Reliability Panel
AEMC

REVIEW

Reliability Panel AEMC

DRAFT REPORT

Reliability Standard and Reliability Settings Review 2014

13 March 2014

Submissions due 10 April 2014. Reference: REL0051
Draft Report

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About the AEMC

The Council of Australian Governments (COAG), through its then Ministerial Council on Energy (MCE), established the Australian Energy Market Commission (AEMC) in July 2005. In June 2011, COAG established the Standing Council on Energy and Resources (SCER) to replace the MCE. The AEMC has two main functions. We make and amend the national electricity, gas and energy retail rules, and we conduct independent reviews of the energy markets for the SCER.

About the AEMC Reliability Panel

The AEMC Reliability Panel (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.

Summary

The Reliability Panel (Panel) is required, under clause 3.9.3A of the National Electricity Rules (NER or rules), to undertake a review and report on the reliability standard and reliability settings that should apply in the National Electricity Market (NEM) from 1 July 2016. The Panel determines the reliability standard, and makes recommendations on the reliability settings to the Australian Energy Market Commission (AEMC).

In the NEM, the reliability standard is used to indicate to the market the required level of supply and demand adequacy on a regional basis. The reliability standard takes account of inter-regional transmission to capture the benefits of generation from across regional boundaries.

The reliability standard is set by the Reliability Panel in accordance with the NER. The current approach specifies 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. Currently, the level of USE is set at 0.002 per cent of the annual energy consumption for the associated NEM region or regions per financial year.

To incentivise sufficient investment in generation capacity and demand-side response to meet the reliability standard, the NEM design includes three key reliability settings. The market price cap (MPC), market floor price (MFP) and the cumulative price threshold (CPT) arrangements form the key price envelope within which the wholesale spot market balances supply and demand and encourages the delivery of sufficient capacity to meet the reliability standard.

The challenge of maintaining reliability in the NEM is, therefore, ensuring that the reliability settings are set at levels to incentivise sufficient levels of generation capacity and demand-side response to deliver the expected reliability outcome, but no higher than consumers are willing to pay for that outcome.

Reliability standard and reliability settings review 2014

In April 2013, the AEMC provided the Panel with a terms of reference for the reliability standard and reliability settings review.

The objectives of this review are 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 NEM from 1 July 2016 to achieve the reliability standard chosen; and
- propose processes for implementing any changes arising from the review.

In accordance with the terms of reference for this review, this draft report presents the Panel's draft recommendations on the reliability standard and reliability settings that should apply in the NEM from 1 July 2016.

In carrying out its review, the Panel has had regard to the national electricity objective (NEO) when undertaking its assessments and draft recommendations. The Panel has considered the outcomes of ROAM Consulting's (ROAM) assessment of the suitability of the current reliability standard and reliability settings from 1 July 2016 to 30 June 2020. The Panel has also had regard to stakeholder submissions on the issues paper.

The Panel's draft decision and recommendations are as follows:

- **Reliability standard**: The Panel's draft recommendation is to retain the current form and level of the reliability standard to apply from 1 July 2016. That is:
  - the reliability standard should remain in the form of 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; and
  - the level of the reliability standard should remain at 0.002 per cent of the annual energy consumption for the associated region or regions per financial year.
- **Market price cap (MPC)**: The Panel's draft recommendation is that no change be made to the real value of the MPC to apply from 1 July 2016. The MPC should continue to be indexed by CPI annually.
- **Cumulative price threshold (CPT)**: The Panel's draft recommendation is that no change be made to the real value of the CPT to apply from 1 July 2016. The CPT should continue to be indexed by CPI annually. However, the Panel does recommend that the AEMC or the Panel (as appropriate) carry out a review of the form of the CPT mechanism prior to the next reliability standard and reliability settings review, due to commence around 2017.
- **Market floor price (MFP)**: The Panel's draft recommendation is that no change be made to the current value of the MFP. The MFP should continue to be set at -$1,000/MWh from 1 July 2016.
- **Indexation**: The Panel does not consider that a change should be made to the current measure of indexation of the MPC and CPT (that is, continue to index MPC and CPT by CPI annually). However, the Panel does recommend that a review of the current indexation measure occurs within two years. In terms of the MFP, the Panel does not consider a change should be made to the current approach of non-indexation (that is, MFP should continue to be set in nominal terms).
- **Value of customer reliability (VCR)**: The Panel's draft recommendation is that the AEMC or the Panel (as appropriate), in consultation with stakeholders,

develop a methodology for calculating an appropriate VCR to determine the efficient reliability standard. This work should take place prior to the next reliability standard and reliability settings review, due to commence around 2017.

- **Methodology for future reliability standard and reliability settings reviews**: The Panel's draft recommendation is that the AEMC or the Panel (as appropriate) develop a methodology for undertaking future reliability standard and reliability settings reviews. This will include consideration of how the outcomes of any market modelling should be treated. This work should take place prior to the next reliability standard and reliability settings review, due to commence around 2017.

In developing its draft decision and draft recommendations, the Panel has sought to balance stability and predictability of the NEM's reliability framework against the potential for various changes to the reliability standard and the reliability settings to further promote efficiency in the NEM.

In doing so, the Panel has had particular regard to the strength of evidence provided by stakeholders and ROAM's modelling to support a case for change to the existing reliability standard and settings. This includes evidence that the potential benefits of a change to the MPC, CPT and MFP would be outweighed by the additional risks and costs that may be introduced by the change.

The Panel considers that its draft decision and draft recommendations are likely to maintain certainty and help to continue to deliver efficient operational and investment decisions in the long term.

The detailed reasons for the Panel's draft decision on the reliability standard, and draft recommendations on the reliability settings, are set out in chapters 5 and 6 of this draft report, respectively.

Submissions on the draft report

In response to the Panel's draft decision and draft recommendations, as contained in this draft report, the Panel invites written submissions from interested parties by no later than **10 April 2014**. All submissions received will be published on the AEMC's website, subject to any claims for confidentiality.

Electronic submissions must be lodged online through the AEMC's website 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 electronic submissions, the AEMC website will issue a confirmation email. If this confirmation email is not received within three businesses days, it is the submitter's responsibility to ensure the submission has been delivered successfully.

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:

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Contents

1 Introduction

This draft report has been prepared for the Reliability Panel's (Panel) 2014 reliability standard and reliability settings review. The purpose of this report is to present the Panel's draft findings and recommendations on the reliability standard and reliability settings to apply in the National Electricity Market (NEM) from 1 July 2016, and to seek stakeholder views. Submissions received in response to this report will inform the Panel's final findings and recommendations to be contained in the final report.

1.1 The reliability standard and reliability settings review

Under the National Electricity Rules (NER or rules), the Panel is required to carry out a review of the reliability standard and reliability settings once every four years.[1] In this review, the Panel is reviewing the standard and settings to apply from 1 July 2016 to at least 30 June 2020.[2]

The regular review of the standard and settings allows the Panel to consider whether they remain suitable, or whether changes should be made to ensure they continue to meet the requirements of the market, market participants and consumers. This is because the market environment and market arrangements are constantly evolving. Regular review of the standard and settings is therefore important to allow potential impacts of any changes to be assessed.

If the standard and settings are not reviewed regularly, they may not continue to provide appropriate signals for necessary investment in electricity supply. This would ultimately have a detrimental effect on the reliability of electricity supply to consumers.

A four-yearly review represents an appropriate balance between the certainty provided between reviews and the need to periodically check that the reliability standard and the values of the reliability settings continue to be appropriate. The four year timetable also allows for any changes to the reliability standard or reliability settings to take effect before the next review is commenced.

1 Clause 3.9.3A(a) of the NER.

2 In this review, the Panel is considering "reliability" of the electricity generation and bulk transmission sectors. Reliability refers to the system capacity to generate and transport sufficient electricity to meet consumer demand in the NEM. The "reliability standard" is the primary mechanism to signal to the market for the delivery of enough capacity to meet consumer demand for electricity. The "reliability settings" are price mechanisms which 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 while avoiding unmanageable risks for market participants.

1.2 Purpose of the review

The purpose of the 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 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 of the 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 or Commission).[3]

As set out under the NER, the Panel must consider the following as part of this review:[4]

- the reliability standard; and
- the reliability settings:
  - the market price cap (MPC), including the manner of indexing the MPC;
  - the cumulative price threshold (CPT), including the manner of indexing the CPT; and
  - the market floor price (MFP).

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

1.4 Consultation process

The NER requires that the Panel follow the rules consultation procedures in carrying out this review.[5]

3 The terms of reference can be found on the AEMC website: www.aemc.gov.au.

4 Clause 3.9.3A(b) of the NER.

The following table outlines the key milestones and dates leading to the delivery of the Panel's final report to the AEMC.

Milestone	Date
Publication of issues paper	9 May 2013
Close of submissions on issues paper	21 June 2013
Public forum	4 December 2013
Publication of ROAM's draft report	16 December 2013
Close of submissions on ROAM's draft report	16 January 2014
Publication of Panel's draft report	13 March 2014
Close of submissions on Panel's draft report	10 April 2014
Publication of final report	22 May 2014

1.5 Consultation on the issues paper

On 9 May 2013, the Panel published an issues paper for this review of the reliability standard and reliability settings. Submissions on the issues paper closed on 21 June 2013. The Panel received 12 submissions and these are available on the AEMC website. A summary of issues raised in submissions, and the Panel's response to each issue, are set out in Appendix A.

1.6 Consultation on ROAM's draft report

On 4 December 2013, the Panel held a public forum in Melbourne for ROAM to present ROAM's draft modelling results for this review.

On 16 December 2013, the Panel published ROAM's draft report for this review. Submissions on ROAM's draft report, prior to this Panel's draft report being published, closed on 16 January 2014. The Panel received five submissions and these are available on the AEMC website. A summary of issues raised in submissions, and the Panel's response to each issue, are set out in Appendix A.

1.7 Submissions on the Panel's draft report

For this draft report, the Panel invites written submissions from interested parties by no later than **10 April 2014**. All submissions received will be published on the AEMC's website, subject to any claims for confidentiality.

5 Clauses 3.9.3A(a) and 8.9 of the NER.

Electronic submissions must be lodged online through the AEMC's website 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.

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1.8 Structure of the draft report

The remainder of this draft report is set out as follows:

- **Chapter 2 - Background:** provides an overview of the reliability framework in the NEM.
- **Chapter 3 - Assessment framework:** outlines the factors the Panel will have regard to in analysing issues raised in this review.
- **Chapter 4 - Overview of modelling methodology:** summarises the modelling approach by the Panel's consultant, ROAM Consulting (ROAM), for this review.
- **Chapter 5 - Reliability standard:** discusses specific issues, conclusions and recommendations related to the reliability standard.
- **Chapter 6 - Reliability settings:** discusses specific issues, conclusions and recommendations related to the reliability settings.
- **Appendix A - Submissions summary:** provides a summary of the issues raised by stakeholders in submissions on the issues paper and ROAM's draft report for this review, including the Panel's response to those issues.
- **Appendix B - Current and past related work:** provides a summary of current and previous reviews that have been conducted on the reliability standard and reliability settings.

2 Background

This chapter provides background information on, and explanations of:[6]

- reliability;
- the reliability standard; and
- the reliability settings.

2.1 Reliability and the reliability standard

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

For the purpose of measuring reliability in the context of this review, the reliability of the electricity generation and bulk transmission sectors is being considered. 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 for the generation and bulk transmission supply of electricity (that is, the reliability standard) is to indicate to the market the required level of supply and demand adequacy on a regional basis. It is set by the Panel in accordance with the NER.

The current reliability standard 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. Under the current 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.[7]

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. Therefore, the reliability standard defines the reliability incidents for the generation and bulk transmission supply of electricity 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:

6 Appendix B provides an overview of the history behind the reliability standard and reliability settings.

7 The reliability standard is published on the AEMC website: www.aemc.gov.au.

- a single credible contingency event on a generating unit or an inter-regional transmission element, that may occur concurrently with generating unit or inter-regional transmission element outages;[8] 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".

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

- multiple or non-credible contingencies;[9]

- 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.

2.1.1 Performance against the reliability standard

Reviewing reliability standard performance in the past 13 financial years, the standard has been breached twice on a regional basis - in Victoria and South Australia in 2008-09. These two breaches occurred around the same time (29 and 30 January 2009) due to relatively extreme high temperatures over a prolonged period.[10] At the time the incidents were reviewed, the Panel had noted that the "long term" reliability standard over the previous ten year period had not been breached, and that the incidents had been managed appropriately by the Australian Energy Market Operator (AEMO) and market participants.

Regional performance against the reliability standard is set out in Table 2.1 below.

8 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.

9 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.

10 These events were considered in: AEMC, *Annual Market Performance Review 2009*, Final Report, 18 December 2009.

Table 2.1 Regional USE (2000-01 to 2012-13)

Year	Queensland	New South Wales	Victoria	South Australia	Tasmania[11]
2012-13	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2011-12	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2010-11	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2009-10	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2008-09	0.0000%	0.0000%	**0.0040%**	**0.0032%**	0.0000%
2007-08	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2006-07	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2005-06	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2004-05	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2003-04	0.0000%	0.0000%	0.0000%	0.0000%	
2002-03	0.0000%	0.0000%	0.0000%	0.0000%	
2001-02	0.0000%	0.0000%	0.0000%	0.0000%	
2000-01	0.0000%	0.0000%	0.0000%	0.0000%	

2.2 Reliability settings

The reliability settings are the price mechanisms under the NER. These mechanisms are:[12]

- MPC – the MPC is a cap placed on electricity spot prices in each half-hourly trading interval, and is set at $13,100/MWh for the current 2013-14 financial year. Under the NER, the AEMC indexes the MPC by the consumer price index (CPI) each financial year. The MPC for the 2014-15 financial year is $13,500/MWh.

- 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 (half hourly) trading intervals exceeds the CPT, the APC will be applied in that region. The CPT is set at $197,100 for the current 2013-14 financial year. Under the NER, the AEMC indexes the CPT by the CPI each financial year. The CPT for the 2014-15 financial year is $201,900.

11 Tasmania joined the NEM in May 2005.

12 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.

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

The reliability settings function to:

- establish the parameters governing the price envelope within which supply and demand is balanced in the wholesale electricity market;
- provide important price signals to market participants in relation to the delivery of sufficient generation capacity and/or demand-side response (DSR) to meet the reliability standard;[13] and
- at the same time, provide a mechanism to limit financial risk for market participants.

The MPC and the MFP 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 associated with electricity generation and bulk transmission supply 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 electricity spot market. If the CPT is breached, AEMO must impose the APC in accordance with the NER.[14] The APC is currently set at ±$300/MWh for all regions of the NEM, for all time periods.[15]

A summary of the current reliability framework is provided in Table 2.2 below.

13 Demand-side participation (DSP) refers to the ability of energy consumers to make decisions regarding the quantity and timing of their energy consumption that reflect their value of the supply and delivery of electricity. A form of DSP is DSR, which refers to actions by energy users to reduce their demand for network supplied energy in response to pricing signals during periods of peak demand or network stress. This draft report refers to DSP in the context of DSR.

14 Clause 3.14.2(c) of the NER.

15 The APC is specified in a schedule that is developed, authorised, published and varied by the AEMC. It is available on the AEMC website, www.aemc.gov.au.

