Australian Energy Market Commission

AEMC Reliability Panel

Comprehensive Reliability Review

Second Interim Report
August 2007

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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

Foreword

This Second Interim Report represents the third stage in the Reliability Panel's (the Panel's) comprehensive review of the National Electricity Market (NEM) reliability settings. The Review is designed to ensure that those settings contribute effectively to the reliable supply of electricity to consumers and is the first review of reliability since the inception of the NEM.

This Second Interim Report is conclusive about certain facets of the mechanisms affecting reliability in the NEM. In particular, it makes recommendations about improvements to NEM reliability information, the form, level and scope of the reliability standard, and the future of the Reliability Safety Net, commonly referred to as the "Reserve Trader" provisions. A number of other matters which are still under review by the Panel were canvassed in the First Interim Report, released in March 2007. Responses from stakeholders to the matters raised in this Second Interim Report are crucially important to the Panel in reaching its conclusions for the Final Report in November 2007.

In this regard, the Panel strongly encourages stakeholders to draw on their own NEM experience in providing a detailed rationale for making any improvements or changes to the reliability settings. This should take into account the integrated nature of those settings (which are described in Chapter 2 of this second Interim Report) and be supported by analysis. The Panel also invites stakeholders to indicate how reliability outcomes may be affected by other broader features of the market.

Written submissions should be made by 28 September 2007. The Panel also invites stakeholders to attend a public forum on 13 September 2007 to provide comment on the recommendations contained within this report as well as on any outstanding issues the Panel will address in its Final Report.

This review has been characterised by a strong emphasis on consultation and the Panel greatly appreciates the contribution to date from stakeholders. The Panel looks forward to receiving further submissions to the final phase of this important Review.

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Commissioner, Australian Energy Market Commission

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Contents

Abbreviations

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AMPR	Annual Market Performance Review
ANTS	Annual National Transmission Statement
CAIDI	Customer Average Interruption Duration Index
COPD	Cumulative Outage Probability Distribution
CPT	Cumulative Price Threshold
CRA	CRA International
DNSP	Distribution Network Service Provider
DSR	Demand Side Response
EAAP	Energy Adequacy Assessment Projection
LOEE	Loss of Energy Expectation
LOLE	Loss of Load Expectation
LOLP	Loss of Load Probability
MCE	Ministerial Council on Energy
MRL	Minimum reserve level
MW	Megawatt
MWh	Megawatt hour
NEL	National Electricity Law
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NGF	National Generators Forum
OCGT	Open-cycle gas turbine
Panel	The Reliability Panel
PASA	Projected Assessment of System Adequacy
POE	Probability of Exceedence
PJM	Pennsylvania New Jersey Maryland
Rules	National Electricity Rules
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SOO	Statement Of Opportunities
TNSP	Transmission Network Service Provider
USE	Unserved Energy
VCR	Valuation of Customer Reliability
VoLL	Value of Lost Load

Executive summary

Context

The Comprehensive Reliability Review (CRR) was to be complete in July 2007 with the publication of the Panel's Final Report. However, in June 2007 the Ministerial Council on Energy (MCE) wrote to the AEMC requesting the Panel "review and provide advice on the effectiveness of current market arrangements in managing generation input constraints" in the context of energy shortfalls being forecast by NEMMCO if the prevailing drought conditions remained.[1] The letter also "notes that the current terms of reference [of the CRR] may need to be broadened from its current focus on reliability to consider what, if any, improvements can be made to arrangements, including Reserve Trader, to strengthen the market's ability to manage input constraints."[2]

The Commission then amended the Panel's Terms of Reference[3] to require the Panel to:

- Provide advice to the AEMC for the MCE by mid-July 2007 on what, if any, improvements can be made to arrangements, including Reserve Trader, to strengthen the market's ability to manage generator input constraints.

- Extend the timetable of the CRR to include a second Interim Report [this report] which will seek feedback from stakeholders on the matters raised in that advice before its final report is issued later this year.

The Panel provided the requested advice to the MCE and now publishes this second Interim Report to seek feedback from stakeholders on issues arising from that advice as well as a number of matters from the broader CRR.

First Interim Report

In its first Interim Report the Panel came to the following preliminary conclusions:

- Against the reliability standard, the reliability mechanisms in the NEM have been satisfactory to date, but that there are risks on the horizon which may affect the timing of generation investment needed to meet the reliability standard in the future.

- To confirm the existing NEM-wide reliability standard at 0.002% unserved energy but to more clearly specify its measurement and targeting.

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1 Letter from the MCE to the AEMC, available on the AEMC's website.

2 Ibid.

3 See Appendix A for the amended Terms of Reference.

- That raising VoLL at this stage may not be the most preferred approach and that other options should be considered first.

- The current annual review of VoLL should be replaced by a comprehensive and holistic review of all the reliability settings (i.e. the reliability standard, VoLL, the CPT, the market floor price, the redesigned emergency safety net and any additional reliability mechanisms) which should take place every three to five years.

- The 'Reserve Trader' should be redesigned to become an emergency Reserve Trader; this emergency Reserve Trader should be retained for a sunset period; and its operation should be reviewed as part of the general review of the reliability settings.

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

- To request that NEMMCO report to the Panel each August 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.

This Second Interim Report

In this second Interim Report the Panel has reached firm conclusions on many of these matters, amongst other things, including:

- The NEM has to date achieved satisfactory performance against the reliability standard.

- Confirming and clarifying the reliability standard in form, level and scope.

    - The form of the standard will be unserved energy (USE) measured over ten years looking backwards, and that it should be targeted to be achieved prospectively on an annual basis, NEM-wide and in each region.

    - The level of the standard will remain unchanged at 0.002% USE.

    - The scope of the standard should extend to generation and bulk transmission capacity only, and should not apply to security events and external events such as terrorism, industrial action or 'acts of God'

- The design and operation of a new Energy Adequacy Assessment Projection (EAAP, an information gathering and dissemination mechanism) to enable the market to forecast and respond to projected times where there may be energy constraints.

- Confirming NEMMCO's ongoing power to issue Reliability Directions.

- Improving the 'Reserve Trader' with incremental changes to redesign it as a Reliability Emergency Reserve Mechanism (RERM) to operate with a defined sunset period.

- The review of short term reserve levels and reporting of SOO demand forecasting.

- Replacing the annual VoLL review with a holistic review of all the reliability settings every three years.

- That the AEMC review the level of the Administered Price Cap as a matter of priority.

An exposure draft of the proposed RERM, EAAP and Reliability Directions Power is contained in Appendix C of this report. Comment is sought on this exposure draft before it is submitted by the Panel to the AEMC as a Rule change proposal, at which time it will go through the usual consultation procedure as for any other Rule change.

The Panel also intends to formally publish the updated NEM Reliability Standard as part of its Final Report in November.

Matters under specific Consultation from the Second Interim Report

The Panel seeks feedback on all issues raised in this second Interim Report, but especially on the following:

- The design, operation and information dissemination process of the EAAP.

- NEMMCO's power to issue reliability directions.

- The design of the RERM.

- The guidelines to be issued by the Panel to NEMMCO on the practical operation of the RERM.

As discussed, the Panel seeks feedback from stakeholders on the exposure draft of the RERM, reliability directions and EAAP, both in written submissions and in the form of presentations to the Panel at a forum to be held in September. Once all feedback has been received and analysed, the Panel will convert its exposure draft into a Rule change proposal to be submitted to the AEMC later this year.

Remaining matters under consideration to be addressed in the Final Report

In its final report in November 2007 the Panel will issue its findings on the following matters:

- The level of VoLL and whether not it should be fixed or indexed.

- The level of the market floor price.
- The level of the CPT (noting that the CPT was nearly exceeded in June 2007).
- The consideration of additional or alternative reliability measures (such as a Reliability Ancillary Service or Reliability Options etc) to ensure reliability in the NEM.
- Other matters that arise through the upcoming stakeholder consultation process.

The Panel welcomes further stakeholder feedback on any of these outstanding matters as well as the detailed recommendations referred to above.

Key Dates for the Review

The following key dates outline the process forward towards the publication of the Final Report for the Comprehensive Reliability Review.

- Thursday, 13 September 2007 – a public forum in Melbourne. Stakeholders are invited to present to the Panel on any issues raised thus far as part of this Review, but particularly on the RERM and EAAP
- Friday, 28 September 2007 – the closing date for submissions to this second Interim Report.
- Friday, 30 November 2007 – the publication of the Final Report.

1 Introduction

This chapter outlines the purpose, scope and key themes of the Comprehensive Reliability Review (the Review) and describes its progress to date. It also outlines the structure of this Second Interim Report.

1.1 The Comprehensive Reliability Review

In December 2005 the Australian Energy Market Commission (the AEMC)[1] directed the Reliability Panel (the Panel)[2] to undertake a comprehensive and integrated review of the key mechanisms, standards and parameters (collectively, the 'reliability settings') for achieving reliability of supply in the National Electricity Market (NEM).

1.1.1 Purpose of the Review

The purpose of the Review is to investigate the effectiveness of the current reliability settings and to consider if, and how, they can be improved for the benefit of consumers.

The reliability settings comprise:

- An explicit reliability standard for generation and bulk transmission (currently set at no more than 0.002% USE and assessed over the long term);
- Price mechanisms designed to ensure that the wholesale spot market delivers capacity to meet the reliability standard: a price cap (known as the Value of Lost Load or VoLL) with a market floor price and a cap on financial exposure (the CPT); and
- An intervention mechanism known as the 'reliability safety net', should the price mechanisms fail.[3]

As noted in the Executive Summary the Panel was due to submit its final report to the AEMC by 31 March 2007. The AEMC subsequently revised this date to 31 July 2007. This was further revised to 30 November 2007 following a request from the

1 The AEMC is the national body responsible for making the National Electricity Rules (the Rules) that govern the operation of the NEM. It is also responsible for market development of the NEM. The AEMC's responsibilities are specified in section 29 of the National Electricity Law (NEL).

2 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.

3 NEMMCO also has a power of direction it is able to use at short notice.

Ministerial Council of Energy for advice from the Panel on ways to manage generation input constraints.[4]

This Second Interim Report presents results of research and analysis carried out in light of stakeholders' submissions to the Issues Paper of May 2006 and the First Interim Report of March 2007. Further results and recommendations will be forthcoming when the Panel publishes its Final report in November 2007. The Panel encourages stakeholders to comment on the findings and observations presented in this Second Interim Report.

1.1.2 Timing of the Review

This is an opportune time to review the reliability settings, for several reasons. The reliability standard itself has not been reviewed since the NEM's inception in 1998, and the various market price and intervention mechanisms have only been reviewed as discrete elements, never as part of a coherent and integrated whole. More importantly, the settings need to be reviewed because over the years the market has evolved. There is an increasingly peaky demand profile. The mix of generation plant has altered to include a growing contribution from peaking and wind generation. The 'Reserve Trader' safety net has been invoked twice now. The overhang of generation capacity with which the market started has been substantially consumed in all regions, and reserve margins are now approaching levels that are low by conventional standards. Significantly ,the market narrowly avoided exceeding the Cumulative Price Threshold in June 2007, which would have resulted in Administered Prices. There have been concerns raised by stakeholders on generation constraints arising from drought conditions in several NEM regions. Finally, some investor uncertainty has become evident with regard to building new generation.

1.1.3 Scope of the Review

The continuity of electricity supply to consumers depends on there being (1) an adequate level of generation and bulk transmission network assets available ('reliability'), and (2) the safe and secure operation of the power system ('security'). (These concepts are explained more fully in Chapter 2) Delivering sufficient investment in generation and bulk transmission and maintaining the technical performance of the power system requires an appropriate market structure, governance arrangements, regulatory settings and technical standards. The reliability settings are an important part of this broad picture.

While the Panel does have some responsibilities that impact on power system security, the focus of this Review is reliability.

The Panel has also sought to be informed as to how reliability may be affected by broader market features and, therefore, the Issues Paper invited comment on this from stakeholders. Schemes aimed at reducing greenhouse gas emissions and other government initiatives, for example renewable energy targets and retail price caps,

4 See the Terms of Reference (see Appendix A).

were raised in submissions by some stakeholders as having a significant impact on future reliability.

The Panel has undertaken to perform an initial assessment of any suggestions concerning changes to market features that lie outside the scope of this Review or are beyond the role of the Panel as defined under the NEL and the Rules, and forward them to the relevant decision-making body. It will do this after the release of its Final Report in November 2007.

Other reviews

Due to the complex and interconnected nature of the NEM, reliability cannot be considered in isolation from other elements of the market that are currently under review. For example, changes to transmission regulation or market structure may have an influence on investment strategies, and consequently on reliability. The Panel notes that several other reviews are currently under way which may have some bearing on future market settings, including:

- Some of the energy work program of MCE relating to energy market reforms; and
- The AEMC's Congestion Management Review.

1.1.4 Key themes and questions

Inevitably, any tightening of the reliability settings would result in both costs and benefits for electricity consumers. Changes may also impact on other dimensions of electricity supply such as the security of the power system. These inter-relationships are reflected in the NEM objective, set out in the NEL, which is used as the basis for assessing proposed changes to the Rules. It provides that:

> The national electricity market objective is to promote efficient investment in, and efficient use of, electricity services for the long-term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system.[5]

The Panel's view is 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 NEM objective. 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;
- The maximising of efficiency in investment and use of electricity;

5 NEL, s7.

- 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.

In order to address these key themes, the Panel has approached this Review in terms of the following fundamental questions raised in the 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?

1.1.5 Progress to date

The Issues Paper (May 2006) described the current reliability standard and mechanisms, and discussed the NEM's performance against the standard to date as well as where there may be scope for improvement.

After receiving twenty-three submissions to the Issues Paper from a range of industry stakeholders, the Panel held a Stakeholder Forum on 27 July 2006 in which further views were presented and discussed. Subsequently the Panel also received eight supplementary submissions. Submissions and presentations can be viewed on the AEMC website at www.aemc.gov.au.

To prepare for the First Interim Report a consultancy, CRA, was commissioned by the Panel to assist in analysis, which included modelling reliability outcomes for the current market design and for possible alternative design options. The First Interim Report was published on 30 March 2007 with the preliminary results of the CRA analysis presented to give stakeholders further opportunity for comment. Fifteen submissions were received from stakeholders at this stage of consultation.

