Australian Energy Market Commission

AEMC Reliability Panel

Package Two

NEM Reliability Settings: VoLL, CPT and Future Reliability Review

Exposure Draft for Consultation

September 2008

Inquiries

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

E: aemc@aemc.gov.au
T: (02) 8296 7800
F: (02) 8296 7899

Citation

AEMC Reliability Panel, Exposure Draft, NEM Reliability Settings: VoLL, CPT and Future Reliability Review, July 2008, Sydney

About the AEMC

The Council of Australian Governments, through its Ministerial Council on Energy, established the Australian Energy Market Commission (AEMC) in July 2005 to be the Rule maker for national energy markets. The AEMC is currently responsible for Rules and policy advice covering the National Electricity Market. It is a statutory authority. Our key responsibilities are to consider Rule change proposals, conduct energy market reviews and provide policy advice to the Ministerial Council as requested, or on AEMC initiative.

About the AEMC Reliability Panel

The Panel is a specialist body within the AEMC and comprises industry and consumer representatives. It is responsible for monitoring, reviewing and reporting on the safety, security and reliability 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 NEL.

Disclaimer

The views and recommendations set out in this document are those of the Reliability Panel and are not necessarily those of the Australian Energy Market Commission.

Reliability Panel Members

Chairman

Ian C Woodward, Commissioner, Australian Energy Market Commission

Other AEMC Reliability Panel Members

Kerry Connors, former Executive Officer, Consumer Utilities Advocacy Centre

Jeff Dimery, General Manager, Merchant Power, AGL Energy

Mark Grenning, Chief Advisor Energy, Rio Tinto

Les Hosking, Managing Director and CEO, NEMMCO

Gordon Jardine, Chief Executive, Powerlink

George Maltabarow, Managing Director, EnergyAustralia

Stephen Orr, Commercial Director, International Power Australia

David Swift, Chief Executive, Electricity Supply Industry Planning Council

Geoff Willis, former CEO, Hydro Tasmania

Contents

Abbreviations and Glossary

AEMC	Australian Energy Market Commission
CRR	Comprehensive Reliability Review
DSR	Demand Side Response
EAAP	Energy Adequacy Assessment Projection
Final Report	The Final Report of the Reliability Panel's Comprehensive Reliability Review, published in December 2007.
Interim Report	The First Interim Report of the Reliability Panel's Comprehensive Reliability Review, published in April 2007.
MCE	Ministerial Council on Energy
MPL	Market Price Limit, proposed to replace the term Value of Lost Load (VoLL)
MRL	Minimum reserve level
MW	Megawatt
MWh	Megawatt hour
NECA	National Electricity Code Administrator
NEL	National Electricity Law
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NEO	National Electricity Objective
NGF	National Generators Forum
OCGT	Open-cycle gas turbine
Panel	The Reliability Panel
PASA	Projected Assessment of System Adequacy
Regulations	National Electricity Regulations
RERT	Reliability and Emergency Reserve Trader
Rules	National Electricity Rules
Second Interim Report	The Second Interim Report of the Reliability Panel's Comprehensive Reliability Review, published in September 2007.
SOO	Statement Of Opportunities
USE	Unserved Energy
VoLL	Value of Lost Load

Executive Summary

In December 2007, the Reliability Panel (Panel) published the Final Report of its Comprehensive Reliability Review (CRR). In the CRR the Panel made recommendations related to the reliability settings in the National Electricity Market (NEM) including:

- the NEM reliability standard;
- the Value of Lost Load (VoLL), market floor price and cumulative price threshold (CPT);
- whether the reliability safety net ("reserve trader") should be allowed to expire (the subject of a recent Rule change assessment by the AEMC) or alternative arrangements put in place; and
- improvements in market information related to reliability.

Amongst the CRR recommendations, the Panel foreshadowed a number of Rule change packages that it would submit in the form of Rule change proposals to the AEMC in 2008. This Exposure Draft consolidates the second and third Rule change packages foreshadowed in the CRR into a single Rule change package for reasons of efficiency and to streamline the process.

This Exposure Draft intends to implement the following recommendations relating to proposed Rule changes:

- an increase in the level of VoLL from the existing level of $10,000/MWh to $12,500/MWh to be effective from 1 July 2010;
- the CPT be defined in the Rules as 15 times VoLL;
- the term "Value of Lost Load (VoLL)" be changed to the "Market Price Limit (MPL)"; and
- the current annual review of VoLL be replaced with a reliability standards and settings review (i.e. the reliability standard, VoLL, CPT, and the market floor price) which is to take place every two years with two years' notice of any change.

Since the publication of the CRR, the Federal Government has announced plans for a Carbon Pollution Reduction Scheme (CPRS), and an expansion of the existing Mandatory Renewable Energy Target. There is also a review by the AEMC at the request of the Ministerial Council on Energy (MCE) relating to the implications of the introduction of the CPRS and expanded renewable energy target on the energy market frameworks and Rules.

The Panel notes the current announcements for the intention to introduce the CPRS on 1 July 2008. With regard to the proposals the Panel is covering in this exposure draft, the Panel is explicitly seeking views from stakeholders on the appropriateness of also raising VoLL and the CPT on the same date, and may propose a different date

in its Rule change proposal to the AEMC depending upon responses from stakeholders and its further analysis.

Within the existing energy market design framework, the mechanisms that can be adjusted to provide investment signals are limited to VoLL, the CPT and the market floor price. Other potential mechanisms were considered and consulted on as part of the CRR, but were deemed inappropriate by the Panel. The Panel notes that new mechanisms may be considered during the AEMC's review of the CPRS implications, or as a result of some other MCE initiative. The Panel recognizes that if new mechanisms arise, the levels of VoLL, the CPT and the market floor price may need to be re-examined at an appropriate stage. However, in light of the extensive analysis of the CRR, the Panel believes that the proposed changes to the levels of the existing reliability and market mechanisms which are covered by this exposure draft remain appropriate changes at this time.

The Panel has included a statement of the issues being addressed by this Exposure Draft in chapter 2 of this proposal and a description of the Proposed Rule in chapter 3.

The Panel will request that the AEMC review the Rule change proposal, resulting from this Exposure Draft, under section 96A of the NEL. Under this section, the proposal may be fast tracked if the entity making the request is an electricity market regulating body (which includes the Reliability Panel) that has undertaken a public consultation when developing the proposal, or if the proposal was contained in a MCE review.

The Panel considers that the Proposed Rule is likely to advance the National Electricity Objective (NEO) as the Panel anticipates that:

- increasing the level of VoLL would decrease the incidence of breaching the reliability standard thereby improving the reliability of electricity supply to consumers, and would promote efficient investment in electricity services by compensating investors who adopt a higher discount rate when assessing investments;

- maintaining the ratio of 15:1 between CPT and VoLL would promote the efficient operation of electricity services with respect to reliability as a financial safety net, and would promote efficient investment as the CPT is designed not to hinder investment or the remuneration of occasionally utilised capacity by being set at a level that is unlikely to be triggered except in very extreme circumstances;

- renaming the term "VoLL" would promote the efficient use of electricity services through clarification of the term as a market price limit and avoid any misunderstanding as to the true meaning of VoLL;

- reviewing all the reliability settings (i.e. the reliability standard, VoLL, the CPT, and the market floor price) together would promote the long term interest of consumers and electricity as it ensures the reliability standard is met and becomes more effective.