Table 2.2 Summary of the current reliability framework

Parameter	Objective	Level
Reliability standard	Indicates to the market the required level of supply and demand adequacy.	USE < 0.002% annual energy consumption of region
Market price cap	The key reliability setting. Provides incentives for supply and demand-side investment to deliver the reliability standard.	$13,100/MWh (2013-14) Indexed by CPI each financial year
Market floor price	The lowest allowable limit for the spot price. Is generally considered unrelated to investment signals.	-$1,000/MWh
Cumulative price threshold	An explicit risk management mechanism designed to limit participants' exposure to protracted levels of high prices in the spot market.	$197,100 (2013-14) Indexed by CPI each financial year
Administered price cap	Designed to reduce the financial exposure of market participants during an extreme market event, while maintaining incentives for market participants to supply electricity.	±$300/MWh

2.3 Relationship between the reliability standard and reliability settings

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

Under the current framework, short-term reliability shortfalls may be managed by AEMO through two intervention mechanisms:

- The reliability and emergency reserve trader (RERT) mechanism - AEMO has the authority to contract for electricity reserves if shortfalls are forecast. This would

require AEMO to negotiate and enter into contracts with reserve providers. The RERT provisions in the NER expire on 30 June 2016.[16]

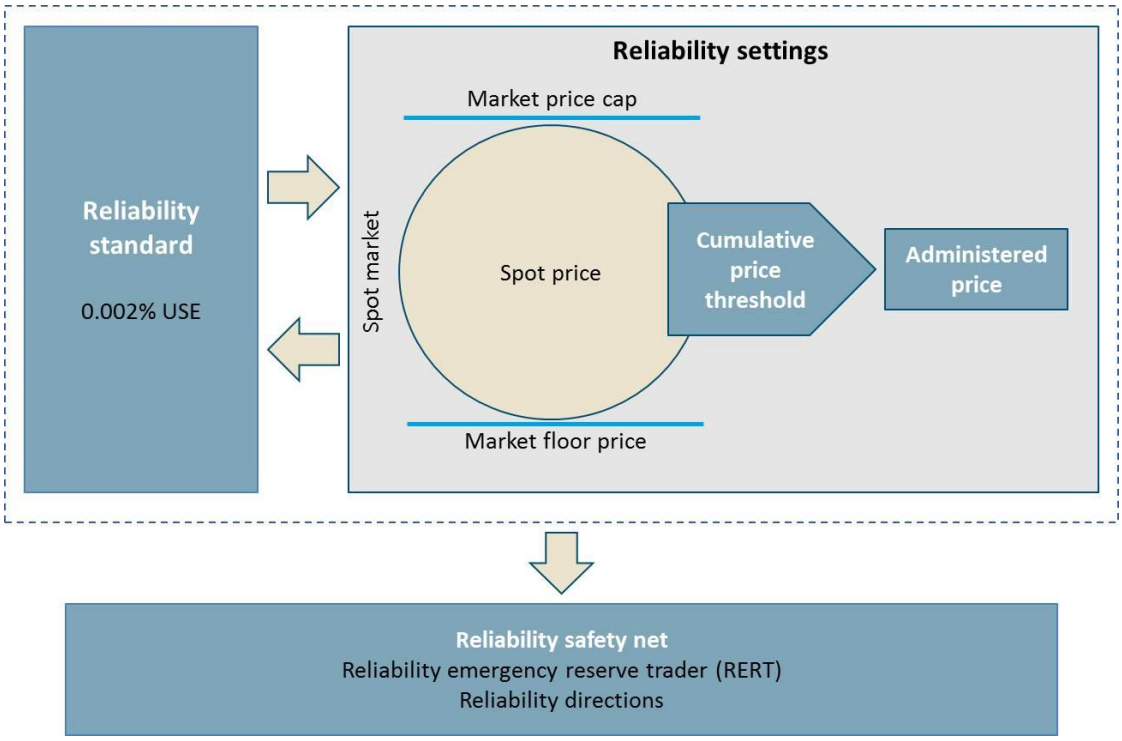
- Reliability directions - AEMO may also direct registered participants to take certain action to maintain or re-establish the power system to the required operating state. Such reliability directions are governed by the provisions under the NER.[17]

These two intervention mechanisms provide a "safety net" in the event that there is insufficient generation capacity to meet demand. They provide the ability for AEMO to attempt to reduce the level of any electricity load shedding of customers.

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

This inter-relationship between the NEM reliability standard and reliability settings, and the two intervention mechanisms, is depicted diagrammatically in Figure 2.1 below.

Figure 2.1 NEM reliability standard and reliability settings



16 The RERT provisions are set out under rule 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.

17 Clause 4.8.9 of the NER.

The Panel has undertaken a number of reviews examining the reliability standard and reliability settings in the past. A summary of the key reviews is provided in Appendix B to provide additional context to this review.

3 Assessment framework

This chapter describes the assessment framework that the Panel has applied to assess the reliability standard and reliability settings in this review, in accordance with the requirements set out in the NEL and NER.

3.1 Requirements under the law and rules

3.1.1 National electricity objective

The Panel is required to have regard to the national electricity objective (NEO) when it undertakes its assessments and makes recommendations for this review.

The NEO is set out in section 7 of the NEL as follows:

> "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."

For this review, the relevant aspect of the NEO is efficient investment in electricity services for the long term interests of consumers of electricity with respect to the price and reliability of supply of electricity.

Any changes to the reliability standard and reliability settings must be consistent with meeting the reliability standard, and must provide an appropriate level of protection to customers in respect of price. The long term interests of consumers will be promoted where an appropriate balance is achieved between price and reliability of supply of electricity.

3.1.2 Potential impact of proposed changes to the reliability settings

In accordance with the terms of reference for this review, and the NEL in which the following requirements are derived from, the Panel is also to consider the potential impact of any proposed changes to the MPC, CPT or MFP on:

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

- market participants and consumers.

The Panel may also take into account any other matters the Panel considers relevant.[18]

3.2 Other factors considered by the Panel

To assist its review of the reliability standard and reliability settings, the Panel has also had regard to the following factors:

- **Modelling** - quantitative and qualitative modelling can be used to investigate a range of issues relating to the reliability standard and reliability settings, particularly where the issues (such as in the external environment) and system (such as the NEM) are complex. Modelling is limited by a number of factors, including input assumptions made. It is only one consideration amongst other factors, described below.

- **Broader NEM philosophy** - competition between buyers and sellers in the market should be allowed to set the efficient price to achieve the appropriate level of reliability that is valued by customers in the market. The reliability settings should be designed to provide a sufficient range to promote this behaviour in the market.

- **Value to customers** - the reliability standard and reliability settings should be set at a level which reflects the price at which customers are willing to pay for reliability. That is, at a price that is not higher than the value customers place on reliability.

- **Trade-off between price and reliability** - in determining the level of the reliability settings required to achieve the reliability standard, there is a tension between price and reliability outcomes. Regard should be given to the trade-off between price to consumers and reliability of electricity supply.

- **Investment certainty** - any changes to the reliability settings need to take into account the impact on investor certainty and incentives to invest in generation in order to achieve the reliability standard.

- **Financial risk** - the reliability settings need to be set at appropriate levels such that market participants and consumers are not exposed to risks of extreme or sustained high prices.

- **Stability and predictability** - consistency in the approach to setting the reliability standard and reliability settings provides stability and predictability for market

18 These other matters could include any implications the gas market settings have on the electricity market settings or interactions between the gas and electricity markets, and the impact of renewable energy targets and other relevant policy settings. The Panel has to also consult with AEMO on the relevant gas market settings - AEMO's participation as a member of the Panel should facilitate this process.

participants. This includes taking into account relevant reviews and recommendations. Such an approach will promote confidence in the market, investment certainty and efficiency in investment. In addition, some flexibility is required to accommodate changes in market conditions, while not undermining investor confidence. Therefore, any departure from previous approaches to setting the reliability standard and reliability settings should be transparent and based on clearly articulated objectives.

- **Proportionality and materiality** - any change to the reliability standard and reliability settings should be proportionate to the scale of any issue identified with the current reliability standard and reliability settings. In addition, the likely benefits from making a change should be balanced against the likely risks and costs to the market of doing so.

4 Overview of modelling methodology

On behalf of the Panel, the AEMC engaged ROAM to provide advice and modelling to assist the Panel with this review.

For further details of the modelling undertaken by ROAM, a separate draft modelling report by ROAM has been published by the Panel as an accompanying document to this draft report.[19]

4.1 Modelling objectives

The objective of the modelling was to explore the reliability settings that are required to meet the reliability standard for the 2016-17 to 2019-20 period.

ROAM also assessed the likelihood of a breach in the reliability standard over the next decade, and evaluated the suitability of the reliability standard from an economic perspective.

Finally, ROAM considered a number of non-reliability related impacts of changing the reliability settings.

4.2 Approach to modelling between Panel reviews

ROAM also carried out the modelling for the 2010 reliability standard and reliability settings review.[20] During that review, ROAM received feedback from stakeholders regarding its modelling methodology, including possible improvements. In response to stakeholder suggestions, ROAM has developed a new approach for this review which it has applied concurrently with the methodology used in 2010. The two approaches are discussed further in section 4.5.

4.3 Modelling stages

ROAM performed quantitative modelling to investigate a range of issues relating to the reliability standard and reliability settings. ROAM's modelling involved a number of stages to consider particular aspects of the reliability standard and reliability settings and their potential impact on the operation of the market.

These stages included the following:

- Benchmarking with previous studies:
  - Benchmarking studies for this review to ensure consistency of assumptions with previous studies.

19 Available at: www.aemc.gov.au.

20 Ibid.

- Stage 1 - Conceptual assessment of the reliability settings:
  - Quantitative modelling to determine the MPC (and associated CPT) required to allow new entrant open cycle gas turbine (OCGT) generation to operate profitably in a market which achieves the reliability standard. This stage focused on the "cap defender" approach, which was compared to the previously applied "extreme peaker" approach.[21]
- Stage 2 - Assessment of current market conditions:
  - Additional quantitative modelling to forecast the level of reliability in a market where the existing reliability settings are maintained. A forecast is presented for two markets over a ten year period: one with a purely market-driven development of capacity; and another with no change in thermal capacity.
- Stage 3 - Assessment of the reliability standard:
  - Modelling to investigate the suitability of the current reliability standard of a maximum permissible USE of 0.002 per cent. This modelling determines the optimum level of the reliability standard, given an assumed value of customer reliability (VCR).[22]
- Stage 4 - MFP assessment:
  - Modelling to review the suitability of the existing MFP. This modelling involves simulating cycling decisions of all generators in the NEM, subject to an objective of minimising costs over the forthcoming week.[23]
- Stage 5 - Market impacts analysis:
  - Incorporates both forecast modelling and historical analysis to explore the impact that reliability settings have in the operation of the NEM. The analysis focuses on wholesale and contract markets in the NEM, how the reliability settings influence the behaviour of market participants, and the potential impacts of a reduction in the MPC from $13,100/MWh to $9,000/MWh.[24]

4.4 Modelling assumptions and sensitivities

The Panel held a number of discussions with ROAM to develop the key input assumptions to be used in ROAM's modelling. In addition, given the significant degree

21 See section 4.5 for further discussion on the "cap defender" and "extreme peaker" approaches.

22 The VCR relates to how customers value reliability.

23 In this instance, "costs" means avoidable costs (fuel, and variable operating and maintenance cost) and startup costs.

24 ROAM's modelling utilised an MPC of $13,100/MWh, as applicable for the 2013-14 financial year.

of uncertainty in relation to a number of the input assumptions, ROAM also developed a range of alternative scenarios to inform the analysis.

The base case in ROAM's modelling incorporated the following assumptions:

- medium peak demand and energy projections;
- the mandated large-scale renewable energy target (LRET) scheme, targeting approximately 41 TWh of renewable energy generation by 2020;
- the central gas price trajectory provided in the AEMO Planning Assumptions 2013;[25]
- a repealed carbon price;
- an annualised capital cost of $100,000/MW per annum for OCGT capacity; and
- demand-side participation (DSP) quantities and price thresholds from the 2013 AEMO National Electricity Forecast Report (NEFR).[26]

The sensitivities that were developed for ROAM's analysis included:

- high and low capital cost assumptions for the new entrant OCGT;
- alternative MPC multipliers associated with the CPT: 12 times, 15 times and 18 times the MPC;
- high and low demand and energy growth forecasts;
- a reduced LRET;
- a low gas price projection;
- carbon pricing at the Treasury Core projection;[27] and
- a 50 per cent reduction in the quantity of DSP.

4.5 Modelling approaches: cap defender and extreme peaker

An important change in ROAM's modelling approach since its work for the Panel on the 2010 review of the reliability standard and reliability settings is the application of the "cap defending generator" (or "cap defender") approach, in addition to the "extreme peaking generator" (or "extreme peaker") approach, for this review.

25 AEMO, *2013 Planning Assumptions: Existing Generation Data*, 22 August 2013.

26 AEMO, *2013 National Electricity Forecasting Report*, 28 June 2013.

27 Australian Government, The Treasury, *Strong Growth, Low Pollution: Modelling a Carbon Price*, 21 September 2011, p. 90.

4.5.1 Extreme peaker approach

In 2010, ROAM applied the extreme peaker approach only. The extreme peaker approach assumes that a new entrant OCGT is bidding the MPC. This approach determines a relationship between the USE observed in each iteration of the modelling, and the MPC required for the new entrant generator to profitably operate in a system which is expected to experience a level of USE approaching the reliability standard.

A criticism from a number of stakeholders, at the time of the previous review, was that this concept of an extreme peaker was somewhat theoretical as it did not reflect market impacts. In particular, the approach was not consistent with the operation of recently commissioned OCGT plant in the NEM whereby the owners of such plant earnt income by selling caps and offering plant for dispatch at its marginal operating costs rather than only operating when the spot price as at the MPC

A number of participants did not consider that it was appropriate to retire generation to force the market to deliver USE at the reliability standard. They also considered that the assessment of a new entrant generator was inappropriate in a market that had sufficient installed capacity to just meet the reliability standard.

For the current review, ROAM developed a new approach which it considered better reflected the operation of recently commissioned OCGT plant in the NEM. This approach is summarised below.

In its draft report, ROAM noted that the purpose of including the results of its extreme peaker method was to provide a point of comparison with the 2010 review, and to provide a more theoretical upper bound on the MPC required to deliver the reliability standard.

4.5.2 Cap defender approach

For this review, ROAM also applied the cap defender approach for the first time. The approach continues to be based on assessing the MPC required for a peaking generator to be profitable with USE at 0.002 per cent (or some other standard being investigated). However, the peaking generator operates as a "cap defender". That is, the generator is assumed to be a notional 1 MW OCGT which is fully contracted using a $300/MWh cap contract and bids its entire capacity at $300/MWh.[28]

ROAM considered that by incorporating the commercial considerations that drive new entrant investment in the real market, the cap-defender approach would deliver results that were more robust and informative than those provided by the theoretical approach (extreme peaker) applied in 2010.

28 By modelling a notional 1 MW generator, the potential for the generator to significantly impact on the market price outcome is removed.

The cap defender approach allows the new entrant OCGT to recover its capital investment in periods in which the price is below the MPC, but above $300/MWh. In contrast, the extreme peaking generator is prevented from benefiting from these opportunities as it only operates when USE occurs, or would occur, and when the spot price is at the MPC.

This allows the cap defending generator to profitably operate with a significantly lower MPC than is required by the extreme peaking generator. In other words, the outcome under the extreme peaker approach essentially represents an upper bound on the MPC that is required for a peaking generator to be profitable, given a particular demand forecast.

The cap defender approach aims to replicate market behaviour, by giving consideration to commercial market factors that drive new entrant OCGT generation investment in the NEM. The extreme peaker approach, in contrast, is independent of these factors.

Further discussion of the outcomes and limitations of each approach is provided in section 6.1.3 below.

5 Review of the reliability standard

This chapter discusses specific issues, conclusions and recommendations related to the reliability standard. This chapter also considers the VCR as it relates to the reliability standard.

Draft recommendations

- No changes should be made to the current form and level of the reliability standard. The standard should therefore continue to be:
  - in the form of 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; and
  - at the level of the maximum permissible USE, or the maximum allowable level of electricity at risk of not being supplied to consumers, of 0.002 per cent of the annual energy consumption for the associated region or regions per financial year.
- The AEMC or the Panel (as appropriate) should develop a methodology for calculating an appropriate VCR to determine the efficient reliability standard. This work should be carried out prior to the next reliability standard and reliability settings review which is due to commence around 2017.

5.1 Form of the reliability standard

As discussed in chapter 2, the 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.

5.1.1 Stakeholder submissions

In submissions on the issues paper for this review,[29] stakeholders were generally supportive of maintaining the current form of the reliability standard using USE.[30] Consequently, no submissions offered an alternative form of the reliability standard.

29 The issues paper and submissions on the issues paper are available on the AEMC's website, www.aemc.gov.au.

30 AGL, Submission on issues paper, 21 June 2013, p. 1; Energy Supply Association of Australia (ESAA), Submission on issues paper, 21 June 2013, pp.1-2; GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 1; NGF, Submission on issues paper, 21 June 2013, p. 3;

St Kitts Associates considered there would be value in the Panel elaborating on how the concept of USE remains appropriate in the context of increased DSR capability.[31]

5.1.2 Panel's analysis

The Panel has previously undertaken extensive assessment of the form of the reliability standard and whether measures other than USE should be adopted.[32] In those reviews, the Panel did not identify any overall benefits to the market, or market participants and consumers, from changing to the form of the reliability standard. There was also limited support from stakeholders for change.

