



RELIABILITY PANEL AEMC

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Mr John Pierce AO
Chairman
Australian Energy Market Commission
Level 6, 201 Elizabeth Street
Sydney NSW 2000

By email: john.pierce@aemc.gov.au

Dear Mr Pierce,

Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change

The Reliability Panel (Panel) thanks the Australian Energy Market Commission (AEMC) for the opportunity to provide advice on the AEMC's Enhancement to the Reliability and Emergency Reserve Trader (RERT) rule change.

As you would be aware, the Panel reviews and reports on the safety, security and reliability of the national electricity system. The Panel is comprised of members who represent a range of participants in the national electricity market (NEM), including consumer groups, generators, network businesses, retailers as well as AEMO.

Context for the Panel's advice

In particular, as the Commission noted when it requested the advice, the Panel has a number of responsibilities that are related to this rule change, specifically:

- An ongoing and periodic obligation to review and provide advice on the reliability standards and settings to the AEMC every four years (note that the most recent review of the reliability standards and settings was published in April 2018), and in doing so, having regard to a *Reliability Standard and Settings Guideline* that we also prepare.
- A requirement to develop and publish guidelines that provide guidance for AEMO in its operation for the RERT.

The Commission requested that the Panel draw on its previous work and expert views, and present views back to the Commission on a number of matters. The Panel also notes that it has received a number of briefings from AEMO over the past year, which have further informed the Panel in their thinking. This includes a briefing on AEMO's proposed enhancement to the RERT, prior to the rule change request being submitted to the AEMC; and discussions on views about whether the reliability standard may no longer be appropriate given changing system conditions. The Panel appreciates these discussions with AEMO, and has also drawn from these in responding to the Commission's request.

The Panel considers each of these areas in turn, below.

Whether the reliability standard (i.e. 0.002 per cent unserved energy) remains appropriate for the NEM¹

The reliability standard is a crucial market standard. It expresses the level of reliability sought from the NEM's generation and transmission assets. The reliability standard embodies the economic trade-off, made by the Panel on behalf of consumers, between the prices paid for electricity and the cost of not having energy when it is needed. The reliability standard also helps to guide AEMO's operation of the system. AEMO uses its own judgement to apply the standard to its operational processes², subject to its Reliability Standard Implementation Guidelines. The standard is a key input into various decisions made by AEMO in its role as the system operator, including being a trigger for the procurement of the RERT.

¹ For further details on this point, please see sections A.1 to A.3 of the Panel's final report for the 2018 review.

² For example, AEMO uses the MT PASA process to declare a low reserve condition to inform the market that it is projecting unserved energy in excess of the reliability standard.

As the Commission notes, in April 2018 the Panel completed its review of the reliability standard and settings to apply in the NEM from 1 July 2020.³ In doing so, the Panel noted that the reliability standard is foundational for the reliability settings. The reliability settings protect the long term integrity of the market by limiting the extent to which wholesale prices can rise and fall, to limit market participants' exposure to prices that could threaten the financial viability of a prudent market participant. They are set at a level that allows prices over the long-term to incentivise sufficient new investment in generation to achieve the reliability standard. The settings comprise:

- the market price cap, which imposes an upper limit on temporary high prices in the wholesale market
- the cumulative price threshold, which imposes a limit on sustained high prices in the wholesale market
- the administered price cap, which is the 'default' price cap that applies when the cumulative price threshold is exceeded
- the market floor price, which imposes a negative limit on prices in the wholesale market.

The reliability standard and settings are interrelated. For example, an increase in the level of the reliability standard (such as tightening the standard to a higher level of reliability of, say, 0.001 per cent of unserved energy) may require a corresponding increase in the level of the market price cap, or some other form of generation remuneration, to signal the appropriate level of generation capacity and demand-side response to deliver the higher standard.

At the start of the market, the standard was established as maximum expectation of unserved energy of 0.002 per cent. Part of the reason for establishing the standard on unserved energy was that it clearly fits within the market-based environment of the NEM. The potential for interruption of individual consumers is then a function of the regional reliability, which in turn is assessed by the system operator on the basis of market data. This is consistent with the underlying principles of the NEM, rather than looking at occurrences of interruptions which would be more consistent with capacity based arrangements.⁴

In accordance with the Panel's Guidelines for undertaking this review, the level of the reliability standard is not automatically reassessed and if the materiality threshold is not met the standard should remain as previously determined.