In addition to the Panel's assessment of the proposal against the NEO, the Panel has provided an explanation of the expected benefits and costs of the proposed change and the potential impacts of the change on those likely to be affected.

The Panel is seeking stakeholder submissions to this Exposure Draft and Proposed Rule by Friday 31 October 2008. Submissions may be sent electronically to submissions@aemc.gov.au or by mail to:

Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

or by Fax: (02) 8296 7899.

This page has been intentionally left blank

1 Introduction

1.1 Context of the Exposure Draft

In December 2007, the Reliability Panel (Panel) published the Final Report for the Comprehensive Reliability Review ("CRR Report"). In the CRR Report, the Panel made recommendations relating to the reliability settings in the National Electricity Market (NEM) including:

- the NEM reliability standard;
- the Value of Lost Load (VoLL), market floor price and cumulative price threshold (CPT);
- whether the reliability safety net ("reserve trader") should be allowed to expire (the subject of a recent Rule change assessment by the Australian Energy Market Commission (AEMC)) or alternative arrangements put in place; and
- improvements in market information related to reliability.

1.2 Questions addressed during the CRR

The Panel approached the CRR in terms of the following fundamental questions raised in the CRR Issues Paper of May 2006:

1. Is there now, or is there likely to be in the future, a problem with supply reliability in the NEM?
2. If yes, is there now, or is there likely to be in the future, a problem with the reliability settings?
3. If yes, is it serious enough to cause material dislocation to suppliers and users in the future?
4. If no, what improvements to the operation of the reliability settings should be made?
5. Otherwise, what changes to the reliability settings should be contemplated that would be beneficial?

1.3 CRR Conclusions and Recommendations

In the CRR Report, the Panel made the following conclusions and recommendations:

- That the current safety net or 'Reserve Trader' should be redesigned to become a Reliability and Emergency Reserve Trader (RERT).[1]

- That a new Energy Adequacy Assessment Projection (EAAP, an information gathering and dissemination mechanism) should be introduced to enable the market to forecast and respond to projected times where there may be energy constraints that would affect reliability.[2]

- That there should be a confirmation of NEMMCO's ongoing power to issue Reliability Directions with no sunset date for this power.[3]

- That the current annual review of VoLL should be replaced by a reliability standards and mechanisms review of all the reliability settings (i.e. the reliability standard, VoLL, the CPT, and the market floor price) which should take place every two years. With respect to any recommendations from the biennial Review which may suggest changes to VoLL, the market floor price and the CPT, there should be a two year notification period. In essence, this process would mean an average four-year cycle of potential changes which the Panel believes to be a balanced and appropriate time scale.

- That the Panel would request NEMMCO to conduct a review of the level of short term reserves that should be used in the short term PASA.

- That the Panel would request that NEMMCO report to the Panel each November on the accuracy of the most recent Statement of Opportunities (SOO) demand forecasts and on improvements in the forecasting process that will be used to prepare the subsequent SOO.

- The Panel noted the significant progress being made by jurisdictions and NEMMCO in further improving the demand forecasts for the market. The Panel believed that continuous improvements in the accuracy of demand forecasting would be beneficial for the market and for reliability responses.

- That the Panel should undertake a formal consultation under the Rules for the 'Guidelines for management of electricity supply shortfall events' which was issued by the Panel in 1998.

- That the Panel should establish a taskforce to look specifically at the methodology and process for calculating Minimum Reserve Levels (MRLs), especially where the MRLs are applied across more than one jurisdiction. This taskforce will comprise of NEMMCO, industry and jurisdictional representation and would be chaired by a member of the Panel.

---

1 This is included in the National Electricity Amendment (NEM Reliability Settings: Information, Safety Net and Directions) Rule 2008 No 6.

2 Ibid.

3 Ibid.

- The Panel endorsed the action of the AEMC in undertaking a review of the Administered Price Cap (APC). The Panel also noted that a related Rule change proposal regarding the compensation arrangements for administered prices had been proposed by a market participant which would allow consideration of this matter by the AEMC.

- The Panel noted that there appeared to be potential benefits to medium-term reliability from the development of demand-side and standing reserve arrangements. The Panel noted that the AEMC is currently undertaking a review of demand-side issues relating to the Rules. The Panel intended to provide inputs to that review based upon the submission and analysis work undertaken for the CRR Report. Furthermore, the Panel intended to establish a work program in 2008 relating to "medium-term reserves and reliability" to provide additional analytical material that would be relevant to deliberations by the MCE and AEMC on policy and market development issues respectively.

- That the Panel continue to release its Annual Market Performance Review relating to reliability and security.

Amongst the recommendations in the CRR Report, the Panel foreshadowed three Rule change packages that it would submit in the form of Rule change proposals to the AEMC in 2008:

- The first Rule change package addressed the re-designed reserve trader (RERT), the new EAAP information mechanism and NEMMCO's power to issue reliability directions. This is the first such rule change package and was submitted to the AEMC. On 26 June 2008, the AEMC published its final Determination and Rule to be made.

- The second Rule change package was to be largely administrative by addressing the name of VoLL (to be changed to the Maximum Price Limit (MPL)) and future reviews of the reliability settings (the cycle of which would commence from 2010).

- The third Rule change package was to address the levels of VoLL and the CPT.

Subsequently, the Panel decided to consolidate the second and third Rule change packages into a single Rule change package for reasons of efficiency and to streamline the process.

The purpose of this Exposure Draft is to develop a Rule change proposal that implements the policies outlined in Rule change packages 2 and 3 as defined in the CRR Final Report. The Panel therefore invites written submissions from interested parties in response to:

- this Exposure Draft; and

- the Proposed Rule.

1.4 Process

The Panel undertook an extensive consultation process for the CRR. A summary of this process is provided in Appendix A. Stakeholder comments were made to the Panel in the form of submissions, supplementary submissions and presentations after the release of the CRR Issues Paper, the CRR Interim Report, and the Second CRR Interim Report.

The AEMC Reliability Panel is the proponent of this Exposure Draft and Proposed Rule and will request that the AEMC make a Rule change proposal, resulting from this Exposure Draft, in accordance with section 91 of the NEL. The Panel considers that it is able to make this request as section 91(4) allows the Panel to make requests in relation to its functions under the NEL and the Rules. In particular, the Panel can make recommendations on market changes or changes to the Rules on overall power system reliability matters.

The Panel also considers that the Rule change proposal, resulting from this Exposure Draft, is in regard to subject matter that the AEMC may make Rules, as set out in section 34 of the NEL and, more specifically, in Schedule 1 of the NEL.

The Panel is seeking stakeholder submissions to this Exposure Draft and Proposed Rule by Friday 31 October 2008. Submissions may be sent electronically to submissions@aemc.gov.au or by mail to:

Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

or by Fax: (02) 8296 7899.

The Panel's Rule change proposal, resulting from this Exposure Draft, and finalised Proposed Rule, after consideration of all submissions received, will be submitted to the AEMC. The Panel intends to request that the Rule change proposal be "fast tracked" in accordance with section 96A of the Rules.

2 Statement of Issues

As discussed in chapter 1, this Exposure Draft combines two Rule change packages which were identified in the CRR Report. These two Rule change packages address the following matters:

1. the levels of VoLL and the CPT; and

2. the name of VoLL (to be changed to the Maximum Price Limit (MPL)), and the timing and process of future review of the reliability settings (the cycle of which would commence from 2010).