In the issues paper, the Panel did not consider there had been any changes in market arrangements to suggest that its previous considerations on this matter were no longer relevant. Submissions on the issues paper also appeared to support this view.

St Kitts Associates' specific query relates to the relevance of the current form of the reliability standard in the context of increasing DSR.[33] Assuming the MPC was sufficiently high (and the demand side is able to respond in real-time), the reliability standard based on USE would never be breached. This is because the MPC would send a price signal to the market to clear in order to reduce the wholesale market spot price by load shedding through DSR, but not through load curtailment by network service providers. In theory, if there was sufficient DSR in the NEM (and a high enough MPC), the reliability standard would not be required. This is because the DSR would be sufficiently active to respond to times of low supply. However, as DSR is currently under development and insufficient, there is still a need for having the reliability standard to signal to the market the required level of supply and demand adequacy. Further, the MPC (and the CPT) limit risks to market participants in the event that there is insufficient DSP at a time of supply scarcity.

In addition, as the Panel stated in its 2007 Comprehensive Reliability Review, the current USE standard in the NEM is an energy standard for an energy-only market.[34] This design is well suited to placing value on cumulative, long-term energy shortfalls and thus rewarding additional generation, or DSR, to reduce that shortfall.

Further, implementation of the Demand Response Mechanism (DRM) has been deferred.[35] Given the uncertainty around its implementation (and, thus, the timing of

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Alinta Energy, Submission on issues paper, 21 June 2013, p. 1; Macquarie Generation, Submission on issues paper, 21 June 2013, pp. 1-6; Major Energy Users (MEU), Submission on issues paper, 21 June 2013, pp.3-4.

31 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 3.

32 See Appendix B for further details of these past Panel reviews.

33 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 3.

34 Reliability Panel, *Comprehensive Reliability Review*, Final Report, 21 December 2007, p. 24.

35 This follows from a SCER request, at its December 2013 meeting, for AEMO to defer lodgement of the DRM rule change request due to a change in market circumstances since the initiative was first

its benefits), it is appropriate, at this stage, to monitor the work being carried out, and to consider the impacts on the form of the reliability standard in its next review which is due to commence around 2017.

Given that there has not been sufficient evidence to support a need to change the existing form of the reliability standard, the current form of the reliability standard will not be changed in this review.

5.1.3 Panel's draft recommendation

The Panel's draft recommendation is for no change to the current form of the reliability standard. That is, the form will continue to be 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.

5.2 Level of the reliability standard

As discussed in chapter 2, the current level of the reliability standard is 0.002 per cent of USE for each region or regions per financial year. It has remained unchanged since it was established in 1998 at the commencement of the NEM.

Operationally, available electricity generation and bulk transmission capacity in (and between) each region should be planned up to the point that USE does not exceed the reliability standard in each financial year. Where this is achieved, the reliability standard would also be achieved for the NEM as a whole.

5.2.1 Stakeholder submissions

In submissions on the issues paper for this review, a number of stakeholders considered that the current level of the reliability standard was appropriate.[36] Consequently, no submissions offered an alternative level of the reliability standard.

For example, AGL did not see any benefit in tightening the standard from 1 July 2016, given that the current level appears to be sufficient for delivering reliable capacity and adequate generation investment in the NEM.[37] GDF SUEZ noted that the current

proposed. SCER has requested officials to undertake further work on the DRM, including a cost-benefit analysis, and to report back to SCER at its first meeting in 2014. See: www.scer.gov.au.

36 AGL, Submission on issues paper, 21 June 2013, p. 1; ESAA, Submission on issues paper, 21 June 2013, pp.1-2; GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 1; NGF, Submission on issues paper, 21 June 2013, p. 3; Alinta Energy, Submission on issues paper, 21 June 2013, p. 1; Macquarie Generation, Submission on issues paper, 21 June 2013, pp. 1-6; MEU, Submission on issues paper, 21 June 2013, pp.3-4.

37 AGL, Submission on issues paper, 21 June 2013, p. 1.

reliability standard was broadly consistent with international experience and had been serving the industry well.[38]

5.2.2 ROAM's modelling

To help inform the Panel on the ability of the market to achieve the reliability standard over the next 10 years, ROAM prepared a quantitative analysis to forecast the level of reliability achieved in a market with the existing reliability standards. The results of ROAM's modelling indicated that, assuming the existing reliability settings are maintained, the current oversupply of capacity in the NEM will be maintained between 2013-14 and 2022-23.[39] That is, the existing reliability settings are sufficient to achieve a level of reliability consistent with the reliability standard.

In addition, ROAM carried out modelling to investigate the suitability of the current reliability standard from an economic perspective. Specifically, ROAM examined the optimum level of the reliability standard given an assumed VCR.[40] ROAM's modelling indicated that the current reliability standard of a maximum permissible USE of 0.002 per cent would be economically efficient if the VCR was assumed to be $30,000/MWh.

While ROAM's modelling has determined a relationship between VCR and the optimal level of reliability (that is, the level of reliability that minimises total economic costs), ROAM has not formed a view on whether the existing reliability standard is the economically efficient or optimal standard.[41] The relationship between the reliability standard and VCR is considered further in section 5.3 below.

5.2.3 Panel's analysis

To date, the NEM has performed well against the reliability standard. In the past 10 financial years, the reliability standard has only been breached, on a regional basis, twice - in Victoria and South Australia in 2008-09. These two breaches occurred around the same time and coincided with relatively extreme weather events.[42]

In addition, having regard to both ROAM's assessment of current market conditions and submissions on the issues paper, sufficient evidence has not been presented to support a proposition that reliability in the NEM will deteriorate in the future.

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38 GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 1.

39 ROAM Consulting, *Reliability Standard and Settings Review*, Draft Report to AEMC, 11 December 2013, p. 30.

40 Ibid, pp. 62-63.

41 Ibid, p. 62.

42 At the time, the Panel noted that the "long term" reliability standard over the past 10 year period had not been breached, and that AEMO and market participants managed the incidents appropriately.

For these reasons, the Panel does not propose to change the current level of the reliability standard from the maximum permissible USE of 0.002 per cent of the annual energy consumption for the associated region or regions per financial year.

With that said, the Panel has an obligation under the NER to have regard to any VCR determined by AEMO, which the Panel considers relevant, when carrying out its review of the reliability standard and reliability settings.[43] In this context, the Panel welcomes the work of ROAM to determine a relationship between the optimal reliability standard and VCR.

While the ability to determine an optimal reliability standard for the NEM is currently constrained by the lack of an appropriate VCR estimate, nevertheless, this is an area that warrants further investigation. The relationship between the VCR and the reliability standard is considered further in the section 5.3 below.

5.2.4 Panel's draft recommendation

The Panel's draft recommendation is to maintain the current level of the reliability standard. That is, the level will continue to be set at the maximum permissible USE, or the maximum allowable level of electricity at risk of not being supplied to consumers, of 0.002 per cent of the annual energy consumption for the associated region or regions per financial year.

5.3 Value of customer reliability

In this draft report, the VCR is considered with respect to the reliability standard, as opposed to in relation to the MPC. This is because the VCR and MPC address different purposes and are not directly related.

The VCR relates to how customers value reliability. On the other hand, the MPC aims to incentivise investment and operational behaviours necessary to deliver the expected reliability outcome. For instance, the characteristics of the NEM, such as the inability for consumers to respond quickly to prices, mean it is unlikely to be appropriate for MPC to reflect the VCR.

As the MPC does not reflect the VCR, a better approach is to consider how to minimise costs to consumers with respect to the reliability standard. This is achieved by setting the reliability standard at a level which minimises the sum of the cost of generation required to meet the reliability standard and the cost of unreliability.

In the issues paper for this review, the Panel sought views from stakeholders on whether the current approach to determining the reliability standard and reliability settings effectively takes into account the trade-offs between the costs and VCR.

43 Rule 3.9.3A(c)(2) of the NER.

In addition, AEMO is currently conducting a national VCR review, which is due to be completed in 2014, and following completion of the Panel's review.[44] All market participants are encouraged to participate in AEMO's review.

5.3.1 Stakeholder submissions

In submissions on the issues paper for this review, stakeholders were generally supportive of the VCR being given some consideration in this current review of the reliability standard and reliability settings.

However, stakeholders also recognised the difficulties associated with determining an accurate measure of VCR.[45] For example, the Energy Supply Association of Australia (ESAA) noted that the VCR typically cannot account for customers' exposure to high impact, low probability events on the transmission network and are subject to uncertainty and measurement error.[46] Therefore, stakeholders also generally considered that caution should be exercised by the Panel when using the VCR in the review.[47]

Opinions differed on the appropriate VCR to use in the context of setting the reliability standard for the electricity generation and bulk transmission sectors. The ESAA considered that the residential sector was the most appropriate customer group to reference as this sector is most likely to experience load shedding at times of short supply.[48] However, Alinta Energy considered that use of a VCR based on the residential sector ignores the overall VCR by not reflecting the value of reliability by the industrial and commercial sectors.[49] Alinta Energy considered this to be indicative of the issue of investment in transmission being valued above investment in generation and demand-side alternatives.[50]

EnergyAustralia considered that, given it is not practical to have different reliability standards for generation and bulk transmission capacity within the NEM regions, the VCR needs to reflect an average across the NEM.[51]

GDF SUEZ noted that the MPC and VCR are different mechanisms and do not necessarily need to be set at similar levels.[52] On a related note, St Kitts Associates noted

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44 See Appendix B for further details of this review.

45 AGL, Submission on issues paper, 21 June 2013, p. 2; ESAA, Submission on issues paper, 21 June 2013, p. 2.

46 ESAA, Submission on issues paper, 21 June 2013, p. 2.

47 AGL, Submission on issues paper, 21 June 2013, p. 2; ESAA, Submission on issues paper, 21 June 2013, p. 2.

48 ESAA, Submission on issues paper, 21 June 2013, p. 2

49 Alinta Energy, Submission on issues paper, 21 June 2013, p. 15.

50 Ibid.

51 EnergyAustralia, Submission on issues paper, 25 June 2013, p. 2.

52 GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 2.

that the residential VCR should be considered as a ceiling on the MPC, but that this should not be interpreted as saying that the MPC should be increased to the current VCR.[53]

The Major Energy Users (MEU) considered there was no direct correlation between the VCR and the MPC.[54] It considered that the VCR is used for assessing whether network investment was efficient, while the MPC is set at the point where no increase will result in increased reliability of supply.

St Kitts Associates noted that another dimension to the VCR discussion was the emergence of DSR at existing prices.[55] It considered this was evidence of a willingness to accept demand-side reductions at prices already revealed in the market.[56]

St Kitts Associates also noted that the policy response from the Standing Council on Energy and Resources (SCER) to the AEMC's Extreme Weather Review[57] (which included a request to the AEMC) to provide additional advice on the relationship between the VCR and MPC.[58] It considered that this advice would be of value for consideration as a part of this review.[59]

5.3.2 Panel's analysis

From an efficiency perspective, the level of reliability pursued through regulation must have regard to both the rising incremental costs, and the diminishing value, of greater reliability.

This interaction was highlighted by ROAM in its work to determine the relationship between the VCR and the optimal level of reliability (that is, the level of reliability that minimises total economic costs). The relationship is illustrated in Box 5.1 below.

53 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 6.

54 MEU, Submission on issues paper, 21 June 2013, p. 10

55 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 6.

56 Ibid.

57 AEMC, *Review of the Effectiveness of NEM Security and Reliability Arrangements in light of Extreme Weather Events*, Final report, 31 May 2010.

58 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 6.

59 Ibid.

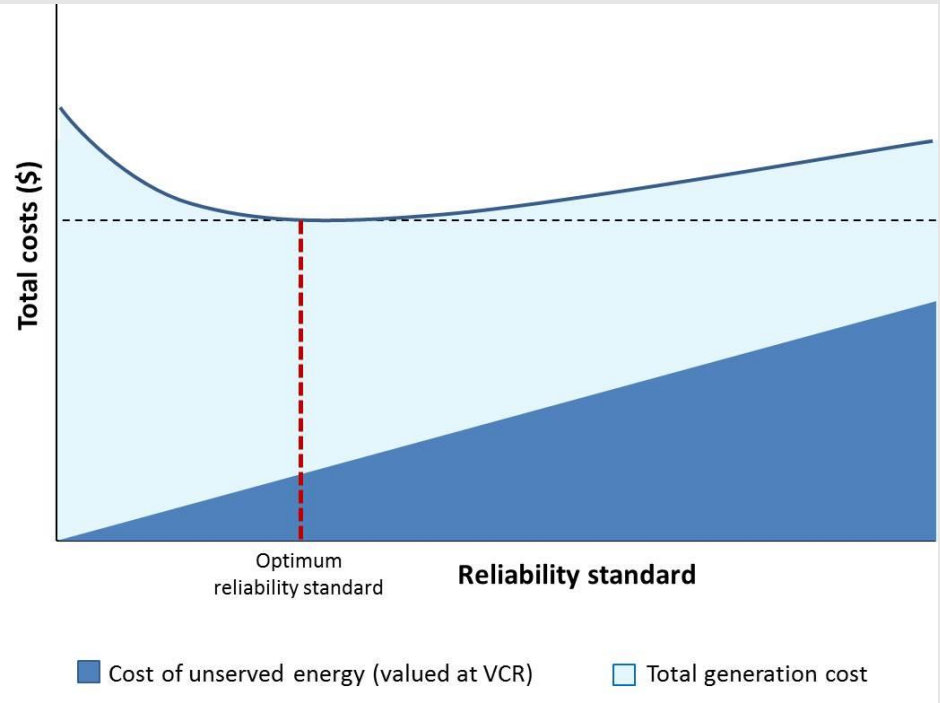
Box 5.1 Delivering reliability at minimum cost to consumers

The total cost to the market of achieving a given reliability standard is the sum of:

- the cost of generation required to meet the reliability standard; and
- the cost of unreliability, as measured by the VCR multiplied by the level of USE.

The market is optimised, from a theoretical perspective, when the reliability standard corresponds to the minimum combined cost of generation and USE. A conceptual representation of this relationship is provided in Figure 5.1.

Figure 5.1 Assessment of the reliability standard



Source: ROAM Consulting, *Reliability Standard and Settings Review*, Draft Report to AEMC, 11 December 2013, p. 12.

Costs and benefits vary, depending on the type of customer, time of interruption, geographical location, and climate. Hence, to set appropriate standards, detailed and accurate information about the cost functions of businesses, and the value of reliability for customers, is needed.

To date, the value of reliability for all NEM customers has never been evaluated. Such an evaluation necessarily involves complex issues, such as variations in valuations across customers in different sectors and locations.

For this reason, the current approach used in the NEM has been to measure reliability by the reliability standard.[60] The challenge of maintaining reliability in the NEM has, therefore, been a question as to what level of MPC is sufficient to incentivise investment and operational behaviours necessary to deliver the expected reliability outcome.

In December 2013, the AEMC provided advice to SCER on linking the reliability standard and reliability settings in the wholesale energy market with the VCR.[61] The AEMC's final recommendation drew on the work carried out by ROAM in the context of this review. Specifically, the AEMC recommended that a VCR, estimated for the customers most affected by a supply shortfall, be used as a cross-check on the reliability standard to assess how well the prevailing standard reflects the value customers place on reliability.

As noted above, the outcome of ROAM's modelling indicated that the current reliability standard of a maximum permissible USE of 0.002 per cent would be economically efficient if the VCR was assumed to be $30,000/MWh.

AEMO is currently conducting a national VCR review, which is due to be completed in 2014, but after the Panel's review.[62] AEMO's review entails the development of VCRs at transmission node level across the NEM. The outcomes of AEMO's review should inform discussion on an appropriate form and value of VCR to apply to the determination of the reliability standard. All market participants are encouraged to participate in AEMO's review.

