



24 January 2007

Mr Ian C Woodward  
Chairman, Reliability Panel  
Australian Energy Market Commission  
PO Box H166  
Australia Square NSW 1215  
[panel@aemc.gov.au](mailto:panel@aemc.gov.au)

Dear Mr Woodward,

**RE: COMPREHENSIVE RELIABILITY REVIEW – ISSUES PAPER**

In addition to the Planning Council's previous comments to the Reliability Panel, recent changes to the reserve margins and discussions with NEMMCO concerning the application of the USE Reliability Standard, have raised a number of issues with respect to the definition and its effective application and operation.

Such issues can effectively be categorised into the following three major groups:

**Definitional:** while a single USE figure provides an easily described measure of the desirable level of reliability, the existing definition does not meaningfully address important questions with respect to its application and measurement.

**Analytical:** One of the key aspects of the USE Standard should be its ability to be interpreted and calculated by all market participants or interested parties. The Reliability Panel should consider whether it should prescribe a methodology for its calculation.

**Consistency of Application:** the standard and approach for analysis and application of that standard should be sustainable and, to the extent possible, capable of being consistently applied from year to year, and region to region.

Of concern to a number of participants in the market has been the variation in the approach taken by NEMMCO in performing the reliability analysis. Since the start of the NEM, NEMMCO have reviewed the reserve margins 4 or 5 times.

The methodology for the calculation of these reserves has varied significantly each time. While originally this analysis was supported by a reference group of jurisdictional planning representatives, more recent analysis has been performed by NEMMCO in isolation with the consequence that the results are not transparent and the methodology questionable.

The following sections annunciate the Planning Council's concerns in more detail.

### Definitional Issues

The Reliability Standard [1], as it was originally developed and published, is somewhat ambiguous with respect to the provision of a precise interpretation of the Standard.

*"The existing standard, which has remained unchanged since market launch, specifies that there must be sufficient reserve from the energy market to ensure that no more than 0.002 per cent of annual customer demand may be at risk of not being supplied over the long term"*

The concept of a long term average, while fine in principle, is problematic to interpret and apply in practice without understanding the time period which is considered to define the "long term". Similarly "no more than 0.002 per cent of annual customer demand may be at risk of not being supplied over the long term" provides little insight into the practical interpretation of this aspirational target into meaningful measures of customer reliability.

The interpretation applied by NEMMCO appears to be that the probable average unserved energy considering a range of possible outcomes in repeating the current year should be equal to the 0.002% standard. Under this definition, customers are 'at risk' of much larger USE in any year. The standard is also applied to only a given sub-set of loss of load events which excludes unserved energy arising from events such as those on 16 January in Victoria and, in fact, most if not all unserved energy that has occurred to date. Planning Council considers that measures should be put in place which will more precisely define the 0.002% USE target. For example: if the "long term" were defined as 10 years then a number of the other parameters which would define the customer reliability become apparent. An approach such as this would be consistent with the "1 day in 10 years" approach used in many international markets. It may also be advisable to look at additional limits such as defining the maximum number of unserved energy events permissible in the period.

The 2001 MMA analysis also recommended that the Reliability Panel incorporate a series of confidence intervals relating to the various of levels of reliability as predicted in their analysis.

*"NEMMCO publish confidence levels on the 0.002% adequacy Reliability Panel to add a criterion which says that there should be a XX% confidence that USE will not exceed 0.00Y% in any one year based on uncertainties in:*

- the market operation (weather, generation and transmission failures)*
- the market context (underlying energy growth, supply mix), and*
- modelling uncertainty (level of approximation, statistical simulation, standard error of estimated parameters).*

*This would provide a quantitative way of expressing a limitation on exposure to more extreme events having regard to the uncertainties in the reserve margin analysis. It may even be defined or calibrated to match the results of observed market behaviour of participants seeking to manage their own risk position by installing new plant or taking up demand side*

*options. In this way changes in market investment behaviour having regard to prevailing market uncertainties would be usefully signalled and there would be a stronger relationship between reserve margins sought and underlying market uncertainty in the short, medium and long-term views.”*

This recommendation is consistent with the Planning Council's suggestion to provide more clarity in the measurement of the standard but has serious implications for the approach to calculation of the measures. Alternative approaches might be considered, for example by applying a limit to the maximum USE allowed to occur once in 10 years or it may be advisable to look at additional or side limits to the application of an average standard, for example by defining the probable number of unserved energy events permissible in a year.