With respect to VoLL and the CPT, the Panel considered a range of issues in the CRR Report, including:

- options for changing, amending or augmenting the reliability mechanisms to address the risks on the horizon that may impact the NEM achieving the reliability standard in the future; and

- whether the current level of the CPT is appropriate.

The Panel also considered administrative issues relating to the reliability settings, including the recommendation to rename VoLL to the Market Price Limit, and issues relating to the future reliability reviews and reporting, such as:

- Should there be longer-term certainty about the level of VoLL?

- Should all the reliability settings be reviewed on a regular and integrated basis?

Further information on the CRR is available on the AEMC website[4].

2.1 Current Reliability Settings

The level of VoLL, the market floor price and the CPT are the key price envelopes within which the wholesale spot market seeks to balance supply and demand, and deliver capacity to meet the NEM reliability standard with the aim of avoiding unmanageable risks for market participants. VoLL is the maximum market price level and is currently set at $10,000/MWh. The market price floor is currently set at -$1,000/MWh. These parameters are crucial because they provide key signals for supply and demand-side investment and usage. For example, if the value of VoLL is set too high, Market Customers (retailers or consumers who trade directly in the market themselves) and generators can be exposed to very large financial risks. However, if it is set too low, there may be insufficient incentives to invest in new generation capacity to meet future reliability.

[4] Information on the Panel's CRR is available on the AEMC website at http://www.aemc.gov.au/electricity.php?r=20051215.142656.

The CPT is designed to limit participants' exposure to protracted stress in the wholesale spot market and is currently set at $150,000/MWh. This is an explicit risk management mechanism. If the sum of the half-hourly wholesale market spot prices over a rolling seven-day period exceeds this threshold, then NEMMCO must impose an administered price cap such that spot market prices do not exceed $300/MWh until the sustained high prices fall away[5]. Some market participants have, however, complained that the CPT does not actually assist in the management of risks. In particular the level of potential administered prices, combined with an open ended compensation regime for generators, means that prudently hedged retailers may suffer increased losses if the CPT is exceeded.[6] This level of concern was heightened when such an event almost occurred in June 2007 in NSW due to a combination of higher winter demand and reduced supply due to the impact of the drought.

In March 2008, the CPT was breached in South Australia for the first time and an administered price cap was declared such that spot market prices could not exceed $100/MWh during peak times and $50/MWh at all other times.[7] NEMMCO reported on its website that "[t]his was driven by temperatures in Adelaide of up to 40.1 degrees and in Melbourne of 37.8 degrees".[8]

Within the existing energy market design framework, the mechanisms that can be adjusted to provide investment signals are limited to VoLL, the CPT and the market floor price. Other potential mechanisms were considered and consulted on as part of the CRR, but were deemed inappropriate by the Panel. The Panel notes that new mechanisms may be considered during the AEMC's review of the CPRS implications, or as a result of some other MCE initiative. The Panel recognizes that if new mechanisms arise, the levels of VoLL, the CPT and the market floor price may need to be re-examined at an appropriate stage. However, in light of the extensive analysis of the CRR, the Panel believes that the proposed changes to the levels of the existing reliability and market mechanisms which are covered by this exposure draft remain appropriate changes at this time.

VoLL, the market floor price and the CPT are further discussed below.

---

[5] The AEMC has recently published the final determination for the Schedule for the APC which can be found on http://www.aemc.gov.au/electricity.php?r=20071105.151356.

[6] Energy Retailers Association of Australia submission to the CRR Issues Paper.

[7] This event occurred before the AEMC final determination for the Schedule for the APC, when the APC was raised from $100/MWh during peak times and $50/MWh at all other times to $300/MWh at all times.

[8] Further information on this can be found on http://www.nemmco.com.au/opreports/pricing_mar.html.

2.2 Value of Lost Load (VoLL)

2.2.1 Should the level of VoLL be changed?

In the CRR Final Report, one option considered for changing, amending or augmenting the reliability mechanisms to increase the reliability was altering the level of VoLL. It is anticipated that increasing VoLL would encourage participants to enter into longer-term contracts to underwrite new investments as well as to provide a wholesale price envelope for the medium-term that reflects the costs of achieving NEM reliability at 0.002% unserved energy (USE).

The Panel considered retaining the existing arrangements and raising VoLL in response to rising construction costs of new generating plant and increased uncertainty about prices. It would also compensate investors who are adopting a higher discount rate when assessing investments. Raising VoLL is consistent with the basic design of the NEM and would be least disruptive to existing systems and to participants' understanding of the market. However, to be successful, it will require that investors, retailers and consumers enter into contracts of sufficient length so as to encourage new and timely investment, as well as manage the consequent increase in the overall level of financial risk. Future movements in the level of VoLL should be contemplated in an incremental manner and against clear evidence that the existing price signal is insufficient. In addition, an incremental approach to movements in the level of VoLL on realistic time cycles, as opposed to more substantial yet less frequent movements, would assist in addressing consumer concerns about increasing the potential volatility of the wholesale market prices.

The Panel's analysis in the CRR Report suggested that raising VoLL will increase the average revenue that generators can expect over the long-term for a given level of reliability. However, the Panel noted that raising VoLL would need to be accompanied by a market response that increases the scope of long-term contracts.

2.2.2 Submissions

There were a number of submissions that called for a substantial increase in VoLL. For example TRUenergy, in its submission to the First CRR Interim Report, suggested $30,000/MWh and, in its submission to the Second CRR Interim Report, "continued to support a large increase in the market price cap".[9]

A number of submissions called for VoLL to be increased by indexation, either annually or at less frequent intervals in order that VoLL increase as costs increase.[10] A number of submissions, such as Origin Energy's submission to the Second CRR Interim Report, recommended the status quo and VoLL to remain at $10,000/MWh.[11]

---

[9] TRUenergy submission to the Second CRR Interim Report.

[10] For example, the Electricity Supply Industry Planning Council submission to the Second CRR Interim Report.

[11] Origin Energy submission to the Second CRR Interim Report.

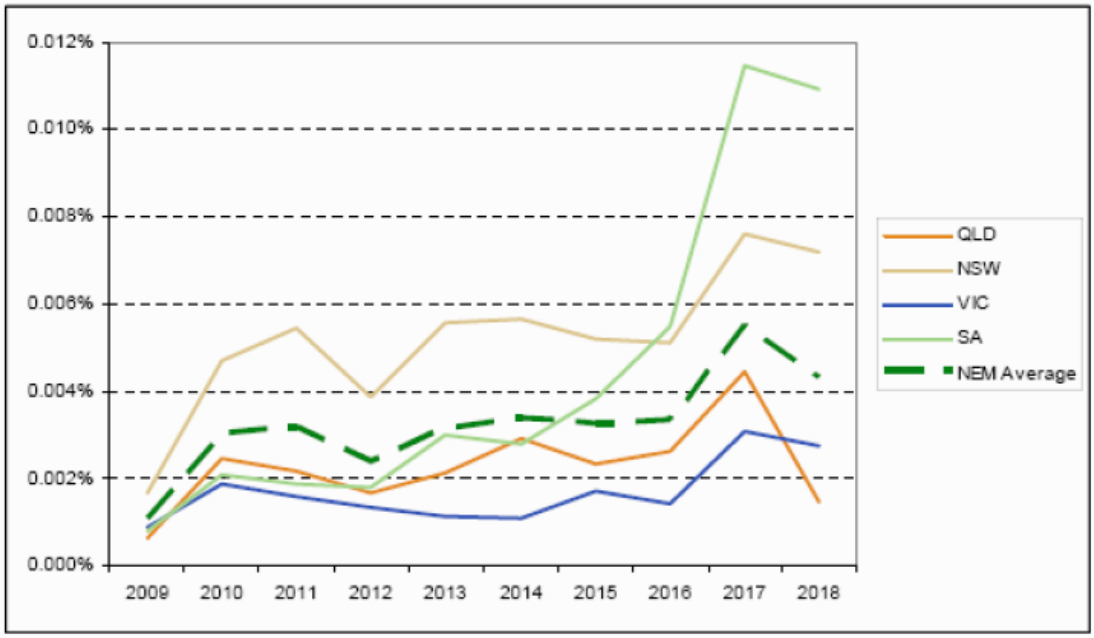
Submissions to the Panel were divided on whether an increase in VoLL would result in more or less contracting activity. In theory, an increase in VoLL would expose retailers to additional risk and create incentives for greater levels of contracting and demand side response. However, a number of participants suggested that raising the level of VoLL would also increase the risk of exposure faced by generators as a result of forced outages and, as such, may prompt generators to contract less and apply a higher discount factor to compensate for the increased risk.[12] These comments need to be considered in the context of the size and timing of any potential change to the level of VoLL.

