particular consideration to impacts on investment costs and the promotion of market stability.
- The CPT should not impede the ability of the market to determine price signals for efficient operation and investment in energy services.
- The CPT should be determined giving consideration to the level of the MPC.

Any considerations or changes of the market price cap will necessarily relate to the cumulative price threshold and its role in managing market participant risk without hindering efficient price signals.

Stakeholder responses to the consultation paper

The majority of stakeholder comments received by the Panel expressed support for the need for flexibility to consider the form and level of the CPT. They also outlined some alternative forms of the CPT including specific regional CPT and a change to the period over which the CPT is calculated as options that could be considered.[97] The AEC, in particular suggested that it may be appropriate to align the timing of the CPT with those more typically used in industry risk management.[98] That is, the CPT might instead operate by accumulating prices over a quarter and when it is triggered, would apply the APC until the end of the quarter and limit the risks of the CPT being triggered multiple times within a quarter.

Two stakeholders indicated that they did not see a reason for the Panel to review the form of the CPT.[99] Shell Energy considered that there are slightly different forms the CPT could take, but concluded that there is no evidence that the current CPT format is not working and therefore no need for a change.[100]

The Panel notes in the assessment of the CPT a number of issues can be considered related to the current and future market developments. In particular, the potential effect and impact of low or negatives prices occurring in the market and ESB reforms. For example, the CPT is increasingly binding in periods of high prices in South Australia and is becoming an important factor in the price of energy derivative contracts. The CPT dampens investment signals by reducing the market's exposure to periods of sustained high prices. The Panel considers it will be important to consider if changes to the CPT mechanism could allay the dampening of investment signals while continuing to mitigate the market's exposure to sustained high prices, eg:

96 Reliability Panel, *2016 Reliability Standard and Setting Guidelines*, December 2016, p. 7
97 AEC, Energy Australia, p.4.
98 AEC, p.3.
99 MEU, p.5; Shell Energy, p.9.
100 Shell Energy, p.9.

- Decreasing the timeframe over which the CPT is triggered. Currently it is over one week's worth of trading intervals but could be reduced
- Triggering only when certain events have occurred and the price level has been breached, for example, during an interconnector outage.

The Panel, as noted, will outline its consideration of these issues, including how stakeholders can be involved, and others as part of the RSS review.

4.4.3 Market Floor Price

The MFP is the minimum price that can be reached in any dispatch interval and in any trading interval, measured in $/MWh.[101] The purpose of the MFP is to allow the market to clear during low demand periods, while preventing market instability by imposing a negative limit on the total potential volatility of market prices. The value of the MFP is specified in the NER and is currently set at -$1,000/MWh.[102]

Assessment of the form and level of the MFP

In the previous RSSR, the form of the MFP was closed for review as per the guidance in the 2016 guidelines as it was considered that form of the MFP is the unit of measurement upon which an energy only market is dispatched and settled. The Panel also considered at the time that there was no alternative form that could be applied to the MFP. The level was subject to a materiality assessment and the MFP was not subject to indexation.[103]

The Panel will include the existing NER requirements in the Guidelines and remove the limitations on the assessment of the form and level of the MFP. The NER requirements included in the Guidelines are that the Panel may only recommend an MFP which it considers will:

- allow the market to clear in most circumstances
- not create substantial risks which threaten the overall stability and integrity of the market.[104]

The form of the MFP will remain unless there are material benefits that result from changing it. The level of the MFP will be assessed in the context of the assessment criteria in the guidelines and other relevant factors the Panel considers necessary. These will include the factors related to:

- the number and frequency of trading intervals where the market price has been, or has approached, the level of the MFP, and
- whether there have been significant changes in the generation fleet, such that average generator cycling costs have changed significantly.[105]

Stakeholder responses to the consultation paper

101 NER clause 3.9.6.
102 NER clauses 3.9.6(b).
103 2016 Final Guidelines, *Review of the reliability Standard and Settings Guidelines*, section 3.5, pg 7.
104 NER, clause 3.9.3A(h).
105 2016 Final Guidelines, *Review of the reliability Standard and Settings Guidelines*, section 3.5, pg 8.

A number of stakeholders did not comment on the change to the approach in the Guidelines to consider the form and level of the MFP. Shell Energy submitted that they did not consider there to be value in the Panel routinely reviewing the form of the MFP as part of each RSSR and additionally in their view, concepts such as a negative CPT do not merit a detailed review as negative prices are in the benefit of customers and a negative CPT would mute the negative price signals which incentivises generators to lower their output. Shell also did not consider any viable alternatives to the current form of the MFP in an energy only market such as the NEM.[106]

However, some stakeholders raised the need to reassess the structure of the MFP to ensure that it will incentivise capability when there is low operational demand.[107] In particular, it was suggested that the Panel should clearly articulate the role of the MFP in system stability and make technology-agnostic assessments when considering elements such as the "viability of storage technologies" in its materiality assessment (as was done in the previous review of the reliability standard).[108]

As outlined in Chapter 2, there are potentially a number of changes occurring in the market that may also affect the Panel's review of the MFP, in particular:

- The increasing investment in battery storage
- The changing generation mix
- Increase cycling of generators
- Increased penetration of household solar PV systems is projected to increase the severity of minimum grid-based demand and so, very low prices which creates risks for generators. Currently no version of the cumulative price threshold for very low prices – ie, a limit on the level of a sustained period of low prices.

The Panel believes it is important to consider and assess if any change to the form and level of the MFP is needed so that it could provide more efficient investment and dispatch outcomes. The Panel will canvass these issues, including how stakeholders can be more involved, and others such as ESB reforms in the broader RSS review.

4.4.4 Administered Price Cap

The APC is the maximum settlement price that applies during an administered price period.[109] The function of the APC is to cap participant exposure to the potential of what could otherwise be high prices during an APP, while maintaining incentives for participants to supply energy. The value of the APC is specified in the NER and is currently set at $300/MWh.[110]

106 Shell, p.9.
107 CS Energy, p.2.
108 CS Energy, p.3-4.
109 NER clause 3.14.1.
110 NER cl 3.14.1(a).

In the previous RSSR, the form of the APC was closed for review for the same reasons as the MPC and MFP, as per 2016 guidelines. The consideration of the level of the APC was subject to a materiality assessment. The APC is also not subject to indexation.

Assessment of the form and level of the APC

The assessment of the APC will be subject to an assessment based on the NER requirements and other factors as outlined. These, as with other assessment criteria, will form the materiality assessment for the Panel to consider the APC. The form APC will remain unless there is a material benefit from changing it. The level will be assessed in accordance with the principles and criteria outlined in the guidelines.

