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Reliability Panel AEMC

**CONSULTATION PAPER**

REVIEW OF THE RELIABILITY  
STANDARD AND SETTINGS  
GUIDELINES

4 MARCH 2021

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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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# 1 INTRODUCTION

The Reliability Panel is required to conduct a review of the reliability standard and settings (RSSR) every four years under the National Electricity Rules (NER).<sup>1</sup> The next review must be completed by April 2022.

In undertaking the review, the NER mandates that the Panel must comply with the *reliability standard and settings guidelines*. These guidelines set out the principles and assumptions the Panel must use when undertaking the *reliability standard and settings reviews*.<sup>2</sup>

Since the guidelines were first established in December 2016, the National Electricity Market (NEM) has undergone a period of rapid transition. This is expected to continue due in large part to changes in the generation mix and associated reforms. The Panel considers that it is important that the guidelines are sufficiently broad and continue to be relevant as the market evolves, so that they remain applicable for future reliability standard and settings reviews. Against this backdrop, the Panel is of the view that it is timely and appropriate to review and amend the 2016 guidelines so that they are fit for purpose going forward.

This consultation paper sets out the background to the guidelines, the broader context in which the Panel is undertaking its review and the matters for consideration in the review of the guidelines. Stakeholders are invited to provide comment to the Panel on these and any other issues that may be relevant. Stakeholder submissions are due on or before **08/04/2021** via the AEMC's website, [www.aemc.gov.au](http://www.aemc.gov.au), using the 'lodge a submission' function and selecting the project reference code REL0080.

The timetable for the review is provided in Table 1.1 below.<sup>3</sup>

**Table 1.1: Timetable for the review**

<b>ACTION</b>	<b>DATE</b>
Issues Paper	4 March 2021
Stakeholder consultations	March/April 2021
Stakeholder submissions close	8 April 2021
Final report and guidelines	13 May 2021

## 1.1 Reliability standard and settings

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

<sup>1</sup> NER cl 3.9.3A(d).

<sup>2</sup> NER cl 3.9.3A(a).

<sup>3</sup> The Panel must amend the reliability and settings guidelines in accordance with the consultation process set out in NER clauses 8.8.3 (d) to (l).

The reliability standard is expressed as the maximum expected unserved energy (USE) in a region.<sup>4</sup> It is a measure of the extent to which the electricity generation and transmission system is able to 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 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
- Market Floor Price (MFP), which places a lower limit on low dispatch prices in the wholesale market
- Cumulative Price Threshold (CPT). The limit of aggregate dispatch prices over the previous seven days (336 trading intervals) that, when surpassed, triggers an administered price period, and
- Administered Price Cap (APC). The prevailing dispatch price that applies during an administered price period after a set of sustained high dispatch prices exceed the cumulative price threshold.

The form and level of the standard and each of the settings are specified in the Rules.<sup>5</sup> If the Panel recommends an amendment to the standard or settings in a reliability standard and settings review, it is required to submit a rule change request to the AEMC as soon as practicable after the RSSR is completed.<sup>6</sup>

## 1.2 The current guidelines

The current guidelines were drafted in 2016 and were the initial set of guidelines. As noted, the guidelines set out the principles and assumptions that the Panel uses in conducting the reliability standard and settings review. These guidelines were formulated with the Panel's overarching goal being to provide the market with useful and transparent information about how it intends to conduct each review. To this end, the guidelines set out:

- The role and function 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 assumptions 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 components are "open, subject to a materiality assessment or closed for review," and

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4 NER cl 3.93C (a).

5 See section 3.3 for more detail.

6 NER cl 3.9.3A (i).

- A general approach to the modelling that the Panel will use when undertaking each review.

### 1.3 The 2018 reliability and settings review

In 2018, the Panel completed the most recent reliability standard and settings review (the 2018 RSSR).<sup>7</sup> This was the first RSSR to take into account the guidelines. The Panel 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 are 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).<sup>8</sup>

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:<sup>9</sup>

- 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 that it would take, and
- The introduction of jurisdictional schemes to invest in generation and storage projects.

<sup>7</sup> Reliability Panel AEMC, Reliability standard and settings review 2018, 30 April 2018.

<sup>8</sup> Reliability Panel, Reliability standard and settings review 2018, 30 April 2018, pp 25-28.

<sup>9</sup> Reliability Panel, Reliability standard and settings review 2018, 30 April 2018, p 39.

The Panel's considerations were informed by modelling undertaken by EY that evaluated the expected performance of the standard and settings using a simulation of the NEM under a number of scenarios and sensitivities.<sup>10</sup>

In reaching these conclusions, the Panel took into account:<sup>11</sup>

- 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 AER's value of customer reliability (VCR) measure.