2.2.3 The Panel's Analysis

The Panel undertook further and more detailed analysis in relation to VoLL in Appendix E of the CRR Report. The analysis examined the impact that raising VoLL would have on USE. The scenarios examined included nominal VoLL levels of the current $10,000/MWh with alternate values of $5,000/MWh, $12,500/MWh, $15,000/MWh, $17,500/MWh, $20,000/MWh and $30,000/MWh.

Plots of USE under different levels of VoLL (i.e. $10,000/MWh (i.e. the status quo), $12,500/MWh and $15,000/MWh) are shown below.[13]

Figure 9: Annual USE by Region (VoLL $10,000/MWh nominal)



[12] EnergyAustralia submission to the First CRR Interim Report.

[13] These plots have been extracted from figures 9, 10 and 11 in Appendix E of the CRR Report.

Figure 10: Annual USE by Region (VoLL $12,500/MWh nominal)

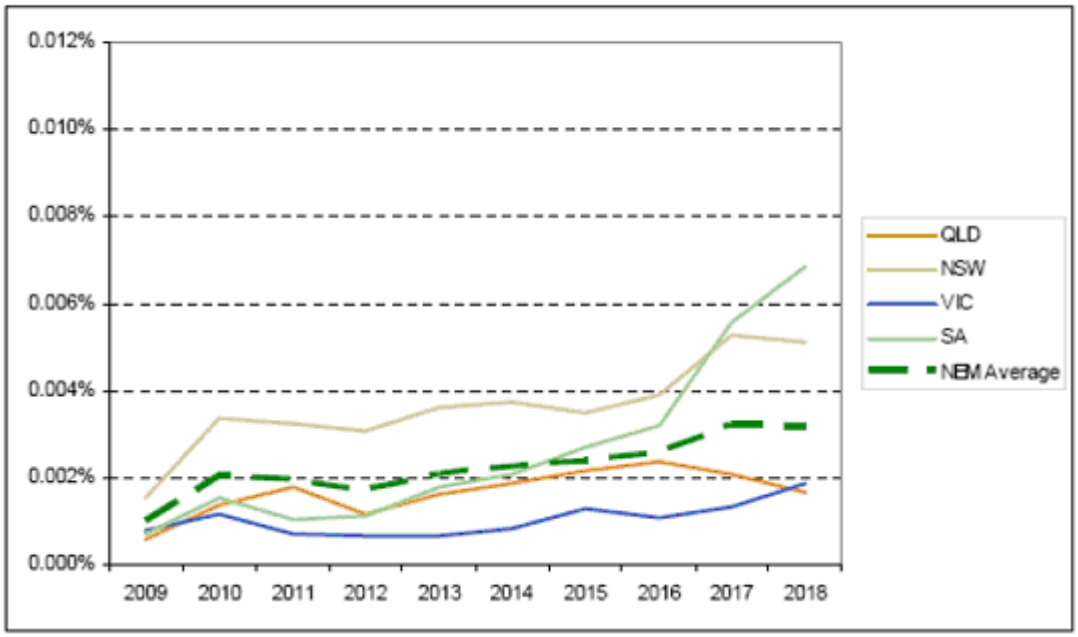
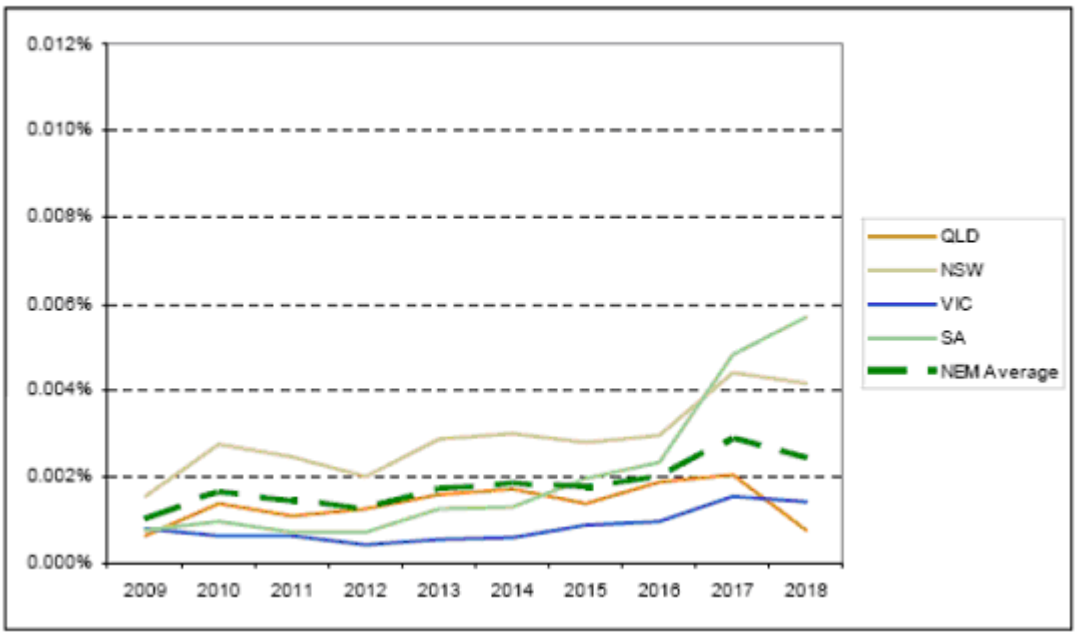