Stakeholder responses to the consultation paper

In their submissions, stakeholders generally supported the Panel's proposal of a review of both the form and level of APC, although Shell and MEU did not support a change to the current guideline approach. These stakeholders considered that there to be little value in routinely reviewing the form of the APC.[111]

The AEC commented that APC in its current form interfered with key incentives at times of system stress as it left little room for marginal supply, especially demand response as it operates as a blunt cap.[112] Flow Power also noted that 'the APC is well below the marginal value of using electricity for many consumers, particularly after a prolonged period of having provided demand response.[113]

In the 2018 RSSR, the Panel noted that the operating costs of all but 19 generating units in the NEM were below the real value of the APC. As battery storage plants become an increasingly important component of the wholesale market, the relationship between the operating cost of generating units and the APC will change as battery storage plants earn arbitrage revenue from intra-day price variation.

Traditionally, the prices offered by demand-side participants to provide demand response have been higher than the current level of the APC.[114] In the event of an administered price period, the prevailing APC may incentivise demand-side participants who were otherwise reducing their demand to cease demand reduction activities, leading to an increase of demand at a time when the market is under the most stress.[115] This, with other market development issues will be outlined in the Panel's RSS reviews.

The APC imposes on the market prices and caps the price at $300 per MWh. The Panel considers that the settings should send signals to allow technology-neutral investment. Currently this cap, when in place, particularly impacts on incentives for demand-side response and storage plant investment and dispatch. These are increasingly becoming least cost marginal technologies.

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111 Shell Energy, p.10; MEU, p.5.

112 AEC, p.3

113 Flow Power, p.3.

114 AEMO, *Demand Side Participation Forecast and Methodology*, August 2019, p 13.

115 AEMC, *Wholesale Demand Response Mechanism, Rule Determination*, 11 June 2020, pp 234-235.

The Panel noes that it is important to consider the APC, and whether changing the mechanism on the activation of the APC could potentially deliver more efficient investment and operational outcomes. For example, if the APC ratchets down over time from a relatively high level so that there is not a sudden decrease in prices, investment and operational signals may be better maintained. These and other issues will be canvassed and outlined in the RSS review.

4.4.5 Indexation

Since the commencement of the National Electricity Amendment (Reliability Settings from 1 July 2012) Rule 2011 No. 5 in 2012, the AEMC has inflated the nominal value of the MPC and CPT each year based on historical inflation that has occurred.[116] The AEMC has undertaken this indexation by the consumer price index (CPI), which is a measure of the changes in prices faced by consumers in the broader economy.

The application of indexation (using the CPI) for the MPC and CPT is prescribed in the NER.[117] The NER do not prescribe indexation for the MFP and APC, which retain their nominal values.

The application of indexation was closed for review in the previous RSSR, as per the guidance in the Guidelines. As noted, the Panel will rely on the NER requirements and other factors as required and remove the approach that the reliability components are deemed as open, closed or subject to a materiality assessment.

The Panel previously considered that indexation should continue to be applied to the MPC and the CPT as these boundaries allowed the market to determine price signals for efficient operation of and investment in energy services.[118]

Stakeholder responses to the consultation paper

A number of stakeholders did not comment on the Panel's proposed approach for indexation, and those that did consider the current approach to be sufficient. [119]

The Panel will continue to apply the following factors related to the form of indexation which include whether:

- there have been material changes in the basket of goods used to calculate the CPI that make it less relevant for indexation of the settings
- there have been other changes in the methodology used to calculate the CPI, and
- a more preferable index becomes available and/or there is a change in the designation of the CPI as an official statistic.

116 AEMC, *Reliability Settings from 1 July 2012, Rule Determination*, 16 June 2011.

117 EY, *Reliability Standard and Settings Review 2018, Modelling Report*, 13 April 2018, p 2.

118 Final Determination, *Review of the Reliability Standard and settings guidelines*, December 2016, p.41.

119 AEC p.4; Shell Energy, p.11.

5 MODELLING REQUIREMENTS

Modelling forms a key input into the Panel's assessment of the standard and settings. It allows the Panel and stakeholders to understand the effect of varying the levels of the standard and settings and the relationship between them. Modelling is also a useful tool in understanding the effects of potential future market developments, such as increases in demand-side participation and government investment schemes, and how these affect the achievement of the reliability standard.

As such, the modelling provides a quantitative framework that brings rigour to the Panel's decisions. In order for the modelling to be relied on as a key tool, the Panel considers that it is important that any modelling undertaken for the RSS reviews are performed in a transparent manner consistent with the principles outlined the Assessment Approach section of the guidelines.

This chapter sets out the approach and principles that the Panel will apply for the modelling in the review of the reliability standard and settings that will be included in the guidelines. This includes the Panel's considerations on overarching principles and range of inputs.

5.1 The 2016 guidelines approach to modelling

The 2016 guidelines outlined a number of considerations that the Panel would take into account when performing the modelling for the reliability standard and settings review. These are:

- **General principles** – In developing modelling for the purposes of informing its assessment of the standard and settings, the Panel will consider the following general principles:
  - the model should consider how a long-term equilibrium between price and reliability can be achieved in the market, and
  - in considering long-term equilibrium, the modelling should consider both new investment and the potential for retirement of capacity,
- **Specific model principles** – When designing the specifics of the model, the Panel will consider the following principles regarding the assumed generator behaviour included in the model:
  - the model should be technology-neutral and assess MPC on the basis of the cheapest available marginal technology that can be used to deliver the standard
  - assumed generator behaviours should be modelled in reality and the modelled generators should be allowed to offer their capacity in a way that reflects reasonable behaviour, and
  - the model should not make assumptions regarding the contracting behaviour of any modelled generators,
- **Model inputs** - The range of inputs to be used in the model may include but are not limited to:

- average and peak demand projections for each region
- expected load profiles
- government-mandated schemes for encouraging renewable energy technologies
- sectoral or economy-wide mechanisms designed to address climate change, such as a sectoral emissions intensity trading scheme or an emissions trading scheme
- gas price trajectories
- costs for marginal generating units
- demand-side participation quantities and price thresholds
- expected changes in the large scale generation fleet, particularly thermal unit retirement, and
- growth rates for small scale distributed generation, particularly rooftop PV and battery storage, and

- **Model scenarios** - The scenarios to be used in the model may include but are not limited to:
  - high and low capital cost assumptions for marginal plant
  - alternative MPC / CPT ratios
  - high and low peak demand and average demand growth forecasts
  - changes in load profiles, including withdrawal of large industrial loads
  - different emission reduction and renewable target settings
  - high and low gas price projections
  - potential changes in the level of demand side participation
  - different projections in the price of distributed energy and emerging technologies, including solar PV and battery storage
  - different timelines for retirement of large-scale generators, and
  - different timelines for exit of large customers.