The findings from AEMO's review will also be relevant to the Panel's review of the reliability standard in the future. After AEMO's VCR review has been completed, there will be more information on which the Panel can draw upon to undertake a more informed review of the reliability standard.

5.3.3 Panel's draft recommendation

The Panel's draft recommendation is that, following the completion of AEMO's review of a national VCR, the AEMC or the Panel (as appropriate) should develop a methodology for calculating an appropriate VCR estimate to determine the efficient reliability standard. This work should be carried out prior to the next reliability standard and reliability settings review due to commence around 2017.

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60 As noted above, the objective of the reliability standard is to deliver an expectation of reliability that reflects the value that consumers place on reliability. The current approach specifies that value in terms of the targeted quantum of USE and applies a derived MPC set to deliver a level of generation capacity consistent with meeting the reliability standard.

61 AEMC, *Advice to SCER on linking the reliability standard and reliability settings with VCR*, Final report, 20 December 2013.

62 See Appendix B for further details of this review.

6 Review of the reliability settings

This chapter considers whether the current levels of the MPC, CPT and MFP are appropriate to achieve the chosen reliability standard to apply in the NEM from 1 July 2016. It also considers the manner in which the MPC and CPT are indexed, and whether this should extend to the MFP.

Draft recommendations

Market price cap (MPC)

- No change should be made to the real value of the MPC. The MPC will continue to be indexed by CPI annually.

Cumulative price threshold (CPT)

- No change should be made to the real value of the CPT. The CPT will continue to be indexed by CPI annually.
- The AEMC or the Panel (as appropriate) to review the current form of the CPT, prior to the next reliability standard and reliability settings review which is due to commence around 2017.

Market floor price (MFP)

- No change should be made to the current value of the MFP. The MFP should, therefore, continue to be set at -$1,000/MWh.

Indexation

- No changes should be made to the current measure of indexation of the MPC and CPT (that is, the values of MPC and CPT should continue to be adjusted by CPI annually). However, the Panel does recommend that a review of the current indexation measure occurs within two years.
- No change should be made to the current approach of non-indexation of the MFP. The MFP should, therefore, continue to be set in nominal terms.

General

- The AEMC or the Panel (as appropriate) develop a methodology for undertaking future reliability standard and reliability settings reviews. This will include consideration of how the outcomes of any market modelling should be treated. This work should take place prior to the next reliability standard and reliability settings review, due to commence around 2017.

6.1 Market price cap

As discussed in chapter 2, the MPC is set at $13,100/MWh for the current 2013-14 financial year and will increase to $13,500/MWh for the 2014-15 financial year.[63] For this review, the current MPC value has been assessed to determine whether it remains appropriate to meet the reliability standard to apply from 1 July 2016.

6.1.1 Stakeholder submissions

Level of the market price cap

In submissions on the issues paper for this review, a number of stakeholders considered the current value of the MPC is suitable to meet the reliability standard going forward.[64] Some of these stakeholders referred to the fact that the reliability standard had only been breached twice in the past ten years as a reason that no change was required to the existing reliability settings.

In contrast, a number of other stakeholders considered that there is a case for changing the current level of the MPC. Alinta Energy noted that, during the Panel's 2010 review of the reliability standard and reliability settings, Alinta Energy had supported an increase in the MPC to $16,000/MWh as recommended by ROAM at the time.[65] Alinta Energy also noted that its own analysis at the time had suggested the MPC be set in the range of $14,000/MWh to $20,000/MWh.[66] For this review, Alinta Energy reiterated Alinta Energy's view that the MPC is too low to ensure the reliability standard will be met.[67]

The MEU considered that, based on market evidence, the current value of MPC was "probably too high" and that the previous setting of $10,000/MWh was sufficient to ensure the reliability standard would be achieved.[68]

63 As indexed by the AEMC in accordance with clauses 3.9.4(c)-(e) and 3.14.1(d)-(f) of the NER.

64 AGL, Submission on issues paper, 21 June 2013, pp. 1-2; GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 2; National Generators Forum (NGF), Submission on issues paper, 21 June 2013, pp. 3-4.

65 Alinta Energy, Submission on issues paper, 21 June 2013, p. 2.

66 Ibid.

67 Ibid, pp. 2-3.

68 The MEU noted that under the current reliability settings: there has been no lack of investment in generation except for base load dispatchable generation; there has been considerable investment in peaking generation and renewable energy generation; and the reliability standard had been outperformed. On this basis, the MEU considered that the MPC was "probably too high" and that the previous setting of $10,000/MWh was sufficient to meet the reliability standard. For further details, see: MEU, Submission on issues paper, 21 June 2013, pp. 3, 6.

Regional market price caps

Regional MPCs relate to setting a different MPC in each NEM region to deliver a different price-reliability trade-off from the generation sector. This issue has been previously considered by the Panel, the AEMC and the Ministerial Council on Energy (MCE).

In its submission on ROAM's draft report, the MEU considered that an outcome from ROAM's modelling is that the South Australian region, having the lowest peak demand and the lowest energy consumption of all mainland NEM regions, requires a higher MPC to meet the USE compared to the other NEM regions.[69] As a consequence, it suggests that the South Australian region sets the level of the MPC across the other NEM regions.[70] It argued that maintaining the reliability standard and MPC across the NEM imposes unnecessary costs on consumers in regions where the MPC could be lower and still achieve the reliability standard.[71] It considered that weighting the MPC in proportion to demand or consumption in each region would produce the most equitable outcome if a single MPC is used.[72]

On the other hand, Origin Energy considered that a single reliability standard and reliability settings should apply across the regions, noting the difficulties outweighing the economic benefit of having multiple MPCs.[73] It considered that this is consistent with the Panel's view in 2007.

6.1.2 ROAM's modelling

ROAM was asked to model the reliability settings to determine, among other things, the MPC required for the market to continue to deliver the reliability standard. ROAM applied two approaches in its modelling:[74]

- The cap defender approach: as noted in section 4.5.2, this approach determines the MPC required for a new entrant OCGT bidding at $300/MWh to operate profitably in a market that is expected to deliver the reliability standard.
- The extreme peaker approach: as noted in section 4.5.1, this approach assumes that a new entrant OCGT is bidding at the MPC. This approach was used in the Panel's 2010 review of the reliability standard and reliability settings.

ROAM's modelling under the extreme peaker approach suggested that a higher MPC - in the vicinity of $23,000/MWh - would be required to deliver the standard.[75] In

69 MEU, Submission on ROAM's draft report, 16 January 2014, pp. 15-22.

70 Ibid.

71 Ibid.

72 Ibid.

73 Origin Energy, Submission on ROAM's draft report, 17 January 2014, p. 2.

74 See section 4.5 for further discussion on these two approaches.

contrast, ROAM's modelling of MPC values under the cap defender approach indicated that a lower MPC - around $9,000/MWh - may be sufficient to incentivise the market to deliver the current reliability standard.[76]

The above values provide a range to guide consideration of the potential non-reliability impacts of changing the MPC on the market.[77]

As part of the assessment of the MPC, ROAM's modelling explored the relationship between MPC and USE in each region.[78] ROAM observed that there are significant differences in MPC requirements between regions when the cap defender approach is applied.[79] In particular, South Australia would require a MPC which is significantly higher than other regions to allow a new entrant OCGT generator to operate profitably in a market which is expected to achieve the reliability standard.[80]

6.1.3 Panel's analysis

Panel's consideration of the modelling

Level of market price cap

The outcomes of ROAM's modelling under both the cap defender and extreme peaker approaches have been considered. This has included consideration of the inherent limitations associated with each of the models.

Importantly, while the results of the cap defender approach suggest that a lower MPC may be sufficient to continue to deliver the reliability standard, the results of the extreme peaker approach suggest that the current MPC may not be high enough to continue to meet the reliability standard.

In relation to the extreme peaker approach, it can be observed that after a number of MPC reviews, there appears to be an emerging consensus that this approach to determining an appropriate MPC to achieve the reliability standard produces a MPC outcome that is arguably higher than what is needed for the NEM to meet the reliability standard.

The primary reason for this is generally acknowledged to be that the extreme peaker approach relies on income when the spot price is at the MPC and does not take into account the income that could be received at market prices between its marginal operating cost and the MPC. The decision made by the Panel in the last review to set

75 Ibid, p. 3.

76 ROAM Consulting, *Reliability Standard and Settings Review*, Draft Report to AEMC, 11 December 2013, p. 3.

77 Ibid.

78 Ibid, pp. 30, 32.

79 Ibid, p. 33.

80 Ibid.

the MPC lower than the value determined by the extreme peaker approach ($23,000/MWh) is consistent with this observation.

As outlined in section 4.5.2, the cap defender approach was developed by ROAM to address these concerns. That is, by including commercial considerations which drive new entrant investment, the new cap defender approach is expected to provide a more realistic view of the market compared to the extreme peaker approach.

A small number of stakeholders chose to comment on the modelling approaches and they were equally divided in terms of their support for one or the other approach.

Assumptions about market structure, as well as the extent of, and conditions for, DSP can have a significant effect on whether ROAM's modelling results derive a conservative or optimistic estimation of MPC. For example:

- Market structure: The cap defender approach assumes the level of concentration of market power that occurs in the NEM. The greater the level of market concentration, the more prices are likely to exceed $300/MWh, leading to an increase in the pool price revenue and an increased supply of generation. This means that a lower MPC would be required, compared to a situation of greater competition.

- Bid prices for DSP: If DSP is modelled as being bid at a high price, when the DSP is dispatched, the spot prices will be high and the cap defending generator would earn a high revenue. However, if DSP is modelled as being bid at a low price nearer to $300/MWh, then the cap defending generator would not earn a high revenue when the DSP is setting the spot price.

Also, the cap defender approach relies on an assumed bidding engine which determines the order of generation offers for dispatch. Assumptions about generation portfolio and individual generator behaviour will influence modelling outcomes. It is uncertain at this stage whether the assumed bidding engine produces results which are higher or lower than what is needed.

It needs to be recognised that neither modelling approaches are ideal, and modelling can only be used to inform subsequent judgements. For the reasons stated above, the extreme peaker is considered to provide a MPC outcome which is arguably higher than what is needed for the NEM to meet the reliability standard. Whilst the cap defender approach is designed to be more realistic than the extreme peaker and therefore less theoretical in construct, it is difficult at this stage to determine just how optimistic the former is. Until both the Panel and stakeholders have a better understanding of the cap defender approach, including the implications on the results from the assumptions and sensitivities applied, it would be premature to consider reducing the value of the MPC to that determined by that modelling approach. Equally, it would be inappropriate to consider increasing the current level of the MPC to that suggested by the extreme peaker modelling. This is in light of the Panel's previous concerns regarding the extreme peaker approach.

Therefore, at this stage, the Panel considers there is value in drawing on the results of ROAM's two modelling approaches (the extreme peaker and cap defender approaches) to help guide the discussion with respect to an appropriate value of MPC. On this basis, the appropriate level of the MPC to apply from 1 July 2016 is unlikely to be as low as the outcome of the cap defender approach (that is, $9,000/MWh), and not as high as the outcome of the extreme peaker approach (that is, $23,000/MWh). The Panel notes that the current value of the MPC ($13,100/MWh) sits within this range.

In summary, at this stage, the results of ROAM's modelling do not provide sufficient evidence to support a case for either an increase, or decrease, to the value of the MPC.

Regional market price caps

The rules require that the Panel has an obligation to review, among other things, a single MPC which is applicable across the NEM. The consideration of different MPCs in each region is beyond the scope of this review. However, having had regard to the issues raised by stakeholders in their submissions, the Panel has a number of comments on this matter.

While the outcomes of ROAM's modelling provide a useful starting point for discussion around the appropriate value of the MPC, the results should not be construed as evidence that change to the MPC is required. As noted above, the outcomes of ROAM's modelling (in particular, the outcomes of its cap defender approach) are extremely sensitive to the input assumptions made, and the sensitivities applied.

In respect of this matter, ROAM notes in its report that consideration of different MPCs in each region was beyond the scope of its review. Its modelling, therefore, did not include consideration of issues such as the physical and pricing constraints between regions. These issues, had they been incorporated into the modelling, would have resulted in different values being produced, and potentially different conclusions being drawn.[81] For this reason, ROAM's modelling does not provide evidence that different MPCs for different regions lead to "equitable" prices.

81 For example, under ROAM's modelling in Figure 5.2 of its draft report, a simple interpretation is that Victoria requires a much lower MPC compared to South Australia, and South Australia appears to be setting a higher level of MPC across the different regions. Based on this argument, it would suggest that Victorian customers are paying inequitably higher prices as a result of a higher than required MPC. However, this is based on ROAM's modelling of only physical constraints. If both the physical and pricing constraints were considered between the different regions, Victoria would likely require a higher MPC, although how much higher is unknown. Otherwise, if Victoria was subjected to a lower MPC, without consideration of these constraints, it could experience a lower level of reliability that may not be consistent with the reliability standard.

Other factors considered

Level of market price cap

The MPC modelling for this review has provided both a simple and a more complex representation of generator investment in the NEM. In order to gain a better understanding of the potential costs and risks associated with making a change to the current level of the MPC, some of the broader impacts associated with making such a change have been considered. The additional factors, some of which are set out below, have helped to inform the Panel's draft recommendation on the level of the MPC to apply from 1 July 2016.

Extensive work has been carried out in past Panel and AEMC reviews examining the broader impacts on market pricing outcomes and participant behaviour from alternative levels of the MPC.[82]

In its report to the Panel, ROAM provided some high level qualitative analysis considering the non-reliability impacts of changing the MPC. A number of observations related to market pricing outcomes and market participant behaviour are summarised below:[83]

- *Market impact for consumers*: In theory, reducing the level of MPC may reduce the ability of generators to earn revenue in the spot market, leading to lower prices for consumers in the short term. However, over the longer term, a lower MPC could dampen investment signals, leading to a shortage of generation capacity. In this event, a lower MPC could result in increased prices to consumers over the longer term.

- *Impact on contract markets*: The level of MPC affects investors' future expectations of pool price outcomes. An increase in MPC, which is likely to increase expectations of future pool price outcomes, will likely lead to an increase in electricity contract prices. A change in MPC will also influence the level of volatility in the NEM. This may affect decisions made by market participants given their level of risk aversion, and therefore contract market liquidity. A lower MPC would reduce the incentive for market customers to purchase cap contracts which, in turn, would reduce contract premiums. Contract discounts could have impacts on reliability and, consequently, on risks of a lower MPC.[84]

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82 For example, the AEMC's 2010 extreme weather review and the Panel's 2010 review of the reliability standard and reliability settings considered in detail the non-reliability impacts of increasing the level of the MPC. Other important reviews are set out in Appendix B.

83 ROAM Consulting, *Reliability Standard and Settings Review*, Draft Report to AEMC, 11 December 2013, pp. 69-83.

84 That said, ROAM recognised that significant contract discounts would presumably attract investment speculators, and, therefore, there should be a natural lower limit on contract values.

- *Prudential requirements*: Qualitatively, a change in the reliability settings will, at some stage in the future, change the prudential requirement and credit limit for both generators and customers operating in the NEM. All else being equal, an increase in the MPC will increase prudential requirements, and vice versa.

- *Impact on DSP*: A reduction in MPC may reduce the incentive for participants to engage in demand-side management activities. However, a reduction in DSP can result in a need to increase the MPC to meet the reliability standard. Therefore, the level of MPC and the quantity of DSP which is provided to the market are closely related.

In addition, investor decisions in the NEM are based on expectations of future prices, as opposed to the current level of prices. Therefore, in order for the NEM's reliability framework to operate as intended (that is, to incentivise investment), it must be stable and predictable.[85]

Given the importance of maintaining the stability and predictability of the NEM's reliability framework, any changes proposed to the reliability settings - in this case, the MPC - would need to be supported by evidence that change is warranted. This includes evidence that the potential benefits of an increase, or decrease, in the level of the MPC (in terms of investment incentive) are likely to be outweighed by the additional risks and costs that may be introduced by the change.

Regional market price caps

In addition to the Panel's analysis of ROAM's modelling in relation to regional MPCs, it is noted the work carried out by the AEMC in its extreme weather review which was completed in 2010.[86] In that review, the AEMC recommended that an arrangement allowing the MPC to vary between regions should not be pursued further. It considered that introducing new regional specific arrangements into the NEM's inter-connected market would most likely be detrimental to overall NEM efficiency and would be unlikely to contribute to the achievement of the NEO. It also noted that such an arrangement would present a number of challenging implementation issues, including the need to re-apportion load-shedding between regions.