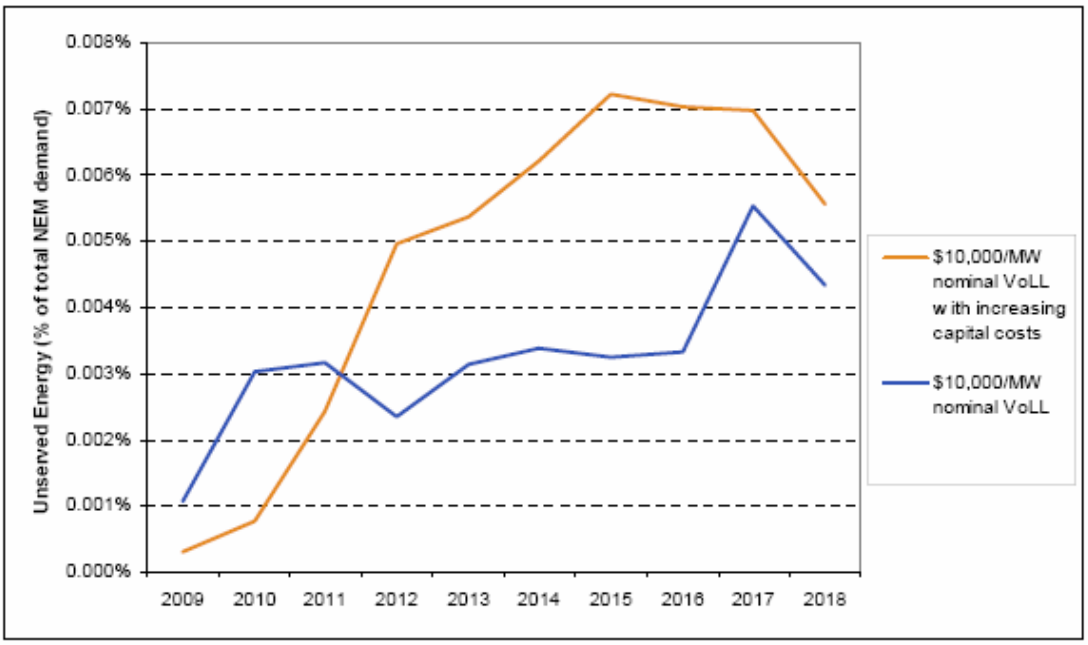
Figure 11: Annual USE by Region (VoLL $15,000/MWh nominal)



The extensive modelling in the CRR Report indicated that raising VoLL would decrease the incidence of USE. It also indicated that leaving VoLL at its current level would result in a breach of the reliability standard sometime between 2010 and 2014, particularly when considering the conservative nature of the modelling which assumes a near ideal market setting and does not allow for material increases in the costs of constructing new generating plant.

The plot below indicates that USE increases when VoLL is kept stable but capital costs increase.[14] On this basis, the Panel notes that an increase in capital costs of new generating plant has been a feature of the NEM in recent years, and is a feature which could continue in future years.

Figure 21: NEM Annual USE comparison of Original and Increasing Capital Cost Scenarios



In the CRR Report, the Panel also took into account whether the current situation reflected the fact that the market is still in transition as surplus capacity in different regions and transitionary pricing arrangements are wound back. It also considered whether an increase in VoLL to adjust for changing costs and risks might likely result in increased contracts and investment, in line with the market design assumptions, and also whether it may accelerate the emergence of greater level of DSR.

2.2.4 Proposed increase in VoLL

The Panel concludes that the prudent option is to adjust the existing price mechanism as a medium-term signal for investment and demand. It proposes an increase in VoLL from the existing level of $10,000/MWh to $12,500/MWh to be effective from 1 July 2010. This is justified in light of the Panel's analysis which was undertaken against a conservative case of the construction costs of new generating plant and minimal market distortions which clearly indicates that there would be a very likely breach of the reliability standard after 2011 NEM-wide and in a number of regions.

Furthermore, the Panel believes that as there is a real risk on the horizon of breaching the reliability standard, an incremental adjustment to the level of VoLL is warranted.

[14] This plot has been extracted from Figure 21 of Appendix E in the CRR Report.

The Panel notes that risks relating to the future cost of generation construction and development, as well as the implementation of other energy related public policy initiatives, suggest that the time frame for the Panel's recommendation is appropriate. A higher level of VoLL should encourage investment in new generation and provide greater incentives for customers to participate in demand side responses.

2.3 The Market Floor Price

The Panel's modelling in the CRR Report stated that "the level at which it [the market floor price] is set is unrelated to investment signals". This implies that the setting of the market floor price will have little or no effect on USE. As there were no stakeholder calls for a change in the level of the market floor price and, following modelling analysis in the CRR Report which showed no affect on reliability, the Panel proposes to leave the market floor price unchanged at -$1,000/MWh.

2.4 Cumulative Price Threshold (CPT)

2.4.1 Is the current level of the CPT appropriate?

The CPT was established as part of the changes to the level of VoLL in the NEM. 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 or the remuneration of occasionally utilised capacity in that the CPT is set at a level that is unlikely to be triggered except in very extreme circumstances.

Currently, the CPT is set at $150,000. This means that if, over a rolling seven-day period (336 half-hour trading intervals), the cumulative sum of the wholesale market spot prices equals or exceeds this threshold, then NEMMCO is required to impose an administered price cap such that spot market prices do not exceed $300/MWh. This price cap remains in place until the sustained high prices falls away.[15]

The CPT was established in December 2000 and set at $150,000 by the ACCC, following a recommendation by the Reliability Panel.[16] Prior to the establishment of the CPT, the APC would be triggered by the occurrence of "force majeure events". The National Electricity Code Administrator (NECA) defined force majeure events as the occurrence of a trading interval price in any region equal to VoLL due to involuntary load shedding or the occurrence of a network failure or derating that constrained one or more scheduled generators in the dispatch process.[17] In defining force majeure events, NECA indicated that there was a need to balance the

---

[15] Due to the nature of the CPT, this may take up to seven days, or even longer if the cause of the high prices persists.

[16] ACCC, 2000, 'Determination- Application for Authorisation- VoLL, Capacity Mechanism and Price Floor', 20 December. Available at: http://www.accc.gov.au/content/trimFile.phtml?trimFileName=D03+38328.pdf&trimFileTitle=D03+38328.pdf&trimFileFromVersionId=756473

[17] NECA, 1998, 'Administered price arrangements and force majeure', April, p.10.

"conflicting objectives of overall market risk management and allowing the market to operate normally as long as possible".[18]

The CPT was introduced to provide greater certainty to Market Participants in relation to when risk would be capped as it was based on price alone, rather than the occurrence of event such as load shedding or network failure.[19] It should be noted that, on the recommendation of the Reliability Panel, NECA initially sought to set the CPT at $300,000, when it applied for Code change authorisation by the ACCC in 1999. A level of $300,000 was chosen by the Panel as the Panel believed that the high price periods before each CPT breach would provide incentives for the supply of cost effective peak generation investment, by allowing a new entrant open cycle gas turbine plant to recover three years worth of its annual fixed costs.[20] However, the ACCC indicated in its final determination in 2000 that a lower CPT level was required to reduce the risk of Market Participants being exposed to extreme prices over prolonged periods of time before the APC was imposed.[21]

The CPT was breached in March 2008 in SA when the rolling seven-day price exceeded $150,000. Prior to this, the closest the CPT has been to being breached was in June 2007 in NSW when the rolling seven-day price reached ~$135,000. The Panel notes that the events of June 2007 caused considerable financial stress to some market participants, with one retailer exiting the market in these circumstances, as NEMMCO's prudential requirements increased as a direct result of those high prices. A major increase in the CPT may exacerbate this position.

2.4.2 Submissions

A number of criticisms of the CPT mechanism were raised with the Panel during the CRR including:[22]

- the CPT mechanism protects participants who do not appropriately manage their hedge positions; and
- the CPT mechanism would expose retailers to an unhedgeable risk during an administered price period because they are required to pay their share of the compensation to generators whose costs exceed the administered price.[23]

---

[18] NECA, 1998, 'Administered price arrangements and force majeure', April, p. 12.