The Panel has considered the undertakings of the 2016 guidelines, current market developments, stakeholder submissions and has developed a modelling approach that aligns with the proposed assessment principles and allows more flexibility in the modelling approach. This modelling approach is outlined in section 5.2 below.

5.2 Modelling approach – final guidelines

The Panel has made a number of changes to the existing modelling approach to ensure that the guidelines provide the market with useful and transparent information on how the modelling will be undertaken, without constraining the Panel in the specific approach, which will naturally evolve as the market continues to change over time.

The Panel has determined that the general principles for modelling remain appropriate as an overarching purpose to guide the modelling. The Panel considers that the principle of considering the long-term behaviour between price and reliability and investment decisions, as described in the principles is appropriate, because:

- It is consistent with the assessment framework, described in Chapter 4, and
- It is consistent with the approach of assessing the MPC, which specifies that the Panel should not actively steer the market into a short-term equilibrium.

The Panel has determined that changes to the specific model principles will allow for market participants to understand the modelling approach, as well as allowing the model to be flexible to respond to the changing market. As such, the Panel considers the following changes to be appropriate:

- Changing the reference to 'the MPC' to 'the settings' on the principle that the model should be technology-neutral. This change acknowledges the interrelationships that the settings have and their co-dependent relationship on investment decisions and achieving the standard.
- Removing the principle that generators should offer capacity in a way that reflects reasonable behaviour. The Panel considers that this principle is an underlying objective of any reasonable market model and does not provide useful information to market participants on how the modelling will be undertaken.
- Removing the principles that the model should not make assumptions regarding the contracting behaviour of modelled generators. The Panel considers that this principle is a fundamental consideration of any reasonable market model that examines investment decisions in the long-term and does not provide useful information to market participants on how the modelling will be undertaken.
- Including a new principle that states that the assumptions, data and parameters that underpin the model will be transparent and visible to stakeholders. The Panel considers that this principle is an important factor in ensuring that market participants are able to understand and comment on the modelling process, and so the outcomes from the model, in an informed manner. Further, the Panel considers that this principle is consistent with the overarching guidelines principle to provide predictable regulatory framework.
- Including a new principle that states that sensitivity analysis will be applied on assumptions whether there is material uncertainty on the true or forecast value. The Panel considers it important to acknowledge uncertainty in the modelling process and to understand how uncertainty may affect the Panel's determination of the standard and settings. The Panel considers that this principle furthers its overarching purpose to provide a predictable regulatory framework as market participants will be able to gauge the effect that the changing market will affect the modelling outcomes.
- Removing the reference to 'assumed generator behaviour' in the purpose of the specific model principles to reflect the above changes.

Stakeholders were supportive of these additional principles with Shell Energy, the Australian Energy Council, Wärtsilä Energy and Major Energy Users commenting that the need for transparency of assumptions and sensitivity analysis where appropriate were suitable

overarching objectives for the Panel to contain in the guidelines.[120] As such, the specific model principles to be included in the final guidelines are shown in Box 2.

BOX 2: SPECIFIC MODEL PRINCIPLES

When designing the specifics of the model, the Panel will consider the following principles:

- *The model should be technology-neutral and assess the settings on the basis of the cheapest available marginal technology that can be used to deliver the standard*
- *The assumptions, data and parameters that underpin the model should be transparent to be visible and consulted on by stakeholders, and*
- *Sensitivity analysis should be applied on assumptions where there exists material uncertainty on the true or forecast value.*

The Panel has determined that it is appropriate to remove the list of model inputs and the model scenarios from the guidelines. The modelling inputs described in the current guidelines are generic inputs that would be considered for any energy market modelling task and do not provide any specificity to market participants on how the modelling would be undertaken. Similarly, the listed model scenarios represent a generic set of scenarios that might be tested in any market modelling exercise and do not provide the flexibility to analyse key market dynamics outside of these core set. Instead, the Panel considers that the inclusion of the modelling parameters in the guidelines may be constraining if they do not consider matters related to future scenarios or modelling approaches.

Shell Energy and Major Energy Users commented that the inputs or scenarios as they are set out in the 2016 guidelines would not constrain the Panel as they are included as items that the Panel 'may' include.[121] Shell Energy further commented that there is no value in removing these from the guidelines.[122]

The Panel accepts that it would not be required to include these inputs and scenarios in future modelling if they are not relevant. However, the Panel considers that, while these inputs and scenarios remain in the guidelines, the Panel would be required to justify why they are not included in the modelling even if they are largely accepted as irrelevant or uninformative. For this reason, the Panel considers that there is value in removing the inputs and scenarios from the guidelines so that the review itself is able to set out the conceptual framework of how the Panel intends to undertake the modelling for the review. This would further the Panel's goal of providing a flexible and predictable regulatory framework.

120 Shell, , p 11; Wärtsilä, R p 1; MEU, p 5.

121 Shell Energy, Rp 11; MEU, p 5.

122 *Shell Energy, Rp 11.*

ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMPR	Annual Market Performance Report
APC	Administered Price Cap
Commission	See AEMC
COAG	Council of Australian Governments
CPT	Cumulative Price Threshold
LOR	Lack of Reserve
ESB	Energy Security Board
ISP	Integrated System Plan
MFP	Market Floor Price
MPC	Market Price Cap
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National electricity objective
NER	National Electricity Rules
OCGT	Open Cycle Gas Turbine
RERT	Reliability and Emergency Reserve Trader
RSSR	Reliability Standard and Settings Review
USE	Unserved Energy

GLOSSARY

Available capacity	The total MW capacity available for dispatch by a scheduled generating unit or scheduled load (i.e. maximum plant availability) or, in relation to a specified price band, the MW capacity within that price band available for dispatch (i.e. availability at each price band).
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.
Customer average interruption duration index (CAIDI)	The sum of the duration of each sustained customer interruption (in minutes) divided by the total number of sustained customer interruptions (SAIDI divided by SAIFI). CAIDI excludes momentary interruptions (one minute or less duration).
Directions	Under s. 116 of the NEL, AEMO may issue

	directions. Section 116 directions may include directions as issued under clause 4.8.9 of the NER (e.g. directing a scheduled generator to increase output) or clause 4.8.9 instructions (e.g. instructing a network service provider to load shed). AEMO directs or instructs participants to take action to maintain or re-establish the power system to a secure operating state, a satisfactory operating state, or a reliable operating state.
Dispatch	The act of initiating or enabling all or part of the response specified in a dispatch bid, dispatch offer or market ancillary service offer in respect of a scheduled generating unit, a scheduled load, a scheduled network service, an ancillary service generating unit or an ancillary service load in accordance with NER rule 3.8, or a direction or operation of capacity the subject of a reserve contract as appropriate.
Frequency control ancillary services (FCAS)	Those ancillary services concerned with balancing, over short intervals, the power supplied by generators with the power consumed by loads (throughout the power system). Imbalances cause the frequency to deviate from 50 Hz.
Interconnector	A transmission line or group of transmission lines that connect the transmission networks in adjacent regions.
Lack of reserve	This is when reserves are below specified reporting levels.
Load	A connection point (or defined set of connection points) at which electrical power is delivered, or the amount of electrical power delivered at a defined instant at a connection point (or aggregated over a defined set of connection points).
Load event	In the context of frequency control ancillary services, a load event: involves a disconnection or a sudden reduction in the amount of power consumed at a connection point and results in an overall excess of supply.