In June 2007 the MCE requested the Panel to "review and provide advice on the effectiveness of current market arrangements in managing generation input constraints".[6] The AEMC then changed the Panel's terms of reference to incorporate this piece of work for the MCE and extended the publication date of the final report and also extending the timetable of the CRR to include a second Interim Report to

6 The MCE letter is available on the AEMC's website.

specifically deal with the issues arising from the advice to the MCE. There will also be further opportunity for stakeholder consultation at a public forum the Panel will host in Melbourne on 13 September 2007.

For the preparation of the Panel's Final Report its analysis program is ongoing.

1.2 Structure of this report

The rest of this Report is organised as follows:

- Chapter 2 is a general introduction to the fundamental design of the NEM and the role of the reliability settings;
- Chapter 3 is an historical examination of the NEM's reliability performance to date;
- Chapter 4 assesses whether the current form, level and scope of the reliability standard are appropriate for the future;
- Chapter 5 outlines the Panel's conclusions about the Reserve Trader provisions in the Rules.
- Chapter 6 discusses other aspects of the NEM on which the Panel has reached conclusions to enhance the market's reliability performance.
- Chapter 7 provides a summary of all the issues raised in this report about which the Panel seeks stakeholders' feedback.

The Report also includes three appendices:

- The Review's Terms of Reference (Appendix A); and
- A list of all submissions, supplementary submissions and presentations made to the Panel (Appendix B).
- An exposure draft of a Rule change proposal the Panel intends to submit to the AEMC containing the redesigned Reserve Trader and other matters on which the Panel has reached conclusions (Appendix C).

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2 A general introduction to the NEM and 'reliability'

This chapter provides a general introduction to the National Electricity Market (NEM), how reliability is defined in the NEM, what mechanisms are used to achieve it, and the reasons why such mechanisms are necessary. The chapter also highlights the relationship between the reliability settings and key themes of this Review.

2.1 What is the NEM?

The NEM is the single interconnected power system stretching from Queensland through New South Wales, the Australian Capital Territory, Victoria, and South Australia to Tasmania. It does not currently include the Northern Territory or Western Australia. The NEM is divided into pricing regions which closely align with State borders (the ACT forms part of the NSW region), and there is an additional region encompassing the Snowy Mountains Hydro Electric Scheme.[7]

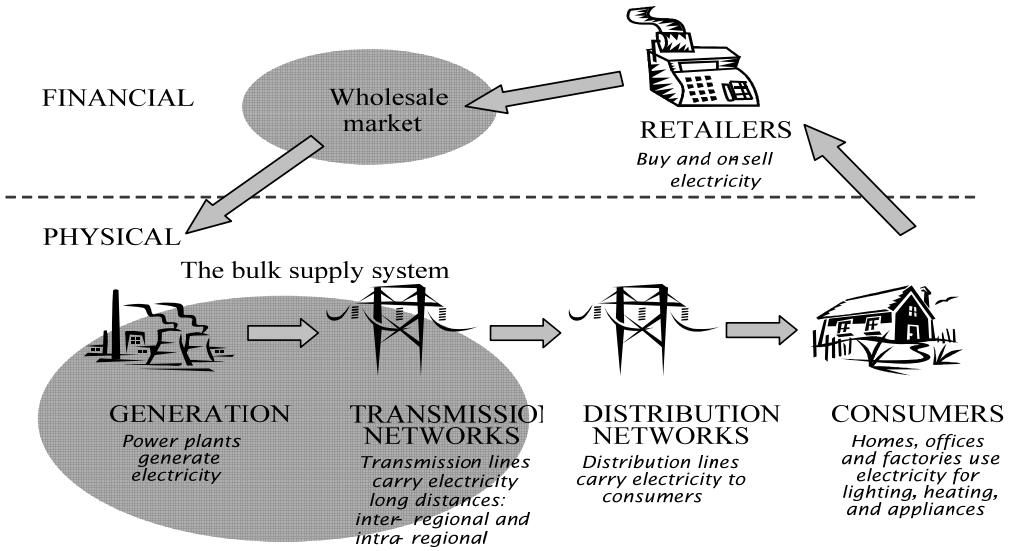
The NEM comprises a number of elements including:

- A *wholesale market* for the sale of electricity by generators to wholesale consumers (typically retailers and large consumers), and which allows trading in contracts between generators, wholesale consumers and merchant traders;
- The physical *power system* used to deliver the electricity from generators via transmission networks (together referred to as the 'bulk supply system') and local distribution networks; and
- *Retail arrangements* whereby retailers on-sell the energy they purchase to end-user consumers such as households and businesses.[8]

7 There are currently Rule change proposals under consideration by the AEMC that may change the region boundaries within the NEM.

8 In the context of this Review, the Panel's responsibilities do not extend to the retail sector or certain aspects of the network arrangements. The boundaries with those matters are discussed in Chapter 4.

Figure 2.1 The NEM Supply Chain



The NEM is a partially-regulated market. That is, generators and retailers operate according to competitive market conditions, whereas owners of 'natural monopoly' assets – transmission networks and distribution networks – are largely regulated. An option for market network service providers also exists for specific network assets to operate under competitive market arrangements. This means that if public or private enterprises are to provide adequate generation capacity to meet demand at all times, there needs to be sufficient financial incentives for them to do so. These incentives are delivered through the operation of a wholesale spot market.

Spot electricity prices are calculated for each region every five minutes (known as a dispatch interval). Six dispatch prices are averaged every half-hour (trading interval) to determine the regional spot market price used as the basis for settling the market. The wholesale spot price can vary considerably, potentially dramatically, in short periods of time. The degree to which the price moves is important to many stakeholders. A large proportion of suppliers and consumers negotiate financial contracts to manage the financial risk associated with market volatility. Those contracts are private arrangements in that the prices are not visible other than to the participants who are party to the contracts.

All electricity generated is traded via the spot market (this is known as a 'gross pool' arrangement) and dispatched centrally by the National Electricity Market Management Company (NEMMCO) – the market and system operator. NEMMCO also manages the security of the power system and provides ongoing information to market participants about forecast and actual supply and demand. NEMMCO and transmission network companies also acquire specific technical or ancillary services from generators and consumers to support the operation of the physical power system.

2.2 What is 'reliability'?

Broadly, the reasons why consumers may not receive a continuous, uninterrupted supply of electricity may fall into two categories. The first is technical: action has been taken to ensure that power system equipment is protected from damage or exceeding operating limits that, if left unchecked, may lead to wider interruptions to supply. This is *security*. Ensuring that the power system is operated securely is the responsibility of NEMMCO and the network operators. The second is non-technical: quite simply there is not enough capacity to generate or transport electricity across the networks to meet all consumer demand. This is *reliability*. This second reason is economic to the extent that it must be cost-effective for generators and networks to have enough capacity to meet demand at all times.

Standards for security are set in the Rules and by the Panel. In technical terms, the formal definition of reliability includes single credible contingencies[9] but excludes non-credible contingencies, including multiple contingencies, which are classified as security events.[10]

For security or reliability reasons, or a combination of both, some consumers may be without electricity for some of the time. Most commonly, interruption to supply is caused by unforeseeable events such as storm damage to local distribution networks. Such events are, as explained above, security issues (and are therefore outside the scope of this Review). From the consumer's perspective, however, there usually appears to be little if any difference between an interruption caused by a reliability issue and one caused by a security issue. But from a market design perspective, the two causes have very different ramifications: security events – managed through standards applied by NEMMCO and network operators – usually pass quickly, whereas a reliability issue is far more likely to be long term as it may be the symptom of a fundamental problem – a lack of sufficient supply capacity – which will take time to rectify.

There are any number of responses to the question of what degree of reliability is tolerable and how much value is ascribed to increased reliability. One group of consumers may tolerate a different level of reliability, and therefore would be willing to pay a higher price for reliable supply, from another. For example, businesses are likely to be less tolerant of interruption to supply during office or factory hours, whereas families are likely to be less tolerant of it in the mornings and evening and on weekends. Potentially, each individual consumer may have a unique tolerance threshold and there are millions of consumers in the NEM. Thus, the question as to what degree of reliability is tolerable also raises an issue concerning how differing expectations regarding reliability and the cost of that reliability can be communicated most effectively to suppliers.

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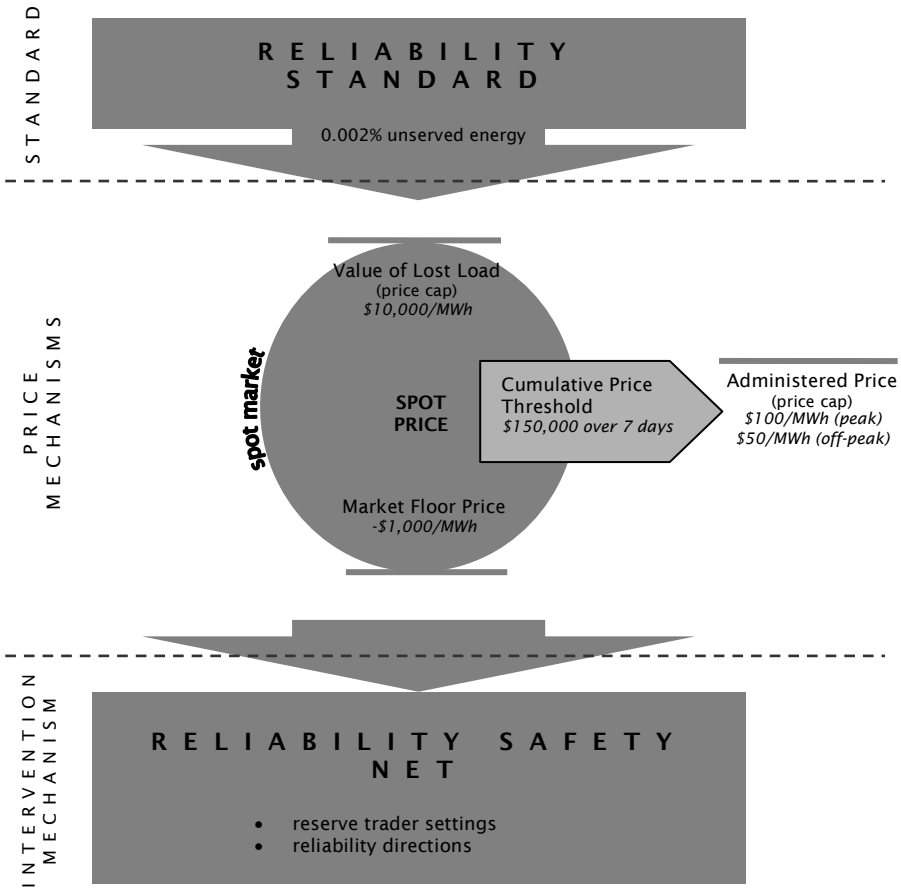
9 A credible contingency event is defined in clause 4.2.3(b) of the Rules as "a contingency event the occurrence of which NEMMCO considers to be reasonably possible in the surrounding circumstances including the technical envelope." A contingency event is defined as "an event affecting the power system which NEMMCO expects would be likely to involve the failure or removal from operational service of a generating unit or transmission element."

10 For example, the unserved energy arising from events in NSW on 13 August 2004 was a security event rather than a reliability one.

There is also an important relationship between reliability and security. Security is fundamental to the operation of the power system. However, larger amounts of generation and network capacity generally will make it less likely that interventions will be required to keep the power system secure (although this is subject to how that capacity is distributed throughout the system and how reliable each component is itself).[11] Therefore, the level of reliability tolerated by consumers in respect of a system may impact on the technical risk that the system will be unable to supply electricity.

2.3 What are the NEM's reliability settings?

Figure 2.2 The NEM reliability settings



11 There are exceptions. For example, having too much generation on line overnight when demand is low can lead to problems controlling the stability of the power system if most generators have been forced down towards their minimum stable operating level.

2.3.1 The reliability standard

The reliability standard was set at no more than 0.002% unserved energy (USE) 'over the long term' by the Panel at market start in 1998 and has remained unchanged since that time. The standard describes the minimum acceptable level of bulk electricity supply measured against the total demand of consumers. A number of aspects in the way that the standard should be interpreted remain undefined. For example, the practice to date has been to measure the standard over the long term. Thus, if consumer energy demand was 100,000 MWh over the long term, the standard would require the supply of no less than 99,998 MWh, although the standard does allow for significant variations from year to year providing the long-term average is within the standard. Currently, in order to operationalise the standard, NEMMCO calculates minimum reserve levels for each region. It then compares forecast and actual reserve levels with those minimum levels to manage against the risk that the reserve standard will not be met at the time of dispatch.

2.3.2 Price mechanisms

The level of VoLL, the market floor price and the CPT arrangements are the key price envelope within which the wholesale spot market seeks to balance the aim of delivering capacity to meet the NEM reliability standard with the aim of avoiding unmanageable risks for market participants. VoLL is the market price cap 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 caps are set too high, consumers (either via their retailers or trading directly in the market themselves) can be financially exposed. Set too low and there may be insufficient incentives to invest in new generation capacity to meet future demand.

The CPT is designed to limit participants' exposure to protracted stress in the wholesale spot market and is currently set at $150,000. This is an explicit risk management mechanism. If the half-hourly wholesale market spot prices over a rolling seven day period total or exceed this threshold, then NEMMCO must impose an administered price cap such that spot market prices do not exceed $100/MWh during peak times and $50/MWh in off-peak times until the sustained high prices fall away. 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.[12] This concern was exacerbated when such an event almost occurred in June 2007.

Under the current Rules, the Panel is required to conduct a review of VoLL, the market floor price and the CPT by 30 April each year. In its 2006 and 2007 determinations, the Panel did not alter the level of those parameters mainly on the basis that they would be extensively examined as part of this Review and will be reported on in the CRR Final Report in November.

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12 Energy Retailers Association of Australia submission to the Issues Paper.

2.3.3 Intervention mechanisms

The reliability safety net refers to NEMMCO's powers to intervene in the market to address potential shortfalls of supply against the NEM reliability standard. Currently, the trigger for NEMMCO's intervention is if reserves appear likely to – or in fact do – fall below the minimum reserve levels it periodically sets. NEMMCO can intervene in the market in either or both of two ways:

- By acting as a "Reserve Trader" and purchasing ahead of time the additional reserve generation and/or demand side response (DSR) it forecasts will be needed at the time the market is dispatched to meet the minimum reserve levels. Twice now NEMMCO has contracted for, but has not in fact been required to dispatch, reserve capacity in order to meet forecast summer peak demand.

