

Reliability Panel AEMC

## ISSUES PAPER

# Reliability Standard and Settings Review 2014

9 May 2013

## **Inquiries**

Reliability Panel  
Australian Energy Market Commission  
PO Box A2449  
Sydney South NSW 1235

E: panel@aemc.gov.au

T: (02) 8296 7800

F: (02) 8296 7899

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## **About the AEMC**

The Council of Australian Governments, through its Ministerial Council on Energy (MCE), established the Australian Energy Market Commission (AEMC) in July 2005. The AEMC has two principal functions. We make and amend the national electricity and gas rules, and we conduct independent reviews of the energy markets for the MCE.

## **About the AEMC Reliability Panel**

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

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## **Reliability Panel Members**

Neville Henderson, Chairman and AEMC Commissioner

Trevor Armstrong, Chief Operating Officer, Ausgrid

Stephen Davy, Chief Commercial Officer, Hydro Tasmania

Mark Grenning, Chief Advisor Energy, Rio Tinto

Chris Murphy, Chief Executive Officer, Secure Energy

Andrew Nance, Principal, St Kitts Associates

Tim O'Grady, Head of Public Policy, Origin Energy

Nick Sankey, Head of Utilities Energy and Renewables, Commonwealth Bank

David Swift, Executive General Manager Corporate Development, Australian Energy Market Operator

Merryn York, Chief Executive Officer, Powerlink

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# 1 Introduction

This issues paper has been prepared for the Reliability Panel's (Panel's) reliability standard and settings review (review). The purpose of this paper is to facilitate consultation and seek views on relevant issues.

## 1.1 The reliability standard and settings review

Under the National Electricity Rules (NER), the Panel is required to carry out a review of the reliability standard and reliability settings once every four years. This regular review allows the Panel to consider whether the reliability standard and reliability settings remain suitable, or whether changes should be made to ensure these mechanisms continue to meet the requirements of the market, market participants and consumers.

The market environment and market arrangements are constantly evolving. Regular review of the reliability standard and reliability settings is therefore important to allow potential impacts of any changes to be assessed. If the reliability standard and settings are not reviewed, they may not continue to provide appropriate signals for investment. This would ultimately have a detrimental effect on the reliability of electricity supply to consumers.

## 1.2 Purpose of this review

The purpose of this review is to:

- determine whether the existing reliability standard is appropriate for the current market arrangements;
- determine the form and level of the reliability standard that should apply from 1 July 2016;
- recommend the appropriate reliability settings to apply in the National Electricity Market (NEM) from 1 July 2016 to achieve the reliability standard chosen; and
- propose processes for implementing any changes arising from the review.

## 1.3 Requirements for this review

The Panel is undertaking this review in accordance with the requirements under the NER and the terms of reference issued by the Australian Energy Market Commission

(AEMC).<sup>1</sup> The NER requires that the Panel follow the rules consultation procedures in carrying out this review. <sup>2</sup>

Following the completion of this review, the Panel may set a new reliability standard while any recommended changes to the reliability settings would be submitted to the AEMC as a rule change request for consideration under the National Electricity Law (NEL) rule change process.

## 1.4 Consultation process

The Panel will undertake consultation with stakeholders through seeking comments and submissions on the issues paper and draft report as well as through at least one public meeting. The key milestones and proposed dates are set out in the following table.

**Table 1.1 Indicative review timetable**

<b>Milestones</b>	<b>Date/Indicative date</b>
Issues paper - published	9 May 2013
Issues paper - close of consultation	21 June 2013
Draft report - publish	13 December 2013
Draft report - close of consultation	14 February 2014
Final report - publish	by 30 April 2014

## 1.5 Submissions to the issues paper

The Panel invites comments from interested parties in response to this issues paper by 21 June 2013. All submissions will be published on the AEMC website.

Electronic submissions must be lodged online through the AEMC's website [www.aemc.gov.au](http://www.aemc.gov.au) using the link entitled "lodge a submission" and reference code "REL0051". The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated.

Upon receipt of the electronic submissions, the AEMC website will issue a confirmation email. If this confirmation email is not received within three business days, it is the submitter's responsibility to ensure the submission has been delivered successfully.

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<sup>1</sup> The requirements for the review are set out under clause 3.9.3A(a) of the NER, and the terms of reference is published on the AEMC website [www.aemc.gov.au](http://www.aemc.gov.au).

<sup>2</sup> The rules consultation procedures are set out under section 8.9 of the NER.

Or, if choosing to make submissions by mail, the submission must be on letterhead (if submitted on behalf of an organisation), signed and dated. The submission may be posted to:

Reliability Panel  
Australian Energy Market Commission  
PO Box A2449  
SYDNEY SOUTH NSW 1235

Or by Fax to (02) 8296 7899.

## **1.6 Structure of the paper**

The remainder of this issues paper is set out as follows:

- **Chapter 2 – Background:** provides background information on the reliability standard and reliability settings, and a summary of the previous reviews the Panel conducted on these matters.
- **Chapter 3 – Factors for consideration:** outlines the scope of the review and the factors the Panel will have regard to in undertaking this review.
- **Chapter 4 – Issues for consultation:** outlines specific issues on which the Panel is seeking comment, including some discussion of these issues.
- **Appendix A:** sets out the Panel’s obligations under the NER for this review.
- **Appendix B:** sets out the current reliability standard.

## 2 Background

This chapter provides background information on and explanations of reliability, the reliability standard and the reliability settings. A summary of previous reviews on the reliability standard and settings is also provided.