[19] ACCC, 2000, 'Determination- Application for Authorisation- VoLL, Capacity Mechanism and Price Floor', 20 December, p. 6.

[20] Reliability Panel, 1999, 'Review of VoLL in the National Electricity Market: Report and Recommendations', Final Report, NECA, Adelaide, July, p.20.

[21] ACCC, 2000, 'Determination- Application for Authorisation- VoLL, Capacity Mechanism and Price Floor', 20 December, p. 44-45.

[22] Supplementary comments from AGL subsequent to their submission to the CRR Issues Paper.

[23] The AEMC is currently preparing the draft Rule determination on EnergyAustralia's Rule change proposal relating to compensation arrangements under administered pricing.

2.4.3 The Panels Analysis

The modelling undertaken by the Panel in the CRR Report indicated that any lowering of the CPT would result in an increase in the number incidences where the reliability standard may be exceeded, while an increase would not result in any reduction in USE.

2.4.4 Proposed unchanged CPT

The Panel believes that the current relative level of the CPT (i.e. 15 times VoLL) is consistent with the philosophy that underpinned its creation, namely to act as a financial safety net without hindering investment. Raising VoLL without raising the CPT would result in increased incidence of application of the APC. Given that the CPT should only be exceeded in extreme conditions, the Panel's conclusion is that the level of the CPT, relative to VoLL, should remain unchanged.

Thus, given the Panel's recommendation to incrementally increase the level of VoLL to $12,500/MWh from 1 July 2010, the Panel recommends that the CPT be defined in the Rules as 15 times VoLL. If these recommendations were accepted, and the level of VoLL were to move to $12,500/MWh, then the CPT would be reset to $187,500 at 1 July 2010.

2.5 Renaming VoLL to Market Price Limit

The Panel believes that the use of the term "Value of Lost Load (VoLL)" to describe what is clearly an upper limit on the market price is misleading. This is because a true value for VoLL would be based on a theoretical price at which customers would rather have interrupted supply than pay the market price for electricity, as opposed to a level of VoLL in reference to projections of meeting a USE reliability standard. For this reason, the Panel recommends changing the name from "Value of Lost Load (VoLL)" to the "Market Price Limit (MPL)". This would also bring the titles of the two terms "Market Price Limit" and "Market Floor Price", which define the wholesale price ranges in the NEM, into alignment.

2.6 Future Reliability Reviews and Reporting

Currently, the only arrangement in place for regularly reviewing any of the reliability settings is the Panel's annual review of VoLL. This is in accordance with clauses 3.9.4(c) and 3.9.6(c) of the Rules, where the Panel is required to review VoLL and market floor price by 30 April each year. Any change to VoLL takes effect from July two years after the Panel makes the determination and any change to the market floor price takes effect from July one year after the determination.

At the time the Panel undertook the 2008 VoLL review, it was also required under clause 3.12.1(b) to recommend whether the reliability safety net can be replaced. In effect, this gives market participants 26 months' advance notice of changes to VoLL, except in unusual circumstances where there may be 14 months' notice. The AEMC published its final determination relating to the replacement of the reliability safety net on 26 June 2008.

2.6.1 Should there be longer-term certainty about the level of VoLL?

The NEO relates to the long-term interests of consumers. Consumers have a direct interest in the future reliability settings which influence the price and the level of investment.

Investors seek as much certainty as possible about potential returns on their investments. Certainty is affected by the frequency of VoLL changes and the length of the notification period for such changes.

Advance notice of any change to VoLL is necessary so that market participants can adjust their risk management arrangements accordingly and make any other necessary adjustments to trading conditions such as the level of contracting that might be appropriate for a material change. The volatility of revenue for investors in peak plants will be more affected by changes in the level of VoLL than revenue for investors in base load plants.

Suggestions have been made that, for example, the level of VoLL should be adjusted only on request from a market participant to the Panel (followed by the necessary Rule change proposal to the AEMC if the Panel agrees with the market participant), or that it should be fixed for a longer period of, say, two years.[24]

The central issue here, for consumers and investors, is the trade-off between certainty and opportunity. Fixing the level of VoLL for too long risks inefficiencies if the level is higher than needed, and risks greater use of the market safety net if the level is too low.

2.6.2 Should all the reliability settings be reviewed on a regular basis?

The second issue concerns whether or not there should be a regular review of all the reliability settings (i.e. the reliability standard, VoLL, the CPT, and the market floor price). The Panel's view is that all the reliability settings (i.e. the reliability standard, VoLL, the CPT, and the market floor price) have an effect (though not necessarily an equal one) on USE and so should all be reviewed together. This will also mean that any adjustments to the reliability settings, to ensure the reliability standard is met, will be more effective.

The Panel's conclusion covered in the CRR interim reports was that VoLL should be reviewed less frequently than every year, and that it was more appropriate to review the level of VoLL in conjunction with a regular and integrated review of all the reliability settings.

2.6.3 Proposed change for a biennial review of all reliability settings

The Panel recommends that the current annual review of VoLL be replaced with a reliability standards and settings review (i.e. the reliability standard, VoLL, CPT, and the market floor price) which is to take place every two years. Any change to the reliability settings would occur two years later, at which time the two yearly review

[24] The CRR Report, p.89.

cycle would reset. The Panel raised these matters in its CRR interim reports. It acknowledges the overwhelming response from stakeholders in support of an integrated reliability review process not undertaken annually.

Based upon feedback from stakeholders and further analysis, the Panel concludes the "two plus two" concept, i.e. a review every two years with two years' notice of any change, represents an appropriate balance between:

- certainty for consumers and investors on one hand; and
- the need to maintain appropriate and timely vigilance in relation to overall NEM reliability performance.

The CRR was the first comprehensive and broad ranging review covering all the reliability settings since the inception of the NEM. The review was extensive in time and scope. The Panel believes that the proposed future biennial reviews of the reliability standard and settings would be completed in a very much shorter period of time against defined criteria in the Rules. In addition, the Panel will manage its work program against the two-yearly cycle to enable ongoing information collection that would facilitate a shorter period to undertake the review.

This page has been intentionally left blank

3 Proposed Rule

This chapter provides a description of the Proposed Rule developed by the Panel, the power for the Panel to submit the Rule change proposal, resulting from this Exposure Draft, to the AEMC, and the power that the Panel considers that the AEMC has to consider the Rule change proposal.

The Panel has attached a copy of the Proposed Rule to this Exposure Draft.

3.1 Description of the Proposed Rule

The Panel's Exposure Draft relates to improving the overall power system reliability through:

- minimising the possibility of a real risk on the horizon of breaching the reliability standard through increasing VoLL from the existing level of $10,000/MWh to $12,500/MWh to be effective from 1 July 2010;

- remaining consistent with the philosophy that underpinned the creation of the CPT by defining the current relative level of the CPT as 15 times VoLL in the Rules e.g. if the level of VoLL were to move to $12,500/MWh, then the CPT would be reset to $187,500 at 1 July 2010;

- clarifying the current definition of the term "VoLL" to be a market price limit by changing the term from "Value of Lost Load (VoLL)" to "Market Price Limit (MPL)"; and

- replacing the current annual review of VoLL with a reliability standards and settings review (i.e. the reliability standard, VoLL, CPT, and the market floor price) which is to take place every two years.