## 1.4 Structure of this paper

The remainder of this paper is structured as follows:

- Chapter 2. Context: the NEM is transitioning. This section covers power system reliability to date, current drivers of change in the market and reforms occurring in the NEM
- Chapter 3. Matters for the guidelines. This section covers the principles and assumptions proposed for this review and highlights some key points for consideration related to the reliability standard and settings, and
- Chapter 4. List of questions for stakeholder comment.

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<sup>10</sup> EY, Reliability standard and settings review 2018 – modelling report, 13 April 2018, p 2.

<sup>11</sup> NER cl 3.9.3A (e).



## 2 CONTEXT: THE NEM IS TRANSITIONING

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 reviews of the reliability standard and settings.

### 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 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. 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' periods. This is driven by the fact that maintenance on generators and transmission infrastructure is increasingly occurring in these periods, which reduces supply. In addition, given changing weather patterns and increases in variable renewables, supply and demand during shoulder periods are less predictable in the past.<sup>12</sup>

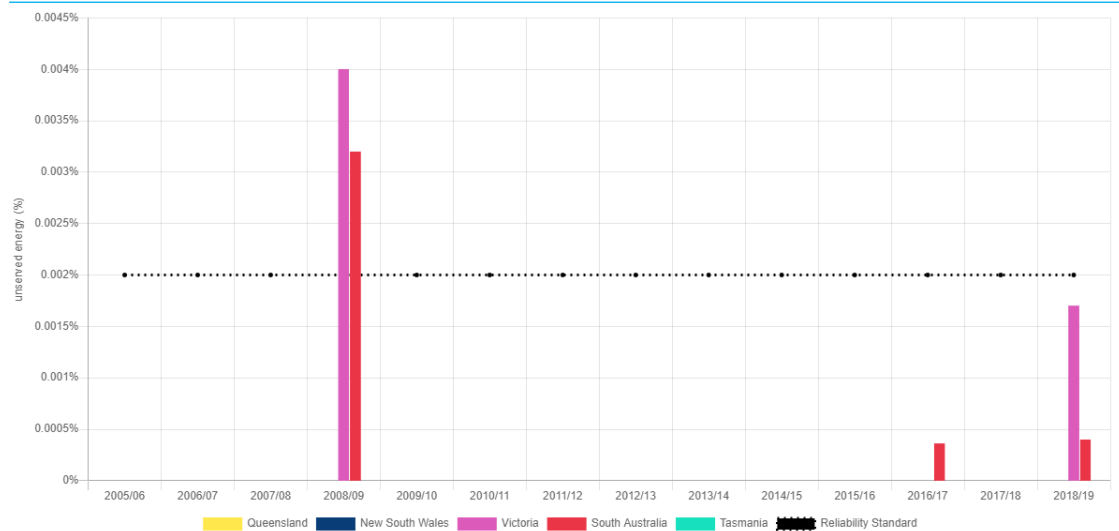
#### 2.1.1 Reliability experience in the NEM

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 the Basslink interconnector.<sup>13</sup>

<sup>12</sup> Reliability Panel, *Information Paper: The reliability standard, current considerations*, March 2020.

<sup>13</sup> Reliability Panel, *Information Paper: The Reliability Standard, Current Considerations*, March 2020, p.17.

**Figure 2.1: Historical unserved energy in the NEM**



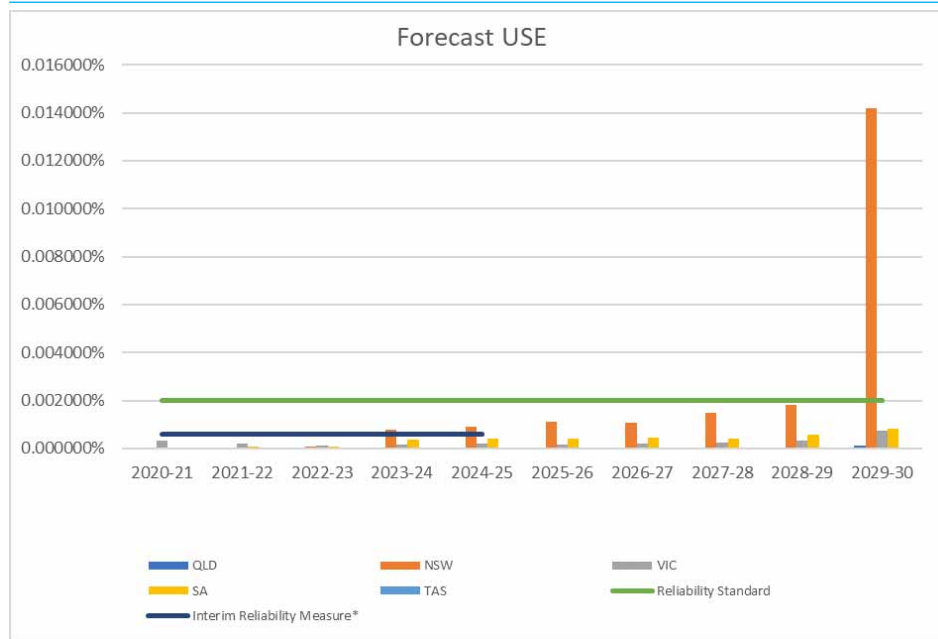
Source: Reliability Panel, Information Paper, The Reliability Standard: current considerations, March 2020.