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.
Low reserve condition (LRC)	This is when reserves are below the minimum reserve level.
Minimum reserve level (MRL)	The minimum reserve margin calculated by AEMO to meet the reliability standard.
National Electricity Code	The National Electricity Code was replaced by the National Electricity Rules on 1 July 2005.
National electricity market (NEM)	The NEM is a wholesale exchange for the supply of electricity to retailers and consumers. It commenced on 13 December 1998, and now includes Queensland, New South Wales, Australian Capital Territory, Victoria, South Australia, and Tasmania.
National Electricity Law (NEL)	The NEL is contained in a schedule to the National Electricity (South Australia) Act 1996. The NEL is applied as law in each participating jurisdiction of the NEM by the application statutes.
National Electricity Rules (NER)	The NER came into effect on 1 July 2005, replacing the National Electricity Code.
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.
Probability of excellence (POE)	POE relates to the weather/temperature dependence of the maximum demand in a region. A detailed description is given in the AEMO ESOO.
Reliable operating state	Refer to operating state.
Reliability of supply	The likelihood of having sufficient capacity (generation or demand-side response) to meet demand (the consumer load).
Reliability standard	The Reliability Panel's current standard for reliability is that there should be sufficient generation and bulk transmission capacity so that the maximum expected unserved energy is 0.002 per cent.
Reserve	The amount of supply (including available generation capability, demand side participation and interconnector capability) in excess of the demand forecast for a particular period.

Reserve margin	The difference between reserve and the projected demand for electricity, where: Reserve margin = (generation capability + interconnection reserve sharing) – peak demand + demand-side participation.
Satisfactory operating state	Refer to operating state.
Scheduled load	A market load which has been classified by AEMO as a scheduled load at the market customer's request. A market customer may submit dispatch bids in relation to scheduled loads.
Secure operating state	Refer to operating state.
Separation event	In the context of frequency control ancillary services, this describes the electrical separation of one or more NEM regions from the others, thereby preventing frequency control ancillary services being transferred from one region to another.
Spot market	Wholesale trading in electricity is conducted as a spot market. The spot market allows instantaneous matching of supply against demand. The spot market trades from an electricity pool, and is effectively a set of rules and procedures (not a physical location) managed by AEMO (in conjunction with market participants and regulatory agencies) that are set out in the NER.
Supply-demand balance	A calculation of the reserve margin for a given set of demand conditions, which is used to minimise reserve deficits by making use of available interconnector capabilities.
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.
Transmission network	The high-voltage transmission assets that transport electricity between generators and distribution networks. Transmission networks do not include connection assets, which form part of a transmission system.
Transmission network service provider (Tsp)	An entity that owns operates and/or controls a transmission network.

Unserved energy (USE)	The amount of energy that is required (or demanded) by consumers but which is not supplied due to a shortage of generation or interconnection capacity. Unserved energy does not include interruptions to consumer supply that are caused by outages of local transmission or distribution elements that do not significantly impact the ability to transfer power into a region.

A STAKEHOLDER SUBMISSIONS SUMMARY

Table A.1: **RESPONSES TO SUBMISSION ON THE ISSUES PAPER**

STAKEHOLDER	ISSUE	PANEL RESPONSE
General Assessment Principles		
Australian Aluminium Council, p.2	Note that the Panel when considering the principles to meet the NEO needs to balance price risk with reliability and other risks.	The Panel agrees with the AER that it will be important to consider the work of the ESB and how it interacts with the review of the reliability standard and settings. The Panel submitted to the ESB's April options paper in order to emphasise how the processes can dovetail together.
Australian Aluminium Council, p.2	Note that if adding flexibility by reviewing both the form and the level of the reliability standard and settings, the review needs to be done within a strong governance framework; to ensure the Panel has an appropriate risk appetite that reflects the needs of customers and is neither excessively cautious nor imprudent.	The Panel agrees with the Australian Aluminium Council and notes that the guidelines provide strong parameters about how the reliability standard and settings review is to be conducted.
Australian Energy Council, p.2	The Australian Energy Council propose the addition of a fourth principle: "Supporting the secure operation of the real-time market."	The Panel notes the AEC's suggestion. It considers it is already the role of the reliability standard and settings to provide incentives to ensure the real time market operates securely and efficiently in order to best achieve the NEO. This occurs through how the reliability standard is operationalized through the NER and various AEMO guidelines and procedures.
Flow Power, p.3	Note that the principles outlined in the guidelines appear to be different to the assessment framework used by the ESB to explore resource adequacy which has greater emphasis on loosely defined community expectations.	The Panel notes that despite having different guidelines, in alignment with rule 3.9.3A(e)(3)(i), the Panel must have regard to any proposed change of a reliability setting on market participants. Meaning there is an inherent consideration on

STAKEHOLDER	ISSUE	PANEL RESPONSE
		community expectations.
EnergyAustralia, p.4	EnergyAustralia would like to highlight that the link between VCR and MPC is vague and arbitrary which warrants clarification in the guideline principles.	As discussed in Chapter 3.3, the second assessment principle outlines the relationship between the MPC and VCR. This is achieved by setting the MPC to incentivise sufficient investment in generation to maintain the reliability standard, while not setting MPC so high that it exceeds the value that customers place on reliability.
Shell, p.2	Consider that regulatory stability should be retained unless there is a compelling case for change. Shell do not think that the consultation paper makes such a case.	As set out in Chapter 2.2 and 2.3 the Panel considers that there is significant change taking place with the energy sector. The Panel is still mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability.
Broad approach for guidelines update		
AER p.1, AEC, p.1	Consider it is important that the Panel's forthcoming reliability standards and settings review includes close examination of, and alignment with, the reforms that are ultimately agreed by Energy Ministers through the NEM post-2025 project.	The Panel agrees with the AER that it will be important to consider the work of the ESB and how it interacts with the review of the reliability standard and settings and is working closely with the ESB's processes to maintain consistent time frames to deliver outcomes. The Panel submitted to the ESB's April options paper in order to emphasise how the processes can dovetail together.
PIAC, p.3	State that under a one-off change	The Panel agrees that the form and