In light of the above, the Panel does not intend to review this matter further.

6.1.4 Panel's draft recommendation

The Panel's draft recommendation is that no change should be made to the real value of the MPC to apply from 1 July 2016. This is discussed further in section 6.4.1.

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85 Given that there are many factors outside of the NEM's reliability framework which affect prices (government environmental policies, for example), providing certainty in relation to the framework will allow investors to better form their own view of how external factors would likely influence future prices in the NEM.

86 AEMC, *Review of the Effectiveness of NEM Security and Reliability Arrangements in light of Extreme Weather Events*, Final report, 31 May 2010.

Prior to the next reliability standard and reliability settings review, due to commence around 2017, the AEMC or the Panel (as appropriate) should develop a methodology for undertaking future reliability standard and reliability settings reviews. This will include consideration of how the outcomes of any market modelling should be treated. For example, a comprehensive critique and evaluation could be undertaken on the cap defender and extreme peaker approaches, including the merits of any other approach, to seek to establish a modelling methodology (including sensitivities to assumptions made) that is understood by all stakeholders.

6.2 Cumulative price threshold

As discussed in chapter 2, the CPT is set at a value that is equivalent to 15 times the MPC – that is, at $197,100 for the current 2013-14 financial year, and increasing to $201,900 for the 2014-15 financial year.[87] For this review, the current real value of the CPT has been assessed to determine whether it remains appropriate to apply from 1 July 2016 to alleviate the risk of market participants being exposed to prolonged periods at extreme prices before the APC is applied.

6.2.1 Stakeholder submissions

In submissions on the issues paper for this review, AGL and GDF SUEZ considered the current value of the CPT is suitable to limit financial risk for market participants.[88]

In contrast, the MEU considered that the current level of the CPT is "probably too high and imposes costs on consumers that are not warranted".[89] The Australian Energy Regulator (AER) noted that the CPT had been breached a number of times since it was considered in detail, and that these events should be reviewed to determine whether the CPT remains effective as a risk management mechanism.[90] St Kitts Associates also noted that the issues paper did not provide any analysis of the number of times the current CPT had been breached and the nature of those circumstances.[91]

Several stakeholders commented on the level of the CPT as a multiple of the MPC. GDF SUEZ considered that the current level of CPT at 15 times the MPC provided the correct balance between protecting market participants from extended high price periods, and providing a sufficient signal to sustain the energy only market.[92]

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87 As indexed by the AEMC in accordance with clauses 3.14.1(d)-(f) of the NER.

88 AGL, Submission on issues paper, 21 June 2013, p. 2; GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 2.

89 MEU, Submission on issues paper, 21 June 2013, p. 6

90 Other reasons that the AER argued for reviewing the CPT were: the period since the CPT has been considered in detail; the CPT should be reviewed to determine whether it is still appropriate; and whether there are other alternative designs to the CPT. For further details, see: AER, Submission on issues paper, 28 June 2013, pp. 1-3

91 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 5.

92 GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 2.

On the other hand, Alinta Energy questioned whether the link between the CPT and MPC should continue. It argued that these two reliability settings should first be reviewed separately, and then their overall impact considered, given they influence the market differently.[93] The MEU considered that the Panel should identify a more theoretically sensible basis for setting the value of the CPT, which should be based on the risks faced by market participants rather than based on an arbitrary multiple of the MPC.[94]

Alinta Energy also noted that the CPT should remain the primary mechanism for dealing with low probability, high impact events that jeopardise a participant's cash flow.[95] It considered that, if a CPT of $193,000 did not provide sufficient time for the market to respond to successive price periods at or near the MPC, then market intervention is required to maintain the viability of market participants.[96] Nevertheless, it suggested that the issue, as to the appropriate level of the CPT, should take into consideration its effect on merchant investor behaviour, impact on price signals, and the level of risk that the market can accept.[97]

St Kitts Associates considered it was important for the Panel to communicate analysis of the trade-off between incentivising investment and introducing additional price risk.[98]

6.2.2 ROAM's modelling

The value of the CPT has a material impact on the MPC required to achieve the reliability standard. As noted above, the CPT is currently set to a value equivalent to 15 times the value of MPC. ROAM analysed the impact of changes to this multiplier, using its cap defender approach. Two alternative CPT multipliers (12 and 18 times the MPC) were applied to explore the MPC required for the new entrant OCGT generator to profitably operate.

ROAM found that as the CPT increases, the number of administered price periods decreases, leading to fewer APC-adjusted periods. As a result, the pool revenue of the new entrant OCGT generator increases and the MPC required for a new entrant OCGT generator to operate profitably decreases. Averaged over regions and study years, ROAM found:[99]

93 Alinta Energy, Submission on issues paper, 21 June 2013, pp. 2-3, 5.

94 MEU, Submission on issues paper, 21 June 2013, pp. 6-7.

95 Alinta Energy, Submission on issues paper, 21 June 2013, p. 3.

96 Ibid.

97 Ibid, pp. 3-5.

98 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 4.

99 ROAM Consulting, *Reliability Standard and Settings Review*, Draft Report to AEMC, 11 December 2013, pp. 45-46.

- a 20 per cent decrease in CPT multiplier, from 15 to 12, leads to a 19 per cent increase in the required MPC; and
- a 20 per cent increase in CPT multiplier, from 15 to 18, leads to a 13 per cent decrease in the required MPC.

6.2.3 Panel's analysis

Panel's consideration of the modelling

ROAM's modelling highlights a clear relationship between the CPT and MPC. However, as discussed in the previous section in relation to the MPC, the specific outcomes are highly sensitive to the input assumptions used. At this stage, the results of ROAM's modelling do not provide sufficient evidence to support a case for either an increase, or decrease, to the value of the CPT.

In addition, the appropriate level of the CPT needs to be considered in the context of the acceptable level of risk for market participants. As noted by ROAM, one element of this is prudential requirements. This is discussed in the next section.

Other factors considered

As explained in chapter 2, the CPT is an explicit risk management mechanism designed to limit participants' financial exposure to the wholesale spot market during prolonged periods of high prices. It is also designed not to hinder investment, in that the CPT is set at a level that is unlikely to be triggered except in very extreme circumstances.

In considering the appropriate level of the CPT to apply from 1 July 2016, the above objectives have been considered. In particular, if the level of the CPT is set too high, market participants and consumers may not be adequately protected from prolonged periods of extreme prices. Similarly, if the level of the CPT is too low, there is a risk that the investment signals provided by the MPC may be dampened, potentially leading to an increase in the number incidences where the USE would be exceeded.

To date, the CPT threshold has only been exceeded, and therefore an administered price period triggered, in a limited number of circumstances. As envisaged by its design, these circumstances have been rare, suggesting they occur at extreme cases.

Given that the CPT appears to be working as intended, and given the lack of sufficient evidence provided by ROAM's modelling and in stakeholders' submissions to suggest that an increase, or decrease, in the current level of the CPT is required from 1 July 2016, at this stage the level of the CPT (relative to the MPC) should remain unchanged.

It is acknowledged the views of stakeholders who questioned whether the current form of the CPT, including the multiplier, remains appropriate. It is also recognised that the design of the CPT mechanism has not been the subject of a comprehensive review for

some time.[100] However, in the context of this current review, the Panel's consideration of the CPT is limited to the level of the threshold.

With that said, there may be merit in recommending that the AEMC or the Panel (as appropriate) undertakes a piece of work looking into this matter ahead of the next reliability standard and reliability settings review. This work could coincide with the Panel's other recommended review of the VCR having regard to the MPC and reliability standard. For example, this work could include a review of the units of measurement of the CPT, and take into consideration AEMO's recent review of a CPT for the Declared Wholesale Gas Market.[101]

6.2.4 Panel's draft recommendation

The Panel's draft recommendation is that no change should be made to the real value of the CPT to apply from 1 July 2016. The CPT will continue to be indexed by CPI annually.

There may be benefit in the AEMC or the Panel (as appropriate) to carry out a review of the current form of the CPT, prior to the next reliability standard and reliability settings review which is due to commence in 2017.

6.3 Market floor price

As discussed in chapter 2, the MFP is currently set at -$1000/MWh under the NER. For this review, the current MFP value has been assessed to determine whether it remains appropriate to apply from 1 July 2016.

100 In 2002, the National Electricity Code Administrator (NECA) conducted a review of capacity mechanisms in parallel to the NECA Reliability Panel's review of the value of lost load (VoLL), including an increase of VoLL to $20,000/MWh and accompanied by the introduction of the CPT to be set at $300,000. Subsequent to this, the ACCC did not allow for this and substituted a value of $10,000/MWh for VoLL and $150,000 for the CPT. In the AEMC Reliability Panel's 2007 Comprehensive Reliability Review, the Panel reviewed VoLL and the CPT and recommended they be increased to $12,500/MWh and $187,500, respectively. These values were considered and approved by the AEMC in a NER rule determination in 2009, and has remained as the base values for MPC and CPT since 1 July 2010.

101 AEMO, Declared Wholesale Gas Market Cumulative Price Threshold Review, Final report, 16 September 2013.

6.3.1 Stakeholder submissions

Level of the market floor price

In submissions on the issues paper, AGL and Stanwell considered the current MFP is appropriate.[102] For instance, AGL considered that the current MFP sufficiently incentivises offload of generation.[103]

Alinta Energy suggested that the MFP be set at a level that exceeds the price of a renewable energy certificate (REC). It considered that a value, such as -$100, may be correct.[104]

GDF SUEZ noted that the price signal provided by the MFP should be sufficiently strong to drive down surplus generation, but not so strong as to result in driving off conventional generation that may be required to support intermittent generation.[105]

St Kitts Associates considered that the issues paper did not explain the role of the MFP in satisfying the NEO, and queried whether a negative MFP is appropriate, or whether a MFP is required at all.[106] Alinta Energy also noted that the purpose of the MFP needs to be clarified, including how it assists the market and in meeting the supply and demand balance in the interest of consumers.[107]

Other considerations

In relation to the impact of increasing intermittent generation on negative pricing outcomes, the MEU suggested that the Panel look at the broader risks to the market. This is because higher volumes of intermittent generation have resulted in a reduction in the availability of dispatchable generation capacity, increasing the risk of low reserve levels.[108] It does not consider that increasing the MFP would address this problem.[109]

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102 AGL, Submission on issues paper, 21 June 2013, p. 2; Stanwell Corporation, Submission on issues paper, 21 June 2013, p. 1.

103 AGL, Submission on issues paper, 21 June 2013, p. 2.

104 In its submission, Alinta noted that wind generators that are subsidised via RECs were able to generate and earn revenue regardless of the spot price, given their short run marginal costs (SRMC) were close to zero. In contrast, non-renewable generators who needed to continue to generate at high levels of minimum generation, were unable to recover their costs as a result of excess wind generators suppressing the price outcomes. See: Alinta Energy, Submission on issues paper, 21 June 2013, pp. 14-15.

105 GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 2.

106 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 5.

107 Alinta Energy, Submission on issues paper, 21 June 2013, p. 12.

108 MEU, Submission on issues paper, 21 June 2013, p. 9.

109 Ibid.

EnergyAustralia considered that the renewable energy target (RET) had driven the increased penetration of renewable generators that are subsidised to generate at negative prices rather than for any technical constraint.[110] It submitted that the Panel should consider the MFP in this context, and also consider whether generation and market interconnectors should only be able to bid negatively where there are demonstrable technical constraints.[111]

Macquarie Generation noted that where conventional thermal generators have been taken out of service due to the RET, AEMO's direction powers (as noted in chapter 2) may no longer provide a reliable safety net mechanism.[112]

While not directly related to reliability, Alinta Energy noted that system security is an issue in terms of availability of generation.[113] That is, there is an impact on the ability of those generators to provide system restart ancillary services.[114]

6.3.2 ROAM's modelling

ROAM was asked to explore issues related to the MFP, including to determine the MFP required to incentivise economically efficient behaviour at times of very low demand and excess generation.

ROAM's modelling of the MFP indicated that short-term cycling of coal-fired generation units is not necessary in the near future.[115] Therefore, ROAM considered that there is no economic imperative for a significantly negative MFP, and suggested that a MFP of -$50/MWh may be sufficient to allow an efficient operation of the market.[116]

However, ROAM noted that its analysis was based on an assumed set of cycling costs, which are difficult to estimate given the potential impacts of cycling on unit wear-and-tear and outages.[117]

110 EnergyAustralia, Submission on issues paper, 25 June 2013, p. 3.

111 Ibid.

112 Macquarie Generation, Submission on issues paper, 21 June 2013, pp. 5-6.

113 Alinta Energy, Submission on issues paper, 21 June 2013, p. 16.

114 Ibid.

115 ROAM Consulting, *Reliability Standard and Settings Review*, Draft Report to AEMC, 11 December 2013, p. 66.

116 Ibid, pp. 66-67.

117 Ibid, p. 13.

6.3.3 Panel's analysis

Panel's consideration of ROAM's modelling

In reviewing the MFP, the outcomes of ROAM's modelling have been considered to assess the maximum MFP required for market efficiency.

ROAM's modelling was based on an analysis of the cycling decisions of generators using a number of key cycling cost assumptions. While ROAM concluded that there is no strong evidence to suggest that the current MFP is required to achieve efficient outcomes in the NEM, it also cautioned against drawing inferences from the outcomes of this modelling without taking the large uncertainty in cycling costs into account.[118]

Given the inherent uncertainties associated with generator cycling costs in the NEM, and, therefore, the limitations inherent in ROAM's analysis, the outcomes of this modelling should not be relied upon too heavily to justify changes to the current level of MFP.

With that said, regard has been given to the historical analysis carried out by ROAM in relation to the effect of the MFP on the operation of the market in the recent past.[119] Of the few events that have occurred since July 2011 (mostly in Queensland and South Australia), ROAM found that the majority were driven either by the behaviour of market participants in the dispatch intervals following a pool price spike (MFP bidding), or in periods of low demand.

ROAM found that while the above low demand events were generally short term only and that minimum generation levels were still required to be dispatched, the MFP bidding events could have had a detrimental impact on efficiency in the market. On the latter point, ROAM considered that increasing the MFP may reduce the effectiveness of this behaviour and lead to more efficient outcomes.

Having considered ROAM's qualitative analysis of the historical occurrences of MFP events, the conclusions do not provide sufficient evidence to support a case for an increase to the value of the MFP (that is, less negative in value).

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118 In its draft report, ROAM notes that there is no public source of information relating to the cost of cycling in the NEM. Furthermore, cycling costs are notoriously difficult to estimate. While ROAM used publically available estimates of cycling costs for different technologies and consulted with stakeholders to ensure that these costs were broadly appropriate for plant in the NEM, it nonetheless noted that inferences drawn from the outcomes of this modelling should take the large uncertainty in cycling costs into account.

119 The MFP has occurred infrequently in recent history. It is most frequently observed in Queensland (25 dispatch intervals since 1 July 2011) and in South Australia (15 dispatch intervals since July 2011).

In relation to ROAM's observations on MFP bidding, this issue, and its effect on efficient market outcomes, is expected to be considered in the context of the AEMC's upcoming Optional Firm Access review.[120]

Other factors considered

The MFP aims to provide appropriate price signals for the spot market to clear at times of very low demand and excess generation in a region where generators offload. Generators should be incentivised by appropriate price signals to offload generation when it is efficient to do so and acts as an effective incentive. Customers should receive market benefits when setting the MFP level to reflect lower demand. This leads to efficient operation, and use of, electricity services with respect to reliability and the price of supply of electricity, which benefits consumers in the long term.

It is observed that there has been an increase in the number of negative pricing periods in the NEM in recent history. This may be due to a number of factors, including that the costs of shutting down and restarting generating units may be high. It may also be a result of generators who receive other revenue outside the spot market (such as renewable generators through RECs) being able to profitably bid below zero at times.

It is also recognised that, in the current environment of low demand growth and increasing investment in renewable energy (mostly wind), there may be further downward pressure on wholesale electricity prices, potentially causing the number of negative pricing periods to increase. At the same time, the nature of wind generation is more intermittent, which could affect the costs for managing power system security.