### 2.1 Reliability and the reliability standard

Reliability is a term used across different industries but the meaning and the measure of 'reliability' can be quite different.

In the context of this review, we are considering the reliability of the generation and bulk transmission sectors where reliability refers to the system capacity to generate and transport sufficient electricity to meet consumer demand in the NEM. For the purpose of measuring reliability, "bulk transmission" capacity equates to inter-regional capability.

The reliability standard is the primary mechanism to signal the market to deliver enough capacity to meet consumer demand for electricity. It is set by the Panel in accordance with the NER.

The current 'Reliability Standard for Generation and Bulk Supply' is expressed in terms of the maximum unserved energy (USE) - or the maximum amount of electricity expected to be at risk of not being supplied to consumers. Currently under the reliability standard, the level of the USE should not exceed 0.002 per cent of the annual energy consumption for the associated region or regions per financial year.<sup>3</sup>

The reliability standard needs to adequately account for events that could impact power system performance but which may not affect the overall reliability of the NEM. The reliability standard therefore defines the reliability incidents for generation and bulk supply that are to be included and excluded from assessing power system reliability.

The reliability standard includes USE associated with power system reliability incidents that result from:

- a single credible contingency on a generating unit or an inter-regional transmission element, that may occur concurrently with generating unit or inter-regional transmission element outages; or<sup>4</sup>

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<sup>3</sup> The reliability standard is published on the AEMC Reliability Panel website: [www.aemc.gov.au/panels-and-committees/reliability-panel/guidelines-and-standards.html](http://www.aemc.gov.au/panels-and-committees/reliability-panel/guidelines-and-standards.html)

<sup>4</sup> A 'contingency event' is defined under the NER as an event affecting the power system which the Australian Energy Market Operator (AEMO) expects would be likely to involve the failure or removal from operational services of one or more generating units and/or transmission elements. The NER further defines a 'credible contingency event' as a contingency event where the occurrence of which AEMO considers to be reasonably possible in the surrounding circumstances including the technical envelope. See clause 4.2.3 of the NER.



- delays to the construction or commissioning of new generating units or inter-regional transmission network elements, including delays due to industrial action or "acts of God".

The reliability standard excludes USE associated with power system security incidents that results from:

- multiple or non-credible contingencies;<sup>5</sup>
- outages of transmission or distribution network elements that do not significantly impact the ability to transfer power into the region where the USE occurred; or
- industrial action or 'acts of God' at existing generating or inter-regional transmission facilities.

The Panel undertakes an annual review of whether the reliability standard has been met. This is completed as a part of the Annual Market Performance Review (AMPR).<sup>6</sup>

In looking at the performance in the past 10 financial years, the reliability standard has been breached on a regional basis twice - in Victoria and South Australia in 2008-2009. These two breaches occurred around the same time due to relatively extreme weather events. The incidents occurred on 29-30 January 2009 where there were high temperatures over a prolonged period.<sup>7</sup> At the time the incidents were reviewed, the Panel had noted that the 'long term' reliability standard over the past ten year period had not been breached and that the incidents were managed appropriately by AEMO and market participants.

The regional performance against the reliability is set out in the table below.

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<sup>5</sup> The NER further defines 'non-credible contingency events' as a contingency event other than a credible contingency event. See clause 4.2.3 of the NER.

<sup>6</sup> The latest AMPR was published in March 2013 and reviewed the performance of various aspects of the NEM in the 2011-2012 financial year. This report, as well as all previous reports, can be found on the AEMC website:<http://www.aemc.gov.au/market-reviews/completed.html>

<sup>7</sup> These events were considered in the 2008-2009 AMPR.

**Table 2.1 Regional USE for the past 10 years**

Year	Queensland	New South Wales	Victoria	South Australia	Tasmania <sup>8</sup>
2011-2012	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2010-2011	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2009-2010	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2008-2009	0.0000%	0.0000%	<b>0.0040%</b>	<b>0.0032%</b>	0.0000%
2007-2008	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2006-2007	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2005-2006	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2004-2005	0.0000%	<b>0.00005</b>	0.0000%	0.0000%	0.0000%
2003-2004	0.0000%	0.0000%	0.0000%	0.0000%	
2002-2003	0.0000%	0.0000%	0.0000%	0.0000%	
<b>Average</b>	<b>0.0000%</b>	<b>0.0000%</b>	<b>0.0004%</b>	<b>0.0003%</b>	<b>0.0000%</b>

## 2.2 Reliability settings

The reliability settings are the three price mechanisms under the NER. These mechanisms are:<sup>9</sup>

- Market price cap (MPC) – the MPC is a cap placed on spot prices in each half-hourly trading interval, and is currently set at \$12,900/MWh for the 2012-2013 financial year. Under the NER, the AEMC indexes the MPC by the consumer price index (CPI) each financial year.<sup>10</sup>
- Cumulative price threshold (CPT) – the CPT is the threshold governing the imposition of an administered price cap (APC). Where the sum of the spot prices in a region in 336 consecutive trading intervals exceeds the CPT, the APC will be applied in that region. The CPT is currently set at \$193,900 for the 2012-2013 financial year. Under the NER, the AEMC indexes the CPT by CPI each financial year.<sup>11</sup>

<sup>8</sup> Tasmania joined the NEM in May 2005

<sup>9</sup> The value of the MPC and CPT for each financial year is published in the schedule of reliability settings by the AEMC on its website:  
[www.aemc.gov.au/electricity/guidelines-and-standards.html](http://www.aemc.gov.au/electricity/guidelines-and-standards.html).