The Panel determined:⁵

"the materiality threshold for reassessing the level of the reliability standard has not been met at this time for the following key reasons:

- the absence of any change in AEMO's value of customer reliability measure
- changes in the way consumers use electricity do not suggest they are markedly less reliant on grid-supplied electricity
- other factors such as changes in the costs of new entrant generation⁷ since 2014 and the benefits of predictability and stability⁸."

The Panel notes that nothing has changed in relation to these factors since the Panel made its final determination, and so there is no new evidence for the Panel to consider in order to change its earlier views that the current reliability standard is still appropriate.

However, the Panel acknowledges that the NEM is transforming, and these materiality criteria may be met in the future. In this regard, the Panel notes that:

³ In 2016 the Panel published guidelines that define the scope of reliability standard and settings reviews. The guidelines specify that the level of the reliability standard is not automatically reassessed every review cycle, rather, the Panel must apply a materiality test to determine if the reliability standard should be reassessed.

⁴ Reliability Panel, 1998, *Determination of reserve trader and direction guidelines*, p. 6

⁵ Reliability Panel, *2018 Reliability standard and settings review, final report*, p. 13

⁷ Changes in the cost of producing an additional unit of energy to meet otherwise unmet demand are the counter point to the value of customer reliability in the reliability "trade-off" that is embodied in the reliability standard. EY's modelling for the 2018 Reliability standard and settings review showed that the marginal generator remains a gas turbine generator with no substantial changes in cost compared to historical levels.

⁸ Given the substantial policy uncertainty affecting the NEM, there is merit in not reassessing the reliability standard to provide a measure of regulatory certainty and stability.

- the AER must publish the results of a VCR study by end of 2019. It is likely that these new VCRs will be different to the previous values that were used in the market. This could therefore be a trigger for the Panel to consider a future reassessment of the reliability standard at or prior to the next four yearly review, particularly, if the study reveals material changes in the value of customer reliability.
- the Panel will also continue to monitor emerging trends and uncertainties that bear on the effectiveness of the reliability standard and settings and which may affect the other two limbs of the materiality threshold to warrant reassessing the reliability settings.

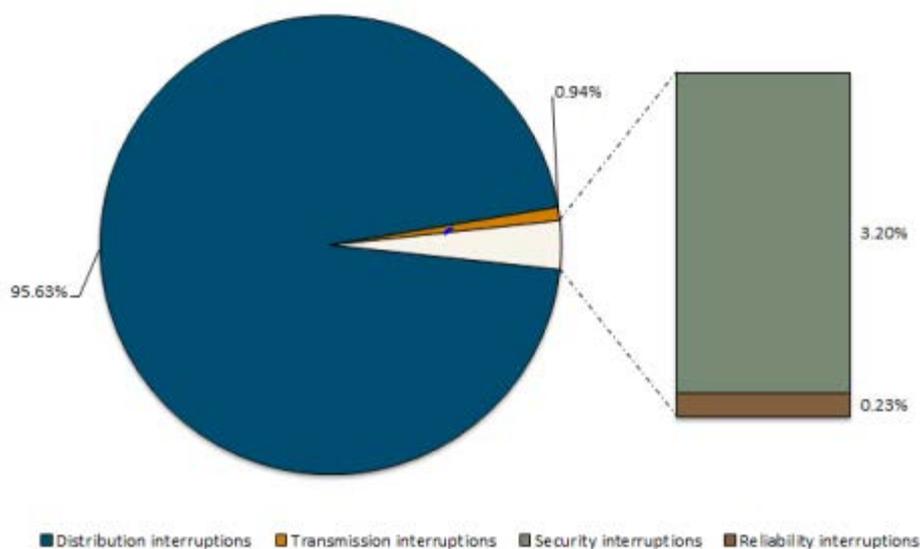
The Panel notes that the Commission may give the Panel terms of reference for an interim review of the reliability standard and settings, prior to the next four yearly review, if warranted due to changing market circumstances.

Evidence that the standard may need to be tightened, in some of all conditions, to meet community expectations, including stakeholder submissions on this point⁹

The Panel may also consider other matters relevant to assessing whether the materiality threshold has been met for reassessment of the reliability standard. Other matters considered included the public discourse regarding the standard.