- By requiring generators to provide additional supply at the actual time of dispatch to meet those minimum reserve levels using its power of short-term direction.

In December 2005, the Panel lodged a Rule-change proposal with the AEMC to extend the expiry date of the reliability safety net from 30 June 2006 until 30 June 2008 to allow it time to complete this Review. The AEMC has released a determination accepting that proposal subject to allowing the expiry date to be brought forward on the recommendation of the Panel as an outcome of this Review.[13] In this Review, the Panel will assess whether an intervention mechanism is still required, whether the current reliability safety net mechanism remains appropriate or whether alternative arrangements should be put in place.

2.3.4 Inter-relationship between the reliability settings

The settings outlined above are inter-related. For example, an increase in the level of the reliability standard (i.e. an actual tightening of the standard to a more reliable supply level such as 0.001% USE) is likely to require an increase in the level of VoLL or some other form of generation remuneration, within the constraints of the existing reliability standard, in order to signal the appropriate level of investment to wholesale spot market participants so that the standard can be delivered. Depending on the effectiveness of that pricing signal, it may also mean that NEMMCO intervenes to contract for additional generation or DSR in order to address any potential reliability shortfalls.

2.4 Achieving reliability: why are 'reliability mechanisms' needed?

Although there are some exceptions, in most commodity markets the price for the commodity in question is decided at any moment in time through the buyers (the demand side) and sellers (the supply side) agreeing on a price at which to transact. In effect, consumers signal the value they place on supply – and this provides a price

13 National Electricity Amendment (Reliability Safety Net Extension) Rule No. 7 , 18 May 2006, located at the AEMC's website: http://www.aemc.gov.au

signal to the market, at times when a shortfall in supply is forecast, to drive investment in *new* supply. In such markets, there is no need for a minimum level of supply to be determined by a central body, because it is possible for the consumers themselves to signal clearly at what price they are willing to curtail demand.

The electricity market does not work quite as smoothly as this for several reasons:

- Electricity is a commodity that is not cost effective to store in bulk;
- The provision of electricity is regarded as an 'essential service'; and
- On the whole, consumers of electricity have little involvement in the market (i.e. there is an absence of 'demand-side participation').

All these factors, as will be explained below, limit the ability of consumers to send accurate and effective price signals. This distorts the market's functioning and hence its capacity to deliver reliability of its own accord. Consequently, special 'reliability mechanisms' have to be introduced to compensate for this distortion, and such mechanisms have been a feature of the NEM since its inception.

As electricity cannot be cost effectively stored in bulk, it therefore must be generated in a literally 'as it is used' manner. Generally only larger industrial or commercial consumers are equipped with 'time of use' metering that records electricity consumed within each half hour. The majority of (smaller) consumers are metered on a cumulative basis with no record taken of when electricity is used. Retailers generally apply an average load shape to most consumers for the purpose of setting their tariffs and apply a flat tariff which takes account of consumer usage patterns and the actual time-related cost of electricity. In effect, consumers do not see a 'time of use' related price signal.

The continued rollout of 'time of use' metering, as recommended by the MCE and COAG, combined with 'time of use' reflective tariffs, may provide more opportunity for demand-side participation.[14] Consumers will send more effective signals to the supply side as to how they value electricity at different times during the day. In effect, consumers will be billed different rates depending upon 'time of use' and can choose when to use electricity based on the different cost of supply during, for example, peak or off-peak periods. Consequently this will, in theory at least, signal exactly what level of reliability consumers require and what they are willing to pay for it. 'Time of use' metering also has the prospect of lowering supply costs overall through encouraging less use of electricity at peak times of the day (when it is expensive) and hence reducing the need for as much investment in infrastructure, particularly peaking plant which currently only run for perhaps a few hours a year. Significantly, there is an increasing trend towards the adoption of 'time of use' metering.

In the absence of wide-scale demand-side participation the price of electricity is predominantly set by the supply side, with some limited DSR from typically large users who have the ability to indicate their price sensitivity and curtail load without

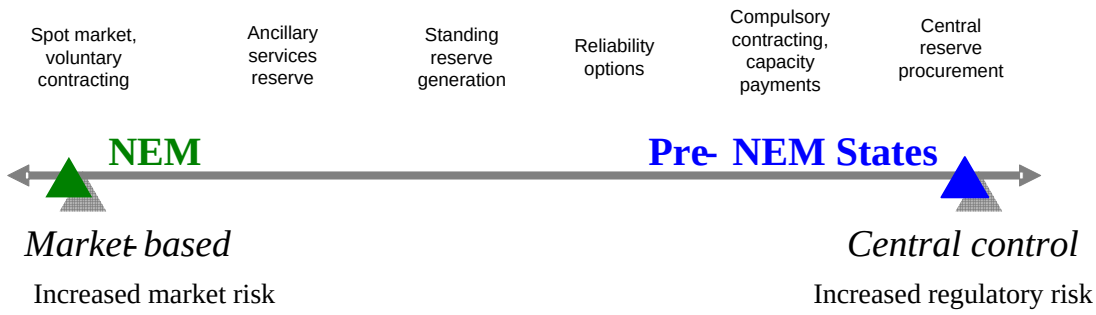
14 MCE Communiqué, 27 October 2006 and COAG Communiqué, 10 February 2006.

impacting other consumers (for example, large industrial consumers that have direct connection to the transmission network).

For this reason, and because electricity supply is considered an essential service, it is necessary for electricity systems to have some form of reliability standard to signal the minimum expected level of reliability, and reliability mechanisms within the market design that are aimed at delivering the level of supply capacity needed to meet that standard.

Deciding what mechanisms to use to achieve a particular standard of reliability is a subject of debate worldwide. Options for market design can be considered as sitting on a spectrum which ranges from various forms of centralised control to more market-based mechanisms. This diagram illustrates where the NEM sits on the spectrum:

Figure 2.3



A fully centrally-controlled solution would see a central body, perhaps a regulated generation company, responsible for ensuring sufficient generation capacity to meet the required level of reliability.

On the other end of the spectrum, a market-based solution would leave the market to decide how much capacity should be provided, with appropriate mechanisms designed to incentivise sufficient capacity to meet the reliability standard in an efficient manner.

There are many options in between these two extremes, with varying degrees of central control, for example, using a central body to contract for additional reserves when there is a perceived risk that the reliability standard will be met (as with the market design at present), to instating capacity obligations on market participants.

The NEM's position on the spectrum is partly a result of the fact that it is an 'energy-only' market design. This means the market pays for actual electricity served, not for capacity available.

Before one looks at how to go about ensuring a certain level of reliability, a decision must be made as to the level of the reliability standard itself. Clearly all consumers will have a threshold above which they would not want to pay any more for

increased reliability. In the absence of a clear price signal from all consumers on a continuous through-time basis, a design feature of the market is for a central body to define a standard that balances the differing needs of all consumers. In the NEM this responsibility falls to the AEMC's Reliability Panel.

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3 Reliability performance

In assessing the performance of the reliability settings it is necessary to begin by getting a clear historical perspective on the issue. The purpose of this chapter, therefore, is to examine the NEM's track record on reliability since market start in 1998. This track record is examined through two different indicators: reliability performance to date, and previous projections of capacity shortfall.

The Panel's conclusion is that although reliability outcomes have been affected by a range of factors, and although the overall level of interruptions to consumers due to the operation of the power system has in some instances exceeded the reliability standard, the reliability settings themselves, which are the focus of this Review, have performed adequately to date.

Chapter 4 and the Final Report will assess the ability of the settings to allow the NEM to meet the reliability standard in the future.

3.1 Reliability performance to date

The first part of this section looks at the performance to date of the bulk supply system against the reliability standard, the exact definition of which is given in section 4.1. The second part reviews the historical adequacy of reserves measured against the minimum reserve levels set by NEMMCO.

3.1.1 Performance against the reliability standard

The Panel's most recent assessment of the NEM's performance against the reliability standard is contained in its Annual Market Performance Review (AMPR) 2005-06.[15] In it the Panel reported that for the period since market start in 1998, the long-term averages for unserved energy due to supply shortfall are as follows:

- New South Wales, 0.0001%;
- Queensland, 0%;
- South Australia, 0.0025%; and
- Victoria, 0.0101%.

South Australia and Victoria fell outside the reliability standard in the year 2000, when there was a coincidence of industrial action, high demand, and temporary loss of generating units in Victoria during January and February. In every year since then, both states have met the reliability standard. It is due to the 2000 event alone that their long-term averages remain outside the standard.

15 AMPR 2005-06, p 19 located on the AEMC's website at www.aemc.gov.au.

The Panel also reported in the AMPR that, with the exception of an incident in NSW on 1 December 2004, there had been sufficient capacity from the energy market to meet consumer demand at all times and in all regions for the fifth consecutive year.

It is important to note that these long-term averages were based on only seven years' experience, a relatively short span of time in the history of an electricity market of the size and complexity of the NEM. Relying solely on these results to conclude that there is not now, nor will be in the future, a problem with reliability carries the risk that they fail to reflect any 'true' or underlying longer-term trend. Consequently, it is important to supplement these results by considering the adequacy of reserve levels since market start.

3.1.2 Adequacy of reserve levels

The Panel reported in the 2005-06 AMPR that there has been a general reduction in forecast and actual shortfalls in reserves in each region over time such that they have fallen below the NEMMCO-determined minimum reserve levels.[16] The single exception was South Australia during the Moomba crisis of January and February 2004, when the restricted supply of gas led to the unavailability of gas-fired generation. This is shown in Table 1.

16 Reserve levels are not set for the Snowy region as that region contains virtually no load. NEMMCO's methodology for assessing minimum reserve levels has developed since market start. This is discussed in Chapter 5.

Table 1 – Duration below the minimum reserve levels[17]

	Year	Qld	NSW	VIC	SA
Forecast duration below the threshold (hours)	2005 – 2006	0	0	0	0
	2004 – 2005	17.5	0	0	6
	2003 – 2004	11.5	4.5	17.5	645
	2002 – 2003	2.5	3.5	7	115.5
	2001 – 2002	1	0	0	45.5
	2000 – 2001	188	8	67	716
	1999 – 2000	43	33	145	699
Actual duration below the threshold (hours)	2005 – 2006	0	0	0	1[18]
	2004 – 2005	0	2	0	0
	2003 – 2004	0	1	4	6
	2002 – 2003	0	1	0	0
	2001 – 2002	0	0	0	0
	2000 – 2001	0	0	3	24
	1999 – 2000	5	4	36	88

The Panel also noted that:

- A shortfall in reserves of 195 MW was forecast for Victoria and South Australia for February 2005, which was partially offset by NEMMCO contracting for 84 MW of reserve capacity;
- A similar shortfall in reserves of 500 MW was forecast for Victoria and South Australia for February 2006, which was partially offset by NEMMCO contracting for 375 MW of reserve capacity; and
- In both cases the forecast shortfall did not eventuate.

It should also be noted that the results included in the table include forecast and actual shortfalls before or during particular 'events'. The reserve trading activity is in reaction to forecasts of low reserve against peak conditions.

17 AMPR 2005-06, p 27, available on the AEMC website at www.aemc.gov.au.

18 The one hour of reserve shortfalls was not flagged in market notices, although the reserve data recently supplied by NEMMCO identifies the trading intervals ending 4pm and 4.30pm on 30 December 2005.

3.2 Previous projections of capacity shortfall

Each year since the start of the NEM, NEMMCO has published a 10-year projection of supply adequacy for each NEM region in its annual Statement of Opportunities (SOO).[19] These projections show the expected level of demand and generation capacity within each region over the 10 year outlook period. The purpose of these projections has been to inform stakeholders of forecast supply and demand conditions, and the likely timing of anticipated shortfalls of capacity to meet growing demand and, therefore, opportunities for investing in new generation or network capability. The SOO also provides additional information to assist investors with their investment decisions.

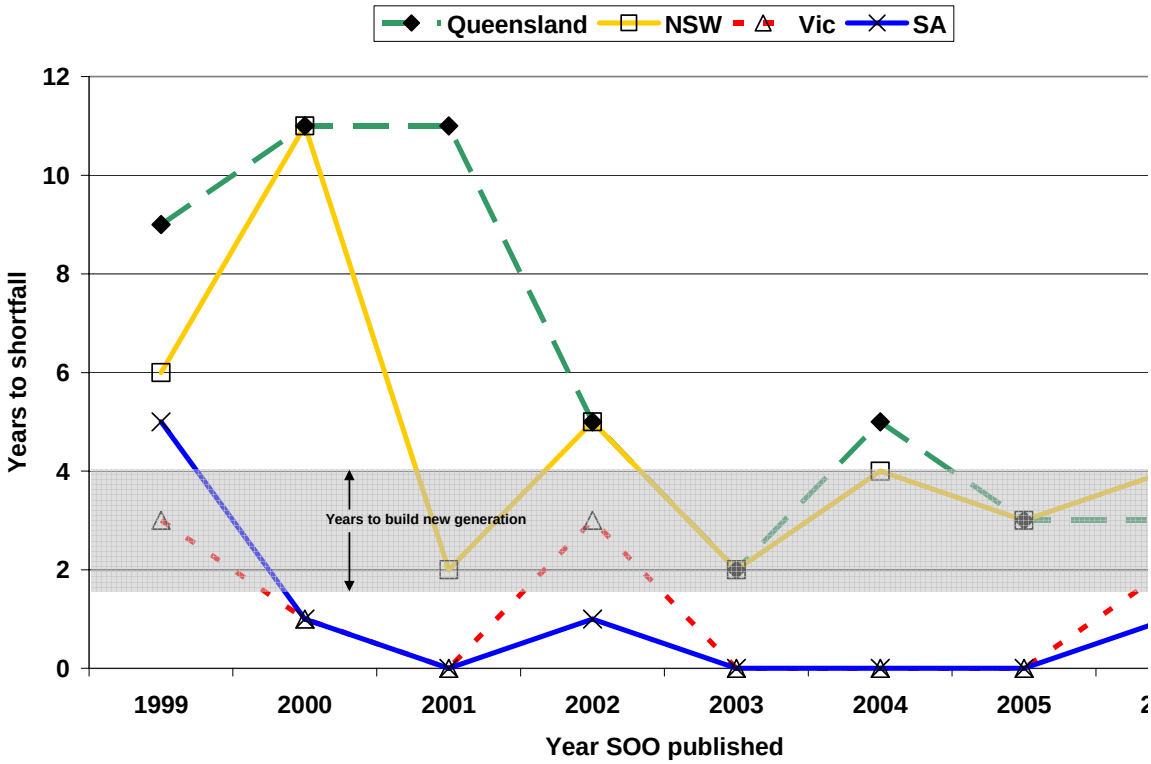
Figure 3.1 presents the number of years from each NEMMCO SOO to a projected shortfall of generation capacity for each region (except Tasmania). That is, the number of years from the publication of the SOO until, in the absence of appropriate investment, it was anticipated that the level of reserve generation would not meet the Panel's reliability standard. In particular, the figure shows:

- Considerable spare reserve in Queensland and New South Wales prior to 2001 which has reduced in recent years, converging to between 2 and 5 years' anticipation of when additional capacity will be required. This implies that either new capacity, including additional generation capacity and interconnector refinements, has been built in response to projected shortfalls of generation, or that there have been changes in the estimates of supply and demand leading to revisions to the minimum reserve levels (MRLs) for these regions.