STAKEHOLDER	ISSUE	PANEL RESPONSE
	the Panel should consider reviewing in a comprehensive manner all reliability settings and the standard so that they can remain appropriate for the purpose which they are intended to serve.	level of the reliability standard and settings should be reviewed in order to keep them up to date and fit for purpose. Though the Panel notes that the guidelines allow for a wholesale review of the reliability standard and settings at each review every 4 years.
EUAA, p.2	State that they do not support the proposal to automatically review the form of the standard/settings at each RSSR.	As set out in Chapter 2.2 and 2.3 the Panel considers that there is significant change taking place with the energy sector. The Panel is still mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability. The Panel considers that opening up the form of standard/settings at each RSSR does not mean that it would automatically be reviewed, but rather it would be open for the Panel to turn its minds to this.
PIAC, p.1	Support the Reliability Panel taking a broad scope in reviewing the reliability standards and settings – considering certain aspects to be out of scope of such a review is unlikely to help achieve the long-term interests of consumers.	The Panel agrees with this submission.
EUAA, p. 2	Do not support the Panel's proposed approach of removing	The Panel has removed the approach where components are

STAKEHOLDER	ISSUE	PANEL RESPONSE
	the existing arrangement where components are open, subject to materiality assessment or closed for review from the guidelines, effectively making all components open; reviewing/updating the statements in the existing guidelines that refer to the purpose/function of each component; and effectively forming a materiality assessment for the guidelines. Do not think that the benefits of stability no longer outweigh the benefits of a flexible framework in a changing environment, or that the changes to the NEM are significant enough to warrant a more flexible framework.	open, subject to materiality assessment or closed for review with the NER requirements for each of the standard and settings. These requirements will act as the assessment criteria allowing the Panel to consider market developments and new evidence available since the previous RSSR. The reasons for this are outlined in Chapter 4. As set out in Chapter 2.2 and 2.3 the Panel considers that there is significant change taking place with the energy sector. The Panel is still mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability.
EUAA, p.2	Do not consider there is any value in the Panel considering other forms of the reliability standard, the market price cap, market price floor, CPT, administered price cap or application of indexation as part of RSSR.	The Panel notes this, though considers that due to the significant change taking place within the energy sector, it would provide material benefit in terms of market predictability to conduct a wholesale review of the form and level of the reliability standard and settings to ensure that they are fit for purpose.
EUAA, p.2	Do not want an additional source of uncertainty around form and potential cost increases introduced at the very time that	The Panel notes this and has been guided by the NEO ("long term interests of consumers").

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	the level of uncertainty around cost increases is increasing.	
CS Energy, p. 2	CS Energy suggests that the AEMC re-frame the approach of the review, shifting from providing the case for what is in scope, to considering all aspects open and demonstrating why any of these should not be within the scope of the review.	The Panel notes this, and considers its approach set out in this Guideline is consistent with this.
EnergyAustralia, p. 2	EnergyAustralia believes that the current approach to determining which elements are assessed every four years remains appropriate. Regulatory stability is necessary for investment and frequent changes in the settings or standard add uncertainty in an already uncertain market environment.	The Panel has removed the approach where components are open, subject to materiality assessment or closed for review with the NER requirements for each of the standard and settings. These requirements will act as the assessment criteria allowing the Panel to consider market developments and new evidence available since the previous RSSR. The reasons for this are outlined in Chapter 4. The Panel is still mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability.
MEU, p.2	Note that they do not see a need to change the guidelines for reviewing the Reliability Standard and its associated market settings	As set out in Chapter 2.2 and 2.3 the Panel considers that there is significant change taking place with the energy sector. The Panel is still

STAKEHOLDER	ISSUE	PANEL RESPONSE
	as part of the regular four-yearly reliability standard and settings review (RSSR).	mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability.
Shell, p.1	State that they do not support amending the Guidelines to allow the Panel to routinely consider the form of the reliability standard and/or settings as part of the four-yearly reliability standard and settings review (RSSR).	As set out in Chapter 2.2 and 2.3 the Panel considers that there is significant change taking place with the energy sector. The Panel is still mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability.
Shell, p. 2	State that if there is a genuine need for the Panel to consider the form of the reliability standard and/or settings, there is already a mechanism to allow it. Clause 8.8.3(c) of the National Electricity Rules (NER) provides for the AEMC to issue the Panel with a terms of reference for any RSSR. Clause 3.9.3A(e) of the NER requires the Panel to have regard to this terms of reference.	The Panel notes this, however highlights that the guidelines take precedence over the terms of reference.

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Shell, p.5	State that in the current changing environment, it makes sense to provide regulatory stability and certainty with respect to the form of the reliability standard and settings. Increasing the risk of form changes adds another unknown variable to an already uncertain situation.	As set out in Chapter 2.2 and 2.3 the Panel considers that there is significant change taking place with the energy sector. The Panel is still mindful of the importance of stability but thinks that given the scale of the transition underway this should be removed for these guidelines. The Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions. Further, the process for reviewing the standard and settings, and actioning any changes through subsequent rule changes will further promote stability.
Shell, p.5	State that allowing the Panel to automatically review the form of the reliability standard and/or settings as part of the standard RSSR process would add complexity and regulatory burden to the consultation process. This cost would ultimately be passed to consumers (for likely negligible benefit), which is counterproductive to achieving the NEO.	The Panel notes that regulatory burden may be increased by requesting stakeholders to respond and understand a greater number of changes. However, it is considered that the potential material benefit of conducting a holistic review would outweigh this burden.
Shell, p. 6	Shell state that a broad comment that the market is undergoing changes appears insufficient to justify the Panel's view that 'the benefits of stability may no longer outweigh the benefits of a flexible framework in a changing environment.'	The Panel suggests that change is inherently unpredictable. Thus, it is difficult to know ahead of time when it would be appropriate to review the reliability standard and settings to ensure they are suitable. Instead, the Panel considers that it needs to take into account current changes to ensure it can conduct a review of the form and level of the reliability standard and settings whenever it is suitable to do so. By focusing on reviewing the standard and settings

