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17 June 2019

Nicola Falcon
General Manager, Forecasting
Australian Energy Market Operator

By email: energy.forecasting@aemo.com.au; Nicola.Falcon@aemo.com.au

Dear Ms Falcon

Forecasting for Retailer Reliability Obligation

Energy Consumers Australia appreciates the opportunity to comment on the Australian Energy Market Operator's (AEMO) *Reliability Forecasting Methodology Issues Paper: How to produce the reliability forecast under the Retailer Reliability Obligation* of April 2019 (the Paper) and to participate in the workshop on 9 May 2019.

Energy Consumers Australia is the national voice for residential and small business energy consumers. Established by the Council of Australian Governments Energy Council in 2015, our objective is to promote the long-term interests of energy consumers with respect to price, quality, reliability, safety and security of supply.

The Retailer Reliability Obligation (RRO) is an important market-based reform, and we welcome the opportunity to participate in the design of the detailed implementation arrangements. We have commissioned Finncorn to provide advice on aspects of this work, which we attach for your consideration. It is important to note that this work does not represent an ECA position, but is used to identify areas for further engagement and thinking.

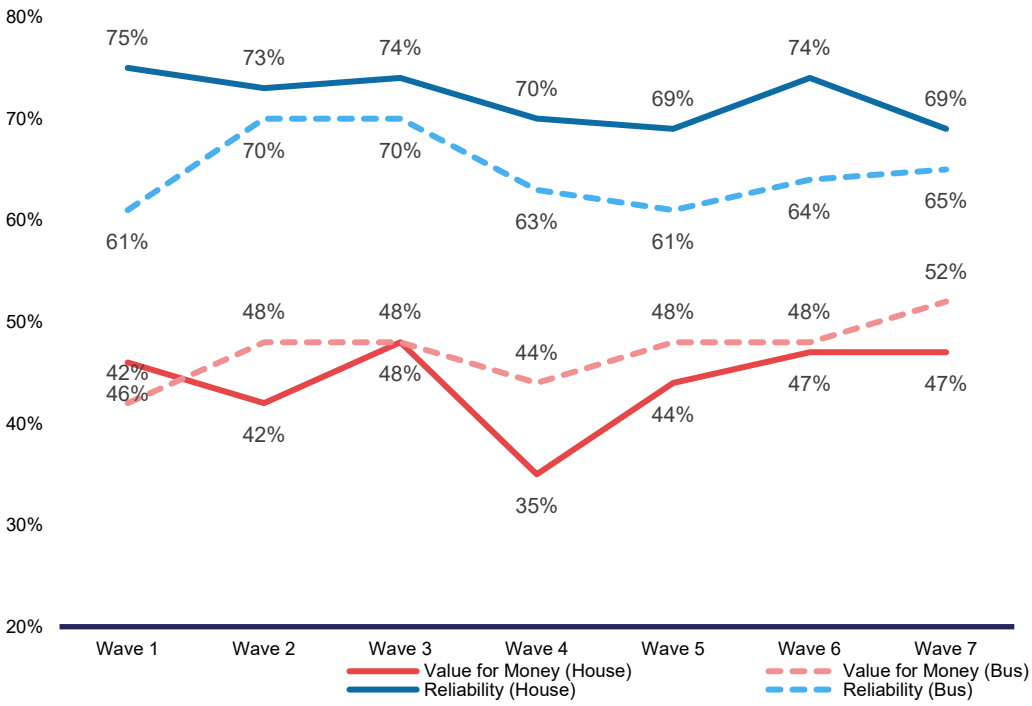
Consumer priorities

A key framing for this work is what consumers are telling us about energy services and priorities. The Energy Consumer Sentiment Survey indicates that affordability is their main priority. Figure 1 shows the response to questions about value for money and reliability over the seven waves of this research, for both households and businesses:[1]

- Value for Money
  "How would you rate the overall value for money of the products and services provided by your electricity company in the last 6 months?" (% 7 out of 10 or higher)"
- Reliability
  "Thinking about the reliability of your electricity supply, how satisfied are you with the number of times you've had loss of power, blackouts or other faults with your electricity supply in the past 6 months?" (% 7 out of 10 or higher)"

[1] https://energyconsumersaustralia.com.au/wp-content/uploads/Energy-Consumer-Sentiment-Survey-Report-June-2019.pdf