The Panel emphasises that the reliability standard is only one input to the consumers’ electricity supply experience. Historically¹⁰ only about 0.23 per cent of total supply interruptions (in terms of GWh) were the result of inadequacy of supply (reliability events), compared to 3.20 per cent of interruptions that were security related.¹¹ The vast majority of supply interruptions were network interruptions, specifically from the distribution network (around 95 per cent of total interruptions).

Sources of supply interruptions in the NEM: 2007-08 to 2016-17¹²



In the final report, the Panel noted that some public commentary about the standard seems to suggest that the standard should in fact be zero unserved energy (i.e. no involuntary load shedding), which would be a tightening of the reliability standard. However, the Panel noted that, notwithstanding the current level of the standard, EY modelling forecasts the system will provide a level of reliability significantly better than the 0.002 per cent reliability standard in all national electricity market regions, for the review period. The Panel notes that the unserved energy outcomes presented by AEMO in its 2017 and 2018 *Electricity Statement of Opportunities (ESOO)* were higher than

⁹ For further details on this point, please see sections A.3 to A.4 of the Panel's final report for the 2018 review.

¹⁰ Over the period 2007-08 to 2016-17.

¹¹ Reliability Panel, *2018 Reliability standard and settings review, final report*, p. 53

¹² Source: AEMC analysis and estimates based on publicly available information from: AEMO's extreme weather event and incident reports and the AER's RIN economic benchmarking spreadsheets

the unserved energy outcomes forecast by EY. It is important to note that the rationales that underpin these two models are different (as are the accompanying assumptions and sensitivities) so different results are unsurprising.¹³

In this regard, the Panel notes that while there have been no new estimates of the value of customer reliability measure (as referred to in the guidelines), there has been a change in public discourse re the acceptability of load shedding.

Submissions received during the consultation process for the 2018 review considered the current level of standard was appropriate.¹⁴ All of the submissions that commented on this issue supported keeping the reliability standard and its current level. For example:

- Origin noted that “We agree that for a change to the reliability standard to be considered, there would need to be a significant variance between the Panel’s VCR and that calculated by AEMO under its 2014 study. We hold this view while noting the inherent limitations of any VCR analysis and the extent to which it can be used to inform the appropriate level of the reliability standard”.¹⁵
- PIAC noted it was of the view “that 0.002% USE represents a level of reliability that, given the cost trade-offs of higher reliability and the impact of lower reliability, is consistent with [...] delivering a level of reliability consistent with the value placed on that reliability by customers”.¹⁶

It is also worth noting that the Panel did not receive any stakeholder requests to reassess the level or form of the reliability standard as part of the 2018 review. The four yearly reliability standard and settings review is a regular mechanism that is built into the NER by which the reliability standard is reviewed through a clear and transparent process, with stakeholder consultation. To the extent that stakeholders see issues with the current reliability standards and settings, the Panel would encourage these stakeholders to participate in this process, given the Panel at the end of the process can make recommendations to the Commission for changes to either the standard or the settings. Moreover, since the reliability standard and settings is contained in the NER, to the extent that stakeholders would like to propose changes to these in a more direct manner, stakeholders can submit rule changes to change these parameters to the AEMC at any time.

Potential costs and benefits arising from the tightening of the reliability standard¹⁷

Setting the level of the reliability standard involves a trade-off between the prices paid for electricity and the cost of not having energy when it is needed. Increasing the levels of reliability involves increased costs. This is a fundamental matter that must be taken into account when considering reliability frameworks.

As part of its recent review, the Panel commissioned EY to forecast the likely expected unserved energy to 2024 based on the current reliability standards and settings. This was to answer the question (within the limitations of the model): what is the expected outlook for unserved energy, relative to the reliability standard, from 1 July 2020 to 1 July 2024? The base scenario modelling conducted by EY (and associated sensitivity analysis) forecast a level of unserved energy that is well below the expected level of unserved energy defined by the reliability standard.