Looking forward, AEMO forecasts no breaches of the reliability standard (0.002% USE) until 2029-30, which is expected primarily in New South Wales and driven by forced outages and retirements of coal plants.<sup>14</sup>

AEMO, however, forecast that there will be a breach of the interim reliability measure (0.0006% USE) for NSW in 2023-24 when the Liddell power station is expected to retire.<sup>15</sup> 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. The interim reliability measure will cease in March 2025.<sup>16</sup>

14 AEMO, 2020 Electricity Statement of Opportunities, August 2020, p 7; and AEMC, Annual Market Performance Update, 17 December 2020, p 8.  
 15 AEMO, 2020 Electricity Statement of Opportunities, August 2020, pp 7-8.  
 16 COAG Energy Council, Interim Reliability Measures, <http://www.coagenergycouncil.gov.au/reliability-and-security-measures/interim-reliability-measures>.

**Figure 2.2: Forecast Unserved Energy**



Source: Reliability Panel, AMPR market update, January-June 2020, December 2020.

In the NEM, there are buffers in the supply-demand balance to achieve a reliable power system. These buffers are known as reserves<sup>17</sup> 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.<sup>18</sup>

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 2018/2019, 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<sup>19</sup> and bushfires<sup>20</sup> affecting the power system, in particular the transmission network. These events were most

17 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”.

18 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.

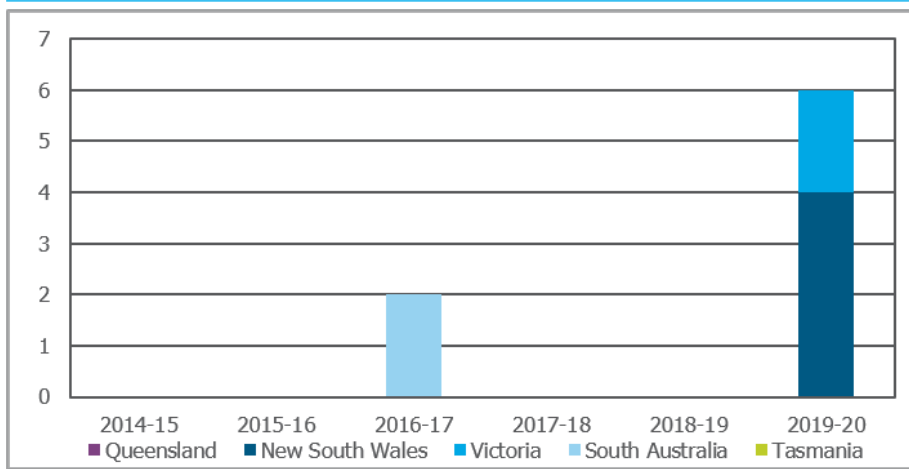
19 Storms on 31 January 2020 that led to transmission outages in Victoria and islanding of South Australia.

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

prevalent in the South Australian separation event and to a lesser extent the Victorian-New South Wales separation event in 2019-20.

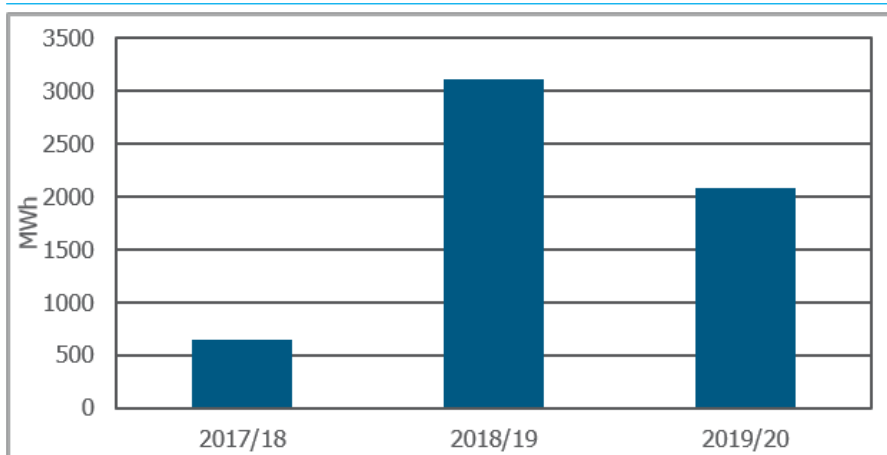
The next section discusses these and other specific changes occurring in the NEM, the challenges they present for operating the power system and for considering any future reliability standard and the reliability settings.