- Shorter time horizons on average before requirement of additional capacity in Victoria and South Australia, including 3 years where the SOO projected a shortfall for the following summer. This implies that responses to anticipated shortfalls are happening closer to the time at which they are forecast to be needed. It should be noted that delays to the commissioning of Basslink and Laverton North power station are considered to have impacted this situation.

19 These long-term projections of supply adequacy are reported in the supply-demand balance chapters of the annual SOO.

Figure 3.1 SOO projections of time until capacity shortfall



Notes on Figure 3.1:

- The grey band 'Years to build new generation' is indicative only, but is intended to represent a likely range of time to build new capacity once a project is deemed as 'committed'. To build base load plant such as coal-fired power stations, for example, typically takes more than 3 years from the point at which the project is deemed to be 'committed'. Peaking plant, such as open cycle gas turbines for example, can be built in a shorter period of time.

- The years to shortfall for New South Wales in the 2000 SOO and for Queensland in the 2000 and 2001 SOOs were reported as being beyond the 10 year outlook period (denoted as 11 years for presentation purposes).

- The 2003, 2004 and 2005 SOOs projected a generation shortfall for Victoria and South Australia for the following summers (2003/04, 2004/05 and 2005/06 respectively). NEMMCO subsequently used its Reserve Trader powers for the 2004/05 and 2005/06 summers, although the contracted reserves were, in the event, not required.

- Tasmania is not included in the figure as the SOO did not report on Tasmania until the 2003 SOO and in each year the SOO has not forecast a need for additional capacity within the 10 year outlook period.

The aim of the market design is to incentivise efficient investment in a timely manner.

This means that the market mechanisms need to incentivise investment such that minimum reserve margins are not breached, but at the same time, mechanisms should not aim to encourage investment significantly earlier than required as this will come at a cost.

Market design therefore needs to find the right balance with regard to ensuring incentives are presented neither too early nor too late.

The recent forecasts for Victoria and South Australia showed the requirement for new capacity within the year for four of the last six years. The Panel also notes that NEMMCO has contracted for, but not needed to dispatch reserve capacity for those two states. Similarly, over the last 5 years NSW and Queensland have not shown a forecast need for new capacity sooner than 2 years out.

In assessing where to strike the balance, it should be noted that the question of investment too early or too late essentially presents different risks for market participants. Investment too early may result in insufficient return for investors; however, investment too late may result in failure to deliver the desired level of supply reliability.

3.3 What does history say about the outlook for reliability?

Historical analysis suggests that the reliability mechanisms are not always able to protect against the kind of extraordinary or coincident exogenous factors that were observed in South Australia and Victoria in 2000. The existing mechanisms also did not bring about sufficient capacity to allay NEMMCO's concerns in 2004 and 2005 that a high load scenario could breach the reliability standard, as a result of which NEMMCO contracted for reserve capacity. However it is unlikely that incidents such as these would have been prevented by adjusting the reliability standard or by redesigning the reliability mechanisms themselves. For that reason, the Panel's conclusion is that the reliability settings themselves, which are the focus of this Review, have performed satisfactorily to date.

As noted, delays to the commissioning of new generators can impact reliability when the design is only delivering 'just in time' outcomes. From that perspective the Panel considers that some prudence should be adopted when designing the mechanisms such that the reliability standard is not susceptible to ordinary events such as construction delays.

4 The reliability standard

This chapter discusses the NEM's current reliability standard, its appropriateness for the future, and whether or not it should be modified in any way.

The Panel's conclusion is that no change is needed to the form, level or scope of the standard and that the same standard should be applied to each NEM region. However, the Panel's analysis has identified concerns about the clarity of understanding of the current reliability standard. Therefore the Panel believes the standard 'over the long term' should be clarified to mean ten years looking backwards, and that it should be targeted to be achieved prospectively on an annual basis, NEM-wide and in each region.

The Panel also considers that there is a need to keep a watching brief on the level of the standard in light of the continuing evolution of the market.

4.1 Definition of the current reliability standard

The current NEM reliability standard, determined by the Panel at market start in 1998, is defined as follows:

> 'There should be sufficient generation and bulk transmission capacity so that, over the long term, no more than 0.002% of the annual energy requirements of consumers in any region is at risk of not being supplied; or, the maximum permissible unserved energy (USE) is 0.002%.'

The standard has three main aspects: *form*, *level* and *scope*.

The *form* of the standard is the method by which reliability is measured. The NEM standard is an output-based measure expressed in terms of 'maximum permissible unserved energy (USE)'. This is also an expression of risk – the maximum allowable level of electricity at risk of not being supplied to consumers in any region.

The *level* of the standard specifies how much USE is acceptable as a percentage of annual demand. The level is currently set at a maximum of 0.002% of USE per annum over the long term.

The *scope* of the standard defines what does and does not count towards the NEM's reliability performance. In terms of the electricity supply chain, the standard currently includes generation and bulk transmission capacity and excludes distribution networks. In terms of events, the standard currently excludes power system security incidents and exogenous incidents such as industrial action and terrorism[20]

20 See sections 2.2 and 4.4 for further discussion of the standard's scope.

4.2 Form of the standard

As part of this Review the Panel has considered whether reliability in the NEM should be defined using a measure (form) other than unserved energy. It could, for example, be measured in terms of the *frequency of interruptions* to supply (e.g. how many times a year supply fails to meet demand). In its considerations, the Panel has taken into account:

- Comparisons with other countries;
- Views of stakeholders; and
- The results of research and analysis.

4.2.1 Definitions of reliability

Different countries use different measures to define reliability for their respective electricity systems. Comparing the form of the NEM reliability standard with that of other major industrialised countries provides a useful perspective from which to ascertain the appropriateness and effectiveness of USE. Typical definitions of reliability include:

- How frequently supply is interrupted – for example, the number of days per year in which an interruption occurs;
- The cumulative duration of interruptions – for example, the total number of hours per year that interruption to any (not necessarily the same) consumer occurs; and
- The amount of energy that is not supplied in a period – for example, the NEM's unserved energy standard, or the SAIDI index for distribution.[21]

Many jurisdictions comparable to the NEM use the first of the above three measures. This is known either as loss of load expectation (LOLE) or loss of load probability (LOLP):

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

LOLP indicates the frequency (events per year) of supply interruptions and not their duration (hours), depth (MW) or energy (MWh). It is possible, for example, due to

21 System Average Interruption Duration Index (SAIDI) is defined as the sum of durations of each interruption averaged over the consumer's base. Generally it is measured in minutes.

the different physical characteristics of energy systems, that one system may have a higher frequency of supply interruptions than another, but that these interruptions will last for shorter periods and will not impact as many consumers.

Indirect standards

The Panel notes that, in some locations, indirect reliability standards are used. These are based on the reserve margin which is the margin by which installed capacity exceeds the expected consumer load as insurance against breakdown of generating plant or unexpectedly high load. However, indirect standards can lead to a reliability level that varies depending upon, for example, the number of generators in service. Hence a standard based upon a reserve margin will not fix the level of reliability.

4.2.2 Stakeholder views

Stakeholders' submissions to the Issues Paper and First Interim Report showed that there is general support for retaining the USE form of the reliability standard.[22] Reasons included:

- It has been used since the NEM commenced;
- It is relatively easy to measure;
- It reflects the economic impact on typical end users; and
- It applies equally to each of the NEM regions.

4.2.3 Using a single form of reliability standard

The Panel acknowledges that using any single form of standard has limitations. The ensuing discussion addresses these limitations and considers the relative merits of introducing an alternative, hybrid form of standard.

Limitations of a single-form standard

Measuring reliability through one form alone does not provide perfect information about interruption to supply. For example, the NEM's USE standard provides no information about the frequency of supply interruptions nor about the depth of any single interruption.[23] This is because the current NEM standard measures energy shortfall over the long term. That is, providing the total of unserved energy over the long term does not exceed 0.002% of consumer demand, the NEM's reliability is consistent with, though at the lower end of, international practice, as discussed later in section 4.3.2.

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22 For example, Macquarie Generation and NEMMCO submissions to the Issues Paper and TRUenergy's submission to the First Interim Report.

23 That is, the extent of the interruption in terms of the number of people and the geographical areas affected.

What the current USE standard cannot capture, however, is the difference in the actual experiences of consumers in different regions. For example, in a region where the demand profile is very peaky (e.g. air-conditioning use increases dramatically on occasional very hot days), the entire allowance of unserved energy (the whole 0.002%) could be used up in a single hot day. Alternatively, in a region where the demand profile is quite flat (e.g. air-conditioning use is minimal or fairly constant because temperatures are consistently high), shortfalls in supply are likely to be less severe but more frequent. Therefore, a single form of the standard does not capture this information and can affect public expectations and have serious community consequences.

Similarly, LOLE and LOLP provide no information about the volume of energy lost due to interruptions, but only provide an estimate on the likelihood of an interruption occurring.

Is a hybrid standard the solution?

Some stakeholders have suggested supplementing the NEM's single USE form with additional parameters, such as LOLE or LOLP, which would indicate the frequency and depth of supply shortfalls[24]. In essence, such additions would create a *hybrid* form of standard.

Hybrid standards are used in several European countries, for example the Netherlands and Italy. A hybrid standard is also being used in Western Australia's new market (which commenced in late 2006), although that standard is currently being reviewed.

Disadvantages of hybrid standards

The current USE standard in the NEM is an energy standard for an energy-only market. This design is well suited to placing value on cumulative, long-term energy shortfall and thus rewarding additional energy generation or consumer responses to reduce that shortfall. Introducing a hybrid standard is likely to create conflicting objectives that cannot readily be incorporated into the market design. For instance, introducing parameters to limit the frequency or depth of individual events may unavoidably affect the cumulative, long-term energy shortfall. Such parameters are also incompatible with the ability of the energy-only market to provide the necessary financial incentives for investment in generation. Hybrid standards, in effect, are as restrictive as their most restrictive element, whether that is long-term USE, annual shortfall, or shortfall from an individual event. Introducing an additional parameter, therefore, may cause the USE standard to be inadvertently tightened, with an associated cost to the consumer.

The Panel considered the possibility of introducing a hybrid standard in 1998.[25] At the time, the Panel recognised that, in general, energy shortfalls to individual

24 For example, EnergyAustralia's submission to the First Interim Report.

25 Reliability Panel Determination on reserve trader and direction guidelines, NECA website (www.neca.com.au), June 1998

consumers would be managed by rotating the shortfalls. As a result, for all probable incidences of shortfall due to reliability, individual consumers would experience very similar effects regardless of how many others were also affected.

Today the Panel is still of the view that, on balance, introducing multiple forms to the reliability standard would be detrimental because it removes the simplicity offered by a single form and would be difficult to justify on economic grounds.

4.2.4 Related issues

Should reliability be a cap or a target?

The Reserve Trader in its current form is used to cap the expected level of USE at 0.002% in each region. It is operated when NEMMCO's projections indicate that a region's reserves are going to fall below the minimum levels determined as being necessary to meet the 0.002% USE standard.

Several stakeholder submissions maintained that a USE standard cannot be used as a cap because it is not possible to guarantee that a given level of USE will never be exceeded. Rather, the USE standard should be used as a target for designing and operating the market.

The Panel agrees that the standard should be considered as a target and that the level of USE should be calculated *ex post* to monitor how effectively the standard has been implemented. The Panel has formed a view that the Reserve Trader mechanism should be redesigned to ensure it is not used as a cap, but instead is used as an emergency instrument only. This issue is discussed more fully in Chapter 5.

Target timeframe

The standard's target of 0.002% USE is defined as being 'over the long term'. There are concerns that this timeframe is unclear, for two main reasons:

- It stipulates that the target level of 0.002% USE is an average over a period of time, but it does not stipulate what that period of time is. The definition could be more explicit, for example 'over 10 years'.

- Whether NEMMCO should target 0.002% expected USE every year or whether NEMMCO should attempt to maintain a long term average USE level by, say, increasing the MRLs following a period of USE.

The Panel notes the views of some market participants on the measurement timeframe and cap/target nature of the standard. For example, the Major Energy Users state that:

> "The MEU believes that USE of 0.002% is a standard that must be achieved over a period of time. This means that if USE has been exceeded, there must

be positive action to ensure that actual USE is brought back under the target."[26]

However, the Panel believes it would be inappropriate for NEMMCO to attempt to maintain a long-term average USE level by varying the MRL in response to actual incidences of USE, for these reasons:

- A year with a high level of USE would need to be followed by years with very low USE targets, which would require unusually high minimum reserves, and this could be expensive to procure;
- It introduces an arbitrary averaging process that is dependent on the number of years over which the standard is applied;
- It introduces unnecessary complexity for the implementation of the USE standard; and
- Having a higher USE target in one year implies that consumer reliability is less valuable than in other years.

The Panel also notes that assessing the NEM's actual reliability against the 0.002% USE standard is not straightforward because the actual USE is not deterministic but is the result of several random factors including forced plant outages, interconnector outages and extreme load conditions. Therefore, if the actual USE were to exceed the 0.002% standard, this would not necessarily mean that the standard had been implemented inappropriately. It may mean instead that a particularly arduous series of random plant outages had occurred. Applying a moving average to the actual annual levels of USE does assist in identifying trends in the level of reliability but it does not provide a clear explanation of the case of a single very high level of USE. As previously stated, the Panel does support a detailed review of every incidence of USE to determine its cause – whether it was due to random plant outages, or to a systematic problem in the implementation of the reliability standard. Two existing mechanisms for this exist under the Rules. These are the incident reports prepared by NEMMCO under clause 4.8.15 and the Panel's annual reviews under clause 8.8.3.