3.2 Power of the Panel to Submit this Proposal

The Panel is a specialist body within the AEMC and comprises industry and consumer representatives. It is responsible for monitoring, reviewing and reporting on the safety, security and reliability 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 NEL and rule 8.8 of the Rules.

The Panel intends to request that the AEMC make this Proposed Rule in accordance with section 91 of the NEL.

Section 91(1) of the NEL specifies that the AEMC may make a Rule at the request of any person, the MCE or the Reliability Panel. However, section 91(4) restricts the Panel to requesting the AEMC to make a Rule that relates to its functions. Section 38(2)(c) of the NEL states that the functions of the Panel include any functions and powers conferred on it under this Law and the Rules.

Clause 8.8.1(a) of the Rules lists the functions of the Panel under the Rules and subparagraph (5) states that one of these functions includes:

> "report to the *AEMC* and *participating jurisdictions* on overall *power system reliability* matters concerning the *power system* and on the matters referred to in clauses 8.8.1(a)(2) and (3), and make recommendations on *market* changes or changes to the *Rules* and any other matters which the *Reliability Panel* considers necessary".

The Panel considers that each aspect of this proposal relates to the overall reliability of the power system and, therefore, within the power of the Panel to recommend changes to the Rules.

3.3 Power of the AEMC to make the Proposed Rule

The subject matters about which the AEMC may make Rules are set out in section 34 of the NEL and, more specifically, in Schedule 1 to the NEL.

The Panel considers that the Rule change proposal, resulting from this Exposure Draft, falls within the subject matters that the AEMC may make Rules about, as it relates to:

- the operation of the national electricity market (as it involves the rules for VoLL and the CPT); and
- the operation of the national electricity system for the purposes of the safety, security, and reliability of that system (as this matter involves the ability to maintain reliability in changing the level of VoLL and retaining the level of the CPT).

The Panel views that the Rule change proposal, resulting from this Exposure Draft, is a matter that the AEMC may make a Rule.

Specifically, the Rule change proposal, resulting from this Exposure Draft, is also within matters set out in Schedule 1 to the NEL as it relates to:

- the setting of prices for electricity and services purchased through the wholesale exchange operated and administered by NEMMCO, including maximum and minimum prices (Item 7 of Schedule 1 to the NEL); and
- reviews by or on behalf of the Panel (Item 33(b) of Schedule 1 to the NEL).

3.4 Power of the AEMC to "fast track" this Proposal

The Panel also intends to request that the AEMC "fast track" the Rule change proposal, resulting from this Exposure Draft, in accordance with section 96A of the NEL.

Section 96A of the NEL specifies that the AEMC may "fast track" a Rule change proposal on receipt of such a request if the AEMC is of the opinion that the consultation conducted by the Panel was adequate having regard to the:

- nature and content of the request; and

- kind of consultation conducted by the Panel.

In addition, clause 8(f) of the Regulations requires that, where the Panel requests that a Rule change proposal be "fast tracked", the proposal must contain a summary of:

- the consultation conducted by the electricity market regulatory body; and
- include information about the extent of the consultation and about the issues raised during the consultation and the Panel's response to those issues.

The Panel believes that the Rule change proposal, resulting from this Exposure Draft, meets these two requirements in that:

- chapter 1 contains a description of the consultation process that the Panel conducted; and
- chapter 2 contains a description of the issues raised by stakeholders and the Panel's response to these issues.

In summary, the Panel considers that it has adequately consulted the public in relation to this Exposure Draft. This consultation with stakeholders on this Exposure Draft is the consultation required in accordance with section 96A of the NEL.

This page has been intentionally left blank

4 How the Proposed Rule will or is likely to contribute to the achievement of the National Electricity Objective

In accordance with clause 8(d) of the Regulations[25], this chapter presents the Panel's explanation of how the Proposed Rule will or is likely to contribute to the achievement of the NEO.

4.1 The National Electricity Objective

The NEO is the basis of assessment under the Rule making test and is set out in section 7 of the NEL[26]:

> "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."

4.2 Advancement of the National Electricity Objective

4.2.1 General

In the CRR Final Report the Panel stated that any assessment of the current reliability settings, as well as any actual improvements to them, should be undertaken on a basis consistent with the NEO. At the time of the CRR, the NEO was known as the National Electricity Market objective and was amended as part of the amendments to the NEL that took effect on 1 January 2008. However, there were no substantive changes to the definition. In this context, the Panel considers that an effective approach to reliability should achieve the following:

- delivery of a level of supply reliability that meets the broad expectations of consumers, and the value they place on it;
- maximising of efficiency in investment and use of electricity;
- clarity in respect of the reliability standard and settings and certainty in respect of how the relevant mechanisms operate; and
- in the event that changes to the reliability settings prove desirable, minimal disruption to the market.

[25] National Electricity (South Australia) Regulations.

[26] National Electricity (South Australia) Act 1996.

4.2.2 Increasing VoLL

The Panel considers that an increase to VoLL decreases the incidence of breaching the reliability standard which improves the reliability of electricity supply to consumers. The Panel also views that retaining the existing arrangements and raising VoLL in response to rising costs and increased uncertainty about prices would promote efficient investment in electricity services by compensating investors who are adopting a higher discount rate when assessing investments.

4.2.3 Retaining level of CPT

The Panel considers that leaving the ratio of 15:1 between CPT and VoLL unchanged maintains its efficient operation of electricity services with respect to reliability as a financial safety net. The Panel also considers that not changing this ratio maintains efficient investment as the CPT is designed not to hinder investment by being set at a level that is unlikely to be triggered except in very extreme circumstances.

4.2.4 Renaming "Value of Lost Load (VoLL)" to "Market Price Limit (MPL)"

The Panel considers that renaming the term "VoLL" promotes the efficient use of electricity services through clarification of the term as a market price limit and avoids any misunderstanding as to the true meaning of VoLL.

4.2.5 Future Reliability Review and Reporting

The Panel considers that the change from the current annual review of VoLL to a review of all reliability settings (i.e. the reliability standard, VoLL, the CPT, and the market floor price) every two years represents an appropriate balance between certainty for consumers and investors on the one hand; and the need to maintain appropriate and timely vigilance in relation to overall NEM reliability performance. The Panel considers that this achieves the long-term interests of consumers in the future reliability settings which influence price, and the long-term interests of investors about potential returns on their investments. The Panel anticipates that the reliability settings being reviewed together promotes the long term interest of consumers and electricity as it ensures the reliability standard is met and becomes more effective.

5 The expected benefits and costs of the proposed change and the potential impacts of the change on those likely to be affected

This chapter presents, in accordance with clause 8(e) of the Regulations[27], the Panel's explanation of the expected benefits and costs of the Proposed Rule and the potential impacts of the Proposed Rule on those likely to be affected.

5.1 Increasing VoLL

The expected benefits of increasing VoLL include:

- increasing confidence in reliability;
- compensating investors who are adopting a higher discount rate when assessing investments;
- consistency with the basic design of the NEM and would be least disruptive to existing systems and to participants' understanding of the market;
- addressing consumer concerns about increasing the potential volatility of the wholesale market prices;
- increasing the average revenue that generators can expect over the long-term;
- creating a medium-term signal for investment and demand;
- reducing possibility of real risk on the horizon of breaching the reliability standard;
- encouraging investment in new generation; and
- providing greater incentives for customers to participate in demand side responses.