Regard has been given to the changing mix of generation in the NEM, and the possibility of increased instances of MFP events, in considering the suitability of the current MFP to deliver efficient outcomes for market participants and consumers in the NEM.

In particular, it is recognised that the increasing levels of investment in renewable generation is being driven by external factors outside of the reliability settings. For instance, some submissions have suggested aligning the value of the MFP to counter the effects of RECs; that is, by making the MFP less negative. However, there is uncertainty surrounding government carbon policy and the RET, which affects incentives and investment decision-making more generally.[121] Given the uncertainty

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120 This is where generators may have an incentive to adjust their offers into the market in order to maximise the amount of output they are dispatched for. Generally, this means that generators will make offers at levels lower than their costs. This can ultimately see all generators behind a constraint making offers at the MFP. The problem of this is that it can result in volatile spot market outcomes and inefficient dispatch. For further information, see: AEMC, *Transmission Frameworks Review*, Final report, 11 April 2013.

121 In the last year, government policy on mechanisms to reduce carbon dioxide emissions from the electricity sector has changed twice. The previous Labor Government announced it would bring forward by one year the transition of a price on carbon emissions, from a fixed price to a floating price linked to the European Union Emissions Trading Scheme. The Liberal-National Coalition

associated with these external policy settings, which are currently at an unsettled stage of development, it would not be appropriate to adjust the reliability settings, especially the MFP.

In addition, it is acknowledged that some market participants have suggested alternative values of the MFP to apply from 1 July 2016. However, in general, stakeholders have not provided sufficient evidence to suggest either that the current value of the MFP is resulting in inefficient market outcomes, or that their proposed values will lead to more efficient market outcomes relative to the current situation.

6.3.4 Panel's draft recommendations

The Panel's draft recommendation is that no change should be made to the current level of the MFP. The MFP should therefore continue to be set at -$1,000.

6.4 Indexation of the reliability settings

CPI indexation of the MPC and CPT was introduced in 2012 following a rule change request from the Panel to the AEMC.[122] The purpose of indexing the MPC and CPT is to maintain the dollar values of these parameters in real terms, broadly reflective of changes in the capital costs of generation, thereby providing certainty in relation to revenue from generation investments over time.

A question for this review is whether the current manner of indexation is still considered to be appropriate for application from 1 July 2016 with respect to achieving the reliability standard.

The current mechanism for indexation ensures that, for each financial year, the values of the MPC and CPT are adjusted to reflect the change in the CPI between the calendar year 2010 (the base year) and the calendar year commencing 18 months before the start of the financial year in question (the indexed year). The calculation is a relatively simple one, with the revised MPC and CPT values to apply from the following 1 July calculated by the AEMC and published on its website no later than the end of February each year.

In the issues paper for this review, the Panel asked stakeholders whether they considered the MPC and CPT should continue to be indexed from 1 July 2016 and, if so, whether the CPI is the appropriate index to be applied.

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gained office following the 7 September 2013 election. Its stated policy is to abolish the carbon price and fund emissions cuts through "direct action" policies. Further, any changes to the carbon price legislation would need to pass through Parliament. The future of the RET has also continued to be the source of speculation. The current Government's current policy is to conduct a full review of the RET in 2014. This is consistent with currently legislated timing for a review.

122 AEMC, *Reliability Settings from 1 July 2012*, Rule determination, 16 June 2011.

In addition, the Panel also asked stakeholders whether the MFP - which is not currently indexed - should also be indexed from 1 July 2016 and, if so, whether the CPI was also the appropriate index to be applied.

The next section considers these matters further.

6.4.1 Indexation of the market price cap and cumulative price threshold

Stakeholder submissions

In their submissions on the issues paper, AGL and GDF SUEZ supported the current indexation of the MPC, which they considered contributes to meeting the reliability standard, which has not been breached.[123]

The MEU considered that the MPC should be indexed by CPI only if the MPC is set for a long period, as costs increase.[124] Otherwise indexing for regular reviews would provide little benefit as there is no exactness of setting the value.

Despite not supporting an increase or decrease of the MPC, the NGF supported the current annual indexation of the MPC.[125]

Further, St Kitts Associates considered that reasons for ongoing indexation appears to be weaker, related to impact of the DSR.[126]

Panel's analysis

AEMC final rule determination

The AEMC made a rule in June 2011 to introduce a mechanism to index the MPC and CPT by applying the CPI on an annual basis, beginning 1 July 2012. This rule was made in response to the Panel's rule change request based on its recommendation in the 2010 reliability standard and reliability settings review.

In the Panel's 2010 reliability standard and reliability settings review, the Panel recommended for the indexation of the MPC and CPT, albeit based on the Intermediate Producer Price Index (Stage 2 PPI). Its selection of this manner of indexation was based on the following criteria, where indexation should:

- be based on the supply side costs of meeting the reliability standard;

123 AGL, Submission on issues paper, 21 June 2013, pp. 1-2; GDF SUEZ Australian Energy, Submission on issues paper, 21 June 2013, p. 2.

124 MEU, Submission on issues paper, 21 June 2013, pp. 4-6.

125 NGF, Submission on issues paper, 21 June 2013, pp. 3-4.

126 St Kitts Associates, Submission on issues paper, 20 June 2013, p. 4.

- follow similar economics trends to those parameters used in setting the MPC and CPT, particularly the capital cost of new OCGTs;[127]
- be independently verifiable; and
- be amenable to forecasting, which is important in providing certainty to investors on the likely changes to the MPC and CPT over time.

In its consideration of the Panel's rule change request, the AEMC agreed that the selection criteria identified by the Panel were broadly appropriate. However, the Commission also concluded that an additional, and critical, factor to be considered in selecting an appropriate index was the relative stability or volatility of the measure.

Based on its assessment of the rule change request against the criteria, the AEMC decided to make a more preferable rule, incorporating many of the features proposed in the Panel's rule change request. The AEMC determined to make a rule to provide for:

- the adjustment of the values of the MPC and CPT in line with changes in the CPI on an annual basis with effect from 1 July 2012; and
- a four-yearly comprehensive review of the reliability standard and reliability settings, including indexation, to be undertaken by the Panel (this replaced the existing obligation on the Panel to undertake a two-yearly review of the reliability standard and reliability settings).

In summary, the AEMC's reasons for its decision were that:

- indexation of the MPC and CPT, to maintain their values in real terms over time, will provide a strong and continuous signal to incentivise an efficient level of investment to deliver the reliability standard, while limiting the financial exposure of market participants and consumers;
- adoption of the CPI introduces an index which is more commonly used in business and investment decisions, which provides a higher degree of stability and predictability to the market than the Stage 2 PPI, and will provide a strong revenue signal for investors;
- retention of the requirement for a comprehensive and integrated review of the reliability standard and reliability settings, including the manner of the indexation of the MPC and CPT, on a four-yearly basis will allow these values to remain calibrated to the relevant underlying cost drivers. It will also allow for any changes that have been introduced to take effect before the next Panel review is commenced (unlike the current biennial process);

127 Capital costs of OCGT generating plant generally include labour, cement, imported materials and basic metals.

- the extension of the time period between Panel reviews of the reliability settings from two to four years will provide a greater measure of certainty and predictability for market participants;

- a clear signal will be sent to the market that the intention in the rules is to preserve the value of the reliability settings over time, which should act to provide further certainty and reassurance to investors; and

- a degree of administrative efficiency is provided by implementing a relatively automated process to effect incremental increases to the MPC and CPT, and thereby avoiding the need to undertake a formal rule making process to implement any such changes.

While the AEMC accepted the benefits of indexation in making its determination, it also noted that it had been unable to identify an available index that was likely to accurately track the changes in the costs of generating plant that are a key consideration in determining the appropriate levels of the MPC and CPT.

This led the AEMC to conclude that the reliability settings should continue to be reviewed on a regular basis to ensure that they remain calibrated to the relevant underlying cost drivers. This was one driver of the AEMC's decision to require the Panel to undertake a comprehensive and integrated review of the reliability standard and reliability settings, including the manner of the indexation of the MPC and CPT, every four years.

The AEMC considered that a four-yearly review represented an appropriate balance between the certainty provided by indexation between reviews, and the need to periodically check whether the reliability standard, the values of the reliability settings, and the indexation of these settings, continued to be appropriate. It also considered that the four year timetable would allow for any changes to the reliability standard or reliability settings that had been introduced to take effect before the next review is commenced, unlike the current biennial process.

Panel's analysis

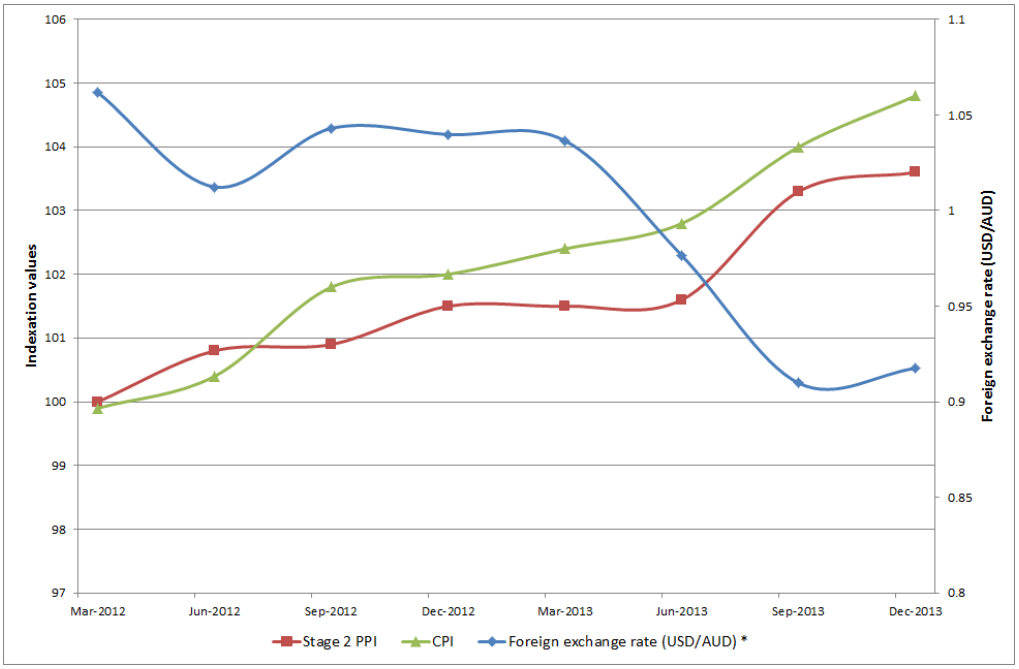
It has only been two years since the AEMC's final decision on indexation of the MPC and CPT came into effect. In this time, the CPI has increased steadily. This is illustrated (among other things) in Figure 6.1. As intended, the nominal values of the MPC and CPT have also increased from 1 July in each of the years since, in order to maintain the real values of these parameters.

Also in this time, recent data from AEMO shows that OCGT costs have remained relatively stable. As shown in Figure 6.2, this follows a period of a slight declining trend in OCGT costs from 2009 to 2012, generally attributed to the global economic downturn lowering demand for OCGT worldwide.

In addition, and as could be expected, there have also been short term movements in a number of inputs that contribute to OCGT costs. Figure 6.2, for example, also shows that the Australian dollar (AUD/USD), which has an impact on any imported

component of OCGT costs, fell over the period from March 2012 to September 2013. In the short to medium term, if the Australian dollar depreciates from its current level, as some market economic forecasts suggest, then OCGT costs may increase as a result of the depreciation.

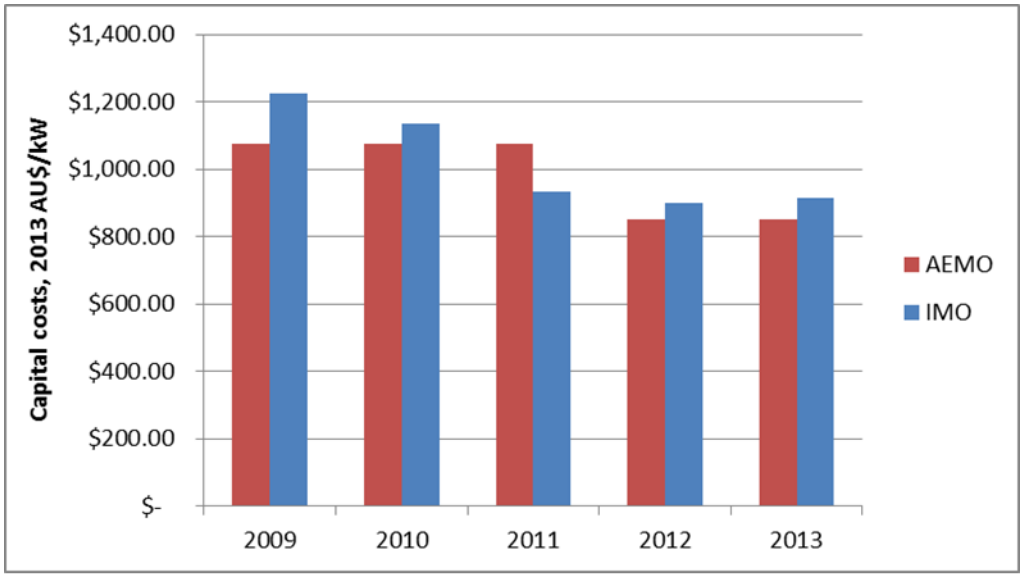
Figure 6.1 Foreign exchange rate and indexation values between 2012 and 2013



Note *: Foreign exchange rates, CPI and interest rates applied are by the Reserve Bank of Australia, monthly data averaged to quarterly unless noted otherwise.

Source: Australian Bureau of Statistics and Reserve Bank of Australia

Figure 6.2 Recent OCGT cost data used by AEMO



Source: Diagram supplied by AEMO, with information sourced from: ACIL Tasman, *Fuel resource, new entry and generation costs in the NEM*, 2009; ACIL Tasman, *Review of EPRI cost data*, prepared for AEMO/DRET, 2010; Bureau of Resources and Energy Economics, *The Australian Energy Technology Assessment (AETA)*, 2012.

In principle, and where achievable, the Panel considers that there are likely to be benefits resulting from indexing the MPC and CPT by a measure which broadly tracks the changes in capital costs of new OCGT plant.

At this (draft report) stage in the review, there is a divergence of views among Panel members around the suitability of CPI as the measure of indexing the MPC and CPT. One viewpoint is, to the extent that the CPI maintains the real dollar values of the MPC and CPT, the CPI measure is considered to be achieving its intended objective. The alternative viewpoint is a concern that CPI indexation of the MPC and CPT may be inappropriate in the context of recent decreases in OCGT plant costs.

Based on the data above, it is difficult to draw any robust conclusions on whether CPI continues to remain the most appropriate measure of indexation to apply over the four year period commencing 1 July 2016. Although the data shows a declining trend in OCGT costs from 2009 to 2011, this is followed by a flattening (and, arguably, a slight in increase) in OCGT costs across 2012 and 2013. In addition (and as noted above), it is less than two years since CPI indexation was first applied on 1 July 2012 to the dollar values of MPC and CPT, as a consequence of a rule made by the AEMC. The identification of any emerging trends in the data or relationships between variables over a relatively short time period is, therefore, challenging.

Further, it is worth noting that when the AEMC chose CPI as the measure by which to index the MPC and CPT, there was a general recognition by the Commission that CPI was not particularly reflective of changes in the capital costs of OCGT plant. Its

strength, rather, was the stability and predictability (and hence certainty to investors) that it would provide.

While it is important to periodically review the selected measure of indexation for application to the MPC and CPT to consider whether it remains appropriate, given the above considerations, one viewpoint may be that to do so now would be premature. The alternative viewpoint may be that by continuing to apply CPI indexation to the MPC and CPT until the next statutory reliability standard and reliability settings review in 2018, this may result in successive increases in these values which may, or may not, reflect general OCGT capital costs trends over the same period.

The Panel, therefore, recommends that it undertakes a review of the current and possible alternative measures of indexation that may be applied to the MPC and CPT, with such a review to be completed by 1 July 2016. This approach allows for the current measure of (CPI) indexation to be observed to operate over an extended period of time, and for any emerging trends to be analysed and evaluated against other possible alternative measures of indexation. This recommendation is in line with the AEMC's intention that the measure of indexation be reviewed every four years. As noted by the AEMC, a four-yearly review provides an appropriate balance between the certainty provided by indexation between reviews, and the need to check that the measure remains appropriate.