4.2.5 Panel's conclusion

The Panel's conclusion is that:

1. The current form of the standard, being USE, should be retained.
2. A hybrid form of standard should not be adopted, but forecasts of frequency, duration and depth of possible shortfalls that make up the 0.002% USE should be prepared by NEMMCO on a regular basis to provide stakeholders with a gauge as to the possible nature of USE events. This would in effect allow these other measures to be used on an information basis.

26 MEU submission to the Interim report.

3. The reliability standard should be considered retrospectively over a long-term period of looking back at least 10 years.

4. Each incidence of USE caused by a reliability issue should be examined to consider whether, in light of the circumstances, the NEM is achieving the desired long term average USE.

5. The most economically justifiable and straightforward method of targeting 0.002% USE in the long term is simply to target 0.002% USE looking forward each year both NEM-wide and within each region.

In its Final Report to be published in November the Panel will formally publish the definition of the reliability standard.

4.3 Level of the standard

The level of the standard, currently set at no more than 0.002% USE in any region, has been used in the NEM since market start. As part of this Review, the Panel has considered whether this level of USE continues to be appropriate. In its considerations, the Panel has taken into account:

- The views of stakeholders; and
- Comparisons with other countries.

4.3.1 Stakeholder views

No submissions have been put forward to the Panel to alter the level of the NEM-wide reliability standard.

The Panel understands that, in part, this is because the level of generation and the performance of the bulk transmission network currently contribute a very small fraction of the total loss of supply experienced by consumers. The major sources of such interruptions are related to distribution networks. Local transmission network interruptions and security events also contribute to supply losses.

4.3.2 International comparisons

The Panel's issues paper for the CRR noted that reliability is one element that contributes to continuity of supply to customers. In the context of the NEM and the Panel's responsibilities, reliability is the ability of the interconnected bulk generation/transmission system to provide supply to meet all demand within specified levels of risk. There are a number of ways that those limits can be expressed. Customer output measures include how frequently supply is interrupted (e.g. number of days per year in which any interruptions occur), the cumulative duration of interruptions (e.g. hours per year that any, but not necessarily the same, customer is interrupted and the amount of energy that is not supplied in a period (e.g. the NEM Unserved Energy standard)). Each measure describes a different characteristic of reliability. These measures cannot readily be used in day to day operations as they are all long term measures and only provide information when interruptions occur and hence are not able to be used to assess how "healthy" the situation is. For this reason customer measures are often translated into operational input measures. Operating capacity reserve margin is a common input margin for a

power system like the NEM, but other measures can be appropriate for other systems, for example reservoir storage level in a hydro based system which is used in New Zealand.

The relative operating reserve margin from one time to another is a useful indicator of the short term "health" of a particular power system but it is much less useful as benchmark for comparison between power systems. This is because the overall characteristics of demand, generation and network sectors determine what level of customer reliability a given reserve margin will provide. For example, all else being equal, a reserve margin of 15% in a system with a very peaky load characteristic with only a few days of extreme demand generally will provide a higher level of reliability on all customer measures than would be expected in a system with a more uniform demand characteristic where the risk of insufficient capacity is spread over more time. Similarly depending on what allowance is made for interconnectors, a heavily interconnected system may have better reliability than an isolated system. The technology and fuel source for the generation fleet can also affect reliability, for example a predominantly hydro system will often have a high capacity reserve margin because water from different reservoirs is used at different times of the year and when there is low flow little water is available for production from the associated generators. But these generators can provide short term capacity reserve by taking water from small local storages to cover over unexpected production shortages elsewhere in the system and thus these systems have a low risk of short term interruptions typical of a capacity limited system like the NEM. However they are at risk of very infrequent periods of extended shortfall during drought conditions due not to the installed capacity but to water storage capacity.

To compare the reliability of different systems it is therefore important to find a common measure or form of standard and also to take account of the different physical characteristics of the respective power systems. Section 4.2.1 introduced the range of forms that are in general use in different systems. In essence the different forms measure the duration (hours or LOLE), depth (MW), frequency (events per year or LOLP) or accumulated energy (USE) of possible interruptions. Section 4.2.3 also notes that it is not practicable to set targets for more than one of the measures and the importance of aligning the standard with the design of market arrangements in place. What is practicable is to adopt one form of measure as the primary standard and cross check that none of the other measures fall below an acceptable level. Many of the measures used internationally have evolved from pre-market eras where reliability was managed by a utility or a central agency that also made decisions about the amount and timing of generation investment, and LOLE and LOLP were the most common measures, and in many cases have been continued through into market environment. Table 2 provides a summary of the measures and standards employed in a number of power systems around the world.

Table 2 – International comparison of reliability

Country/Region	Characteristics	Level and Form of Reliability Standard	Capacity Reserve Margin	Comment
Australia: NEM	35GW max. demand Multiple generation/load regions with moderate interconnections Moderate-high temperature sensitivity	0.002% USE	Approx 15% over 50% POE forecast of maximum demand	
Australia: Western Australia (SWIS)	4GW max demand Mainly meshed network High temperature sensitivity	0.002% USE subject to n-1 reserve	Highest required to meet USE or n-1.	In practice dominated by n-1 requirement
New Zealand	6.5GW max demand Two main regions (nodal pricing) with internal constraints and moderate interconnection Hydro dominated generation base	1 year in 60	Not relevant	Generally high capacity margin. Reliability dependant on hydro reserves and hence any shortfalls generally extended during drought years
US: PJM	145GW max demand Well meshed with strong interconnections to adjoining systems Moderate (winter) temperature sensitivity	LOLE expressed as 1 day in 10 years may experience capacity shortfall. Depth and duration of shortfall not defined	Approx 15% over 50% POE forecast of maximum demand	Inherently reliable due to size and interconnections
US: New York	34GW max demand	LOLE expressed as 1 day in 10 years may experience	15-18% (approx) over 50% POE forecast of	Generally 15% but significant internal network limitation requires higher reserve at major

		capacity shortfall. Depth and duration of shortfall not defined	maximum demand	load centre
Canada: Alberta	Max. demand 10GW Well meshed internal system with moderate interconnection	No specific investment standard	n/a	Authorities anticipate investments will be forthcoming in the market. DSR under contract available to power system operator in the event of shortage
Netherlands	20GW	LOLE expressed as I event in 4 years for a maximum duration of 2 hours		
Ireland	5GW	LOLE expressed as 8 hours per year		
Singapore	6GW Tightly meshed with moderate interconnection	No formal standard	n/a	Government monitoring
UK	60GW Well meshed Moderate interconnections	No formal standard in current market arrangements	n/a	Pre-market (late 1980s) CEGB standard was for LOLE of shortfall event in no more than 9 years per 100 (i.e. similar to the 1 year in 10 employed in US)
France	80GW	LOLE max 3 hours per year		

Although LOLE and LOLP are the most common forms of standard, there are a number of variations. Neither LOLE nor LOLP convey any information about the duration or depth of potential shortfalls and, of the systems that use LOLP, only the Netherlands also spelt out the duration of each event. None give standards relating the depth of an individual event. In order to facilitate a comparison between different systems, CRA and NEMMCO have each calculated the LOLP for the NEM. Currently the standard in the NEM of a maximum of 0.002% USE is equivalent to a maximum of approximately 3.5 hours per year. That is, over the long term, on

average across the NEM, there is an expectation that in 3.5 hours per year there will be insufficient generation to meet all load in all parts of the NEM. By itself the LOLP gives no indication of the amount of load interrupted and hence how much energy will be lost (whereas the USE standard relates only to the accumulated energy and also provides no information about how much is interrupted at any time or the duration of interruptions). It is important to note that the nature of the NEM transmission system means that each instance of interruption will typically be confined to one or two adjacent regions.

Two significant markets, the UK and Alberta, have no formal standard and rely on the structure of the market design, previous practice and an informal understanding that the respective governments take a keen interest in the level of reliability although it is understood arrangements in Alberta may be reviewed in the near future. This is also the case in Singapore where in practice there is a large reserve margin.

US systems tend to use long term LOLP as the base requirement and translate it to a capacity reserve margin in a similar way to the translation of USE into a capacity reserve margin in the NEM. The review was unable to find information about what level of USE the LOLP and reserve margins deliver.[27] In the large markets in the US, for example in Pennsylvania New Jersey Maryland (PJM), the underlying standard is that for no more than 1 day in 10 years will there be a shortfall in generation requiring interruption to customers. It is notable that the maximum demand of the PJM market is approaching 5 times the size of the NEM and it is therefore inherently more reliable. It also has a more meshed transmission network than the relatively long and linear system of the NEM, again making it inherently more reliable. However, the 1 day in 10 years is a higher basic objective than applies in the NEM where the majority of interruptions are due to distribution, transmission and extreme security related events. The PJM standard for transmission is also higher than for the NEM and as a result interconnections to other regions are more reliable, although in assessing NEM reliability intra-regional transmission failures are not considered.

European systems employ a variety of forms of LOLP but employ a range of levels of standard including 8 hours per year in the relatively small system (5 GW maximum demand) in Ireland, 3 hours per year on the 80GW French system and 1 event per 4 years in Netherlands but with the added limitation of a duration of no more than 2 hours for that event.

The relatively small and isolated system in the south west of Western Australia employs a hybrid standard that requires no more than 0.002% USE (the same as the NEM) and that there will also be no loss for defined events (generally the loss of a single generating unit). In practice the defined event requirement dominates. This standard is currently under review but its primary purpose is as a planning criterion to set margins for capacity required to be brought to market by market participants under the market rules in WA.

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27 Informal discussions suggest that the LOLP meets all policy expectations and thus knowledge of the resultant USE is not needed.

Overall the NEM's reliability level is closer to the level in European countries than to the level in the US. European countries typically have populations closer in size to Australia's, but at the same time they generally have a lower level of interconnection than does the north east of the US. Consequently, the characteristics of demand in European countries are generally quite different, with more sustained winter peaks than Australia's high summer peaks.

4.3.3 Related issues

Should the reliability standard be regional or NEM-wide?

At present, the same level of the reliability standard (0.002% USE) is applied to each region. An alternative would be to determine a different level of USE for each region in order to reflect its unique characteristics, to the extent that this information is available.

The Panel's view is that the same level of USE should continue to apply to each region. This is consistent with the national market approach and it provides equivalent incentives to all participants, irrespective of the region they operate in.

The Panel does note that, in the absence of the use of the reliability safety net, the operation of the market with a single value of VoLL across all regions will not necessarily deliver the same USE in each region. This is because, for a given level of VoLL, the level of generator investment in a region, and hence the expected USE, depends on a number of factors, including the:

- Shape of the region load trace (peakiness);
- Degree of DSR in the region;
- Capital and operating cost of generation options available in the region;
- Availability of generation;
- Degree on interconnection with neighbouring regions; and
- Level of contracting in the financial market.

Therefore, while the approach to the reliability standard may be consistently applied across the NEM regions, the actual reliability achieved in each region may be different.

In addition, the Panel notes that, during this Review, some submissions have raised concerns about the potential impact on future reliability from continuing government ownership[28] in the electricity sector and from the use of retail price caps[29] as part of the NEM.

28 International Power Australia and Loy Yang submission to the First Interim Report.

29 AGL submission to the Issues Paper.

4.3.4 Panel's conclusion

The Panel does not see a convincing argument for changing the level of the reliability standard at the current time, for these reasons:

- There has been no call from stakeholders in their submissions, particularly those of consumer representative groups, for a change to the standard's level.
- Countries that appear to have more stringent standards generally have characteristics (such as larger system size and high levels of interconnectedness) that would make a higher standard less costly to achieve.
- Reliability events are responsible for a very small proportion of actual or forecast interruptions.
- Any tightening of the level of the standard would likely have a substantial cost in terms of required new investment.

Nevertheless, the Panel does consider that there is a need to keep a watching brief on the level of the standard in light of potential changes to the value that consumers place on reliability.

4.4 Scope of the standard

The scope of the standard demarcates those aspects of the power system and its performance that are deemed to impact on the NEM's reliability, from those that are not. The scope has two main dimensions, which can be expressed in terms of these questions:

- Which parts of the supply chain should the reliability standard apply to? Currently it applies to generation and bulk transmission capacity only.
- Which *causes* of interruption to supply (or USE) should be taken into account when measuring reliability and which should not, given that supply can be interrupted for numerous reasons? Currently causes are categorised into 'reliability issues', which are taken into account, and 'power system security issues' and 'external factors' (such as industrial action), which are not.

As part of this Review, the Panel has considered whether the current scope of the standard, in both its dimensions, continues to be appropriate.

4.4.1 Scope and the supply chain: what is the definition of 'bulk transmission'?

First, a point of clarification is needed. As mentioned above, the reliability standard applies only to the generation and bulk transmission elements of the supply chain. However, the definition of 'bulk transmission' has caused some confusion, in particular as to whether or not it applies to the transmission network within a region.

For the purpose of measuring reliability, 'bulk transmission' capacity in effect equates to interconnector capability. The reason for this is that the reliability

standard is measured on a regional basis, and the standard is met when sufficient generation capacity is available in a region. This capacity is calculated as the sum of local generation available within the region itself and of interstate generation available via an interconnector. Consequently, only constraints in the transmission network that affect interconnector capability are considered when assessing the availability of reserves in a region. When performing the simulations necessary for it to determine the MRLs, NEMMCO generally recasts intra-regional constraints as equivalent inter-regional constraints.

The reliability of the transmission network within a region is also assessed using other measures.

The Panel notes that this definition of bulk transmission as it applies to the reliability standard may change as a result of:

- The Congestion Management Review currently being performed by the AEMC;[30] and

- Any future changes associated with the application and form of the Regulatory Test, for example the National Transmission Planner project recently undertaken by the AEMC at the request of the MCE.[31]

4.4.2 Scope and the causes of USE: is the boundary between reliability and security incidents appropriate?

Security events include occasions where there has been a major disturbance beyond the capability of normal protective arrangements to manage, for example, the simultaneous breakdown of two generating units or interruption to transmission lines where normal arrangements assume such events will not be simultaneous. A perennial question for the Panel in considering the standard is whether the 0.002% should incorporate security risks due to severe technical malfunction.