The modelling also sought to estimate the indicative costs associated with tightening the reliability standard. The modelling indicated that the expected unserved energy under the base scenario conditions in Victoria was very low at around 0.0000003 per cent in 2020-21. EY indicated that reducing this already low level of expected unserved energy to zero would require an additional 1,000 MW of capacity to be in place in Victoria in 2021-21. The additional cost of moving to (close to) zero expected unserved energy under the base scenario would increase wholesale energy costs by nearly 7 per cent (\$200 million per annum) in that region, as measured against current market outcomes in Victoria.

¹³ The scenarios in the Panel’s review and those in the ESOO have different purposes; they are not seeking to examine comparable ‘futures’. In contrast to the Panel’s review, none of the ESOO core scenarios seek to reflect the likely outcomes for the national electricity market in the review period. Rather, in relation to new capacity, in the 2018 ESOO AEMO seeks to forecast the risk of unserved energy outcomes, should only very well progressed generation projects proceed (as well as two sensitivities with generation and transmission development based on the Integrated System Plan). For a detailed comparison of AEMO’s 2017 ESOO modelling and EY’s modelling, see Appendix H.2 of the Panel’s final report for the 2018 review.

¹⁴ Submissions from EnergyAustralia, Engie, PIAC, ERM Power, Snowy Hydro, EUAA and Origin all supported retaining the current level of the reliability standard.

¹⁵ Origin, submission to the issues paper, p. 1.

¹⁶ PIAC, submission to the issues paper, p. 2.

¹⁷ For further details on this point, please see section A.6.5 of the Panel’s final report for the 2018 review.

EY also modelled an alternative scenario where the reliability standard in Victoria is threatened through early coal fired generation retirement (meaning that the reliability standard would be exceeded if the reliability settings such as the market price cap were not set sufficiently high to incentivise new entrant investment to keep unserved energy below 0.002 per cent). Under this scenario, EY indicated there is a peak unserved energy of approximately 3,000 MW or three times the amount that was modelled under the base scenario. This implies a threefold increase in costs to achieve an expected outcome of zero unserved energy compared to the base scenario. That is around \$600 million per annum, or a 20 per cent increase in wholesale energy costs, compared to current Victorian wholesale energy costs.

Therefore, the Panel would encourage the Commission to be conscious of the reliability trade-off when considering changes to the level of the reliability standard.

Consideration of different metrics for the reliability standard

Alternative metrics for the reliability standard were not considered by the Panel in the 2018 Reliability standard and settings review.¹⁸

However, they were considered in the preparation of the Guidelines that guide the Panel's work on these matters.

As noted in the final determination for that piece of work, the Panel considered a range of different approaches that could be taken to the form of measurement of reliability. Some of these different approaches are as follows:

- How frequently supply is interrupted, for example, the number of days per year in which an interruption occurs. This could include measures such as:
 - Loss of load expectation (LOLE), which 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.
 - Loss of load probability (LOLP), which is the proportion or probability of the days per year, half-hours per year, or events per season, in which available generating capacity is insufficient to serve demand.
- The cumulative duration of interruptions, for example, the total number of hours per year that interruption to any (not necessarily the same) consumer occurs, such as the system average interruption duration index (SAIDI) for distribution.
- The amount of energy that is not supplied in a period, for example, the NEM's current unserved energy standard.
- Deterministic standards, which define a minimum amount of reserve generation capacity.

In their deliberations Panel set out that there are strengths and weaknesses associated with each of these approaches. For example:

- A deterministic standard may be relatively simple to implement, but the actual level of reliability it provides is a function of the number of generators actually in service at any given time.
- Time-based measures such as LOLP and LOLE provide information about the frequency of interruptions, but say nothing about actual volumes of energy not served.
- A volumetric measure, such as USE, captures the volume of energy lost effectively, but says nothing about the frequency or duration of interruptions to customer supply.

Despite this, the Panel concluded that the form of the standard should be retained as USE and that it should not be automatically reassessed at each review, for the following reasons:¹⁹

- Firstly, the NEM is an energy only market, with no separate market to incentivise investment in capacity. The Panel considers that the best way to determine if there has been sufficient capacity investment to meet customer demand is to measure the extent to which all customer demand has been met. A volumetric measure of energy demand met, such as USE, provides an optimal measure of the relative effectiveness of the NEM to meet customer demand.
- There are benefits in retaining the same form of standard to provide a level of certainty and stability to market participants and USE has been used for the reliability standard since market start. Maintaining the status quo has no inherent value, although a perception that it may be subject to regular change could create market uncertainty, potentially increasing the cost of investment. In the absence of any clearly

¹⁸ The 2016 guidelines establish that the form of the reliability standard should be retained as unserved energy and should not be assessed at each reliability standard and settings review.