Panel's draft recommendations

The Panel does not recommend any changes to the current measure of indexation of the MPC and CPT (that is, CPI should continue to be used to index MPC and CPT annually). However, the Panel does recommend that a review of the current indexation measure occurs within two years. In terms of the MFP, the Panel does not consider a change should be made to the current approach of non-indexation (that is, MFP should continue to be set in nominal terms).

However, the Panel welcomes any comments from stakeholders on the measure of indexation of the MPC and CPT. In particular:

- Is there sufficient change in any of the AEMC's previous reasoning that would justify a change to the manner of indexation of the MPC and CPT?
- What improvements could be made to the manner of indexation of the MPC and CPT to promote efficient investment in excess of the current levels? For example, should CPI-X be introduced, and what would be the ramifications and implementation considerations that need to be given to introducing a CPI-X based approach?

6.4.2 Indexation of the market floor price

Stakeholder submissions

In its submission on the issues paper, the NGF considered there should be greater symmetry between the MPC and MFP such that if, for example, the MPC increased by two per cent, then the MFP should decrease by two per cent (and that the MFP should also be indexed).[128] As such, the NGF considered that the MFP should also be indexed.[129]

Although Stanwell endorsed the submission from the NGF, it did not share the NGF's view on the MFP, and instead supported leaving the MFP at the current level, without indexation.[130] Alinta Energy also considered that the arguments of symmetry are largely irrelevant.[131]

Panel's analysis

As noted in section 6.4.1, indexation of the MPC and CPT was introduced following the last Panel review of the reliability standard and reliability settings in 2010.

The MFP, on the other hand, differs from the MPC and CPT in that it does not provide an investment signal, and is therefore delinked from the costs of capital. Instead, the MFP operates at times of very low demand and excess generation and provides a signal to offload generation. On this basis, indexation would have a minimal impact on the signalling effects of the MFP.

As noted by Alinta, given the MFP differs in the signals it provides compared to the MPC and CPT, indexation of the MFP would not be appropriate.

Panel's draft recommendations

The Panel does not recommend any changes to the current non-indexation of the MFP. The Panel welcomes any comments on this current non-indexing of the MFP and how improvements could be made to encourage efficient behaviour.

6.5 Other issues

This section covers specific issues that were raised in submissions which were considered to require particular detailed comments.

128 NGF, Submission on issues paper, 21 June 2013, p. 4.

129 Ibid.

130 Stanwell Corporation, Submission on issues paper, 21 June 2013, p. 1.

131 Alinta Energy, Submission on issues paper, 21 June 2013, p. 13.

6.5.1 External factors for consideration

The purpose of the reliability settings is to: balance supply and demand in the wholesale spot market; deliver sufficient capacity to meet the reliability standard; and avoid unmanageable risks for market participants.

However, consumer preferences and investment requirements are changing. These have partly been in response to changes in relative prices, technology and government policies such as climate change.

In the issues paper for this review, the Panel asked stakeholders for views on whether there were any factors that the Panel should take into consideration in its assessment of the reliability standard and reliability settings.

A number of stakeholders responded and listed the following factors, among others, as warranting consideration by the Panel:

- the current oversupply of generation and the emerging trend of falling demand;
- government environmental policies, such as the LRET, the small-scale renewable energy scheme (SRES) and the carbon price;
- the increased penetration of intermittent generation;
- increased volumes of DSP and the future introduction of a DRM;
- commercial considerations, including increases in the cost of acquiring capital to invest in new generation;
- market structure, including prevalence of vertical integration of generators and retailers; and
- financial considerations, including increased regulation of electricity derivatives.

Other relevant external factors listed by stakeholders in submissions on the issues paper are set out in Appendix A.

The Panel has had regard to these factors, in addition to those listed in chapter 3, in carrying out its review of the reliability standard and reliability settings.

Abbreviations

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
APC	administered price cap
Commission	See AEMC
CPI	consumer price index
CPT	cumulative price threshold
DRM	Demand Response Mechanism
DSP	demand-side participation
DSR	demand-side response
ESAA	Energy Supply Association of Australia
LRET	large-scale renewable energy target
MCE	Ministerial Council on Energy
MEU	Major Energy Users
MFP	market floor price
MPC	market price cap
MRL	minimum reserve level
NECA	National Electricity Code Administrator
NEFR	National Electricity Forecast Report
NEL	National Electricity Law
NEM	National Electricity Market
NEO	national electricity objective
NER	National Electricity Rules

NGF	National Generators Forum
OCGT	open cycle gas turbine
Panel	Reliability Panel
REC	renewable energy certificate
RERT	reliability and emergency reserve trader
RET	renewable energy target
ROAM	ROAM Consulting
rules	See NER
SCER	Standing Council on Energy and Resources
SRES	small-scale renewable energy scheme
SRMC	short run marginal cost
Stage 2 PPI	Intermediate Producer Price Index
USE	unserved energy
VCR	value of customer reliability
VoLL	value of lost load

A Submissions summary

A.1 Submissions on the issues paper

The issues raised in submissions on the issues paper can be categorised into the following areas:

- reliability standard, including VCR;
- MPC;
- CPT;
- MFP; and
- other issues, including external factors for consideration.

These have been summarised in the tables below.

A.1.1 Summary of issues about the reliability standard

Table A.1 Form and level of the reliability standard

Organisation	Substantive point being made	Panel comments
AGL Energy (p. 1), Alinta Energy (p. 1), EnergyAustralia (p. 1), GDF Suez (p. 1), Macquarie Generation (pp. 1-6), MEU (pp. 3-4), NGF (p. 3)	Agree the current form and level are appropriate and no need to change.	Noted. See chapter 5.

Organisation	Substantive point being made	Panel comments
St Kitts Associates (p. 3)	Does not consider a need to tighten the standard. Consumers would likely prefer that if the standard is tightened then reliability investments would target outages originating at the distribution network level rather than at the wholesale market level. Consumers would value if the Panel elaborated on how the USE concept remains appropriate in relation to increase DSR capability. This is because the ability of consumers to lower demand would meet available supply as opposed to historic assumption that investment centered on increased supply to meet demand.	Noted. See chapter 5.

Table A.2 Value of customer reliability

Organisation	Substantive point being made	Panel comments
AGL Energy (p. 2), ESAA (p. 2)	Broadly supports VCR, but it is difficult to measure accurately, and the consequential impacts in changing the reliability settings and standards to reflect the VCR. Therefore suggests caution before taking the VCR into account.	Noted. See chapter 5.
Alinta Energy (p. 15)	The VCR is inconsistent with the MPC because it only considers the residential sector and excludes industrial, commercial and agricultural sectors across the NEM. Such inconsistency creates inefficient outcomes where transmission investment is valued more than generation. Therefore the MPC and VCR should be aligned more closely to assure sufficient incentives exist for generation to meet reliability standards and customer expectations of reliability at least cost.	Noted. See chapter 5.
EnergyAustralia (p. 2)	Having different reliability standards for generation and bulk transmission capacity in the NEM is not practical. The VCR needs to reflect an average across the NEM.	Noted. See chapter 5.
MEU (pp. 10-12)	Does not support alignment between the VCR and MPC because it considers: the USE is determined by competitive generation; no direct relationship between VCR and MPC; there is variation between VCR based on customer types and no reason has been provided for that variation; there would be an increase in the number of	Noted. See chapter 5.

Organisation	Substantive point being made	Panel comments
	reliability settings; and there would be an unnecessary increase in the MPC as a result, where the risks are borne by market participants and costs are passed onto consumers.	
St Kitts Associates (p. 6)	Suggests that the residential VCR should be considered as a ceiling on the MPC but does not propose to increase the MPC to current estimates of the VCR. Considers that it may be misleading to use these estimates associated with consumer willingness to pay for wholesale market reliability and that of network reliability. With respect to DSP, there is evidence that willingness to accept production impacts on demand reduction at revealed market prices.	Noted. See chapter 5.

A.1.2 Summary of issues about the MPC

Table A.3 Level of MPC

Organisation	Substantive point being made	Panel comments
AGL Energy (pp. 1-2), MEU (pp. 3-4), NGF (pp. 1-4)	Current MPC level is appropriate, given the reliability standard has not been breached. AGL did not support an increase to the MPC level because it would financially expose market participants. The NGF does not support changing the MPC, given there are other incentives resulting in current oversupply of generation and decrease in demand growth. Increasing the MPC would send the wrong price signals. MEU considered that the MPC may be too high to achieve the reliability standard and there is more than sufficient generation in the NEM, with the previous value of $10,000/MWh being sufficient.	Noted. See chapter 6.

Organisation	Substantive point being made	Panel comments
Alinta Energy (pp. 2-3, 5-13)	Disagreed with previous submissions that the MPC should not be increased based on the view that investment was occurring under the existing MPC and contract market outcomes were driving investment decisions. Considers the MPC continues to be inadequate because it favours transmission over generation for non-economic reasons. Suggests consideration be given to need for additional capacity based on current market outlook, MPC incentive to signal OCGT build to supply last increment at high demand periods, impact of spot price and contract prices, and consumer benefit from existing generators being incentivised to supply, and value of capacity and energy hedge offers.	Noted. See chapter 6.
GDF Suez (p. 2)	MPC should be kept sufficiently high to provide a significant investment signal. Although the MPC is not the primary investment signal, if it is set too low then it could deter new investment.	Noted. See chapter 6.
St Kitts Associates (p. 4)	Consumers need substantial convincing that the MPC should be increased.	Noted. See chapter 6.

Table A.4 Indexation of MPC

Organisation	Substantive point being made	Panel comments
AGL Energy (pp. 1-2), GDF Suez (p. 2), NGF (pp. 3-4)	Current MPC indexation is appropriate.	Noted. See chapter 6.
MEU (pp. 3-4)	MPC should be indexed by CPI only if it is set for a long period as costs increase; otherwise regular reviews and inexactness of setting the value is of little benefit.	Noted. See chapter 6.
St Kitts Associates (p. 4)	Considers the argument for ongoing indexation appears to be weaker now, noting impact of DSP.	Noted. See chapter 6.

A.1.3 Summary of issues about the CPT

Table A.5 Form of CPT

Organisation	Substantive point being made	Panel comments
AER (pp. 1-3)	The effectiveness of CPT needs to be thoroughly reviewed as a risk management mechanism. It has not been reviewed in detail for a decade, and the CPT has been breached a number of times or close to breaching. Suggests the Panel consider different design possibilities of the CPT such as longer time horizon with a 90 day rolling cumulative price. This could ensure it limits participant financial exposure to the wholesale spot market during high price periods, while preserving the market's ability to use price signals to provide reliability.	Noted. See chapter 6.

Table A.6 Level of CPT

Organisation	Substantive point being made	Panel comments
AER (pp. 1-3)	The current CPT level needs to be reviewed to determine whether it creates unnecessary risk in the market, noting the number of breaches or near breaches of the CPT level.	Noted. See chapter 6.
AGL Energy (p. 2) and GDF Suez (p. 2)	Current CPT level is appropriate, providing the correct balance in limiting financial exposure to market participants.	Noted. See chapter 6.
Alinta Energy (pp. 4-5)	Considers the market has been slow to respond to non-credible risks and congestion, and questions whether CPT level has been set at the appropriate level. If not, then suggests market intervention could be used. Suggests consideration be given to how merchant investors use the CPT, whether	Noted. See chapter 6.

Organisation	Substantive point being made	Panel comments
	the CPT impedes price signals, and a market acceptable level for the CPT without increasing overall market risks.	
MEU (pp. 6-7)	Considers the current CPT may be too high and imposes unwarranted costs on consumers.	Noted. See chapter 6.
St Kitts Associates (p. 5)	Does not consider there to be evidence that the current CPT restricts market ability to meet the standard. The long term interests of consumers in changing the CPT will need to be explained.	Noted. See chapter 6.

Table A.7 Indexation of CPT

Organisation	Substantive point being made	Panel comments
AGL Energy (p. 2)	Current CPT indexation is appropriate	Noted. See chapter 6.

Table A.8 Relationship between CPT and MPC

Organisation	Substantive point being made	Panel comments
Alinta Energy (pp. 2-3, 16)	Considers that the CPT and MPC should be analysed independently as their influence on the market will likely differ. Then the net impact on the market can be drawn.	Noted. See chapter 6.
MEU (pp. 6-7)	Considers that the CPT and MPC are linked by a factor of 15, implying 15 consecutive hours at MPC as a market failure, and disagrees with such a relationship. Considers that the CPT does not impact upon the reliability standard or settings, and linking the CPT to the APC is more realistic to establish a risk	Noted. See chapter 6.

Organisation	Substantive point being made	Panel comments
	mitigation process.	

A.1.4 Summary of issues about the MFP

Table A.9 Level of MFP

Organisation	Substantive point being made	Panel comments
AGL Energy (p. 2), Stanwell Corporation Limited (p. 1)	The current MFP sufficiently incentivises generators to offload at negative price periods. Therefore it does not need to be changed. If the MFP were reduced, Stanwell noted that the Panel needs to fully investigate whether there are benefits of such a reduction that would outweigh the market risks. Increased risks could include financial risks that slow start plant inherent in increasing the magnitude of price fluctuation and settlement of negative spot prices.	Noted. See chapter 6.
Alinta Energy (pp. 13-15), GDF Suez (p. 2)	Alinta Energy considers that the MFP is unrelated to the MPC and therefore does not need to be symmetrical. Given the subsidisation of wind generation, Alinta Energy and GDF Suez consider that the current MFP is not appropriate. Alinta considers that the MFP value should be in excess of the REC and setting it to -$100 could be correct; or it could be -$300 to link with the APC, but this would be for convenience reasons rather than economic reasons.	Noted. See chapter 6.
NGF (p. 4)	Alternative to indexing the MFP at the same rate as the MPC, it suggests a perfectly symmetrical MFP and MPC. However, this could introduce other significant issues.	Noted. See chapter 6.
St Kitts Associates (p. 5)	Questions the need for the MFP, given the lack of interest in it in the past.	Noted. See chapter 6.

Table A.10 Impact of renewable generation on MFP

Organisation	Substantive point being made	Panel comments
Alinta Energy (pp. 13-15)	Considers that given that wind generation is subsidised via the RET, it generates the pool revenue and are given preference. With the current MFP level, there are therefore limited signalling effects on wind generation. This may also encourage strategic bidding where subsidised wind generation bid negatively in expectation that thermal generators with a higher short run marginal cost (SRMC) continue to generate.	Noted. See chapter 6.
EnergyAustralia (pp. 2-3)	Consideration should be given to whether generation and market interconnectors only negatively bid where they demonstrate technical constraints.	Noted. See chapter 6.
GDF Suez (p. 2)	Considers that during periods of low wind generation there may be insufficient thermal generation if too much thermal generation is shut down to low or negative pool prices, leading to blackouts. Therefore, the negative price signal should be sufficiently strong to address these risks, but not too strong that it would discourage conventional generation for supporting intermittent generation. It believes the recent experience in SA should be examined more closely.	Noted. See chapter 6.
MEU (pp. 7-9)	Considers that the Panel is assessing the MFP to avoid harming generators rather than recognising renewable energy policies have resulted in an unexpected outcome where generators recover their fixed costs over a lesser amount of dispatch volume, leading to some generators closing output and others bidding higher to remain viable. The Panel should look at the market risks from higher amounts of intermittent generation reducing the availability of dispatchable generation capacity. Such reductions increase the risk of loss of supply if wind ceases. Increasing the MFP will not address this and is a wider problem related to the market design.	Noted. See chapter 6.

Table A.11 Indexation of MFP

Organisation	Substantive point being made	Panel comments
NGF (p. 4)	Considers the MFP should be indexed down to a lower level at the same rate of the current indexation up of the MPC. This is to maintain the status quo and address the asymmetry between the MFP and MPC.	Noted. See chapter 6.