<sup>10</sup> The MPC for the 2013-2014 financial year is \$13,100/MWh.

<sup>11</sup> The CPT for the 2013-2014 financial year is \$197,100.

- Market floor price – the market floor price is the lowest allowable limit for the spot price. It is currently set at -\$1,000/MWh.

The reliability settings form the key price envelope within which the wholesale spot market seeks to balance supply and demand, and deliver capacity to meet the reliability standard with the aim of avoiding unmanageable risks for market participants. That is, the reliability settings function to:

- establish the parameters governing the price envelope within which energy supply and demand is balanced in the wholesale market;
- provide important price signals to market participants in relation to the delivery of sufficient generation capacity and/or demand side response to meet the reliability standard; and
- at the same time, provide a mechanism to limit financial risk for market participants.

The MPC and the market floor price define the price envelope within which the wholesale electricity pool is dispatched and settled. The level of the MPC provides incentives for supply- and demand-side investment to deliver the reliability standard.

The CPT is an explicit risk management mechanism designed to limit participants' exposure to protracted levels of high prices in the wholesale spot market. If the CPT were breached, the Australian Energy Market Operator (AEMO) must impose the APC in accordance with the NER.<sup>12</sup> The APC is currently set at \$300/MWh and hence imposition of the APC would reduce the financial exposure of market participants.<sup>13</sup>

### **2.3 Relationship between the NEM reliability standard and reliability settings**

The reliability standard and settings are inter-related. For example, an increase in the level of the reliability standard (e.g. tightening the standard to a higher level of reliability such as 0.001 per cent USE) would likely require a corresponding increase in the level of MPC, or some other form of generation remuneration, to signal the appropriate level of investment to deliver the higher standard. Depending on the effectiveness of that pricing signal, there could potentially be reliability shortfalls.

Under the current framework, short-term reliability shortfalls may be managed by AEMO through two intervention mechanisms - the reliability and emergency reserve trader (RERT) and reliability directions. These two intervention mechanisms provide a 'safety net' if there were insufficient generation capacity to meet demand. They provide the ability for AEMO to attempt to reduce the level of any load shedding:

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<sup>12</sup> Clause 3.14.2(c) of the NER.

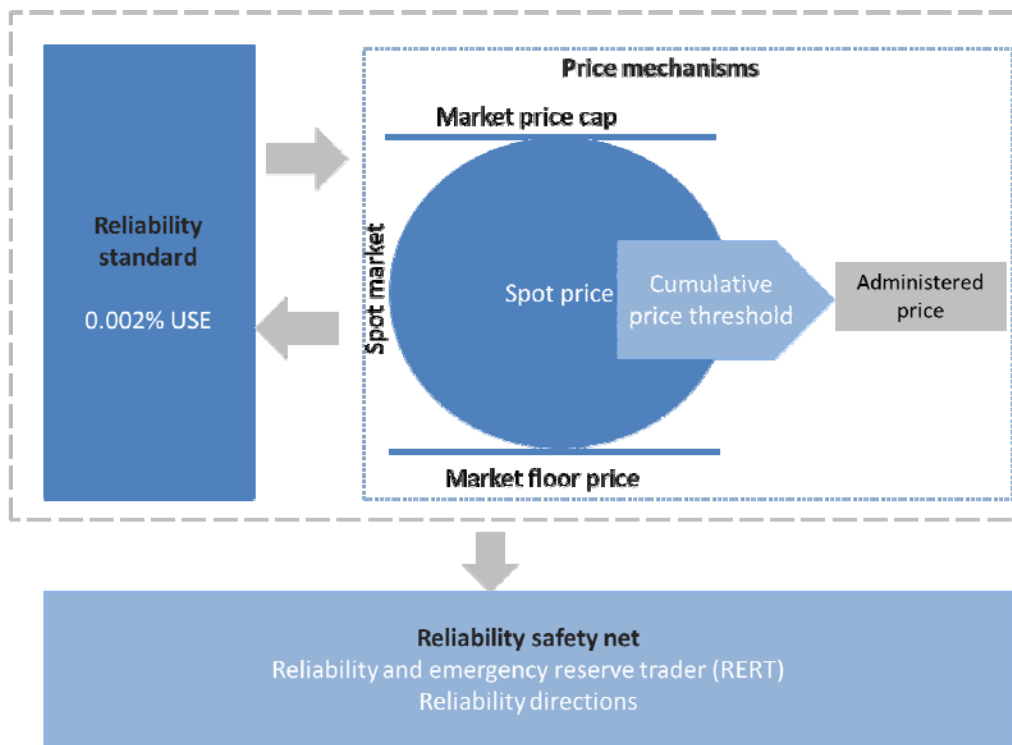
<sup>13</sup> The APC is specified in a schedule that is developed, authorised, published and varied by the AEMC. The APC is currently \$300/MWh for all regions of the NEM, for all time periods.

- The RERT mechanism provides AEMO with the power to contract for reserves if shortfalls were forecast. This would require AEMO to negotiate and enter into contracts with reserve providers. The RERT provisions expire on 30 June 2016.<sup>14</sup>
- AEMO may also direct registered participants to take certain action to maintain or re-establish the power system to the required operating state. Such 'reliability directions' are governed by provisions under the NER.

