

17 May 2024

Charles Pople
Chair of Reliability Panel
Australian Energy Market Commission
Sydney South NSW 1235
REL0086

Dear Mr Pople,

Draft Report – Review of Form of the Reliability Standard and the Administered Price Cap (APC)

This letter and attachment constitute AEMO’s submission to the Draft Report, published 18 April 2024, on the Review of the Form of the Reliability Standard and Administered Price Cap (‘the review’).

AEMO appreciates the opportunity to respond to the Draft Report and actively participate throughout the review process. AEMO supports the Panel undertaking this review and acknowledges the work the Panel has done to investigate and consider the nature of future reliability risk.

The reliability standard plays an important role in establishing the acceptable level of reliability and the market price settings that support effective operation of and investment in the NEM. Whilst there are a range of mechanisms in the NEM to affect reliability, as outlined in the draft report, the reliability standard remains a central feature of the current NEM, and should continue to reflect the evolving market and risk profile. With no system 100 per cent reliable, the reliability standard is set to provide for the economically efficient level of supply for a given value of customer reliability.

While the Panel’s modelling does not demonstrate an immediate issue with the way the standard is expressed, the changing supply mix and reliance on variable renewable energy will increasingly shift the distribution of forecast USE annual expectations away from a target level of annual average expected USE. Within this context it remains AEMO’s preference to update the form of the standard at this time to provide for this changing future, while also making the description of the standard more understandable for stakeholders.

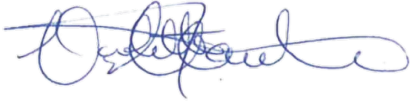
Acknowledging the overall Panel’s recommendation not to change the form of the standard, AEMO recommends the Panel include consideration of the depth, duration and frequency of events as part of the RSSR process when it sets the average annual USE value. This would allow the annual average USE expectation to be retained whilst giving the Panel opportunity to consider whether the forecast distribution of annual average USE expectations is of concern enough to adjust the level of the standard.

The nature of reliability risk in the NEM will continue to change and frameworks should seek to stay ahead of this. While the Panel’s modelling results do not present a significant increase in the level of tail risk for the future power system, AEMO considers more flexibility in the RSSR could respond to the future not emerging as forecast.



If you have any questions regarding this submission please contact Kevin Ly, Group Manager – Reform Development & Insights on kevin.ly@aemo.com.au.

Yours sincerely,



Violette Mouchaileh
Executive General Manager – Reform Delivery

1. Drivers of reliability risk are changing:

In addition to the recommendation on the form of the standard, AEMO considers a key feature of this Review has been the investigation into the drivers and characteristics of reliability events when they do occur. Building on the Directions Paper findings, AEMO acknowledges the additional work the Panel has done (shown in Appendix C of the Draft Report) and agrees that the drivers of reliability risk are changing, with USE increasingly driven by weather and a likely shift from predominantly summer to winter.

This is described on page 61 of the Draft Report where increasing penetrations of VRE combined with evolving demand patterns will increase variability in energy profiles across seasons. This will continue to introduce new challenges to manage the supply and operations of the power system with a range of resources required to maintain reliability.

2. Modelling results present an outlook that will continue to evolve.

The Draft Report also presented results of updated modelling undertaken for the Panel that show while the drivers of reliability risk are changing, forecast USE outcomes are not expected to be characterised by significant tail events. That is, instead of annual forecast USE being dominated by few very large USE events, future reliability outcomes are likely be made up of a population of reasonably frequent USE events that are of reasonable size. While the modelling results may be logical for the approach and modelling exercise, it is important to note this is not a forecast of USE and the distribution of USE events, including the potential for increasingly varied tail events, will shift as the resource mix changes.

Although the Panel's model (AUSM) uses the 2022 ISP as a basis, AEMO has not completed this specific type of modelling – i.e., creating a deliberately under-resourced model to 2040 that is calibrated back to the reliability standard and therefore does not have comparative quantitative information that could provide an alternative view of the future risks. Having said that, AEMO considers the Panel's results could also be interpreted to support the argument that the standard should change (as discussed in Section 3 below).

AEMO notes the Draft Report acknowledges the modelled results are a function of the specific approach and modelling exercise, and any change to the underlying assumptions or modelling methodology may affect the depth and duration of modelled outcomes. For example, the model is under-resourced by removing capacity to calibrate it back to 0.002% USE per year. While AEMO understands and does not disagree with this approach to generate and study USE events for this purpose, the capacity reduction and the calibration methodology may directly affect the depth and duration of USE outcomes. There may also be alternative modelling approaches which provide different results. It is therefore appropriate to exercise caution when assessing these modelling results. Actual USE outcomes will ultimately differ and could lead to different recommendations as the market continues to evolve.

AEMO also acknowledges the proposed process improvements in Section 3.2 of the Draft Report, including the forecasting recommendations to account for a larger range of weather conditions and improve modelling of future demand traces. As is stated, AEMO is continually assessing and updating its forecasting methodology. This includes consideration of the characteristics of demand traces and development of synthetic weather. AEMO does not consider that forecasting improvements should be assessed as an alternative mechanism to managing reliability risk in the future and disagrees with this being characterised as an alternative option.