¹⁹ Reliability Panel, 2016, *Review of the reliability standard and settings guidelines, final determination*, p. 22

identifiable benefit of changing the form of the standard, however, and given the limitations of each of the alternative types of measures, the Panel considers that these costs are not justified.

- Finally, the Panel remains satisfied that the form of the standard should remain defined as a probabilistic target for the purposes of system planning, defined as the maximum expected unserved energy. This measure of expected unserved energy is very important, as it recognises that there are many factors that may impact on the level of USE in a given year, with very different probabilities attached to each. A measure of reliability like expected USE recognises that in any given year, there is a risk that outlier events could result in the standard not being met.

The Panel acknowledges that these considerations were made in 2016. However, as noted above, nothing material has changed that would necessitate further consideration of the reliability standard. If there are concerns that the reliability standard is not appropriate in the face of an increasingly peaky supply-demand balance, then the inputs and assumptions in operationalising the reliability standard may need to be reassessed rather than the standard itself. The Panel will continue to monitor system and market trends to confirm that the above conclusions remain valid.

For example, when AEMO operationalises the reliability standard through the Reliability Standard Implementation Guidelines, it carries out a number of simulations of the power system. As part of these simulations it uses various forecasts for supply and demand. An increasingly “peaky” supply-demand balance would therefore be captured as part of those simulations via the forecasts AEMO uses for supply and demand and this may result in different actions to assure that the reliability standard would be met.

The Panel notes that AEMO has presented other metrics to provide additional insights given the changing power system dynamics, such as LOLP figures in its most recent ESOO as well as various operational reports and advice it has provided. So that these metrics are not misleading or able to be mischaracterised, the Panel considers AEMO should compare the latest LOLP analysis with that from previous years, in order to allow for these metrics to be framed within context and to be used as a basis for comparison. Publication of such metrics would help the Panel with its monitoring of such issues referred to above.

Implications that might arise if the RERT’s procurement trigger was delinked from the reliability standard

As noted above, the reliability standard is foundational for the reliability settings. The Panel considers the market price settings and the reliability standard are well integrated and encourages the Commission to maintain that integration. In other words, the Panel does not consider that the RERT’s procurement trigger should be delinked from the reliability standard – at least in the long-term.

Delinking the procurement trigger from the reliability standard would effectively create a separate standard. Imposing another standard that only relates to procurement of the RERT could distort investment signals. This would be problematic given the current frameworks for reliability in the NEM. So, the Panel would advise against delinking the RERT’s procurement trigger from the reliability standard in the NEM, particularly in relation to the long-notice and medium-notice RERT (reserves procured up to nine months, and up to ten weeks, respectively, in advance).

In relation to the short-notice RERT (reserves procured up to ten days in advance), the Panel considers it less clear whether or not the procurement of the reserves should be linked to the reliability standard. If there are out-of-market reserves that have no availability payments, and usage costs up to the market price cap, the Panel can see attraction to allowing AEMO to procure these and use them to help manage operational reliability. However, the Panel considers there are a number of matters that would need to be thought through in relation to this:

- Why are these reserves not “in the market”? (either by participating directly, or participating via its retailer or a third party provider)
- By allowing these reserves to be procured for the RERT, what implications does this have on broader wholesale market investment and operational signals?

In relation to reserves with usage costs in excess of the market price cap, the Panel considers that there should be a thorough assessment of the costs and benefits and careful consideration of the broader impacts on the market. It may also be worth the Commission thinking through alternatives such as whether a more cost effective solution would be to raise the market price cap.

The Panel also notes that the RERT may be procured to maintain power system security (where practicable) and further consideration would need to be given by the Commission to the appropriateness of this trigger and its role within the intervention framework.

The Panel thanks you for your consideration of its views. If you would like to discuss this matter further, please contact me on 02 8296 7802 or at charles.popple@aemc.gov.au.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Charles Popple', with a stylized flourish at the end.

Charles Popple
Acting Chair, Reliability Panel