STAKEHOLDER	ISSUE	PANEL RESPONSE
		only when there is material benefit of doing so, thus minimising the risk of regulatory burden.
Me, P.3	Note that they do not consider the RP has made a compelling case that the RSSR guidelines need to be changed (IE in the form of the Reliability Standard and the settings) but the Me considers that the changes proposed have the potential to create increased uncertainty and so lead to more risk for investments, causing higher costs to consumers.	The Panel suggests that change is inherently unpredictable. Thus, it is difficult to know ahead of time when it would be appropriate to review the reliability standard and settings to ensure they are suitable. Instead, the Panel considers that it needs to take into account current changes to ensure it can conduct a review of the form and level of the reliability standard and settings whenever it is suitable to do so. By focusing on reviewing the standard and settings only when there is material benefit of doing so, thus minimising the risk of regulatory burden.
Issues pertaining to the Reliability Standard		
Australian Energy Council, p.1	State that the interim reliability standard must be within scope of the Panel's 2022 review and that it should conclude with the recommendation of only one, permanent, reliability standard.	The Panel's role is to set the reliability standard for the period of 2024-2028. The interim reliability measure is due to expire on the 31st of March 2025 according to rule 11.128.1 of the NER. After the expiry the interim reliability measure will be subject for review by the AEMC in July 2024.
AEC, p.2	Comment that a transitioning power system, which was already occurring in 2016, does not necessarily invalidate the conclusions of the 2016 Panel.	The Panel notes this comment.
AEC, p.3	State that the superiority of the USE approach is now well settled and there is no need to re-open this. (*Different cap and floor forms appropriate if ESB Post 2025 review recommends deviating from an energy only*	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review.

STAKEHOLDER	ISSUE	PANEL RESPONSE
	market).	
Flow Power, p.3	Note that unserved energy is the most appropriate metric for the long term function of the reliability standard.	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review.
PAC, p.1	Support the current reliability standard, and do not see merit in moving away from the value of 0.002% USE at this time.	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review.
CS Energy, p.2	Note that they do not consider a need to review the form of the Reliability Standard itself, given it is a clear, outcomes-based metric. It would however, be beneficial for the AEMC to clarify the role of the Interim Reliability Mechanism in the review.	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review. The Panel's role is to set the reliability standard for the period of 2024-2028. The interim reliability measure is due to expire on the 31st of March 2025 according to rule 11.128.1 of the NER. After the expiry the interim reliability measure will be subject for review by the AEMC in July 2024.
Energy Australia, p.2	Suggest that the Panel should take the opportunity to consider the scope of the reliability standard and whether it is the appropriate framework to be held responsible for mitigating high-impact, low-probability (HILP) events.	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review.
Energy Australia, p.3	State that the NEM-wide standard should continue to have a probabilistic basis, rather than predefined margin of units or MW.	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review.
EnergyAustralia, p.3	Note that the proliferation of reliability standards may be	The Panel notes this, however comments that the interim reliability

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	working at cross purposes and leading to inefficient investment. We propose that a singular reliability standard should be used in all jurisdictions for all relevant purposes in the rules.	measure is out of the Panel's scope and will remain in place until the 31st of March 2021.
MEU, p.4	Consider there is no valid reason for the RP to have the power to change the form of the reliability standard – if change is needed, there is a mechanism available to make this change.	The Panel does not have the power to change the form of the reliability standard, the Panel must submit a rule change to the AEMC for the AEMC to review whether a change to the form of the reliability standard has material benefit.
Shell, p.6	State they do not consider there is value in the Panel routinely considering the form of the reliability standard as part of each RSSR. Nor is there value in considering the form of the reliability standard as a once off in the next RSSR.	The Panel notes this comment and notes that such issues will be considered comprehensively through the RSS review itself.
Shell, p.4	State that they are concerned that changing the form of the reliability standard and/or settings may give rise to an excessively stringent reliability regime that adds costs above what consumers are willing to pay.	The Panel note that in accordance with the second assessment principle of the guidelines, any change to the form or level of the reliability standard must take into consideration the value that customers place on reliability as well as all the other requirements under the NER, Guidelines, ToR and taking stakeholder feedback into account.
Shell, p. 7	Note that the Panel and the AEMC have previously considered, on numerous occasions, a range of alternative forms for the reliability standard.	The Panel notes this. The consideration of the form of the reliability standard will be considered through the robust process of the RSS review.
Issues pertaining to the Market Price Cap		
AEC, p.3	Comment that there is no practical alternative to a simple cap and floor on the five-minute dispatch and settlement price.	The Panel notes this. The consideration of the market price cap will be considered through the robust process of the RSS review.

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PIAC, p.4	Recommend that the Panel reconsider the primacy of the MPC as an investment signal.	The Panel acknowledges this comment and has adjusted the assessment principles relating to the MPC to ensure that enabling the market to achieve and send efficient price signals as well as managing participant exposure to price signals are both considered equally.
PIAC, p.4	Suggest that the MPC should be primarily considered as a mechanism to manage participant exposure to price risk.	The Panel notes this and states that it views the roles of the MPC as a mechanism to limit market exposures as well as a tool to send efficient price signals with equal importance.
MEU, p.4	Consider that there is no valid reason for the RP to have the power to change the form of the market price cap – if change is needed, there is a mechanism available to make this change.	The Panel does not have the power to change the form of the MPC, the Panel must submit a rule change to the AEMC for the AEMC to review whether a change to the form of the MPC has material benefit.
Shell, p.8	Do not consider there is value in the Panel routinely reviewing the form of the market price cap (MPC) as part of each RSSR. Nor is there value in considering the form of the MPC as a 'once off' in the next RSSR.	The Panel suggests that change is inherently unpredictable. Thus, it is difficult to know ahead of time when it would be appropriate to review the reliability standard and settings to ensure they are suitable. Instead, the Panel considers that it needs to take into account current changes to ensure it can conduct a review of the form and level of the reliability standard and settings whenever it is suitable to do so. By focusing on reviewing the standard and settings only when there is material benefit of doing so, thus minimising the risk of regulatory burden.
Shell, p.8	Note that a regional MPC has been considered in the 2014 RSSR and the 2016 Guidelines final determination, and they were considered to be inferior to a	Noted. The market price cap will be considered through the robust RSS review.