**Figure 2.3: Number of reliability directions issued by AEMO**



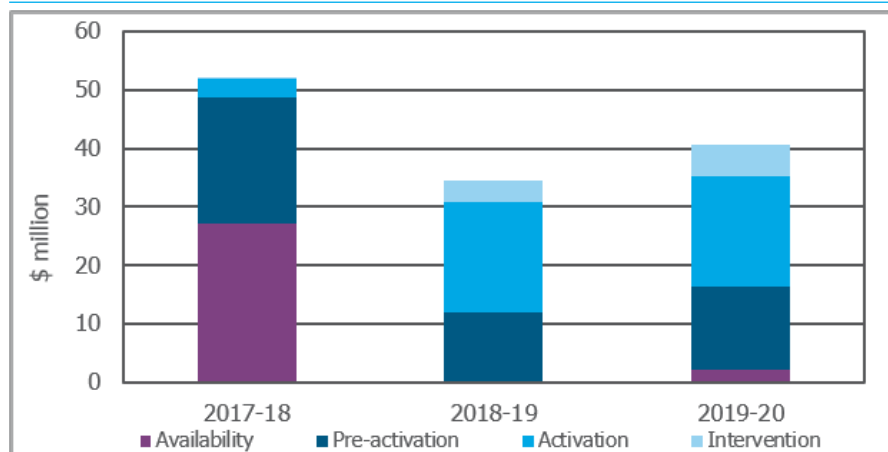
Source: Reliability Panel, AMPR market update, January-June 2020, December 2020.

**Figure 2.4: RERT reserves activated**



Source: Reliability Panel, AMPR Market update January-June 2020, December 2020.

**Figure 2.5: RERT costs**



Source: Reliability Panel, AMPR market update, January-June 2020, December 2020.

## 2.2 Current drivers of change in the NEM

The physical power system of the NEM has changed materially since the guidelines were first introduced in 2016. The generation mix of the wholesale component of the NEM is changing with market dynamics and there has been an increased frequency of severe weather events and other 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 dispatchable generation (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.<sup>21</sup> Each of these changes has materialised on both the supply and demand side of the 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 market events. Traditionally,

<sup>21</sup> Energy Security Board, Post-2025 Market Design Directions Paper, January 2021.

Open Cycle Gas Turbines (OCGT) plants have been the technology type that responds to peak market events in times of temporary scarcity and very high prices. 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 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 could be driving the increase in market price floor events in these jurisdictions.<sup>22</sup>

The demand side of the market is also changing, due to changes and increases in load and demand-side participation which has been driven by advances in remote switching and communication technology as well as 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 reviews of the settings take into account the material changes on both the supply- and demand-side of the market to ensure that efficient price signals are sent to market participants to achieve the reliable operation of the NEM.

Outside of the supply-demand dynamics, 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. Demand has also been affected by the COVID-19 pandemic. The more frequent weather events have presented challenges for reliability and security outcomes in the NEM, while COVID-19 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.<sup>23</sup>

## 2.3 Reforms in NEM

There has been a significant range of reforms that 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 start in October 2021
- Wholesale demand response mechanism, expected to start in October 2021
- Maintaining reliability and security, such as:
  - The seven system security rule changes that form part of the ESB's essential system services work
  - The interim out of market capacity reserve, that allows AEMO to procure reserves under contract terms up to three years. The volume of reserves will be those required

<sup>22</sup> Reliability Panel, Annual Market Performance Market Update, January to June 2020, December 2020.

<sup>23</sup> Reliability Panel, Annual Market Performance Market Update, January-June 2020, December 2020.

to keep unserved energy to no more any 0.0006% in any region in any year for an interim period

- Review of the effectiveness of the Reliability and Emergency Reserve Trader given increased use to manage unexpected contingencies, and<sup>24</sup>
- Release and actioning of AEMO's Integrated System Plan (ISP).<sup>25</sup>

### 2.3.1 Post 2025 market design - ESB reforms

The ESB is advising the Energy Ministers on a long-term reform package with the focus on reviewing the market design of the NEM. In January 2021, the ESB released its directions paper with an update of the progress in the post 2025 design project. The ESB post 2025 market design key focus areas outlined in the January 2021 paper include:

- Resource Adequacy Mechanisms and Ageing Thermal Generation Strategy
- Essential System Services and Scheduling and Ahead Mechanisms
- Demand Side Participation: Two sided markets, valuing demand flexibility and DER integration, and
- Transmission access reform.