The RERT and AEMO's powers of direction are separate to the reliability standard and settings, and therefore are not being considered under this review.

This interrelationship between the NEM reliability standard and reliability settings, and the intervention mechanisms, is depicted diagrammatically in Figure 2.1 below.

**Figure 2.1 NEM reliability standard and reliability settings**



## 2.4 Previous and current reviews

The Panel has undertaken a number of reviews examining the reliability standard and reliability settings in the past. These reviews include the Panel's comprehensive reliability review (CRR) completed in 2007 and the most recent review of the reliability

<sup>14</sup> The RERT provisions are set out under section 3.2 of the NER and have been reviewed by the Panel on a number of occasions and also considered by the AEMC through rule change processes. Although in principle the RERT provisions could provide benefits to the market, the performance of the market mechanisms have provided incentive to ensure sufficient capacity to date. Following the consideration of a rule change request from the Panel, the AEMC made a rule in March 2012 to extend the sunset of the RERT to 2016.

standard and settings completed in April 2010.<sup>15</sup> In addition, on a related matter, the Panel had also undertaken a review of the transmission reliability standards in 2008 and the AEMC is currently progressing further work on a national framework for transmission (and distribution) reliability. A summary of these reviews is outlined below to provide additional context to this current work.

### **2.4.1 Comprehensive reliability review**

The CRR was completed by the Panel in 2007, which included examining a wide range of issues and extensive consultation with stakeholders. The CRR considered the level and scope of the reliability standard, the provisions for the reliability settings, as well as the RERT and the availability of information in the NEM. Specific aspects of the CRR that may have relevance to this review are summarised below.

#### **The reliability standard**

##### *The form of the reliability standard*

As part of the CRR the Panel considered whether reliability in the NEM should be defined using a measure other than USE. The Panel's analysis considered the different forms of reliability standards that are applied in other countries.

The Panel noted that the typical definitions for reliability include how frequently supply is interrupted (e.g. the number of days per year in which interruptions occur); the cumulative duration of interruptions (e.g. the total number of hours per year that interruptions occur); and the amount of energy that is not supplied (e.g. USE as used in the NEM). It was noted that many jurisdictions comparable to the NEM used a frequency measure known as either loss of load expectation (LOLE) or loss of load probability (LOLP).<sup>16</sup>

One aspect of the Panel's considerations was whether a single form of reliability standard should be applied to the NEM. The Panel acknowledged that there could be limitations in the use of a single form of standard as it would not provide perfect information about interruption to supply, and would not be able to capture the difference in the actual experiences of consumers in different regions. In the end, the Panel determined that, on balance, introducing different standards for different regions would be detrimental because it would remove the simplicity offered by a single form. Further, it would be difficult to justify on economic grounds, and multiple forms would have the potential to distort or dilute investment signals.

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<sup>15</sup> The CRR is available at: [www.aemc.gov.au/Market-Reviews/Completed/comprehensive-reliability-review.html](http://www.aemc.gov.au/Market-Reviews/Completed/comprehensive-reliability-review.html). The reliability standard and reliability settings review 2010 is available at: [www.aemc.gov.au/Market-Reviews/Completed/review-of-the-reliability-standard-and-settings.html](http://www.aemc.gov.au/Market-Reviews/Completed/review-of-the-reliability-standard-and-settings.html).

<sup>16</sup> LOLE is the expected number of days per year in which available generating capacity is insufficient to serve demand, or the half-hours per year in which capacity is insufficient to serve half-hourly load. LOLP is the proportion in percentage (probability) of days per year, half-hours per year, or events per season, in which available generating capacity is insufficient to serve demand.

The Panel also considered whether the use of a hybrid form of the standard would be appropriate where USE would be used in conjunction with additional parameters such as LOLE or LOLP. However, the Panel decided that the USE standard in the NEM was suited to our energy-only market. The USE standard placed value on the cumulative, long-term energy shortfall and rewarded additional energy generation or consumer responses to reduce that shortfall.

Given the overall considerations, the Panel decided to maintain the use of USE as the form of the reliability standard, although changes to the standard were made at the time for clarification purposes. Stakeholders had supported maintaining the use of USE.

### *The level of the reliability standard*

In the CRR the Panel also considered whether the 0.002 per cent level of USE was appropriate. The Panel considered the views of the stakeholders and the level of standards in other countries.

In a comparison with international jurisdictions, the Panel took into account the different physical characteristics of different power systems. For example, in the large markets in the US, such as in Pennsylvania New Jersey Maryland (PJM), the underlying standard is that a shortfall in generation requiring interruption to customers would occur no more than once every 10 years. However, it was noted that the maximum demand of the PJM market was approaching five times the size of the NEM, and that with a more meshed transmission network than the relatively long and linear system of the NEM, it could be considered inherently more reliable. Following its assessment and analysis, the Panel concluded that the 0.002 per cent USE was comparable to the standards applied in other international jurisdictions.

The Panel concluded that 0.002 per cent USE should be retained on the basis that any tightening of the standard could have a substantial cost in terms of new investment that would be required, and that 0.002 per cent USE was comparable to other jurisdictions. The Panel also noted that there was no support from stakeholders to change the level of the standard.

### **The reliability settings**

The Panel also considered the reliability settings as part of the CRR. The Panel recommended a number of changes as discussed below.