Reliability events

As discussed in section 2.2, a reliability event occurs when there is insufficient generation available within a region to meet the demand in the region, with the available capacity depending on the outages of the generating units within a region and the interconnector capability under the prevailing system conditions.

Security events

Under clauses 4.2.4 and 4.2.5 of the Rules, NEMMCO must operate the power system in a secure state; that is, the power system will continue to operate following a credible contingency. A credible contingency is defined in clause 4.2.3(b) of the

30 Further information on the Congestion Management Review is available on the AEMC website at http://www.aemc.gov.au/electricity.php?r=20051216.172956

31 Further information on the National Transmission Planner is available on the AEMC website at http://www.aemc.gov.au/electricity.php?r=20070710.172341

Rules as a "contingency event the occurrence of which NEMMCO considers to be reasonably possible".

A security incident occurs following a non-credible, usually a multiple contingency, event. Such events can be severe and lead to large quantities of USE. However, as discussed in section 2.2, it is unlikely that investment in additional generation or bulk transmission would mitigate a security event. Rather such incidents should be reviewed, which may result in changes to operating practices and technical compliance regimes.

Panel's conclusions

After considering this matter the Panel has concluded that the incidence or severity of security incidents would be unlikely to be affected by changes in investment signals. Rather, such matters are better handled through technical operating standards and ensuring compliance with those standards.

While reliability events and security events should be treated separately, the Panel notes that under clause 4.2.3(f) of the Rules NEMMCO can classify a non-credible contingency event as a credible event. This action may affect the network capability if NEMMCO must further constrain network flows in order to maintain the system in a secure operating state, taking into account the reclassified contingency event. This reduction in secure network capability may also reduce the reliability of the power system for the period of time that the non-credible event is reclassified as credible.

The Panel further notes that events such as the Victorian bushfire outages on 16 January 2007 will usually be classified as system security events as they result in line outages and the islanding of the NEM regions.[32] In such cases, the unserved energy that results from these events would not be counted against the 0.002% USE reliability standard.

4.4.3 Scope and the causes of USE: should other sources of USE be taken into account when measuring reliability?

In addition to the reliability and security issues already discussed, supply may also be interrupted by external factors such as industrial action, terrorism, and 'acts of God'.

In the Panel's view, these external sources of USE should not be taken into account when assessing the NEM's performance against the reliability standard. Since the purpose of the standard is to ensure that there is sufficient investment in generation and bulk transmission assets, only those sources of USE that would be mitigated by such additional investments should fall within the standard's scope. USE caused by incidents other than insufficient generation due to random outages of generating units or transmission network elements are best addressed by other mechanisms.

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32 The Victorian event was in fact classified by NEMMCO as a multiple contingency event and hence system security event. See the NEMMCO Power System Incident Report, System Separation and Load Shedding 16 January 2007, June 2007 for further details.

4.4.4 Panel's conclusion

The Panel has concluded that the scope of the reliability standard should not change. That is:

- The standard should extend to generation and bulk transmission capacity only; and

- The standard should not apply to security events and external events such as terrorism, industrial action or 'acts of God'.

Nevertheless, the Panel recommends that all incidents of USE should be reviewed by NEMMCO under clause 4.8.15 of the Rules, 'Review of operating incidents', and reported in the Panel's Annual Market Performance Review. This would include USE caused by:

- Security incidents such as non-credible contingencies, which should be addressed by reviews of operational practices and technical compliance regimes;[33]

- Constraints in local transmission and distribution networks, which should be addressed by changes to the operation or augmentations to these networks;

- Industrial disputes, which should be addressed by the owners of generating units, and not by investment in new generators; and

- Incidents such as terrorism that are mitigated at government level.

The Panel notes that there may be an inconsistency with respect to the treatment of "industrial disputes" in the interpretation of reliability statistics, in that: these are excluded for operating plant and included if the plant is under development for a targeted commencement date (that has been reflected in the capacity forecasts). The Panel would welcome stakeholder feedback on this matter.

4.5 Benefits to Stakeholders

The key benefit to stakeholders arising from the Panel's conclusions in this chapter is the formal definition of the standard which will provide greater certainty going forward as to how the standard will be targeted, which will in turn allow NEMMCO greater ability to ensure the standard is not breached and increase the certainty level for market responses to reliability.

33 The AEMC recently performed a review into the enforcement of and compliance with technical standards. Further information on this review is available on the AEMC website at http://www.aemc.gov.au/electricity.php?r=20051216.173039

5 Safety Net Intervention System

This chapter outlines the Panel's conclusions about the current reliability safety net or "Reserve Trader" provisions in the Rules. It begins with an outline of the Reserve Trader as it exists currently, explains the Panel's reasoning in recommending the retention of the mechanism, although redesigned as a Reliability Emergency Reserve Mechanism (RERM). It then details the characteristics the RERM should have and also outlines an information gathering and dissemination mechanism to enable the market to forecast and react to times where there may be energy constraints. It also makes some recommendations about NEMMCO's power to issue reliability directions under clause 4.8.9 of the Rules and the demand forecasting methodology that NEMMCO uses to calculate the need to intervene with the Reserve Trader (and in future, the RERM).

5.1 Intervention mechanism

5.1.1 Operation of the Reserve Trader

Clause 3.12.1 of the Rules provides for a reliability safety net by conveying on NEMMCO Reserve Trader powers to contract for reserves if it projects low reserve conditions. The Panel has published guidelines governing how NEMMCO should exercise these Reserve Trader powers.[34]

The Reserve Trader provisions are due to expire by 30 June 2008 unless extended by a Rule change or terminated earlier by the AEMC (having regard to advice from the Panel). Furthermore, under the Rules, the Panel must recommend whether or not the reliability safety net should be removed prior to 30 June 2008. The Panel's review of the reliability safety net is incorporated in this Comprehensive Reliability Review.

Both the design of the Reserve Trader mechanism and the manner in which it is implemented have given rise to considerable dissatisfaction amongst stakeholders and have therefore been carefully reviewed by the Panel. The key issues are as follows:

- Whether, because the NEM can provide the same service more efficiently than NEMMCO, the Reserve Trader arrangements contribute to the market objective.
- The Reserve Trader was only ever intended as a temporary mechanism and its use should be seen as a market failure. Such a failure should trigger a major review of the market trading arrangements and market sustainability.
- In the event of NEMMCO activating the Reserve Trader provisions, there is no guarantee that the required capacity or DSR will be available.

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34 The revised guidelines governing NEMMCO's intervention powers were prepared by the Panel under clause 8.8.1(a)(4) of the Rules and are available on the AEMC website at http://www.aemc.gov.au/electricity.php?r=20060525.143043

- The current short-term Reserve Trader does not induce new supply into the market, because it is invoked only months before the perceived shortfall and therefore relies primarily on demand response.

- Interventions should be treated as exceptional and subject to external scrutiny. In 2001, for example, NEMMCO directed a power station to defer a unit outage by two days. The benefit in terms of avoiding a very low risk of shortfall was far outweighed by the resulting NEM-wide compensation cost of $23m.

- Retailers argue that the current Reserve Trader mechanism creates an unhedgeable and unpredictable levy upon them. To date, however, these costs have been low.

- The current reliability safety net provisions impede the NEM from delivering efficient market-based responses to supply shortfalls and result in inefficiencies being passed on as costs to consumers. In particular, the Reserve Trader interferes with the efforts of retailers to contract DSR. This reduces the ability of the market to respond on its own, because retailers have relationships with consumers and are thus better placed to negotiate DSR contracts than is NEMMCO.

- The names and plants of tenderers of DSR should be published so that the market can advise NEMMCO whether the capacity is in fact already available to the market by other means.

- Some stakeholders argue that energy-only markets without active DSR tend to have boom-bust cycles, that an energy-only market is unlikely to provide the necessary long-term signals to build new base and intermediate load generation, and that intervention is therefore essential and inevitable.

5.1.2 Interim Report and context

In its first Interim Report on its Comprehensive Reliability Review, published in March 2007, the Reliability Panel indicated that it has provisionally formed the view that, notwithstanding the satisfactory performance of the NEM against the reliability standard to date, certain risks have been identified that may lead to insufficient or delayed investment in generation to meet demand and ensure reliability in the future. The Panel believed these risks can be managed and sought stakeholder feedback on the possible options that might address these risks.

Since the publication of the Panel's Interim Report, there has been growing concern that the drought in south eastern Australia is having an increasing impact on energy availability in the NEM. Energy constraints, other than the short-term gas constraints experienced in South Australia, have not been experienced on the Australian mainland since the start of the NEM. The NEM design is predicated upon the key factor for long-term reliability being capacity of the bulk supply system, so the impact of energy constraints is new.

It is uncertain how well the market will operate in the presence of this new phenomenon of relatively widespread potential energy constraints and this, therefore, adds to the risks on the horizon that are already identified in the Panel's

first Interim Report. The Panel is proposing the following three strategies to assist in managing these risks, including the impact of the drought:

- Improving the information available to the market participants and stakeholders to facilitate a better understanding of when and where energy constraints could potentially impact reliability;

- Allowing the market participants and other stakeholders to respond to that information; and

- Examining the future of the present reliability safety net.

The Panel considers that these risks, and in particular the risks associated with the drought, are material and its response needs to be timely. Therefore, the Panel has addressed them in detail in an exposure draft contained in Appendix C of this second Interim Report. In preparing this exposure draft, the Panel has had the benefit of the significant stakeholder consultation and detailed analytical work which has been undertaken as part of this Comprehensive Reliability Review during the past year. The Panel explicitly seeks feedback on all aspects of this exposure draft.

5.1.3 Improved information and market response

As discussed in Chapter 3 to date the NEM has been very reliable, with the greatest risk to the ongoing reliability being whether the market delivers sufficient new generating capacity in a timely manner.

To aid the market to deliver this capacity, the NEM market information systems provide projections of capacity reserves and, in situations when capacity reserves have been projected to be below those necessary to meet the reliability standards, NEMMCO has contracted for reserves in the affected region(s), as discussed in section 2.3.3.

However, the Panel is concerned that the current market arrangements do not explicitly address the generation input constraints of the type (energy rather than installed capacity) being witnessed within the present drought. Therefore, the Panel is proposing the following enhancements to the NEM market information systems to better manage the potential impacts of energy constraints on reliability in the NEM:

- Each quarter NEMMCO should publish a two year outlook of the impact of generation input constraints on reliability, to supplement the existing capacity-based projected assessment of system adequacy (MTPASA); and

- NEMMCO should investigate how to incorporate a ten year outlook of the impact of generation input constraints on reliability into its annual Statement of Opportunities (SOO), but necessarily in less detail than the capacity projections.

These quarterly and annual projections of the impact of generation input constraints would be expected to operate in a similar manner to the projections of capacity produced by the two year outlook MTPASA and the ten year supply demand balance projections in the SOO. That is, periods of projected energy shortage would be expected to coincide with high energy prices which should encourage market

responses. Such responses could include a market participant that indicates that it intends to reallocate energy from periods of projected excess energy capability to periods of shortage, or the releasing of additional energy or water allocations. The quarterly two year outlooks would be expected to facilitate changes to the behaviour of existing generators and to the allocations of existing water and fuel resources. The annual ten year outlooks provide sufficient lead time to have influence on market investment decisions for new generating plant. The aim of this increased information availability is to provide the opportunity for market responses to develop within the NEM.

The process and methodology for gathering and disseminating the information is briefly described as follows:

- The Panel will develop guidelines containing the parameters for scenarios which will guide the input date to be provided by participants. The specifics of the scenarios will be determined by NEMMCO following those guidelines.

- The Panel considers that as a matter of principle, changes to the input requirements from participants should minimise the level of practicable intrusion and additional costs of information provision, and limit the exposure of the commercial positions of the participants to that essential to inform the market of the generic energy constraints projected.

- The Energy Adequacy Assessment Projection (EAAP) inputs are additional to the inputs that NEMMCO already receives for reserve adequacy projections. Thus the timeframes for MT PASA and EAAP inputs will be aligned.

- The nature of energy constraints can vary considerably between generating plants, and a 'one size fits all' approach to the modelling of the energy characteristics of generating plant is unlikely to be sufficiently flexible to deliver robust results.

- Each Scheduled Generator would be required to lodge with NEMMCO a 'Generator Energy Model' (GEM) that NEMMCO can use in its assessments of energy adequacy. The nature of GEMs could be tailored by the participant to suit the technology of the generating plant, and the types of agreements the generator has with its fuel suppliers, jurisdictional water authorities or other relevant factors. Once defined, the GEM would require specific inputs in order to operate, and the participant must be under an obligation to provide those inputs (as described below) to suit its defined GEM. The Panel would need to consider the merits of making GEMs publicly available in the interests of transparency as is the case with the current ANTS modelling process.

- Once the GEM is defined for a particular generating plant, the Generator will be obliged to provide input parameters with the exact combination of inputs determined by the tailored GEM, so that some inputs may not be applicable to some generating plants. Some of these inputs may be confidential.

- The inputs will be provided for each scenario and for 24 future months from the start of the next modelling period.

- Inputs for each tailored GEM may include: maximum annual energy; forecast monthly energy; minimum and maximum monthly energies; dependencies between months; pumping strategies for energy storage; and anything else appropriate for each generator circumstance.

- NEMMCO would then publish monthly energy shortfalls for each region for each scenario based on 10% and 50% POE demand forecasts.

- Projected shortfalls would be published using each participant's preferred energy usage pattern and also when monthly energy allocations are optimised by NEMMCO. The difference between the two outputs would represent the 'gap' between current participants' preferences and the minimum USE outcome.

The Panel emphasises that these matters are subject to explicit feedback as part of the exposure draft Rule in Appendix C.

For it to be able to prepare these projections, NEMMCO will need to be given additional powers to collect data from market participants under the National Electricity Rules (Rules) and other entities under the National Electricity Law (NEL). Therefore, these powers are included in the exposure draft of the necessary changes to the Rules which it intends to consult upon as part of this report. The Panel will raise matters relating to the NEL with the MCE.