The ESB has noted that an any new design would not be introduced at a single point in time, rather introduced over time. The ESB is proposing that recommendations on all reforms will be made by mid 2021 (with an options paper planned for March 2021) and required legislation and rules then developed and introduced over time.<sup>26</sup>

There are fundamental interdependencies between the market design initiatives being considered by the ESB and the standard and settings. For example:<sup>27</sup>

- The proposed 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 is of the view that due to market and power system changes, ESB post 2025 work and the uncertainties related to government policy and schemes, it is important that the approach for review of the reliability standard and reliability settings is fit for purpose and that the reliability settings are considered holistically.

Chapter 3 outlines the Panel's broad proposal for updating the guidelines that takes into account the changes in the market.

24 Energy Security Board Post 2025 Market Design Directions Paper, January 2021.

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

26 Energy Security Board Post 2025 Market Design Directions Paper, January 2021, p.12.

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

### 2.3.2 Linkages to other work and reforms

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

- The review of the interim reliability measure in 2024<sup>28</sup>
- Annual Market Performance Report (AMPR) and updates<sup>29</sup>
- Reliability and system security rule changes between 2018 and 2021.
- AER's estimate of the value of customer reliability (VCR)<sup>30</sup>, and
- Other Reliability Panel work proposed.<sup>31</sup>

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28 Energy Security Board, Interim Reliability Measure, Recommendation for National Electricity Amendment Rule 2020, decision paper, July 2020

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

30 AER, Value of Customer Reliability, Final decision, December 2019.

31 See: <https://www.aemc.gov.au/about-us/reliability-panel/current-forward-work-progra>



## 3 MATTERS FOR THE GUIDELINES - PRINCIPLES AND ASSUMPTIONS

As outlined in chapter 1, the existing guidelines:

- Describe the role and function of the standard and settings
- Set out the assessment framework that the Panel will use when undertaking each review
- Identify the components of the reliability frameworks that the Panel considers should be re-examined at each review, and
- Outline a general approach to the modelling that the Panel will use when undertaking each review.

This section steps through each of the above areas as set out in the 2016 guidelines and provides the overarching approach that the Panel is considering for updating the guidelines.

### 3.1 Assessment Framework

When developing and amending the guidelines, the Panel is guided by the NEO. The NEO is:<sup>32</sup>

[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 reliability standard and settings review. This is in order to support efficient investment in and operation of electricity services to maintain reliability 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 existing general assessment principles embedded in the guidelines regarding assessment and to meet the NEO.

The Panel considers these general assessment principles are still appropriate and should be maintained in the guidelines.

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<sup>32</sup> National Electricity Law, s 7 as contained in National Electricity (South Australia) Act 1996 (SA).

### BOX 1: 2016 RSS GUIDELINE: EXISTING GENERAL ASSESSMENT PRINCIPLES TO MEET THE NEO

1. **Allowing efficient price signals while managing price risk.** The Panel will exercise its judgement to allow the market to send efficient price signals while limiting price risk exposure for 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 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.
3. **Providing a stable, 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.

Source: Final Guidelines, Review of the reliability standard and settings guidelines, 1 December 2016, p 2.

### QUESTION 1: GENERAL ASSESSMENT PRINCIPLES TO MEET THE NEO

Do you agree that the general assessment principles outlined in the current guidelines are appropriate to inform future reviews of the reliability standard and settings?

## 3.2 Assessment Approach

In 2016, the Panel outlined the matters that will need to be considered when undertaking future assessments of the reliability standard and settings.

The guidelines must set out the principles and assumptions it will use for each review however the Panel can choose what matters and approach it includes in the guidelines. When considering the level and form for the standard and settings, the Panel determined that only certain components of the reliability standard and market settings would be automatically reviewed every four years.

For those components that could be reviewed, the Panel also set out:<sup>33</sup>

- Some factors or principles that must be taken into account, and
- Explanations for the key function of each setting, given limited guidance in the NER.

The guidelines set out whether the reliability standard and settings are:

- Open, where the form and level can be reviewed at each RSS review, and changes can be recommended

<sup>33</sup> AEMC Reliability Panel 2016, Reliability Standard and Settings Guidelines, Issues Paper, 7 July 2016, Sydney, pp 9-11.

- Subject to materiality assessment, where the form and level can be reviewed only if the Panel considered there may be a material benefit to assessing it during the review, or
- Closed, where the form and level of the standard or setting is not open for review in future reviews.

Table 3.1 sets out which components of the reliability settings described in section 1.1 are open, subject to materiality assessment and which are closed for review under the current guidelines.

**Table 3.1: Ability to review reliability components under the 2016 guidelines**

	<b>RELIABILITY STANDARD</b>	<b>MARKET PRICE CAP</b>	<b>CUMULATIVE PRICE THRESHOLD</b>	<b>MARKET FLOOR PRICE</b>	<b>ADMINISTERED PRICE CAP</b>
<b>Form</b>	Closed	Closed	Closed	Closed	Closed
<b>Level</b>	Materiality assessment	Open	Open	Materiality assessment	Materiality assessment
<b>Application of indexation</b>	NA	Closed (indexation is to apply)	Closed (indexation is to apply)	Closed (indexation is not to be applied)	Closed (indexation is not to be applied)
<b>Form of indexation</b>	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.