### *Market price cap<sup>17</sup>*

In assessing the requirements for the MPC, the Panel had considered there were risks to the timing of generation investment needed to meet the reliability standard in the

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<sup>17</sup> The market price cap was known as the "value of lost load" or "VoLL" at the time of the CRR. VoLL was renamed MPC following the consideration of a rule change arising from the CRR. Details of the rule change are available at: [www.aemc.gov.au/electricity/rule-changes/completed/nem-reliability-settings-voll-cpt-and-future-reliability-review.html](http://www.aemc.gov.au/electricity/rule-changes/completed/nem-reliability-settings-voll-cpt-and-future-reliability-review.html).

near future. This assessment gave consideration to the policy environment at the time as well as investor confidence. The Panel concluded there were sufficient concerns and risks to warrant an increase in the MPC and had recommended that the MPC be increased from \$10,000 to \$12,500, effective 1 July 2010. The Panel's recommendation took into consideration modelling carried out by CRA International and the views of stakeholders. (Following its consideration of the Panel's rule change request, the AEMC made a rule to adopt the recommended MPC.)<sup>18</sup>

### *CPT*

In assessing the requirements for the CPT, the Panel considered the philosophy that underpinned the establishment of the CPT - namely to act as a financial safety net without hindering investment. The Panel considered that the CPT would only be exceeded in extreme conditions, and increasing it would add to the financial risks imposed on market participants without a corresponding reduction in USE. Given these considerations, the Panel concluded that the level of the CPT, relative to the MPC, should remain unchanged at 15 times the value of the MPC. On this basis, the Panel recommended that the CPT be set at 15 times \$12,500, which was \$187,500 from 1 July 2010. (Following its consideration of the Panel's rule change request, the AEMC made a rule to adopt the recommended CPT.)<sup>19</sup>

### *Market floor price*

The Panel concluded not to recommend any changes to the market floor price of -\$1,000/MWh. It noted that the modelling undertaken by CRA International suggested that the level of the market floor price was unrelated to investment signals and therefore the setting would have little or no effect on USE. Stakeholders also did not support a change in the level of the market floor price.

## **2.4.2 Reliability standard and settings review 2010**

The Panel completed a review in April 2010 which, similar to this current review, was required by the NER to examine the reliability standard and reliability settings that should apply from 1 July 2012. In undertaking this review, the Panel considered stakeholders' views and modelling undertaken by ROAM Consulting (ROAM).

### **The reliability standard**

As a part of the 2010 review, the Panel noted the considerations under the CRR where alternatives to the reliability standard were considered. New modelling undertaken by ROAM was also analysed. The Panel concluded to maintain the current form and level of the reliability standard at 0.002 per cent USE. The Panel did not consider there were any compelling evidence that changing the standard would provide net benefits, and considered that the costs of meeting the reliability standard and the benefits to

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<sup>18</sup> National Electricity Amendment (NEM Reliability Settings: VoLL, CPT and future reliability review) Rule 2009 No. 13.

<sup>19</sup> *ibid*

customers appeared to be balanced at the current level. Stakeholders had generally supported maintaining the current standard. The Panel did make changes to the wording and expression of the standard to clarify the application of, and compliance with, the standard.

### **The reliability settings**

The Panel's review also considered whether the values of the reliability settings should be changed. The Panel's assessment had noted ROAM's suggestion for an increase in the MPC to at least \$16,000/MWh from 1 July 2012 (from \$12,500/MWh). However, the Panel was concerned that increases in the MPC may reach a tipping point beyond which the benefits of increasing the MPC (and CPT) would not offset the costs in terms of market risks. These risks include prudential risk, risk associated with increasing price volatility, and the potential for increased outages and congestion to occur. For these reasons, the Panel had recommended that the MPC be maintained at \$12,500/MWh and, similarly, the CPT be maintained at \$187,500.

While the Panel did not recommend an increase in the MPC or CPT, it was considered that if the MPC and CPT were fixed for too long a period, the real values would be eroded. For this reason, the Panel also recommended that the MPC and CPT be indexed on an annual basis. The Panel also recommended an annual review process to determine whether higher increases in the MPC and CPT would be necessary, and whether there were any significant changes that occurred to the economics and mechanism for delivering the reliability standard.

With regards to the market floor price, the Panel had noted that few submissions to the review had commented on the market floor price and there was otherwise no evidence to support it being changed. Therefore, the Panel did not make any recommendations to change the market floor price.

Following its consideration of the Panel's rule change request, the AEMC made a rule for the MPC and CPT to be indexed. The proposed annual review was replaced by a requirement for a four-yearly comprehensive review of the reliability standard and settings, including a review of the indexation provisions, to be undertaken by the Panel.<sup>20</sup>

### **2.4.3 Reviews on transmission reliability**

Although this review is on the reliability of the generation and bulk supply system, the previous work undertaken by the Panel on transmission reliability may provide relevant insights to the assessment of the reliability standard and settings for this review. Further, the AEMC is also currently undertaking a review of the national framework for transmission reliability.<sup>21</sup>

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<sup>20</sup> AEMC, Reliability settings from 1 July 2012, Rule Determination, 16 June 2011, Sydney.

<sup>21</sup> Details on these reviews can be found on the AEMC website:  
<http://www.aemc.gov.au/market-reviews/completed/transmission-reliability-standards-review.html> and



## **Transmission reliability standards review**

The Panel's review of transmission reliability standards, which was completed in 2008, considered whether it would be appropriate to establish a framework for nationally consistent transmission standards. The review noted that the jurisdictional transmission standards in place were not entirely consistent and considered whether there were costs and benefits to move to a national framework.