NEMMCO has changed its methodology for the calculation of reserve margins in each of their reassessments since the start of the market. In the early assessments NEMMCO acknowledged the Reliability Panels decision that reserve margins should not be less than the largest unit relative to the one in 10 year peak (10% Probability of Exceedance (or POE)). This was consistent with the Reliability Panels perspective that customer load should not be put at risk through a single credible contingency event. However, on the basis of this analysis, the level of USE delivered was significantly inside the Reliability Standard. The review of NEMMCO's 2001 reliability assessment by MMA[2] highlighted that the larger reserve margins may be costly, particularly as, on the basis of NEMMCO's analysis, it delivered higher levels of reliability than required under the standard.

More recently NEMMCO has chosen not to use the original largest unit recommendation from the Reliability Panel and has simply targeted the minimum reserves to deliver an average USE of 0.002% in each region. Changing the methodology for calculating the operational interpretation of the reliability standard does little to foster confidence, for either the incumbent generators or prospective new investors, in the application of a measure its interpretation. The Planning Council is not convinced that NEMMCO's current interpretation targeting 0.002%USE is consistent with the Reliability Panel's intention to have “*no more than*” 0.002%USE. KEMA[3] observed that the 0.002% USE target was at the low end of international standards. By targeting this level, rather than using it in accordance with its original intention as a “*no more than*” measure, NEMMCO is exposing customers to a level of risk that is greater than that which was originally intended and higher than international standards.

As was highlighted in the original Reliability Panel decision with respect to the reliability standard, many countries use different measures to assess the required wholesale market reliability. While at the time of publication, many international utilities were, like Australia, defining the mechanisms for their market, it is significant that a majority of the overseas markets now use measures based around LOLE/LOLP as their primary targets. While the USE standard has proven itself to be a simple, single figure measure, its application remains one that is not easily understood.

## Analytical issues

The inconsistency of NEMMCO's approach to the calculation and now also the application of the standards to each region is cause for significant concern. One of the advantages of developing a more precise definition for the standard is the opportunity to also standardise the approach for the calculation of the operational margins that would support it.

The demand, generation and other regionally specific assumptions used in the modelling have, for the last two reviews, been those that NEMMCO has consulted upon and published as part of the preparation of the Annual National Transmission Statement (ANTS). The Planning Council supports this method for defining some of the core inputs into the analysis. While NEMMCO had KEMA[3] perform a high level review, the methodology for the analysis and the establishment of some of the other core assumptions have not been subject to the same level of scrutiny.

Further quantification and clarification of the 0.002% USE standard presents an opportunity for the Reliability Panel to present a formalised methodology for the calculation of the reserve margins. The Reliability Panel recognised the difficulty in application of the 0.002% USE in its 1998 decision saying:

*“Historical margins at time of peak will only be able to be directly compared to NEMMCO's recommended minimum forecast levels for extreme conditions if the historical demand was also extreme. When this is not the case, higher margins will be recorded in historical data.”*

By developing a process for the calculation of the reserve margins that operates on the “extremes” of demand and implying a scaling for lower levels of demand could significantly improve the simplicity, replicability and transparency of the calculation process.

For example the analysis could utilise either a probabilistic calculation or a large number of simulations to develop an outage distribution based on a 10% PoE demand forecast that would, with an appropriate level of confidence, deliver the Reliability Standard over the prescribed period.