For the 2016 guidelines, the Panel considered that there was a need to:<sup>34</sup>

- 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.

The Panel notes that there still is a need to support stability and predictability in the market to the greatest extent possible, but there is also a need to align and have regard to the market changes and post 2025 reforms going forward.

In addition to the guidelines, in the NER, there is a set of assessment requirements and considerations that the Panel must consider or have regard to when reassessing the reliability standard or settings, ie:<sup>35</sup>

- The guidelines themselves
- Any terms of reference that may be provided by the AEMC
- The potential effect on any of:

<sup>34</sup> Reliability Panel, Review of Reliability Standard and Settings Guidelines, Final Determination, 1 December 2016, pp i-ii.

<sup>35</sup> NER cl 3.9.3A(e).

- Spot prices
- Investment in the NEM
- The reliability of the power system, and
- Market participants
- The value of customer reliability determined by the AER, and
- Any other matters specified in the guidelines or that the Panel considers relevant.

In the last reliability standard and settings review, there was a starting point from which the Panel could decompose form and level into two different questions, for example:

- What is the most appropriate form of the market price cap, and
- At what level should it be set?

The Panel determined that there would not be material benefit in reconsidering the form because there had been fewer material changes to the manner in which the market operated. Hence, the Panel, due to the requirements in the guideline, could focus on the levels of the settings. Given the substantial changes that are now presenting themselves in the market, as outlined in Chapter 2, it may make sense to consider both form and level in a comprehensive manner by, for example, reviewing the form of the market price cap so that it remains appropriate for the purpose which it is intended to serve.

The Panel considers the benefits from stability may no longer outweigh the benefits of a flexible framework in a changing environment. Therefore, the Panel is proposing to:

- Consider removing the determination that a component is open, subject to a materiality assessment or closed for review from the guidelines, effectively making all components open
- Review/update the statements in the existing guidelines that refer to the purpose/function of each component, and
- Rely on the assessment principles and the criteria related to the reliability standard and settings in the NER as the basis for the Panel's recommendations. This effectively forming a materiality assessment for the guidelines.

## QUESTION 2: BROAD APPROACH FOR GUIDELINES UPDATE

Do you consider it is appropriate for the Panel to:

- Remove the existing arrangement where components are open, subject to materiality assessment or closed for review
- Going forward, base the RSSR primarily on the assessment principles and other assessment criteria and considerations as set out in the NER, and
- Review/update the existing guidelines statements on purpose/function of each of the components?

In particular, we are interested in views on the benefits of having a more constrained framework i.e. regulatory stability, versus having more flexibility in the framework.

### 3.3 Other matters for consideration - reliability standard and settings

#### Reliability Standard

As noted above, the form of the standard was closed for review in the previous RSSR as per the direction in the guidelines. The form of the reliability standard is specified in the NER.<sup>36</sup> The form of the reliability standard is currently expressed as the level as unserved energy as a proportion of total energy supplied in the market.

The reliability standard balances the value that consumers place on the reliable supply of electricity with the costs required to deliver this level of reliability.

There may be other forms of the reliability standard that are more appropriate for the changing power system that could, either individually or in combination with the current standard, minimise the total cost of reliability. Appendix A describes other reliability standards. The Panel will consider these and other issues formally in the upcoming review of the reliability standard and settings.

#### QUESTION 3: ISSUES PERTAINING TO THE RELIABILITY STANDARD

Do you consider that there is value in the Panel considering the form of the reliability standard as part of RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?

#### Market Price Cap

In the previous RSSR, the form of the MPC was also closed as per the guidance in the guidelines. The form of the MPC is specified in the NER.<sup>37</sup>

The market price cap is set as the minimum value that provides the appropriate long-term price signals for investment in order to meet the reliability standard. Under the NER, the Panel can only recommend an MPC that achieves the reliability standard to be met and that does not create risks to the market.<sup>38</sup> The MPC is currently lower than the AER's estimate of NEM-wide value of customer reliability (VCR), which describes theoretical limits on consumers' willingness to pay for increased reliability.<sup>39</sup>

The Panel considers that there are a number of material changes in the NEM as outlined in chapter 2 that the Panel considers may affect the setting of the MPC, for example:

- 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, and

36 NER cl 3.9.3C(a).

37 NER cl 3.9A (d).

38 NER cl 3.9.3A(f).

39 AER, Values of Customer Reliability - Final report on VCR, December 2019, p 71.

- Little investment in OCGT's, previously considered the default 'new entrant'.