The expected costs of increasing VoLL include:

- increased wholesale prices which will ultimately lead to higher prices for consumers;
- construction costs of new generating plant where raising VoLL encourages new investment;
- participants (especially those not vertically integrated) having greater incentive to enter into longer-term contracts;

[27] National Electricity (South Australia) Regulations.

- implementation costs to NEMMCO (although expected to be insignificant); and

- participant transition cost and disruption is expected to be low.

The potential impacts of the change on those likely to be affected include:

- encouraging participants (especially those not vertically integrated) to enter into longer-term contracts to underwrite new investments as well as to provide a wholesale price envelope for the medium-term that is reflective of costs and targeted to achieving NEM reliability at 0.002% USE;

- encouraging investors, retailers and consumers to enter into contracts of sufficient length so as to encourage new and timely investment as well as manage the consequent increase in the overall level of financial risk;

- raising VoLL is likely to be accompanied by a market response that increases the scope of long-term contracts;

- exposing retailers to additional risk and creating incentives for greater levels of contracting and DSR;

- increasing the risk of exposure faced by generators as a result of forced outages and, as such, may prompt investors to contract less and apply a higher discount factor to compensate for the increased risk; and

- if VoLL is not increased, the reliability standard will more likely be breached after 2011 NEM-wide and in a number of regions.

5.2 Retaining level of CPT relative to VoLL

The expected benefit of retaining the level of the CPT is to maintain consistency with the philosophy that underpinned its creation, namely to act as a financial safety net without hindering investment.

The expected costs of retaining the level of the CPT relative to VoLL would appear to be minimal.

As the level of the CPT is dependent on the value of VoLL (i.e. 15 times VoLL), the Panel anticipates that the impacts in retaining the level of the CPT relative to VoLL would be similar to that of the VoLL.

5.3 Renaming "Value of Lost Load (VoLL)" to "Market Price Limit (MPL)"

The expected benefits of renaming "Value of Lost Load (VoLL)" to "Market Price Limit (MPL)" include:

- clarifying the correct meaning for VoLL, in the context of the NEM, as the market price limit; and

- bringing the titles of the two terms "Market Price Limit" and "Market Floor Price", which define the wholesale price ranges in the NEM, into alignment.

The Panel does not anticipate that there will be any costs in renaming "Value of Lost Load (VoLL)" to "Market Price Limit (MPL)".

The Panel does not envisage that renaming "Value of Lost Load (VoLL)" to "Market Price Limit (MPL)" would have any impact as it considers this to be a minor amendment.

5.4 Future Reliability Review and Reporting

The expected benefits of a reliability standards and settings review every two years include:

- any adjustments to the reliability settings, to ensure the reliability standard is met, will likely be more effective;

- balancing between certainty for consumers and investors on one hand; and the need to maintain appropriate and timely vigilance in relation to overall NEM reliability performance;

- giving investors more certainty about potential returns on their investments; and

- giving more advance notice of any change to VoLL for market participants to adjust their risk management arrangements accordingly and make any other necessary adjustments to trading conditions such as the level of contracting that might be appropriate for a material change.

In terms of the expected costs of a biennial reliability standards and settings review, the revenue for investors in peak plants who are affected by changes in the level of VoLL is anticipated to be less volatile than revenue for investors in base load plants.

The potential impacts of the change on those likely to be affected include:

- future regular biennial reviews of the reliability standard and settings would be expected to be completed in a very much shorter period of time against defined criteria in the Rules; and

- the Panel will manage its work program against the two-yearly cycle to enable ongoing information collection that would facilitate a shorter period to undertake the review.

This page has been intentionally left blank

Appendix A Submissions, supplementary submissions and presentations

The Panel's Exposure Draft and Proposed Rule was prepared as a result of the CRR. The CRR process entailed the following:

• Panel published Issues Paper	11 May 2006
• Submissions on Issues Paper closed	30 June 2006
• First Stakeholder Forum (Gold Coast)	27 July 2006
• Panel published Interim Report	2 April 2007
• Submissions on Interim Report closed	17 May 2007
• Terms of reference modified in response to MCE request	21 June 2007
• Panel published Second Interim Report	30 August 2007
• Second Stakeholder Forum (Melbourne)	13 September 2007
• Submissions on Second Interim Report closed	28 September 2007
• Panel published Final Report	21 December 2007

Listed below are all submissions, supplementary submissions and presentations made to the Panel after the release of the Issues Paper, the Interim Report and the Second Interim Report for the CRR.[28]

A.1 SUBMISSIONS AND SUPPLEMENTARY SUBMISSIONS IN RESPONSE TO THE CRR ISSUES PAPER

The CRR Issues Paper was published by the Panel in May 2006. The Panel received the following submissions:

- AGL
- Country Energy
- Electricity Supply Industry Planning Council
- Energy Response

[28] All these documents are available from the AEMC's website at http://www.aemc.gov.au/electricity.php?r=20051215.142656.

- Energy Retailers Association Of Australia
- EnergyAustralia
- Enertrade
- Hydro Tasmania
- International Power Australia and Loy Yang Marketing
- Macquarie Generation
- National Generators Forum
- NEMMCO
- NewGenPower
- Queensland Government
- TransGrid
- TRUenergy
- VENCorp
- Energy Users Association of Australia
- Major Energy Users
- Total Environment Centre
- Electricity Supply Industry Planning Council Supplementary Submission
- Energy Response Supplementary Submission
- Paul Simshauser Supplementary Submission
- Powerlink Supplementary Submission
- Major Energy Users Supplementary Submission
- Ian Macfarlane
- Joseph Tripodi
- SA Department of Transport Energy and Infrastructure
- TRUenergy Supplementary Submission
- Electricity Supply Industry Planning Council Second Supplementary Submission

- SA Department of Transport Energy and Infrastructure Supplementary Submission

A.2 STAKEHOLDER FORUM PRESENTATIONS (JULY 2006)

The Panel held a stakeholder forum on 27 July 2006 as part of the consultation on its CRR Issues Paper. The Panel received presentations from the following:

- ESIPC
- EUAA and MMA
- NGF
- NewGenPower
- Energy Response
- Enertrade
- MEU
- LYMMCO

A.3 SUBMISSIONS IN RESPONSE TO THE CRR INTERIM REPORT

The CRR Interim Report was published by the Panel in April 2007. The Panel received the following submissions:

- EnergyAustralia
- Institute of Public Affairs
- Australian Energy Regulator
- NEMMCO
- Energy Retailers Association of Australia
- Enertrade
- National Generators Forum
- Energy Users Association of Australia
- Energy Response
- IPA And Loy Yang
- Macquarie Generation

- Major Energy Users
- TRUenergy
- EEE Limited
- Government of South Australia

A.4 Stakeholder Forum Presentations (September 2007) in response to the Second CRR Interim Report

The Panel held a second stakeholder forum on 13 September 2007 as part of the consultation on its Second CRR Interim Report. The Panel received presentations from the following:

- NEMMCO
- MEU
- Energy Action Group
- ESIPC
- ERAA
- NGF
- TRUenergy

A.5 Submissions in response to the Second CRR Interim Report

The Second CRR Interim Report was published by the Panel in September 2007. The Panel received the following submissions:

- South Australian Jurisdiction
- Energy Response
- NEMMCO
- AER
- TRUenergy
- ERAA
- Origin
- ESIPC
- MEU

- International Power Australia and LYMMCo
- EnergyAustralia
- Macquarie Generation
- NGF
- Energy Response - Supplementary