Figure 1: Consumer satisfaction with price and reliability

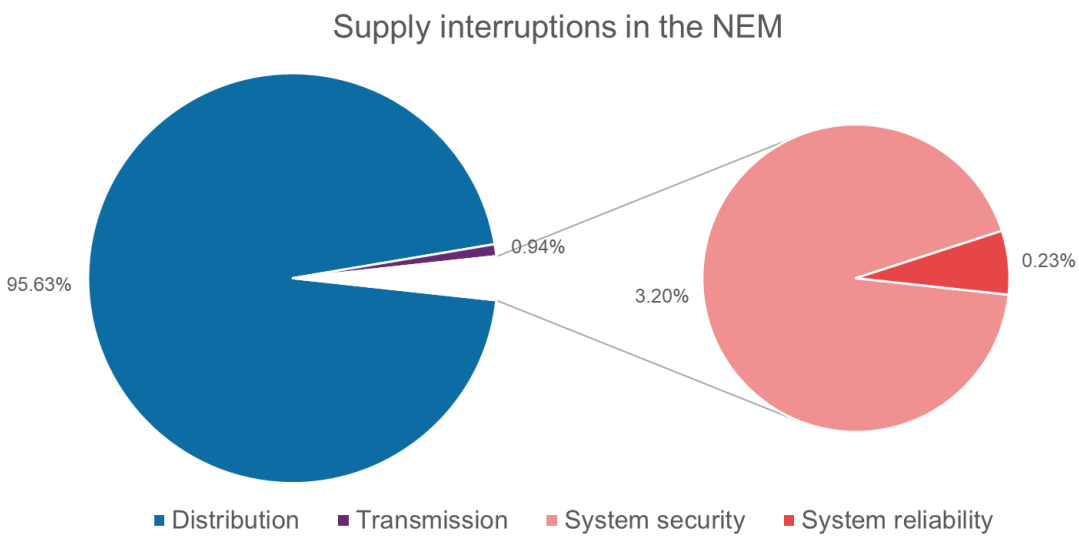


These survey responses demonstrate that consumers have significantly higher satisfaction with the reliability of electricity services than they do with price. The survey has also consistently shown that consumers rate the 'value for money' for electricity below that for all the other services (water, mobile phone, insurance and banking) included in the survey. We do not interpret this data as suggesting that consumers necessarily want a trade-off of lower prices for less reliability. We do, however, believe that it provides strong evidence for being cautious in instituting mechanisms to increase (or maintain) reliability, given the cost implications for consumers.

The need to ensure the RRO is appropriately calibrated is further reinforced by the observation that less than 4% of electricity supply interruptions are caused by system security or system reliability factors (see Figure 2).[2]

[2] Australian Energy Market Commission (AEMC) identified in its *Reliability Frameworks Review: Final Report 2018*

Figure 2: Sources of supply interruptions in the NEM: 2007-08 to 2016-17
(Source: AEMC Reliability Frameworks Review 2018



We believe this is significantly important in the context of the consultation on the RRO. In simple terms, the RRO operates by identifying periods where demand is likely to exceed supply and then requiring retailers to contract enough supply to cover the forecast demand. The initial consequence is too much demand for contracts chasing too little supply, and hence higher prices. The intention is that the demand for contracts will then underwrite the provision of additional supply.

Consequently, it is critical that the forecasting that will inform the decision about whether to trigger the RRO, is as robust as possible and not unduly conservative, given the cost implications for consumers. The Finncorn paper (Attachment A) identifies risks associated with overly conservative RRO settings, and identifies ways to mitigate these risks.

There are two recommendations we regard as being particularly important; consistency of forecasting methodology for the T-3 and T-1 Reliability Gap, and the treatment of 'in progress' generation projects.