#### QUESTION 4: ISSUES PERTAINING TO THE MARKET PRICE CAP

Do you consider that there is value in the Panel reviewing the form of the market price cap as part of the RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines for that review?

### Market Floor Price

In the previous RSSR, the form of the MFP was closed for review as per the guidance in the guidelines. The value of the MFP is specified in the NER.<sup>40</sup>

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

- The increasing investment in battery storage, and
- The changing generation mix.

The Panel considers that it is important that these issues are incorporated in its review of the MFP.

In addition, there is 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 increased penetration of household solar PV systems is projected to increase the severity of minimum grid-based demand and so, very low prices. To effectively manage the risk faced by market participants, it may be prudent to consider a minimum cumulative price threshold and associated minimum administered price period and administered price floor.

#### QUESTION 5: ISSUES PERTAINING TO THE MARKET FLOOR PRICE

Do you consider that there is value in the Panel reviewing the form of the market floor price in RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?

### Cumulative Price Threshold

The form of the CPT was closed for review in the previous RSSR, as per the direction in the guidelines. The form of the CPT is described in the NER.<sup>41</sup>

The cumulative price threshold is approximately fifteen times that of the value of the market price cap.

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, may result in inefficient

<sup>40</sup> NER cl 3.9.6 (b).

<sup>41</sup> NER cl 3.14.1 (e).

over-investment or excessive price risk for all participants in the market. Under the NER, the Panel can only recommend a CPT that allows the reliability standard to be met and that does not create additional risks that threaten the integrity of the market.<sup>42</sup>

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.

#### QUESTION 6: ISSUES PERTAINING TO THE CUMULATIVE PRICE THRESHOLD

Do you consider that there is value in the Panel reviewing the form of the cumulative price threshold in RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?.

#### Administered Price Cap

In the previous RSSR, the form of the APC was closed for review, as per the direction in the guidelines. The value of the APC is specified in the NER.<sup>43</sup>

The Administered Price Cap has a relationship with the CPT. Any considerations or changes of the CPT will therefore require consideration of changes to the Administered Price Cap, including its role in managing market participant risk without hindering price signals for participants to supply energy.

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.<sup>44</sup> 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.<sup>45</sup>

#### QUESTION 7: ISSUES PERTAINING TO THE ADMINISTERED PRICE CAP

Do you consider there is value in the Panel reviewing the form of the administered price cap in RSSR and, if so, what (if any) general principles or assumptions should be included in the

42 NER cl 3.9.3A (f).

43 NER cl 3.14.1 (a).

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

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

guidelines?

### Indexation

Since a Reliability Panel initiated Rule change went into effect in 2012, the AEMC has inflated the nominal value of the MPC and CPT each year based on historical inflation that has occurred.<sup>46</sup> 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.<sup>47</sup> 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 intends to remove the determination of closed, open or subject to materiality assessment and rely on the NER requirements.

#### QUESTION 8: ISSUES PERTAINING TO THE APPLICATION OF INDEXATION

Do you consider that there should be any principles or assumptions included in the guidelines specifically related to indexation?

## 3.4

### Modelling

Modelling, while only one of the inputs, has always been a key tool used by the Panel for each reliability standard and settings review.

The current guidelines set out some general principles, and the suite of inputs and scenarios that may be used to inform the Panel's assessment of the reliability standard and settings. This was done on the basis that the guidelines define an approach, but the model itself should be left for each review.

For the 2018 RSSR review, some changes were made to the modelling approach and factors to be considered relative to the modelling undertaken for the previous RSSR. The changes to the modelling approach were:<sup>48</sup>

- Taking a technology-neutral approach to the new entrant marginal generator, rather than assuming it was an OCGT
- Considering the net revenues of both existing and new entrant generators, rather than just new entrant generators
- Explicitly assessing the value of the MPC that would threaten the reliability standard, and
- Reviewing options to change both the MPC and CPT.

<sup>46</sup> AEMC, Reliability Settings from 1 July 2012, Rule Determination, 16 June 2011, p i.

<sup>47</sup> NER cl 3.9.4 (d); and NER cl 3.14.1 (e).

<sup>48</sup> EY, Reliability Standard and Settings Review 2018 - Modelling Report, 13 April 2018, p 2.



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. 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.

The Panel proposes to remove the modelling approach and factors to consider 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.

However, the Panel considers that there is value in including principles or objectives in the guidelines related to :

- Taking a technology neutral approach to generator investment
- The transparency of assumptions to allow for any data or parameters underpinning the model to be visible and consulted on by stakeholders, and
- Applying sensitivity analysis on assumptions where there exists material uncertainty on the true or forecast value.