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	single MPC that applies to all regions.	
Shell, p. 8	Comment that the Guidelines already allow the Panel to routinely consider the MPC level in every RSSR. Therefore, the issues raised in the consultation paper can be considered as part of the RSSR without changes to the Guidelines.	Noted. The market price cap will be considered through the robust RSS review.
Issues pertaining to the Market Floor Price		
CS Energy, p. 2	Specifically, in CS Energy's view, the Market Floor Price (MFP) needs reassessment to ensure it will efficiently and effectively incentivise the right capability to deliver system stability at times of lower operational demand.	The Panel notes CS Energy's support for reviewing the form and level of the MFP. However, the further comments from CS Energy will be examined in the reliability standard and settings review itself.
CS Energy, p.3	Note that the previous review of the reliability standard and settings considered the "viability of storage technologies" in the materiality assessment of the MFP. This consideration should be technology agnostic focusing instead on the viability of existing and new investment in delivering essential system services as well as energy.	The Panel notes these comments, however this issue will be addressed in the reliability standard and settings review itself.
CS Energy, p.4	Suggest that the Panel and clearly articulate the role of the MFP in terms of system stability.	The role of the MFP is outlined section 3.5 2021 Reliability Standard and Settings Guidelines. The Panel notes that the ESB in its post 2025 market design papers and the AEMC through its seven system services rule changes are examining the incentives that will ensure the system remains secure.
CS Energy, p.4	Suggest that the Panel determine the structure of the MFP and	The Panel notes these comments, however this issue will be addressed

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	potential new associated settings that will most efficiently and effectively incentivise the right capability to deliver system stability at times of lower operational demand.	in the reliability standard and settings review itself.
MEU, p.5	Consider that there is no valid reason for the RP to have the power to change the form of the market floor price – if change is needed, there is a mechanism available to make this change.	The Panel does not have the power to change the form of the MFP directly, the Panel must first review the floor price through the robust process that surrounds that, and then, if it considers that something may need to change, then would have to submit a rule change to the AEMC for the AEMC to review whether a change to the form of MFP would promote the NEO.
Shell, p. 9	State that they do not consider there is value in the Panel routinely reviewing the form of the market floor price (MFP) as part of each RSSR. Nor is there value in considering the form of the MFP as a 'once off' in the next RSSR.	The Panel suggests that change is inherently unpredictable. Thus, it is difficult to know ahead of time when it would be appropriate to review the reliability standard and settings to ensure they are suitable. Instead, the Panel considers that it needs to take into account current changes to ensure it can conduct a review of the form and level of the reliability standard and settings whenever it is suitable to do so. By focusing on reviewing the standard and settings only when there is material benefit of doing so, thus minimising the risk of regulatory burden.
Shell, p. 9	Comment that in their view concepts such as a negative cumulative price threshold and negative administered price cap do not merit detailed consideration as negative prices are in the benefit of consumers and a negative CPT would mute	The Panel notes this, however due to the significant change occurring within the energy sector as outlined in sections 2.2 and 2.3 the Panel considers it important to conduct a holistic review of the reliability standard and settings. This includes an assessment of the value of

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	the negative price signal which incentivises generators to lower their output.	implementing a negative CPT or negative APC.
Issues pertaining to the Cumulative Price Threshold		
AEC, p.3	State that it may be appropriate to align the CPT's timings (7.5 hours of MPC triggering 7 days of APC) with timings more typically used in the industry for risk management. For example, the CPT could instead operate by accumulating prices over a quarter, and, when reached, would apply APC until the end of the quarter. This could address the effectively unlimited risks resulting from CPT being repeatedly triggered within a quarter.	The Panel notes this comment, however details about the CPT and it's timings will be addressed in the reliability standard and settings review itself.
EnergyAustralia, p. 4	Comment that there is merit in reviewing the form of the CPT and the APC to make the most of the market signals they provide, while minimising financial risk for market participants.	The Panel notes this comment.
MEU, p.5	Consider that there is no valid reason for the RP to have the power to change the form of the cumulative price threshold – if change is needed, there is a mechanism available to make this change.	The Panel notes this. The consideration of the CPT will be considered through the robust process of the RSS review.
Shell, p.9	State they do not consider there is value in the Panel routinely reviewing the form of the CPT as part of each RSSR. Nor is there value in considering the form of the CPT as a 'once off' in the next RSSR. Though, they acknowledge that there are slightly different forms the CPT could potentially	The Panel notes this comment. it will consider the matters associated with the CPT in its RSS review.

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	take such as by changing the time period over which the CPT is calculated, or by only considering non-negative prices during the relevant time frame. Though ultimately comment that there is no evidence that the current CPT is not working so there is no need for change.	
Issues pertaining to the Administered Price Cap		
AEC, p.3	Note that APC being a blunt cap interferes with incentives, inhibiting the running of non-scheduled plant with marginal costs exceeding APC, it removes incentives to operate demand-side and small-scale storage and also encourages scheduling of maintenance when plants are most needed by the system.	The Panel notes that the wholesale demand response mechanism rule change, to be implemented from 24 October 2021, will allow demand-side respondents to be compensated during an administered price period. The Panel notes the remainder of this comment and will take this into consideration when conducting the reliability standard and settings review.
Flow Power, p.3	Comment that 'the APC is well below the marginal value of using electricity for many consumers, particularly after a prolonged period of having provided demand response.'	The Panel notes this comment and will take this into consideration when conducting the reliability standard and settings review.
MEU, p.5	Considers that there is no valid reason for the RP to have the power to change the form of the administered price cap. If change is needed, there is a mechanism available to make this change.	The Panel notes this. The consideration of the APC will be considered through the robust process of the RSS review.
Shell, p.10	Do not consider there is value in the Panel routinely reviewing the form of the APC as part of each RSSR. Nor is there value in considering the form of the APC as a 'once off' in the next RSSR.	The Panel suggests that change is inherently unpredictable. Thus, it is difficult to know ahead of time when it would be appropriate to review the reliability standard and settings to ensure they are suitable. Instead, the Panel considers that it needs to take into account current changes to

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		ensure it can conduct a review of the form and level of the reliability standard and settings whenever it is suitable to do so. By focusing on reviewing the standard and settings only when there is material benefit of doing so, thus minimising the risk of regulatory burden. The Panel notes this comment, however it is crucial in a period of substantial change within the energy sector to conduct a holistic review of the form and level of the APC to confirm whether the current APC form is still in fact the most appropriate metric.
Issues pertaining to the application of indexation		
AEC, p.4	State that there is no need to incorporate indexation into the review.	The Panel notes this comment.
MEU, p.5	State that they have consistently been opposed to indexation of the market settings as the valuation of each setting is relatively arbitrary with a range of possible values. The implementation of indexation implies an accuracy in the valuation process that is non-existent.	The Panel notes this comment, and will consider this when conducting the reliability standard and settings review.
Shell, p. 11	Note that Indexation is largely immaterial compared with the other issues the consultation paper is considering.	The Panel notes this comment, and will consider this when conducting the reliability standard and settings review.
Modelling		
Flow Power, p.3	Agree with the principles, though 'note that the Panel shouldn't be thinking about investment in generation. The demand side has a growing role in maintaining the supply-demand balance and the	The Panel notes the role growing role of demand-side participation in maintaining the supply-demand balance and will take this into consideration for the reliability standard and settings reviews