A.1.5 Summary of other issues

Table A.12 External factors for consideration

Organisation	Substantive point being made	Panel comments
Alinta Energy (pp. 2-3, 16)	Market risk, transmission risk, market structure and climate change policies should only be considered relevant to the review where they impede on the market ability to balance supply and demand and provide required price signals. This is because company expectations and reasons for changing reliability settings will be different. Market settings for gas markets should be examined with other energy market settings. Participants are dealing with integrated markets on a daily basis. Therefore questionable whether the current difference price caps in the NEM, DWGM and STTM hubs are appropriate, noting they operate on different timeframes.	Noted. See chapters 3 and 4.
EnergyAustralia (pp. 1-2)	Similar comments to ESAA. In addition, proposed consideration of: • forward contract prices and contract liquidity; • participant's ability to efficiently manage market risk;	Noted. See chapters 3 and 4.

Organisation	Substantive point being made	Panel comments
	• retirement of scheduled capacity; and • proposed changes to regulation of electricity derivatives.	
ESAA (pp. 1-2), GDF Suez (p. 3)	The Panel should consider the following developments in the NEM: • emerging trend of falling aggregate demand; • increasing penetration of intermittent generation at large and small scales, and therefore increasing price volatility; • increasing number of negative price periods; and • future introduction of DRM.	Noted. See chapters 3 and 4.
Macquarie Generation (pp. 1-6)	The RET scheme could create a serious detrimental impact on NEM reliability. These impacts could include: • no new high reliable generation investment to occur; • existing high reliable generation will become less reliable; • existing generation unavailable to be directed; and • increasing reliance on low reliable generation.	Noted. See chapters 3 and 4.
MEU (pp. 1-3, 5)	Considers consideration needs to be given to the large changes in electricity prices over recent years as part of its review.	Noted. See chapters 3 and 4.
NGF (pp. 1-3)	The Panel should question the incentives that are driving the standard to be met, rather than the settings. Considers oversupply in the market is a result of subsidised non-commercial generation. In particular, these are the Queensland Gas Scheme, solar feed-in-tariffs and New South Wales Greenhouse Gas Reduction Scheme, the	Noted. See chapters 3 and 4.

Organisation	Substantive point being made	Panel comments
	regulatory determinations based on long run marginal costs (as opposed to market prices to set retailer wholesale energy costs), disposition of capacity between participants, and illiquid nature of asset transfers between participants. Proposes that the Panel review whether the settings are redundant because of this large amount of subsidised non-commercial generation and forced withdrawal of generation capacity due to cumulative losses.	
Origin Energy (pp. 1-2)	Considers that it is important to examine the role and levels of reliability settings in light of the changing generation mix and incentives for that investment. This means considering the consequences and implications of the various government policies and interventions such as carbon price, LRET and SRES.	Noted. See chapters 3 and 4.
St Kitts Associates (p. 4)	The review needs to reflect the impact of DRM rather than the historic approach of estimating costs associated with capex and opex under the traditional solution of OCGT based capacity. Barriers to potential providers of DSP should be considered. Price signals such as MPC may not need to be stronger but actionable for cost effective DSP. The Panel should consider whether the cost and benefits of these alternative arrangements have changed from the attributes of the current market. The cost effectiveness of capacity mechanisms to deliver reliability in terms of consumer costs should be considered.	Noted. See chapters 3 and 4.
St Kitts Associates (p. 4)	Consumers ultimately bear the cost of risk and rely on retailers to manage this risk for them. The Panel needs to communicate their analysis of the trade-off between incentivising investment and introducing additional price risk.	Noted. See chapters 3 and 4.

Table A.13 Other issues

Organisation	Substantive point being made	Panel comments
Alinta Energy (p. 16)	Availability of generation also impacts on generators providing SRAS. Recent AEMO work is likely to be inconsistent with previous Panel positions and community expectations. Market developments will also likely require a greater need for plant availability to manage system security risks and demand and supply balance.	Noted. See chapters 3 and 4.
Macquarie Generation (pp. 5-6)	Considers that AEMO's reliability directions power may not be effective as an intervention mechanism to ensure supply adequacy. This is because of the RET where conventional thermal generators have had to shut down. This means future adjustments to the reliability settings may not ensure the reliability standard is maintained where external policies undermine the returns of high reliability plant.	Noted. See chapter 2.
St Kitts Associates (p. 2)	Considers that consumers' ability to participate in the latter stages of the review will be dependent on the Panel's ability to communicate how the NEO is used to assess the reliability standards and settings i.e. how the options considered will be in the long term interests of consumers.	Noted. See chapters 3 and 4.

A.2 Submissions on ROAM's draft report

The issues raised in submissions on ROAM's draft report covered ROAM's modelling and also comments relating to the reliability standard and reliability settings more generally. These have been summarised in the table below.

Table A.14 Modelling approach

Organisation	Substantive point being made	Panel comments
Alinta Energy (pp. 1-4)	Does not support the cap defender approach because the assumptions produce outcomes that do not reflect market reality and does not represent the value of lost load upon which the MPC should be based upon. Prefers the extreme peaker approach because it takes into account scarcity of energy at times of extreme peak demand or of low supply. Believes this would be more appropriate because the higher MPC would cover for investors' capital costs.	Noted. See chapter 6.
EnerNOC (pp. 1-3)	Prefers the extreme peaker approach over the cap defender approach because the extreme peaker is more objective, and does not rely on highly subjective input assumptions. Particular criticisms of the cap defender include that: it does not account for different ownership patterns and associated market power; assumes the marginal peaking plant is dispatched perfectly by AEMO; and ignores the effect of a marginal peaking plant being partially dispatched.	Noted. See response to Alinta Energy above.
MEU (pp. 9-22)	Prefers the cap defender approach on the basis that it reflects commercial reality. However, has reservations with the assumptions/sensitivities; in particular the expected level of SRES renewable generation which have not been considered; the historical data used as it may be biased towards South Australia and Queensland; and the effect of MPC on the wholesale price, which has not been considered. That said, also considers the extreme peaker approach is flawed because it is based on the premise that a new entrant generator is built to only operate as a marginal generator.	Noted. See response to Alinta Energy above.
Origin Energy (pp. 1-2)	Considers that both the cap defender and extreme peaker approaches are highly artificial models of the market. Notes that the current settings have been effective in delivering the reliability standard to date. On this basis, questions the suitability of the extreme peaker approach because this approach suggests that the current settings may not be appropriate in the future.	Noted. See response to Alinta Energy above.

Table A.15 Treatment of DSP in the modelling

Organisation	Substantive point being made	Panel comments
EnerNOC (p. 3)	Supports the consideration of DSP within ROAM's modelling approach. However, considers that the modelling should not assume perfect dispatch, noting a propensity for DSP to higher short run marginal cost and longer start up times. Also suggests that the increased volumes of DSP uptake under the AEMC's recommended DRM in the Power of Choice review should be used as the basis for the modelling.	Noted. See chapter 6.
Origin Energy (p. 2)	Considers that caution should be exercised in the modelling of DSP because the DRM has not yet been implemented by AEMO	Noted. See chapter 6.

Table A.16 Treatment of renewable generation in the modelling

Organisation	Substantive point being made	Panel comments
Origin Energy (p. 2)	Considers that caution should be exercised in making assumptions about the treatment of carbon pricing and renewable energy, given the uncertainty in the current policy environment.	Noted. See chapter 6.

Table A.17 Reliability standard

Organisation	Substantive point being made	Panel comments
MEU (pp. 4, 22-23)	Notes that the VCR is subject to uncertainty and questions its use in assessing the reliability standard. However, considers that there is not enough evidence to support	Noted. See chapter 5.

Organisation	Substantive point being made	Panel comments
	a move away from the current reliability standard.	

Table A.18 Level of MPC

Organisation	Substantive point being made	Panel comments
MEU (pp. 4, 15-22)	Considers that the MPC should be significantly reduced to between $5,000 and $6,000, given that the cap defender suggests the current MPC is more than sufficient to achieve the reliability standard. Considers that a reduction in the MPC would lead to a reduction in costs to consumers.	Noted. See chapter 6.

Table A.19 Level of MFP

Organisation	Substantive point being made	Panel comments
MEU (pp. 4, 12, 23-24)	Considers that the MFP should have been modelled on shorter cycling periods because the times that market prices are negative occur for shorter periods than a week ahead outlook. Therefore considers that the MFP should remain at -$1,000/MWh.	Noted. See chapter 6.
Snowy Hydro (pp. 1-3)	Concerned that if the pricing envelope bounded by the MFP and MPC was reduced in magnitude it would introduce sovereign risk for long term investments. Also considers that the MFP should be based on the same approach to the MPC whereby the MFP level is assessed on how to encourage new entrant technologies to alleviate excess generation. Argues that the MFP level needs to be sufficiently negative in value to allow for economic cycling and to account for future growth in renewable generation that are based on shorter cycling.	Noted. See response to MEU above and chapter 6.

Table A.20 Regional MPCs

Organisation	Substantive point being made	Panel comments
MEU (pp. 15-19)	Based on ROAM's modelling, considers that the highest MPC trace is associated with South Australia and that this is setting a higher level of MPC than required across the NEM regions, which have lower MPC traces. Argues that maintaining the reliability standard and MPC across the NEM imposes unnecessary costs on consumers in regions where the MPC could be lower and still achieve the standard. Proposes that if the MPC is weighted in proportion to demand or consumption in each region, then this would produce the most equitable outcome if a single MPC is used.	Noted. See chapter 6.
Origin Energy (p. 2)	Notes the disparity between regions for the MPC under the cap defender approach. Considers that a single reliability standard and reliability settings should apply across the regions, noting the difficulties outweighing the economic benefit of having multiple MPCs. It considers that this is consistent with the Panel's view in 2007.	Noted. See chapter 6.

B Current and past related work

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 completed in 2007 and the most recent review of the reliability standard and reliability settings completed in April 2010. Where relevant, some of the past reviews relating to the specific aspects of the reliability standard and reliability settings will be considered later in this paper.

In addition, more recent reviews relevant to this reliability standard and reliability settings review include the AEMC VCR review and the AEMO VCR review. These reviews are particularly relevant given the number of submissions which have queried the relevance of the VCR with respect to the reliability standard and reliability settings.

B.1 Comprehensive reliability review (2007)

The comprehensive reliability review was completed by the Panel in 2007, which included examining a wide range of issues and extensive consultation with stakeholders. The review 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.

The Panel arrived to the following conclusions for that review:

- 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.

- 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.

- There were sufficient concerns and risks to warrant an increase in the MPC and had recommended that the MPC be increased from $10,000/MWh to $12,500/MWh, 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.)

- The philosophy underpinning the establishment of the CPT was 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/MWh, 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.

- Recommend no changes to the MFP of -$1,000/MWh. The modelling undertaken by CRA International suggested that the level of the MFP 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 MFP.

B.2 Reliability standard and reliability 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.

The Panel arrived to the following conclusions for that review:

- To maintain the current form and level of the reliability standard at 0.002 per cent USE. The Panel did not consider there was 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 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 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 respect to the MFP, the Panel had noted that few submissions to the review had commented on the MFP and there was otherwise no evidence to support it being changed. Therefore, the Panel did not make any recommendations to change the MFP.

- 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 reliability settings, including a review of the indexation provisions, to be undertaken by the Panel.

B.3 Review of the effectiveness of the NEM security and reliability arrangements in light of extreme weather events (2010)

This review was completed by the Panel in 2010. It involved a review of the current arrangements for managing security and reliability in the NEM under the scenario that extreme weather events become more frequent. In undertaking this review, the Panel considered stakeholders' views and modelling undertaken by ROAM, which was peer reviewed by EGR Consulting.

The AEMC made the following recommendations for that review as it relates to the reliability standards and settings:

- Efficient investment in reliability across the supply chain can be achieved by investing to the level of VCR for those consumers most affected by the investment. The AEMC recommended that for generation investment the VCR level for residential consumers should be used because this class of consumer places the lowest value on reliability and are usually shed first during a reliability event. For transmission network investments, it recommended that the level of VCR should reflect the class or classes of consumers that would be affected by the investment.

- The annual market performance review currently undertaken by the Reliability Panel should be expanded to better examine the performance of the power system as a whole (as experienced by consumers at the point of consumption) and the individual segments of the power system (including distinguishing between main system reliability and security events). The AEMC should review the findings of the Annual Market Performance Review from the perspective of market design and if it is found that the current market design is no longer efficiently meeting the expectations of consumers for quality of supply, changes would be recommended to the MCE as appropriate.

- An arrangement that would allow a different MPC in each region to recognise differences in jurisdictional reliability expectations was examined. The AEMC recommended that an arrangement allowing the level of the MPC to vary between regions should not be pursued further. Introducing new regional specific arrangements into the inter-connected NEM would most likely be detrimental to overall NEM efficiency and would be unlikely to contribute to the achievement of the National Electricity Objective. Such an arrangement would also present problematic implementation issues. In addition, in the AEMC's view, varying MPCs is not needed because the AEMC believed that the current assumption that the reliability expectations of residential consumers are consistent in all NEM regions is still relevant.

- An explicit requirement for the reliability standard and reliability settings to reflect the level of reliability valued by consumers should be included in the rules.
- The MPC and VCR would be checked against each other to assess whether the reliability parameters are consistent with the value that consumers place on reliability.
- The reliability standard and reliability settings would be reviewed, and amended where necessary, by the AEMC every 5 years.
- The reliability standard and reliability settings would be specified and given effect in a schedule referred to in the rules.
- AEMO would use the same VCR for its transmission planning activities as is used for determining the reliability parameters.
- The methodology and assumptions that would be applied to determine the reliability standard and reliability settings, minimum reserve levels (MRLs) and the VCR would be subject to public consultation and would be established before the process for determining these parameters commences.
- Considered some of the possible alternative market mechanisms which could be implemented to deliver satisfactory reliability in the NEM including a capacity market, forms of standing reserve and a reserve ancillary service. Considered that implementation of alternative mechanisms is not needed at this stage as there is no evidence to suggest that reliability in the NEM has not been achieved with the application of the current reliability standard and reliability settings.

B.4 AEMC value of customer reliability review (2013)

The AEMC provided advice to SCER on linking the reliability standard and reliability settings in the wholesale electricity market with a VCR.[132] SCER requested this advice in response to the AEMC's review of the effectiveness of NEM security and reliability arrangements in light of extreme weather events.

Relevant to the AEMC VCR review, the AEMC had made a number of recommendations in the extreme weather events review. This included a recommendation for a new requirement in the rules for a VCR, based on the residential consumer class, to be considered when determining the levels for the reliability standard and reliability settings.

In response to the AEMC recommendations, SCER provided a response to the AEMC's final recommendations for that review. While the majority of the recommendations

132 Available at: www.aemc.gov.au.

were endorsed, SCER requested additional advice on the matter of setting the reliability standard and reliability settings with reference to an agreed VCR.

In its advice to SCER, the AEMC indicated its preferred approach for linking the reliability standard and reliability settings in the wholesale electricity market with a VCR. The approach is similar to the current process for determining the wholesale electricity market reliability standard and reliability settings. The key difference is the inclusion of a requirement for a VCR, estimated for the customers most affected by a supply shortfall, to be used as a cross-check on the reliability standard.

This approach provides for the level of supply reliability to customers from the generation and bulk-transmission sectors of the NEM to broadly reflect the value that customers place on receiving a reliable supply of electricity. This will promote efficient market outcomes that are at least consistent with those delivered by the NEM's current reliability standard and reliability settings.

B.5 AEMO value of customer reliability review (2013-14)

AEMO is currently undertaking a review for national VCR. This review arose for the following reasons:

- in response to the MCE Review of the Effectiveness of NEM Security and Reliability Arrangements in light of Extreme Weather Events;
- a detailed survey on VCR has not been undertaken in Victorian since VENCorp's (now AEMO's) 2007 survey;
- no regional or sector-specific VCRs that could be used for planning and revenue setting purposes; and
- reconciliation between the Victorian and New South Wales VCRs following the AEMC's work on developing a New South Wales VCR through its New South Wales workstream on Distribution Reliability Standards and Outcomes.

At the time of the Panel review, AEMO has published a statement of approach.[133] The paper incorporates feedback from submissions on its review and AEMO's key decisions, and presents a proposed methodology for estimating the VCR.

This AEMO review has some relevance to the Panel review because it proposes a national VCR which could be considered in the context of the reliability standard. The Panel notes that it will monitor the progress of this review. Further discussion on the VCR is discussed in chapter 5 of this paper.

133 Available at: www.aemo.com.au.