Following extensive consultation, the Panel recommended a framework for nationally consistent transmission reliability standards should be adopted while noting that significant change would be required to implement a national framework. The Panel's recommendations included a set of principles for developing and assessing the range of competing frameworks. These principles included (but are not limited to): transparency and openness; economic efficiency; appropriate specificity; and ensuring accountability.<sup>22</sup>

The Panel's review also recommended a number of options for a nationally consistent framework. The option that performed best against the principles identified had features including that the standard should be a hybrid that was economically derived using a customer value of reliability or similar measure, and capable of being expressed in a deterministic manner.<sup>23</sup>

The Panel's report was submitted to the AEMC, and then the Ministerial Council on Energy (now the Standing Council on Energy and Resources (SCER)) for consideration.

## **AEMC review of the national framework for transmission reliability**

Following the consideration of the Panel's recommendations (as well as other reports and papers provided by the AEMC), the SCER directed the AEMC to undertake a review to develop a nationally consistent framework and methodology for developing, describing and reporting on electricity network reliability and associated standards in the NEM.

This work is currently being progressed by the AEMC and there are separate review streams for the transmission and distribution network requirements.<sup>24</sup> The SCER's terms of reference directs the AEMC to develop a national framework and methodology that, among other things, will apply an appropriate measure of the value that customers place on the reliability of electricity supply. That is, the transmission reliability standards under the national framework would need to take account of the

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<http://www.aemc.gov.au/market-reviews/open/review-of-the-national-framework-for-transmission-reliability.html> respectively.

<sup>22</sup> The full list of principles is outlined in the Panel's final report which can be found on the AEMC website as outlined above.

<sup>23</sup> Reliability standards for transmission (and distribution) networks are usually either deterministic or probabilistic. Deterministic standards are based on requiring specific network operational conditions to be met, while probabilistic standards are based on determining network investments on whether the value to customers of that investment outweighs the costs.

<sup>24</sup> Information on these reviews can be found on the AEMC website as noted above.

trade-off between the costs of investing in and maintaining transmission networks, and the value placed on reliability by customers.

### **3 Factors for consideration**

This chapter sets out the factors the Panel will consider in this review including any specific requirements under the NER.

#### **3.1 Scope of the review**

As set out under the NER, the Panel must consider the following as a part of this review:<sup>25</sup>

- the reliability standard;
- the MPC, including the manner of indexing the MPC;
- the CPT, including the manner of indexing the CPT; and
- the market floor price.

#### **3.2 Factors to consider**

The Panel will have regard to the National Electricity Objective (NEO) set out in section 7 of the NEL when it undertakes its assessments and makes recommendations for this review. The NEO states that:

“The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- (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 will also consider the potential impact of any proposed changes to the MPC, CPT or market floor price on:

- spot prices;
- forward contract prices and contract liquidity;
- investment in the NEM;
- the reliability of the power system; and
- market participants and consumers.

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<sup>25</sup> Clause 3.9.3A of the NER.

In considering the potential impacts, the Panel will take a holistic approach to evaluate the inter-relationships of each aspect of the market. This will include the consideration of the role and effectiveness of the reliability settings in relation to risk management in the NEM.

Where appropriate, the Panel will take into consideration any value of customer reliability determined by AEMO and any other matters. These other matters may include interactions between the gas and electricity markets and relevant policy settings such as the level of the renewable energy target.

## 4 Issues for consultation

This chapter sets out additional information on the issues that the Panel will consider in this review. It also includes questions to facilitate consultation. Stakeholders are encouraged to consider these questions as well as any other aspects of the reliability standard and settings review you may wish to comment on. Please provide reasons and evidence, where appropriate, in your responses.

### 4.1 Reliability standard

The reliability standard is currently set at 0.002 per cent unserved energy. It has remained unchanged since it was established in 1998 at market start.

#### 4.1.1 Form of the reliability standard

The NEM reliability standard is an output-based measure expressed in terms of the maximum permissible USE, or the maximum allowable level of electricity at risk of not being supplied to consumers per financial year. The USE is expressed as a percentage of the annual energy consumption for the associated region or regions.

As discussed in Chapter 2, the Panel has previously undertaken extensive assessment of the form of the reliability standard and whether measures other than USE should be adopted. In those reviews the Panel did not identify any overall benefits to the market, or market participants and consumers, to change the form of the reliability standard. There was also limited support from stakeholders to change the current form of the standard.

The Panel does not consider that there have been any changes in market arrangements to suggest that the Panel's previous considerations on this matter are no longer relevant. For this reason, in this review, the Panel does not intend to examine the form of the reliability standard. However, the Panel welcomes any comments on this matter.

#### **Question 1      Form of the reliability standard**

**Should an alternative form of the reliability standard be adopted or is the current form of using unserved energy appropriate?**

#### 4.1.2 Level of the reliability standard

The current level of the reliability standard is 0.002 per cent of USE for each region or regions per financial year.

Operationally, it should be planned to not exceed the reliability standard in each financial year and for each region. Where this was the case, the reliability standard would also be achieved for the NEM as a whole.

As a part of this review, the Panel will consider whether the current level of the reliability standard of 0.002 per cent USE remains appropriate.

**Question 2      Level of the reliability standard**

**Is the current level of the reliability standard at 0.002 per cent USE appropriate under the current market arrangements? What factors should be considered by the Panel in its assessment of the level of the standard?**

## **4.2      Reliability settings**

The Panel will consider the values of the reliability settings as well as the method of indexation for the MPC and CPT.