Transparency of methodology and analysis is important to ensure that market participants can adequately understand their risk profiles. Publishing such key data as the sensitivity of the analysis to the uncertainty of demand is a good first step. Recommendations from the 2001 MMA report also highlight the benefits to the confidence in the results from an approach that more effectively assesses the sensitivity of the analysis to variation to major parameters such as demand. A probabilistic approach could effectively incorporate the variability of demand and supply and present a result that would be indicative of the dependence on both.

## Consistency of Application Issues

As previously highlighted in this submission, the consistency, repeatability and simplicity of approach were highlighted by the Reliability Panel as particularly important in the development of the Reliability Standard.

South Australia has had specific issue with the consistency of application of the Reliability Standard in the last two NEMMCO exercises. Above all, the assessment and its practical interpretation for all regions should follow the Reliability Panel's original principles and be transparent in its implementation.

NEMMCO should define specific reserve margins for all of the market timeframes as has been suggested by the Reliability Panel since 1998, highlighted in the 2001 MMA critique and has been discussed by South Australia with NEMMCO on many occasions.

Of significant concern at this time is that the latest application of the new reserve margins by NEMMCO now means that the definitions and the calculation of the Lack of Reserve (LOR) and Low Reserve Condition (LRC) notices, used to inform the market of the reserve situation, are now out of step. The current LRC notice calculation uses the new long term reserve margins as published by NEMMCO, despite there having been no analysis to support their application in this timeframe. The LOR notices are still calculated on the basis of the largest credible contingency within each region. Further to this, the calculation of the published Medium Term and Short Term Projected assessment of System Adequacy (MTPASA and STASA) are based on the latest reserve margins while NEMMCO still advises the seven day ahead outlook on the basis of the capacity available across the interconnected network and the largest contingency in each region.

This further highlights the lack of consistency in the market with respect to the treatment of reserve requirements. The Planning Council is also concerned that the current implementation of the latest reserve margins may not be adequately ensuring that the reserves available in a region are actually accessible to the market and not constrained behind network limitations. The process for assessment takes account of network limitations when the reserve margins are established, however, it is not clear that the same situation applies when regional reserves are reported in the short term and pre-dispatch.

Consistency of approach across regions is also an important aspect of the methodology. The latest approach by NEMMCO accounts for contribution of interconnectors differently in different regions. For South Australia, the calculation assumes no support from the interconnectors, resulting in a -50 MW reserve margin, while in Victoria and NSW, normal interconnector flows are counted. While this has no direct affect on the actual size of the margin delivered using both methodologies in the same set of reserve levels is confusing and makes it hard to compare positions across jurisdictions.

Of key concern however, with respect to the application of the Reliability Standard is the economic efficiency of the outcomes that its interpretation delivers. The current interpretation fails to recognise the economic efficiency aspects of providing signals for the development of capacity solutions that represent the lowest cost of service provision. By defining local reserve requirements for South Australia and Queensland NEMMCO has created a situation where local generators can potentially game the market to ensure that they receive payments for their capacity and also potentially reduce access by these regions to cheaper sources of additional capacity that may be available in other regions. Any new mechanism must address this economic efficiency question in a "national" market context.

Reserves should be sourced on the basis of the optimal cost of reserves with the market as a whole and mechanisms established that then enable the jurisdictions benefiting from the efficiently located and available reserves to be compensated accordingly. The optimisation of

the location and cost of reserves is a significantly different approach to that taken currently by NEMMCO which examines the quantity of reserves.

A change to the principles on which reserves are sourced would dovetail with the Planning Council's approach of a standing reserve trader where the level of regional reserves required is specified and paid for by the jurisdiction.

I would welcome the opportunity to discuss any of the matters raised above with you or your staff.

Yours sincerely,

David Swift  
CHIEF EXECUTIVE

**[1]** Reliability Panel Determination on Reserve Trader and Direction Guidelines, June 1998.

**[2]** Assessment of NEMMCO's 2001 Calculation of Reserve Margins, 10 September 2002 MMA Pty Ltd.

**[3]** Review of Methodology and Assumptions Used in NEMMCO 2003/04 Minimum Reserve Level Assessment, 11 January 2005; KEMA Inc.