3. While the current form of the standard may adequately include the risk of forecast events, it does not provide any insight into the forecast distribution of USE outcomes.

The current form of the standard includes all USE events as all forecast outcomes are weighted against their probability of occurrence and included in the calculation of the average annual expected USE. This is still true in a system where tail risk is present, it is just that average annual expected USE consists of fewer, larger events. As discussed in AEMO's submission¹ to the Consultation Paper, the problem with using an average of USE outcomes in the current form of the standard is that the number of simulations masks the impact of tail risks and sets a maximum based on an expectation of a forecast average outcome, and yet consumers do not experience average outcomes.

The Panel's modelling and analysis presented shows that USE events have sufficient frequency and size that they will materially affect the mean. Based on this analysis and when considering only the effect of forecast USE events on the mean, AEMO considers it is not unreasonable to conclude the current form of the standard adequately includes the risk of forecast reliability events.

Notwithstanding this, AEMO also considers it reasonable to hold an alternative opinion, in that the distribution of annual average expected USE outcomes matters and may affect the target level of reliability.

It is important to note the Panel's finding does not suggest that reliability risk is minimal in the future, only that the types of USE events expected are reasonably approximated by a maximum expected annual USE standard. The model is purposefully calibrated to 0.002% USE to allow for investigation of the nature of expected USE events where they do occur. The Panel's forecasts also show that reliability events are shifting larger, with increasing depth and duration.

While acknowledging the current form of the standard reasonably captures forecast reliability events, it remains AEMO's preference to update the form of the standard. The current form of the standard was developed for a capacity-limited system where reliability risk was largely uniform given the predictable and controllable supply resources available to meet consumer demand. AEMO has previously set out in submissions the importance of communicating average annual expected USE in a more tangible way for stakeholders as reliability risk continues to evolve and we transition to an energy-limited system.

AEMO is frequently requested by governments to represent USE in terms of what it will mean for consumers, and this has been discussed throughout the review as describing USE outcomes in terms of the **depth** (% of customer load), **duration** (hours), and **frequency** (probability of occurrence). Retaining the current form of the standard without acknowledgment of the depth, duration and frequency of reliability events does not recognise what USE means for consumer outcomes nor allow governments, stakeholders, and procurement activities to assess if the types of reliability events embedded within a forecast distribution of average USE are tolerable. In doing so, this may also limit the ability to assess or quantify what depth, duration and frequency is tolerable to consumers with the value of customer reliability focused on the average annual USE experience.

Figures 7.1 and 7.2 from the Draft Report below, provide the opportunity to understand the nature of expected USE outcomes from the Panel's forecast. Ignoring the blue curve and the orange and

¹ AEMO, Submission to Review of form of the reliability standard consultation paper, page 15 - <https://www.aemc.gov.au/sites/default/files/2023-05/Rule%20Change%20Submission%20-%20REL0086%20-%20AEMO%20-%2020230505.PDF>

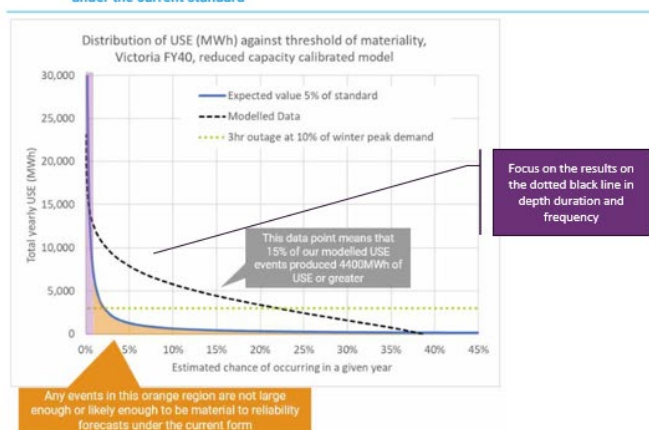
purple areas, and simply concentrating on the results (being the dotted black curve), Figure 7.1 shows when under-resourced and calibrated to 0.002% expected USE as:

- Over 60% of the time there should be no USE each year, so the most common outcome is no USE.
- USE exceeding 10% of winter demand (depth) for 3hrs (duration), should occur once in every four to five years (frequency); and

In contrast, Figure 7.2 shows USE events as their dimensions of depth and duration, with red box highlighting 96% of USE events sitting within the lower left quadrant box are less than 20% USE demand ratio (depth) and 6 hours (duration). The choice of this threshold, or where the box is drawn, changes the description of USE events and therefore how they may be considered by consumers.