Consistency for T-3 and T-1

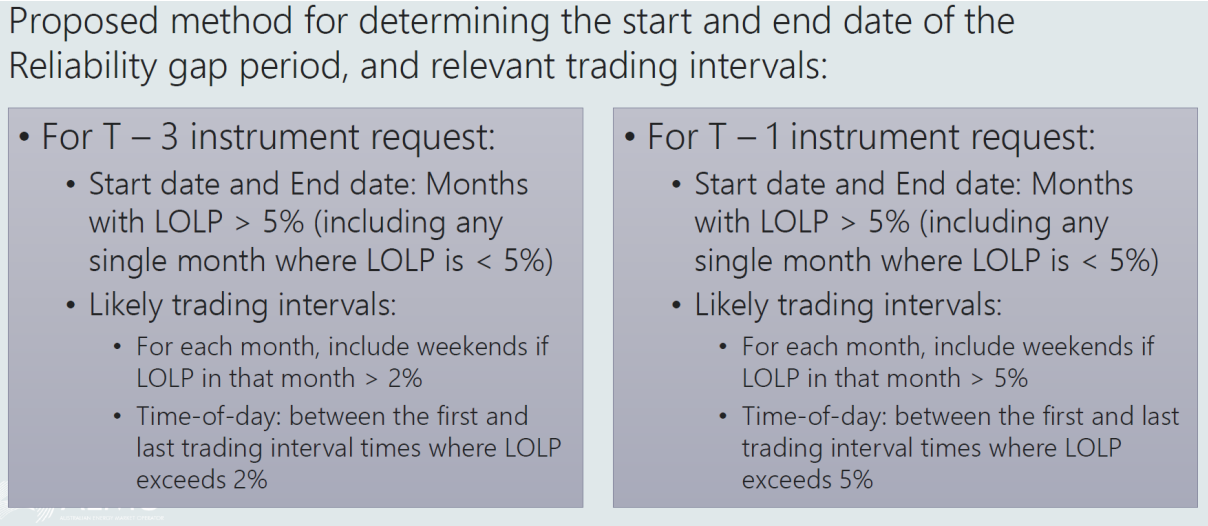
The Paper states AEMO's argument for different approaches to T-3 and T-1 Reliability Gap forecasting as:

> *For a T-3 reliability instrument, the approach for determining the reliability gap period and likely trading intervals will be necessarily conservative to reflect the greater uncertainty around the timing of possible USE events when modelling that far into the future, and noting that as per the RRO Draft Rules clause 4A.C.4 the T-1 reliability gap period can only be a subset of the T-3 reliability gap period.*

A clearer picture of the different proposed approaches is given in slide 42 of the workshop pack[3], reproduced as Figure 3 below.

[3] https://www.aemo.com.au/-/media/Files/Stakeholder_Consultation/Consultations/NEM-Consultations/2019/Reliability-Forecasting-Methodology/RRO-Workshop---combined-slide-pack.pdf

Figure 3: Reliability gap period and trading intervals



The drawback is that this 'conservative' approach will cause an immediate increase in contracting activity, and the result will be higher prices. These costs will not simply go away when a less conservative T-1 forecast is issued. We would ask AEMO to consider whether there may be opportunities for it to signal that there might be a gap, ahead of it formally triggering the RRO.

Whether the proposed Rules should be amended to provide circumstances in which the T-1 reliability gap period can deviate from being a subset of the T-3 period is a matter we leave to AEMO and industry to consider. The underlying principle should be that there is no incentive for the T-3 period to be set conservatively to accommodate a wide range of possible T-1 outcomes.

New entrant generation

The Paper describes AEMO's proposed (new) approach to factoring-in new generation in its forecasts for the RRO as:

> *Projects that have commenced construction but do not yet meet all five of the criteria [in Table 3 of the Paper] are also published, because they have clearly made a formal commitment to construct (referred to as 'Com*' projects in AEMO's Generation Information page).*
>
> *In the 2018 ESOO, all new entrant generation and storage projects that were classified as committed, or had commenced construction, were included in the forecast. However, even though construction may have commenced, Com* may be less certain to proceed, particularly if connection approvals have not been provided. For the 2019 ESOO and future reliability forecasts, AEMO is proposing not to include Com* projects.*
>
> *AEMO considers that this more appropriately takes into consideration the cost of misclassification. At T-3, if more capacity is assumed committed than actually proceeds, there is a risk that a reliability instrument may not be requested, and it is not possible in subsequent years to reverse that decision based on new information. If, on the other hand, more capacity is built than assumed at T-3, this would serve to close any reliability gap and may result in no T-1 reliability instrument needing to be issued.*

As observed above, there are costs associated with being conservative at T-3. While we accept that not all projects with AEMO's 'Com*' will come online at their scheduled dates, it is equally not true that none of them will. Good forecasting practice would be to use history as a guide to what the right 'risk-weighted' proportion of new generation should be (that is a proportion between the 100% previously used and the 0% now being proposed). The proportional likelihood can either be included through processes of weighted likelihood through multiple iterations or, more simply, by applying the weighting to the rated capacity of Com* generators. As noted in the Finncorn paper it is also appropriate to include a forecast 'lag' for average project delays.