There is also a need for a longer term (10 year) energy outlook. The current approach used for the ANTS is to start with current dam (and hence energy) storage levels, assume they remain unchanged until the first day of the SOO study (approximately 6 months) then project forward assuming average inflows. Projected annual energy shortfalls are modelled for each of a range of scenarios from the end of the Medium Term assessment (about 2 years) to a 10 year horizon. The projections are indicative in nature, with scenarios dependent on the information available to NEMMCO.

The parameters adopted for the ANTS are consulted on annually as part of the ANTS data and assumptions consultation. This current process allows adequate input from participants; however the exposure draft explicitly requires NEMMCO to publish long term (i.e. ten years) information on energy constraints associated with generation and the impact of such constraints on the reliability of supply. Feedback is specifically sought on the likely effectiveness of this potential requirement to add a ten-year view explicitly for this purpose, and as to whether it is a desirable or duplicative feature of the information processes in the NEM.

5.1.4 Future of the present reliability safety net

The present reliability safety net provisions in the Rules allow NEMMCO to contract for capacity reserves (the Reserve Trader) when a shortfall of reserve is projected. These reserves can be dispatched by NEMMCO when customer loads would otherwise be shed. Under guidelines prepared by the Panel in accordance with the Rules, distortion to the market is minimised by only allowing NEMMCO to enter into Reserve Trader contracts within six months of a project shortfall.

On balance, the Panel has reached the conclusion that, although the Reserve Trader provisions are a market distortion which would not be necessary under ideal

conditions, the prevailing market conditions are such that a revised form of the provisions needs to be maintained at least for a defined period of time. Ideally, in the longer-term, the market should be able to operate without the need for a distortionary intervention mechanism.

As discussed in Chapter 1, the Panel observes that the NEM's reliability performance has, historically, been bolstered by generation capacity overhang in some regions. This has perhaps made the reliability standard of 0.002% USE an easier benchmark to perform against than would otherwise have been the case in a system starting with a tighter supply-demand balance. The performance of the market in the sort of tighter supply-demand conditions that is likely to be experienced over the next few years has never been tested. Therefore, the Panel considers that the removal of a key safety net provision such as the Reserve Trader may not be prudent at this stage.

Nevertheless, the Panel acknowledges, and agrees with, the views of several market participants (for example International Power Australia and Loy Yang Marketing Management Company Limited[35]) that the enablement of the Reserve Trader should be viewed as a failure of the market to deliver reliability.

The Panel further notes the support of some market participants and stakeholders for retaining the Reserve Trader including the South Australian Government who state that:

> "Given the (SA) Planning Council's modelling and the fact that Reserve Trader has had to be implemented over the last two summers in Victoria and South Australia due to forecast shortfalls in reserve margins, the State Government considers there is a strong case for its retention, albeit with enhancements deigned to promote broader capacity options than just demand side responses."

In its submission to the Issues Paper, Major Energy Users stated that:

> "The $2.7m [average of the two years] contracted by NEMMCO each year of 04/05 and 05/06 to secure adequate supplies needs to be considered in light of the $6.7Bn traded through the NEM spot market for power supplies in 2006."

However, the Panel also notes that some market participants do not support retaining the Reserve Trader, including International Power Australia and Loy Yang Marketing, that consider some of the detriments are as follows:

- "By the very virtue of the existence of the Reserve Trader, participant behaviours and actions are likely to be altered;
- It impedes the demand side response;

35 International Power Australia and Loy Yang submission to the First Interim Report.

- It provides incentives to withhold capacity in order to receive additional revenue; and

- Capacity sought is in excess of what the market customers are willing to contract."

The Panel concludes that although it is a market distortion, on balance the costs are minimal when compared to the costs in the market overall and that if better specified, the mechanism could be less of a distortion.

At this stage the Panel considers, on balance, a redesigned Reserve Trader (the Reliability Emergency Reserve Mechanism (RERM)) should be implemented for the short-term to assist maintaining the future reliability of the NEM.

As noted above, there have been some issues raised by participants concerning the operation of the current Reserve Trader mechanism. These concerns include potential "double dipping" by parties providing Reserve Trader cover, and the arguably conservative forecasting of demand leading to the enacting of the Reserve Trader when perhaps it is not needed. Consequently, the Panel is prepared to recommend a revised Reserve Trader scheme to operate for up to four years.

The "double dipping" issue had been addressed to some extent by the Panel in the guidelines for the redesigned Reserve Trader, the RERM. Prospective providers of capacity under the RERM will be required to give undertakings that the capacity is not contracted to another entity, such as a market participant. The Panel has acknowledged NEMMCO's efforts to improve the reliability of its forecasts[36], including the improvements in the demand forecasts for 2007, and has proposed that NEMMCO report to the Panel each August on the accuracy of the most recent SOO demand forecasts, and on improvements in the forecasting process that will be used to prepare the subsequent SOO.

The Panel also notes that, in the absence of a redesign of the market by jurisdictions to include additional reliability mechanisms, the best alternative the Panel has at its disposal may be to raise VoLL. The Panel stated in its first Interim Report that:

> "On balance, the Panel has formed a preliminary view that raising VoLL at this stage is not the preferred approach and that other options should be considered first. However, given the risks identified, if other options for the reliability mechanisms are not progressed, then an increase in the level of VoLL may need to be contemplated in order to provide the necessary market signals for investment."

The Panel remains of this view, and while it remains open to input from stakeholders on additional capacity mechanisms, and will address views on these in its final CRR report in November.

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36 Acknowledging also that many inputs used by NEMMCO in its forecasts are prepared by Jurisdictional Planning bodies.

5.1.5 The Reliability Directions Power

The other consideration the Panel has had to address as part of its analysis of mechanisms to maintain power system reliability is the power of NEMMCO to issue reliability directions under clause 4.8.9(a) of the Rules. It is the Panel's view that, for the reasons outlined above, this power should also be retained by NEMMCO and that the current derogation time limits on the power be replaced with an explicit Rule.

5.1.6 The Reliability and Emergency Reserve Mechanism (RERM)

The Panel is proposing to replace the current Reserve Trader with a Reliability and Emergency Reserve mechanism (RERM). The proposed RERM incorporates incremental improvements in the design of the existing Reserve Trader and has been designed to impose minimal distortion on the operation of the NEM while increasing NEMMCO's flexibility when contracting for reserves.

Under the current Reserve Trader arrangements, NEMMCO is only able to contract for capacity reserves up to six months in advance of a projected shortfall. The consequence of this short lead-time is that there are only a limited number of potential sources of reserve capacity available. The Panel anticipates that extending this timeframe will increase the range of entities willing to offer reserves contracts, increasing competition and hence reducing the procurement cost, although the Panel is mindful that allowing NEMMCO to procure reserves too far in advance of the projected shortfall may distort investment in new generating plant. On balance, the Panel is recommending that under the proposed RERM, NEMMCO would be able to contract for reserves for up to nine months in advance of a period where the reserves are projected to be insufficient to meet the reliability standards.

NEMMCO currently only has one opportunity to tender and enter into contracts under the Reserve Trader. This rigid tendering and contracting timetable may mean that NEMMCO is restricted from entering into the most efficient reserve contracts. Under the proposed RERM, NEMMCO would be required to contract further in advance of a projected reserve shortfall and it would therefore be necessary to allow NEMMCO to undertake multiple rounds of tendering and contracting when selecting the optimal portfolio of reserve contracts to cover a projected shortfall. Such a rolling tendering process would also allow NEMMCO's reserve contracting to be informed by the updated quarterly projections of the impact of generation input constraints, and the associated market responses.

Like the current Reserve Trader, the proposed RERM would operate on a regional basis. That is, NEMMCO would only contract for reserves in the region, or regions, projected to be in a reserve shortfall. In addition, NEMMCO would continue to be required to consult with the Jurisdictions from the affected regions before entering into reserve contracts. Also, NEMMCO would recover its costs from Market Customers in the affected regions on a basis that is agreed with the associated Jurisdictions. The Panel seeks further feedback from stakeholders as to equitable cost recovery arising from reserve shortfalls in importing regions which could be consequent on actions potentially taken in exporting regions.

Under the current arrangements, the Reserve Trader's operating costs are recovered from Market Customers (in affected regions) at the end of the reserve contract period. The Energy Retailers Association of Australia (ERAA) is concerned that the cost of the current Reserve Trader varies from year to year, and that a more stable long-term arrangement should make costs recovery less of an issue for its members.[37] An alternative arrangement that attempts to address the ERAA's concerns is to spread the costs over a number of years by recovering the costs of the RERM from a fund that is administered by NEMMCO. To this end, the Panel seeks further feedback from stakeholders as to whether the proposed RERM should be funded in the year that the costs occur or from an administered fund over time.

The Panel is recommending that the proposed RERM have a sunset in four years, and that prior to this date, the Panel be required to review the operation of the RERM, including whether the RERM should be retained beyond its sunset. The Panel is recommending that this review be completed within three years of the operation of the RERM as part of a future comprehensive reliability review. The Panel is further recommending that the RERM could be removed prior to the four year sunset if this future comprehensive reliability review recommends removing the RERM.

The power that enables NEMMCO to operate the current Reserve Trader is provided in the Rules, and in a set of guidelines prepared by the Panel in accordance with clause 8.8.1(a)(3) of the Rules. To enable the RERM, the Panel has developed an exposure draft of a proposed Rule change and associated revised guidelines for NEMMCO. The Panel seeks feedback from stakeholders on all aspects of the exposure draft.

The exposure draft, which includes a proposed Rule, also includes the Panel's recommendation that the need for, and effectiveness of, the proposed RERM mechanism be reviewed after three years and contain a sunset provision.

5.1.7 Benefits to Stakeholders

The key benefits gained by stakeholders from the RERM and the information improvement are:

- Lower levels of USE through greater market information leading to improved market response;
- Lower levels of USE through improved response by NEMMCO to forecast capacity shortfalls; and
- Reduced pressure on tightening other reliability settings.

37 ERAA submission to the First Interim Report..

5.2 Calculation of reserve margins

NEMMCO operationalises the NEM reliability standard by estimating the MRLs required in each region to meet it and enabling the Reserve Trader if a shortfall is forecast. NEMMCO determines the MRLs using Monte Carlo simulations of the operation of the NEM including:

- Forecasts of maximum demands and annual energy consumption by region;
- Historical regional load traces adjusted for forecasts and, in some cases, for diversity;
- Price-sensitive demand-side response;
- NEM generating units, including committed new developments;
- Random generator failures based on a survey of historical forced outage rates; and
- Network constraints.

NEMMCO reviews its analysis of MRLs whenever there is a material change to the NEM power system, such as an augmentation to an interconnector or the addition of a new large generating unit. In recent years, NEMMCO has reviewed its calculations every 1 to 2 years, with the most recent assessment being published in October 2006.[38]

As discussed in section 6.1, there is some concern that NEMMCO's calculation of reserve margins is too conservative. A perceived consequence of this has been that in two separate years NEMMCO has contracted for reserve but not been required to dispatch it, although the Panel notes that reserve margins allow for unexpected generator failure and not dispatching contracted reserves can also be a consequence of the conditions not arising for their need. The cost of the reserve was then passed on to consumers.

In October 2004, NEMMCO engaged KEMA Consulting to independently review the methodology and assumptions it used in its 2003/04 determination of MRLs.[39] KEMA found that NEMMCO's approach 'is as good or better than typical international practice'. The most substantial recommendations made by KEMA relate to the representation of generator outages. Consequently NEMMCO and the National Generator Forum formed a joint working group, the Forced Outage Data Working Group, to address this issue.[40]

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38 NEMMCO's MRL analysis is available on its website at http://www.nemmco.com.au/powersystemops/240-0020.htm.

39 The KEMA report "Review of Methodology and Assumptions Used in NEMMCO 2003/04 Minimum Reserve Level Assessment, 11 January 2005 is available on the NEMMCO website at http://www.nemmco.com.au/powersystemops/240-0009.htm.

40 The Forced Outage Data Working Group Terms of Reference, formed in conjunction with the NGF, is available on the NEMMCO website at http://www.nemmco.com.au/powersystemops/240-0021.pdf.

Despite the concerns expressed above, submissions to the Issues Paper and Interim Report indicate that stakeholders generally accept that NEMMCO is still the most suitable entity to calculate MRLs and that its methodology is appropriate.

The Panel agrees that NEMMCO should continue to calculate the MRLs because it already performs similar analysis in the SOO and ANTS and has the appropriate knowledge, skills and information. The Panel also agrees that NEMMCO's approach is appropriate and consistent with international best practice.

The Panel also considers that approval of the MRLs should remain the responsibility of NEMMCO and not the Panel. Under the NEL, the Panel's role is to monitor, review, report and give advice on reliability in the NEM, whereas NEMMCO has a more direct operational role and has existing responsibilities for maintaining system reliability and security.[41]

41 Section 38(2) of the NEL defines the functions and power of the Panel. The role of approving the MRLs could be conferred on the Panel under section 38(2)(c) but this would generally be inconsistent with the functions and powers prescribed in sections 38(2)(a) and 38(2)(b).

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6 Other issues and improvements

This chapter discusses other aspects of the NEM on which the Panel has reached conclusions to enhance the market's reliability performance. Issues are grouped under the following headings:

- Operational issues;
- Review period; and
- Reliability settings and mechanisms

The remaining outstanding issues that will be addressed in the final report in November are also listed in this chapter.

6.1 Operational issues

6.1.1 Demand forecasting

The operationalisation of the reliability standard depends on accurate projections of the maximum demand. If the projections are too high, NEMMCO will tend to intervene with its Reserve Trader or reliability directions powers too often. If the projections are too low, there is an increased risk of USE due to inaction by NEMMCO to avoid untimely generator maintenance.

The Panel notes the concern, shared by many stakeholders, that demand forecasts have been systematically too conservative, particularly at the 10% POE demand levels that underpin Reserve Trader intervention, and that consequently NEMMCO intervenes too often using the Reserve Trader at great cost to consumers. For example, in the summers of 2004/05 and 2005/06, NEMMCO contracted for reserves but ultimately did not need to dispatch them.[42]

The combined cost of these interventions was $5.4m, which was passed on to consumers. As discussed in section 5.1.4 the Panel notes this amount is small compared to the overall value of the market.

The Panel recognises, however, that NEMMCO is taking steps to continue to improve its demand forecasting. In late 2004, NEMMCO engaged KEMA Consulting[43] to independently review its process for preparing the SOO's load forecasts (see also section 5.2). NEMMCO is evaluating KEMA's recommendations as part of its continual improvement processes.[44] Similarly, the demand forecasting

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42 As discussed in section 5.2 there may be other reasons for the non dispatch of contracted reserves.