### **4.2.1      Market price cap**

Currently, the MPC is \$12,900/MWh for the 2012-2013 financial year and increasing to \$13,100/MWh for 2013-2014.<sup>26</sup>

For this review, the Panel will assess the current MPC value to determine whether it remains appropriate. The review will include consideration of the annual indexation process.

**Question 3      Market price cap**

**Is the current value of the MPC appropriate to meet the reliability standard? If no, what should be the value of the MPC? Should the MPC continue to be indexed? Is the CPI the appropriate index to be applied? What factors should be considered by the Panel in its review of the MPC?**

### **4.2.2      Cumulative price threshold**

The current CPT is \$193,900 for the 2012-2013 financial year and increasing to \$197,100 for 2013-2014.<sup>27</sup>

For this review, the Panel will assess the current CPT value to determine whether it remains appropriate. The review will include consideration of the annual indexation process.

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<sup>26</sup> As indexed by the AEMC in accordance with the requirements under the NER.

<sup>27</sup> *ibid*

#### **Question 4      Cumulative price threshold**

**Is the current value of the CPT appropriate to meet the reliability standard? If no, what should be the value of the CPT? Should the CPT continue to be indexed? Is the CPI the appropriate index to be applied? What factors should be considered by the Panel in its review of the CPT?**

#### **4.2.3      Market floor price**

The current market floor price is set at  $-\$1000/\text{MWh}$  under the NER.

In previous reviews, there were no significant issues raised in relation to the level of the market floor price. The Panel had no reasons to recommend a change in the floor price and generally stakeholders supported maintaining the value of  $-\$1,000/\text{MWh}$ . In addition, it was considered that the market floor price had no or little effect on USE.

More recently, the Panel is aware that there has been an increase in the number of negative pricing periods in the NEM.

There are a number of reasons for generators to make negative offers including that the costs of shutting down and restarting the plant may be high. Also, generators who receive other revenue outside the spot market (such as renewable generators through renewable energy certificates) may also be able to profitably bid below zero at times.

In the current environment of low demand growth and increasing investment in renewable energy (mostly wind), there could be further downward pressure on wholesale electricity prices and generally the number of negative pricing periods is expected to increase.<sup>28</sup> At the same time, the nature of wind generation is more intermittent which could affect the costs for managing power system security.

The Panel's considerations will take into account the changing mix of generation in the NEM and what this may mean for the appropriateness of the current market floor price and MPC to deliver efficient outcomes for market participants and consumers in the NEM.

The Panel is interested in stakeholders' views on the impacts of negative price outcomes, and whether this presents a problem to the market and, if so, how the problem may be addressed.

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<sup>28</sup> As outlined in AEMO's South Australia Wind Study Report 2012 (p. 2-9), modelling carried out by AEMO indicated that by 2019-2020 wind generation in South Australia would contribute to a number of low price events in that region. The spot price in South Australia could be expected to fall below  $\$5/\text{MWh}$  for approximately 15 per cent of the time (modelling under the 'Decentralised World, medium carbon price, scenario').

**Question 5      Market floor price**

**Given recent market developments and pricing outcomes, is the current market floor price appropriate? If no, what would be an appropriate market floor price? What factors should be considered by the Panel in its review of the market floor price? Unlike the MPC and CPT, the market floor price is not currently indexed. Should it be indexed and, if so, is the CPI the appropriate index?**

**4.2.4      Customer value of reliability**

As discussed in Chapter 2, the AEMC is considering developing national frameworks for transmission and distribution network reliability that take into account the trade-off between the costs of investing in and maintaining the networks, and the value placed on reliability by customers.

The Panel will take into account the value of customer reliability in its assessments under this review. However, the Panel is interested in stakeholders' views on whether the current approach to determining the reliability standard and reliability settings effectively take into account the trade-offs between costs and customer value of reliability, and to what extent, if at all, should the approach be more consistent with that proposed for the transmission and distribution networks.

**Question 6      Customer value of reliability**

**Does the current framework of the reliability standard and reliability settings appropriately take into account the value customers place on reliability? Should alternative factors or approaches be considered?**

**4.3      Other issues**

The Panel welcomes comments on any other factors that should be considered in its assessment of the reliability standard and reliability settings.

**Question 7      Other issues**

**Are there any other factors that the Panel should take into consideration in its assessment of the reliability standard and reliability settings in this review?**



## Abbreviations

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AMPR	Annual Market Performance Review
APC	administered price cap
CPI	Consumer Price Index
CPT	cumulative price threshold
CRR	comprehensive reliability review
LOLE	loss of load expectation
LOLP	loss of load probability
LRET	large-scale renewable energy target
MCE	Ministerial Council on Energy
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
Panel	Reliability Panel
RERT	reliability and emergency reserve trader
review	reliability standard and settings review 2014
ROAM	ROAM Consulting
SCER	Standing Council on Energy and Resources
USE	unserved energy
VoLL	value of lost load

## A NER obligations for the review

The provisions under the NER on the reliability standard and reliability settings review are set out under rule 3.9.3A and 3.9.3B. These rules are replicated below. (Italicised terms are defined under the NER.)