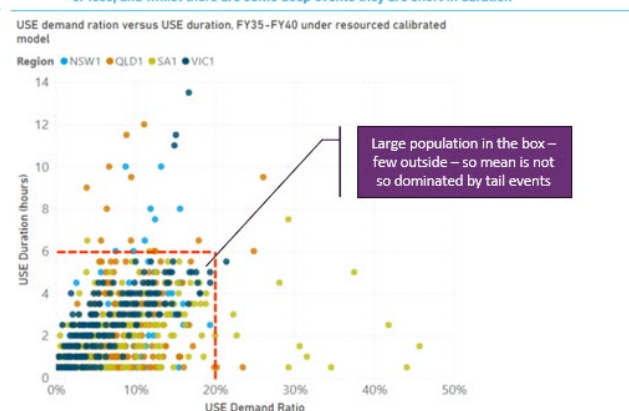
AEMO considers stakeholders need to understand these expected USE outcomes, decide whether they reflect the outcomes that are considered acceptable to stakeholders, and not masked by a singular annual expected USE value. This is why the Panel should consider the depth, duration and frequency of USE expectations as explained below.

Figure 7.1: The vast majority of events produced in the modelling are material to reliability forecasts under the current standard



Cumulative probability curve compared to expected value curve (5% of the standard)

Figure 7.2: The longest events in the calibrated reduced-capacity model are 14 hours in USE duration or less, and whilst there are some deep events they are short in duration



96% of events are less than 6 hours of USE, less than 20% of demand

4. AEMO remains concerned about communicating risk in terms of USE.

Section 3.1.2 of the Draft Report states the Panel agrees with AEMO regarding the communication of the standard and that it is important for stakeholders to be able to understand reliability in a tangible way. The Panel also considers that this can be achieved without changing the form of the standard by AEMO continuing to communicate the existing standard in alternative ways.²

While AEMO can continue to describe the type of events within forecasts in terms of depth, duration and frequency in implementing the current form of the standard, this is no substitute to calibrating the standard based on an understanding of the possible type of events that may occur within an expected USE forecast and relating this to a depth, duration and frequency that is calibrated to consumer tolerance of the risk. If the current standard is retained, AEMO recommends the Panel

² AEMC, Draft Report – Review of Form of the Standard, page 11-12 - <https://www.aemc.gov.au/sites/default/files/2024-04/Draft%20Report%20-%20Review%20of%20the%20Form%20of%20the%20Reliability%20Standard%20and%20APC.pdf>

also describe the maximum expected annual USE in terms of the depth, duration and frequency of events included in their reliability forecasts.

In practice, this could mean that the Panel would retain the current form of the standard but as part of the four-yearly Reliability Standards and Settings Review (RSSR) include consideration of the depth, duration and frequency when setting the *level* of the standard. This would allow the RSSR process to communicate the types of reliability events that a forecast of annual average USE represents and assess the changing nature of events across RSSR cycles. The Panel could then choose to calibrate the 0.002% USE level, with consideration and in response to any concerns over the distribution and type of USE events.

Ultimately given the evolving nature of reliability and the range of potential USE outcomes, AEMO considers transparent and tangible communication of these risks is the priority. All stakeholders should be able to understand and assess their tolerance to potential reliability outcomes. Acknowledging the Panel's modelling results and recommendation not to change the form of the standard at this time, AEMO recommends the Panel consider how better to describe the nature of risk across the probability distribution. This may be enabled by amending the Rules as suggested below to consider the depth, duration and frequency of forecast USE within the RSSR process.

NER 3.9.3A Requirements for the reliability standard and settings review:

In conducting the reliability standard and settings review the Reliability Panel:

- 1) *must comply with the reliability standard and setting guidelines;*
- 2) *must have regard to any terms of reference for the review provided by the AEMC under clause 8.8.3(c);*
- 3) *must have regard to the potential impact of any proposed change to a reliability setting on:*
 - i. *spot prices;*
 - ii. *investment in the NEM;*
 - iii. *the reliability of the power system; and*
 - iv. *Market Participants.*
- 4) *must have regard to any value of customer reliability determined by the AER under rule 8.12 which the Reliability Panel considers to be relevant;*
- 5) *must consider the distribution of forecast unserved energy outcomes in terms of depth, duration and frequency; and*
- 6) ~~5~~ *may take into account any other matters specified in the reliability standards and setting guidelines or which the Reliability Panel considers relevant.*

5. The Draft Report's commentary on low probability events detracts from the main findings.

Section 3.1 of the Draft Report discusses extremely large, very low probability events. AEMO is of the view that this discussion and the recommendations that follow detract from the main findings of the Draft Report.

In any reliability forecast there are some very low probability, extremely large USE events. It is their very low probability that makes these USE events uneconomic to try to avoid. By focusing on these events, the Draft Report could be interpreted to imply those who are seeking a change to the form of the standard, (to account for distribution of annual average USE outcomes), were requesting uneconomic amounts of capacity beyond that consumers desire. This is incorrect in regards to AEMO's continuing suggestion that the form of the standard should change. In contrast AEMO is seeking to ensure an important aspect of providing reliability to consumers can actually be better understood by consumers so that they can engage better with it.

AEMO suggests that the Final Report be streamlined by reducing discussion of extremely large events.