#### QUESTION 9: MODELLING

Do you consider that there is value:

- In removing the section on modelling approach from the updated guidelines, and
- Including broad statements on the objectives, transparency of assumptions and use of sensitivity analysis for the modelling?

## 4 LIST OF QUESTIONS

### QUESTION 1: GENERAL ASSESSMENT PRINCIPLES TO MEET THE NEO

Do you agree that the general assessment principles outlined in the current guidelines are appropriate to inform future reviews of the reliability standard and settings?

### QUESTION 2: BROAD APPROACH FOR GUIDELINES UPDATE

Do you consider it is appropriate for the Panel to:

- Remove the existing arrangement where components are open, subject to materiality assessment or closed for review
- Going forward, base the RSSR primarily on the assessment principles and other assessment criteria and considerations as set out in the NER, and
- Review/update the existing guidelines statements on purpose/function of each of the components?

In particular, we are interested in views on the benefits of having a more constrained framework i.e. regulatory stability, versus having more flexibility in the framework.

### QUESTION 3: ISSUES PERTAINING TO THE RELIABILITY STANDARD

Do you consider that there is value in the Panel considering the form of the reliability standard as part of RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?

### QUESTION 4: ISSUES PERTAINING TO THE MARKET PRICE CAP

Do you consider that there is value in the Panel reviewing the form of the market price cap as part of the RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines for that review?

### QUESTION 5: ISSUES PERTAINING TO THE MARKET FLOOR PRICE

Do you consider that there is value in the Panel reviewing the form of the market floor price

in RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?

#### **QUESTION 6: ISSUES PERTAINING TO THE CUMULATIVE PRICE THRESHOLD**

Do you consider that there is value in the Panel reviewing the form of the cumulative price threshold in RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?.

#### **QUESTION 7: ISSUES PERTAINING TO THE ADMINISTERED PRICE CAP**

Do you consider there is value in the Panel reviewing the form of the administered price cap in RSSR and, if so, what (if any) general principles or assumptions should be included in the guidelines?

#### **QUESTION 8: ISSUES PERTAINING TO THE APPLICATION OF INDEXATION**

Do you consider that there should be any principles or assumptions included in the guidelines specifically related to indexation?

#### **QUESTION 9: MODELLING**

Do you consider that there is value:

- In removing the section on modelling approach from the updated guidelines, and
- Including broad statements on the objectives, transparency of assumptions and use of sensitivity analysis for the modelling?

## A OTHER POTENTIAL FORMS OF RELIABILITY STANDARD

The form of the reliability standard is currently expressed as the level of unserved energy as a proportion of total energy supplied in the market. The reliability standard needs to be considered within the market in which it operates to ensure it is the optimal standard to minimise the total cost of reliability. A number of different forms of the reliability standard could be used to express and assess power system reliability that could, either individually or in combination with the current standard, minimise the total cost of reliability.

There are strengths and weaknesses associated with each of these approaches to the form of the standard. For example:<sup>49</sup>

- Standards that focus on the likelihood of frequency of interruptions generally do not address the magnitude of the shortage. That is, they focus on the likelihood of load being shed but not the severity
- A volumetric measure captures the volume of energy lost effectively, but does not limit the likelihood of interruptions to customer supply, and
- A deterministic standard, such as a minimum reserve margin, may be relatively simple to implement, but the actual level of reliability it provides is a function of the number of generators actually in service at any given time.

Several alternative forms are summarised below.<sup>50</sup>

### **Frequency of interruptions**

The frequency of interruptions is an output-based metric, that would set a maximum level of how frequently supply is interrupted, eg, the number of days per year in which an interruption occurs.

This is important when the number of interruptions is the critical factor for consumers and would be most relevant in circumstances where the system has the potential for a number of small outages of short duration.

### **Maximum probability of USE**

A maximum probability of USE standard expresses a maximum tolerable probability of breaching an upper limit of unserved energy. This standard combines a focus on the tolerable likelihood with a certain size of supply interruption, eg, no more than a 10 per cent probability of exceeding 0.002 per cent USE.

This is important when consumers are willing to tolerate some USE so long as it is only likely to occur on a relatively certain basis, eg, with no more than 10 per cent likelihood.

### **Maximum probability of any lost load**

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49 AEMC, The Reliability Standard: Current Considerations, 12 March 2020, pp 32-33.

50 AEMC, The Reliability Standard: Current Considerations, 12 March 2020, p 32.

The maximum probability of any lost load standard expresses the tolerable probability of having any unserved energy at all, eg, no more than 10 per cent probability of having any unserved energy. This standard would be used where consumers have a low tolerance for any USE at all.

**Volumetric buffer**

The volumetric buffer standard is an input-based standard, that sets a minimum amount of reserve generation capacity to be available at all times.

This is useful when larger generators feature in the physical power system and is a useful indicator of consumers' value of reliability (VCR).

## 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	Unserviced Energy