### 3.9.3A Reliability standard and reliability settings review

- (a) By 30 April of each fourth year (with the first four year period ending in 2014), the *Reliability Panel* must conduct and finalise a review, in accordance with the *Rules consultation procedures* and this clause, on the *reliability standard* and *reliability settings* set out in paragraph (b), and *publish* a report in accordance with clause 3.9.3B on the *reliability standard* and *reliability settings* that it recommends should apply on and from 1 July in the year commencing 2 years after the year in which the report is *published*.
- (b) In conducting a review in accordance with this clause 3.9.3A, the *Reliability Panel* must review the following:
  - (1) the *reliability standard*;
  - (2) the *market price cap*, including the manner of indexing the *market price cap*;
  - (3) the cumulative price threshold, including the manner of indexing the *cumulative price threshold*; and
  - (4) the *market floor price*.
- (c) In any review under this clause the *Reliability Panel*:
  - (1) must have regard to the potential impact of any proposed change in the *market price cap* or *cumulative price threshold* on:
    - (i) *spot prices*;
    - (ii) investment in the *National Electricity Market*;
    - (iii) the *reliability* of the *power system*; and
    - (iv) *Market Participants*;
  - (2) must have regard to any value of customer reliability determined by *AEMO* which the *Reliability Panel* considers to be relevant; and
  - (3) may take into account any other matters the *Reliability Panel* considers relevant.
- (d) The *Reliability Panel* may only recommend a *market price cap* or *cumulative price threshold* which the *Reliability Panel* considers will:
  - (1) allow the *reliability standard* to be satisfied without use of *AEMO*'s powers to intervene under clauses 3.20.7(a) and 4.8.9(a); and
  - (2) in conjunction with other provisions of the *Rules*, not create risks which threaten the overall integrity of the *market*.
- (e) If the *Reliability 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 *Reliability Panel* may only recommend such a decrease where it

has considered any alternative arrangements necessary to maintain the *reliability standard*.

- (f) The *Reliability Panel* may only recommend a *market floor price* which the *Reliability Panel* considers will:
  - (1) allow the *market* to clear in most circumstances; and
  - (2) not create substantial risks which threaten the overall stability and integrity of the *market*.
- (g) The *Reliability Panel* must submit to the *AEMC* any *Rule* change proposal that results from a review under this clause as soon as practicable after the review is completed.

### **3.9.3B Reliability standard and reliability settings review report**

A report of the findings of the *Reliability Panel* in a review under clause 3.9.3A must set out the *Reliability Panel's* conclusions and its recommendations in relation to the *reliability standard* and the level of the *reliability* settings along with supporting information including:

- (a) details of all relevant *market* conditions and circumstances on which its recommendation is based; and
- (b) an assessment of whether the level of the *market price cap* together with the operation of the *cumulative price threshold* have achieved the objectives set out in clause 3.9.3A(d).

## B Reliability standard

The reliability standard is published by the Reliability Panel and replicated below.<sup>29</sup>

### NEM Reliability Standard – Generation and Bulk Supply

This Reliability Standard for Generation and Bulk Supply<sup>30</sup> was determined by the Reliability Panel (Panel) as part of its “Review of the Reliability Standard and Settings”, which completed in April 2010. This Reliability Standard forms part of the *power system security and reliability standards* and was determined in accordance with clauses 8.8.1(a)(2) and 8.8.3 of the National Electricity Rules (Rules).

#### Form of the Reliability Standard

The NEM Reliability Standard for Generation and Bulk Supply is expressed in terms of the *maximum expected unserved energy (USE)*, or the maximum amount of electricity expected to be at risk of not being supplied to consumers, per financial year. The USE is measured in GWh and should be expressed as a percentage of the annual energy consumption for the associated region or regions.

#### Level of the Reliability Standard

The maximum expected unserved energy (USE), or the maximum amount of electricity expected to be at risk of not being supplied to consumers, is **0.002%** of the annual energy consumption for the associated region or regions per financial year.

#### Performance Against the Reliability Standard

Performance against this Reliability Standard for Generation and Bulk Transmission should be considered using the actual observed levels of annual USE for the most recent financial year. Plant performance and demand characteristics that occurred in that financial year should be assessed to determine whether there are any underlying changes occurring.

#### Operational Implementation of the Reliability Standard

Operationally, it should be planned to achieve an expected USE that is within this Reliability Standard for Generation and Bulk Transmission in each financial year and for each region, which means that it should also be achieved for the NEM as a whole.

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<sup>29</sup> The standard can be found on the AEMC website:  
<http://www.aemc.gov.au/panels-and-committees/reliability-panel/guidelines-and-standards.html>

<sup>30</sup> This version of the Reliability Standard takes effect on 1 July 2012. The “NEM Reliability Standard – Generation and Bulk Supply December 2009” is contained in Appendix D of the Review of the Reliability Standard and Settings, December 2009, and is available on the AEMC website.

## Scope of the Reliability Standard

This Reliability Standard for Generation and Bulk Supply includes unserved energy associated with power system reliability incidents that results from:

- a single credible contingency on a generating unit or an inter-regional transmission element, that may occur concurrently with generating unit or inter-regional transmission element outages; or
- delays to the construction or commissioning of new generating units or inter-regional transmission network elements, including delays due to industrial action or 'acts of God'.

This Reliability Standard for Generation and Bulk Supply excludes unserved energy associated with power system security incidents that results from:

- multiple or non-credible contingencies;
- outages of transmission or distribution network elements that do not significantly impact the ability to transfer power into the region where the USE occurred; or
- industrial action or 'acts of God' at existing generating or inter-regional transmission facilities.