43 KEMA (June 2005). 'Review of the process for preparing the SOO load forecasts.' http://www.nemmco.com.au/nemgeneral/419-0012.pdf.

methodologies utilised by the Jurisdictional Planning bodies, which feed into NEMMCO's forecasts, are also the subject of continual improvement processes.

On balance, the Panel acknowledges NEMMCO's continuous improvement processes, including the improvements in the demand forecasts for 2007, and has decided to recommend that NEMMCO report to the Panel in August each year on:

- The accuracy of the most recent SOO demand forecasts; and
- Any improvements that have been incorporated into the process used to prepare the SOO forecasts.

6.1.2 Short and medium capacity reserves

At present NEMMCO calculates MRLs on a medium-term basis. NEMMCO then uses these medium-term MRLs to assess the adequacy of forecast reserve levels in both the medium-term (months or years) and the short-term (hours or days).

As discussed in the Interim Report, an alternative would be for NEMMCO to calculate short-term MRLs as well, to better reflect the prevailing demand conditions that apply in the short-term.

The Panel's view is that the short-term reserve requirements are likely to be lower than those in the medium-term because more information is available on the system conditions, including the maximum demand and generator availability. Therefore, the Panel considers that a review of the allowable short-term minimum reserve levels should be undertaken. To this end, the Panel intends to raise with NEMMCO the desirability of undertaking a review of the level of short-term reserves that should be used in short-term PASA.

6.1.3 The Administered Price Cap

The AEMC has the power under clause 3.14.1(a) of the Rules to:

> "develop, authorise and publish and may vary from time to time a schedule to specify an administered price cap for each region to apply to spot prices and market ancillary service prices"

The Panel notes that the schedule published by NECA prior to the formation of the AEMC would apply in the event of the CPT being exceeded. The Panel recommends that, in light of the high spot prices in June 2007 nearly causing such an exceedence of the CPT, that as a matter of priority the AEMC initiate a consultation process to re-examine the APC and publish a new schedule if necessary.

The Panel will publish its views on the level of the CPT itself in its Final Report in November 2007.

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44 Further information is provided in section 3.8.3 of the 2006 SOO.

6.2 The review period for VoLL and the other reliability settings

Currently, the only arrangement in place for regularly reviewing any of the reliability settings is the Panel's annual review of VoLL.

For the VoLL review, the Panel recommends by April each year the level of VoLL as it will apply from July two years hence; in other words, it is a rolling three-year schedule. As part of the same review the Panel may also decide, in unusual circumstances, to amend the level it set the previous year; in this case, the re-set level would not of course take effect until July *one* year later. In effect, this gives market participants 26 months' advance notice of changes to VoLL, except in unusual circumstances in which case there may be 14 months' notice.

There are two key issues here:

- Should there be longer-term certainty about the level of VoLL?
- Should all the reliability settings be reviewed on a regular and integrated basis?

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

The NEM objective is directed to the long-term interests of consumers. Consumers have a direct interest in the future settings which influence price.

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

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 will 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, three years.

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 it risks greater use of the market safety net if the level is too low.

The Panel's conclusion is that VoLL should be reviewed less frequently and in conjunction with a regular and integrated review of all the reliability settings.

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. The Panel's view is that all the settings 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 settings, to ensure the reliability standard is met, will be more effective.

Accordingly, the Panel proposes to recommend the replacement of the current annual review of VoLL with a comprehensive and holistic review of all the reliability settings (the reliability standard, VoLL, CPT, the market floor price, and any other safety net, emergency reserve or reliability mechanism) which is to take place every three years. The Panel believes that this will offer increased certainty for consumers and potential investors, which in turn will benefit reliability.

6.3 CRR Outstanding Issues

There are a number of further issues that were raised in the Issues Paper and first Interim Report on which extensive feedback has been received by stakeholders. These include:

- The levels of the other current reliability mechanisms (e.g. VoLL and the CPT)
- The need to consider additional mechanisms to improve and encourage reliability in the NEM (e.g. Reliability Options or a Reliability Ancillary Service).

These remaining matters will also be addressed in the Final Report in November 2007.

7 Matters for consultation

This chapter provides a summary of all the issues raised in this report about which the Panel seeks stakeholders' feedback.

7.1 Reliability Emergency Reserve Mechanism

(full discussion in Chapter 5)

The Panel seeks stakeholder feedback on all matters raised in Chapter 5, particularly the redesigned RERM and the EAAP. The Panel also seeks feedback on the exposure draft of proposed changes to the Rules to implement these mechanisms. Once all feedback has been received and analysed the Panel intends to submit this draft to the AEMC as a Rule change proposal.

7.2 Other matters

Cumulative Price Threshold

The Panel notes that the CPT was nearly exceeded in June 2007 and seeks feedback from stakeholders on the appropriateness of the current level of the CPT, being $150,000.

Industrial disputes and their inclusion in reliability statistics

The Panel notes, and seeks feedback on, a possible inconsistency with respect to the treatment of "industrial disputes" in the interpretation of reliability statistics, in that: these are excluded for operating plant and included if the plant is under development for a targeted commencement date (that has been reflected in the capacity forecasts).

Outstanding matters

There are a number of matters that were raised in the Panel's First Interim Report that have not been raised in this Second Interim Report but will be addressed in the Final Report in November. The Panel welcomes further feedback on any of these outstanding matters.

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Appendix A: Terms of reference (amended 22 June 2007)

Introduction

In accordance with the National Electricity Rules (Rules) cl. 8.8.3(b) and (c), the AEMC requests the Reliability Panel to undertake, in a comprehensive and integrated process, the reviews required by the Rules in relation to the following key National Electricity Market (NEM) standards and parameters:

- the NEM reliability standard;
- the Tasmanian reliability and frequency standards;
- the level of Value of Lost Load (VoLL), market floor price and cumulative price threshold (CPT); and
- whether the reliability safety net should be allowed to expire or alternative arrangements put in place.

The AEMC strongly supports the view of the Panel, as customer and industry representatives, that the subject matter of those reviews are closely inter-related and that it is appropriate that they be considered together. This more comprehensive approach will enable the Panel to address the clear need to provide NEM stakeholders with greater medium-term certainty in relation to these fundamental market signals.

The AEMC advises the panel of the terms of reference set out below including a requirement that the Panel complete its reviews and provide its report to the AEMC by 31 March 2007.

Scope

NEM reliability standard

In accordance with Rules cl. 8.8.1(2), the Panel must review and, on the advice of NEMMCO, determine the NEM reliability standards. The reliability standard is the relationship between the minimum acceptable level of bulk electricity supply measured against the total demand of electricity customers. The standard was set at .002% unserved energy (USE) by the Panel at market start in 1998 and it is appropriate to review that standard now.

The Panel is requested to examine:

1. the appropriateness of the standard including consideration of:
    a. the effectiveness of equivalent standards internationally;
    b. the effectiveness of the standard domestically;

c. the appropriate form, level and degree of precision for the standard in the future; and

d. the scope of the standard in terms of the boundary with system security events and the boundaries of application of the standard across electricity infrastructure;

2. the interpretation of the standard into minimum reserve requirements including consideration of whether the contingency, short term and medium term capacity reserve standards should be explicitly defined; and

3. the application of minimum reserve levels in the market.

Tasmanian reliability and frequency standards

The Rules require that the Panel determine the Tasmanian reliability and frequency standards on the advice of NEMMCO and that, in making that determination, take into account the following principles:

- the Panel must have regard to the existing Tasmanian standards;
- the Panel must consider the costs and benefits of any changes;
- the Panel must consider the size and characteristics of the Tasmanian power system;
- the standards may differ from the mainland standards; and
- the standards must be less stringent for islands in Tasmania (cl. 9.49.4).

The Tasmanian Reliability and Network Planning Panel (RNPP) is currently reviewing the Tasmanian capacity reserve and frequency standards. The RNPP released a position paper in August 2005 and received a number of submissions in response. It is expected to make its decision by the end of February 2006.

The Panel is requested to:

4. review the RNPP's position paper and submissions received in response as part of reaching its own determination by no later than 30 April 2006; and

5. take into consideration that determination when undertaking the main body of the comprehensive integrated review.

VoLL, market floor price and CPT

The level of VoLL, the market floor price and the CPT arrangements provide the key price envelope within which the market must deliver to the NEM reliability standard. As established, these parameters provide the key signals for supply and demand-side investment. The Rules currently require the Panel to review the parameters by 30 April each year and that, in setting VoLL, do so at a level which the Panel considers will:

- allow the reliability standard to be met without the use of NEMMCO's intervention powers (to dispatch contracted reserves or direct Registered Participants);
- not create risks which threaten the overall integrity of the market; and
- take into account any other matters the Panel considers relevant.

The Panel is requested to:

6. complete its next review of VoLL, the market floor price and CPT by 30 April 2006 (VoLL 2006 review);
7. undertake the 30 April 2007 review of those parameters (VoLL 2007 review) as part of the main body of the comprehensive reliability review;
8. in undertaking the VoLL 2007 review:
    - consider whether VoLL, the market floor price and CPT are the most appropriate mechanisms for providing adequate investment signals and managing price volatility;
    - if the Panel considers that they remain appropriate mechanisms, determine the values of those parameters appropriate for the future medium-term including how often they should be assessed in the future;
    - if the Panel considers that they are no longer appropriate, consider appropriate alternative mechanisms.

Reliability safety net

The reliability safety net comprises the ability of NEMMCO to take actions to address any potential shortfalls by the market to deliver against the NEM reliability standard. At present, the Rules put a sunset date of 30 June 2006 on NEMMCO's powers in this regard and require the Panel to, by that date, review whether the reliability safety net should be allowed to expire or alternative arrangements be put in place.

The Panel is requested to:

9. consider as a priority how the Panel can meet its obligation under the Rules to address the issue by 30 June 2006 while also addressing the matter as part of the comprehensive review.

Process

Consultation

The comprehensive review is likely to have important implications for NEM stakeholders. Consistent with its philosophy of engaging with those parties, the

AEMC requests the Panel to plan to involve stakeholders by seeking submissions and holding forums on the main review issues paper and on each of its draft decisions.

In giving notice to Registered Participants of the Tasmanian reliability and frequency reviews, as required by Rules 8.8.3(d), the Panel is directed that the notice must be given at least four weeks prior to the meeting referred to in Rules 8.8.3(f).

The Panel is also directed that its report on the Tasmanian reliability and frequency reviews must be provided to the AEMC no later than eight weeks after the meeting referred to in Rules 8.8.3(f).

Resourcing, planning and communication

The Panel is requested to:

- utilise a lead consultant engaged and provided by the AEMC to assist in the preparation of scoping and issues papers, draft and final review documents, the undertaking of research and analysis and carriage of the review generally;
- provide the AEMC with a detailed project plan and budget by 24 February 2006; and
- brief the AEMC on progress in relation to the comprehensive reliability review from time to time as appropriate.

Addendum to Terms of Reference – 21 June 2007

The AEMC requests the Reliability Panel to include an additional component in the comprehensive reliability review to incorporate the request of the MCE to provide advice on the effectiveness of current market arrangements in managing generation input constraints and energy shortfalls.

The Panel is requested to:

- Provide advice to the AEMC for the MCE by mid-July 2007 on what, if any, improvements can be made to arrangements, including reserve trader, to strengthen the market's ability to manage generator input constraints.
- Extend the timetable of the comprehensive reliability review to include a second interim report which will seek feedback from stakeholders on the above advice before its final report is issued.

Revised Timetable for the Comprehensive Reliability Review

The AEMC requests the Reliability Panel incorporate the following key dates in its work program:

- By mid-July 2007 – advice to the AEMC for the MCE
- By 31 August 2007 – second Interim Report of CRR, including an exposure draft of the Panel's proposed changes (if any) to the reserve trader mechanism.
- By 30 November 2007 – final report of CRR.

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Appendix B: Submissions, supplementary submissions and presentations

Listed below are all submissions, supplementary submissions, presentations made to the Panel as stakeholder feedback after the release of the Issues Paper, and submissions to the Interim Report. All these are available from the AEMC's website at www.aemc.gov.au.

B.1 Submissions and supplementary submissions to the Issues Paper

- AGL Energy
- Country Energy
- Electricity Supply Industry Planning Council
- Energy Response
- Energy Retailers Association Of Australia
- EnergyAustralia
- Enertrade
- Hydro Tasmania
- International Power Australia And Loy Yang Marketing
- Macquarie Generation
- National Generators Forum
- National Generators Forum Attachment 1
- National Generators Forum Attachment 2
- NEMMCO
- NewGen Power (revised On 3 August With A Correction To Table 3)
- Queensland Government
- TransGrid
- TRUenergy
- VENCorp
- Energy Users Association Of Australia
- Energy Users Association Of Australia Attachment 1

- Major Energy Users
- Total Environment Centre
- Electricity Supply Industry Planning Council Supplementary Submission
- Electricity Supply Industry Planning Council Supplementary Submission Appendices
- Energy Response Supplementary Submission
- Paul Simshauser (CEO NewGen Power) Supplementary Submission
- Powerlink Supplementary Submission
- Major Energy Users Supplementary Submission
- Commonwealth Minister for Industry, Tourism and Resources
- NSW Minster for Energy
- SA Department Of Transport Energy And Infrastructure
- TRUenergy Supplementary Submission
- Electricity Supply Industry Planning Council Supplementary Submission
- SA Department Of Transport Energy And Infrastructure Supplementary Submission

B.2 Presentations to the Stakeholder Forum – 27 July 2006

- Chairman's Introduction
- Electricity Supply Industry Planning Council
- Energy Users Association Of Australia – McLennan Magasanik Associates
- National Generators Forum
- NewGen Power
- Energy Response
- Enertrade
- Major Energy Users
- Loy Yang Marketing

B.3 Submissions to the First Interim Report

- Institute Of Public Affairs (Attachment Added - 6th June 2007)
- Australian Energy Regulator
- NEMMCO
- Energy Australia
- Enertrade
- Energy Retailers Association Of Australia
- National Generators Forum
- Energy Users Association Of Australia
- Energy Response
- International Power Australia And Loy Yang Marketing
- Macquarie Generation
- Major Energy Users
- TRUenergy
- EEE Limited
- Government Of South Australia

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