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	Panel should be factoring in the role of the market settings in delivering investments on the demand side that support reliability.'	settings.
EnergyAustralia, p.5	State that any changes the Reliability Panel makes to the guidelines for modelling should ensure that inputs and assumptions are consistent with those used in the ISP.	The Panel notes this comment and will review the assumptions for modelling once the reliability standard and settings review is commenced.
Wartsila, p.1	Comment that there is value for the AEMC to be transparent with its modelling inputs and have them be accurate reflections of the state of different technologies.	The Panel notes this and will provide stakeholders with transparency around the assumptions used for the modelling within the reliability standard and settings review.
MEU, p.5	Comment that they do not see that the current guidelines impose any significant constraints on the RP in carrying out its tasks, so it does not agree that there is a compelling reason for change. However, the three dot points listed as principles are seen as beneficial and are supported.	The Panel notes this comment, though considers the proposed broader guidelines for modelling will allow the flexibility required to achieve the optimal modelling outcomes.
Shell, p.11	State that they are unconvinced that the modelling parameters as set out in the Guidelines constrain or restrict the panel in any way where there is value in removing Section 4 when the Guidelines are updated.	The Panel notes this comment, though considers the proposed broader guidelines for modelling will allow the flexibility required to achieve the optimal modelling outcomes.
General comments on the form and level of the reliability standard and settings		
Snowy Hydro, p.3	State that the cumulative price threshold (CTP) is also set too low. The CPT creates a missing money problem. Retailers do not have an incentive to purchase hedging cover above the implied protection of CPT and this is reflected in traded cap prices	The Panel notes this and will consider comments centred on specific changes to the level of the CPT in the upcoming reliability standard and settings review.

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	which results in deferred or absent risk management and high probability of retailers' insolvency.	
PIAC, p.5	Note that some of the new demand response that is brought to the market as a result of reforms such as the Wholesale Demand Response mechanism require a markedly lower price signal than new generators. This could, in turn, indicate that a lower MPC is appropriate.	The Panel notes this and will consider comments centred on specific changes to the MFP in the upcoming reliability standard and settings review.
PIAC, p.5	Recommend that the Reliability Panel considers the role of battery energy storage in the reliability and security of the energy market, and specifically the interactions between energy storage and reliability standard and settings, for this review.	The Panel notes this comment, and will consider the role of battery storage when conducting the upcoming reliability standard and settings review.
PIAC, p.5	Recommend that the Reliability Panel seeks to set different MPC's and CPT's in different regions according to the specific circumstances and needs of each region.	The Panel notes this and will consider comments centred on specific changes to the form of the MPC and CPT in the upcoming reliability standard and settings review.
CS Energy, p.3	Note that the emerging threat to power system stability and reliability is during lower demand periods, with Distributed Energy Resources (DER) reducing operational demand accompanied with abundant VRE and the increase in negative market prices.	The Panel notes this comment on threats to power system stability happening during lower demand periods and will consider this issue in the upcoming reliability standard and settings review.
CS Energy, p.3	CS Energy argues that the Reliability Panel's obligation to recommend an MFP that does "not create substantial risks which threaten the overall stability and integrity of the market" is	The Panel notes and will consider this concern on the level and form of the MFP in the upcoming reliability standard and settings review.

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	currently not met.	
CS Energy, p.3	Suggest that the Panel assess the impact of market distortions such as feed-in-tariffs and the decoupling of the market price with incentives for VRE to generate.	The Panel notes this comment and will consider this within the upcoming reliability standard and settings review.
Energy Australia, p.2	Suggest that as part of this review, the Panel should consider the role of the reliability framework in managing unlikely, but consequential, shortfall events.	The Panel notes that this outside of the parameters of the reliability standard and settings review.
Energy Australia, p.4	Note that the Panel should consider the basis on which any measure of reliability is calculated; operational or native.	The Panel notes this comment and outlines the role and function of the reliability standard in section 3.2 of the reliability standard and settings guidelines.
Shell, p. 8	Suggest that when considering the relationship between the reliability standard and the level of RERT activation, the Panel should consider the role played by AEMO in underestimating real-time demand response, overestimating forecast demand, and the impact of this on AEMO RERT activation decisions.	The Panel notes this comment.

B THE 2018 RELIABILITY AND SETTINGS REVIEW

In 2018, the Panel completed the most recent reliability standard and settings review (the 2018 RSSR).[123] This was the first RSSR to apply the guidelines. In accordance with the guidelines, the Panel was only to consider the level of the reliability standard and settings and concluded that:

- The reliability standard and settings were achieving their purpose, with historical USE in each region of the NEM below the reliability standard of 0.002 per cent
- The levels of the MPC and CPT were sufficient in managing the trade-off between delivering efficient price signals to incentivise the investment necessary to achieve the standard, while continuing to limit market participants' exposure to both temporary and sustained very high prices, and
- Policy uncertainty can create negative effects, which disincentivises investment in long-term assets, and that providing stability and predictability in reviewing the standard and settings will promote efficient investment in electricity services for the long-term interests of consumers and thereby further the National Electricity Objective (NEO).[124]

Therefore, the Panel recommended:

- Retaining the current form and level of the standard
- Making no change to the MPC or CPT in real terms, and
- That the MFP and APC should remain at the nominal values.

The Panel stated that it made its recommendations against a backdrop of rapid transition in the NEM, including: [125]

- Transformation of the generation mix in the market, especially the increasing capacity of intermittent generation and retirement of thermal generation capacity
- The emergence of new technologies, for example, small-scale solar PV and battery storage, that could offer new options for the supply and demand of electricity, and
- Changes to policy and market mechanisms that underpin the NEM, notably, the Panel expected the NEM to transition to five-minute settlement in July 2021.

The Panel noted that market participants were facing vast uncertainty on future developments of the NEM, such as:

- The rates of change of absolute and relative costs of generation technologies and respective fuel input
- Whether a nationally consistent long-term policy on emissions reduction would be introduced and, if so, the form it would take, and
- The introduction of jurisdictional schemes to invest in generation and storage projects.

123 Reliability Panel AEMC, Reliability standard and settings review 2018, 30 April 2018.
124 Reliability Panel, Reliability standard and settings review 2018, 30 April 2018, pp 25-28.
125 Reliability Panel, Reliability standard and settings review 2018, 30 April 2018, p 39.

The Panel's considerations were informed by modelling undertaken by Ernst & Young (EY) that evaluated the expected performance of the standard and settings using a simulation of the NEM under a number of scenarios and sensitivities.[126]

In reaching these conclusions, the Panel took into account:[127]

- The guidelines
- The terms of reference for the review provided by the AEMC
- Any potential effect of any changes to the standard or settings on:
  - Spot prices
  - Investment in the NEM
  - The reliability of the power system, and
  - Market participants, and
- Changes to the AER's value of customer reliability (VCR) measure.

126 EY, Reliability standard and settings review 2018 – modelling report, 13 April 2018, p 2.

127 NER cl 3.9.3A(e).