Conclusion

The RRO is a useful tool for signaling additional investment needs. However, we need to ensure that it is appropriately calibrated. Conservatism in the approach to the T-3 Reliability Gap forecast and treatment of new entrant generation risks increasing costs to consumers for little, or possibly no, benefit.

New investment in the NEM is increasingly likely to be for renewable energy sources and for storage which tend to have shorter lead-times in terms of planning and construction than traditional, large, centralised generation. This means that care will need to be exercised in forecasting reliability gaps, particularly in the medium-term, which the market may close organically by investing in this more flexible technology. As the development of the Hornsdale Power Reserve demonstrated 100MW/129MWh of storage can go from being designed to installed in under 8 months.[4]

Thank you for the opportunity to contribute to the development of the supporting arrangements for the RRO. Please do not hesitate to contact David Havyatt, Senior Economist, on 02 9220 5500 or david.havyatt@energyconsumersaustralia.com.au, if you would like to discuss this submission further.

Yours sincerely,

Lynne Gallagher
Acting Chief Executive Officer

[4] https://hornsdalepowerreserve.com.au/

Summary and recommendations

In this paper we briefly outline the process, the impact on market participants and consumers, particular areas of concern in relation to the forecasting of Reliability Gaps and develop suggestions to minimise negative cost impacts on consumers within an acceptable reliability outcome.

Our recommendations are:

- **Recommendation 1:** ESB and AEMO should (a) clarify what the ESOO USE forecast really represents (b) clarify what the RRO USE forecast trigger is intended to be and (c) adjust the RRO process to differ from the ESOO USE forecast if the two are not identical.
- **Recommendation 2:** AEMO's Forecasting Report should be supplemented with a lookback of their forecast accuracy on maximum demand over the life of their ESOO-style forecasting of the metric.
- **Recommendation 3:** AEMO should include "Com*" projects, using a risked basis of the capacity size and timing to account for uncertainty of delivery. These projects should be subject to a relatively high risk-weighting of the capacity being delivered within three years (80%?), with a reasonable delay assumed (6 months on top of project estimated COD?)
- **Recommendation 4:** AEMO should consider a similar pipeline-risking approach to projects which have met some of the five tests for being considered "Committed" (and thus included in the forecast) – particularly in relation to projects which have secured offtake arrangements and internal and external financing commitments.
- **Recommendation 5:** AEMO should simulate the P90 maximum demand case and include it explicitly, except in the circumstances that the P50 maximum demand case results in zero USE.
- **Recommendation 6:** AEMO's process should allow for a proportional buffer – for example, a 20% breach of the Reliability Standard (from 0.0020% to 0.0024%) before requesting an RI from the AER.
- **Recommendation 7:** AEMO should maintain the same process and threshold for LOLP in defining the RG at both T-3 and T-1.

Review of engagement and supporting material

As requested, we are assisting Energy Consumers Australia ("ECA") in engagement with the RRO design and implementation process. This involves reviewing material from both AER and AEMO in relation to the Retailer Reliability Obligation ("RRO") and participating in structured engagement. This has included:

- Attendance at two AER workshops to date (with Contracts and Firmness to follow on June 14th)
- Review of three of AER's four draft RRO Guidelines (on the **Market Liquidity Obligation**, **Reliability Instrument**, and **Forecasting Best Practice,** again with **Contracts and Firmness** to follow)
- Review of relevant AEMO material including:
    - The **Reliability Forecasting Methodology Issues Paper** (April 2019) and **Addendum** (May 2019)
    - The associated slide pack developed for their Reliability Forecasting Methodology workshop on May 9th (which we were not invited to attend);
    - The associated **Reliability Standard Implementation Guidelines**, draft 17th April 2019 (updated to account for the RRO-related aspects of reliability);
    - The **ESOO Methodology Document** April 2019 (for the 2019 ESOO)
    - The **Electricity Demand Forecasting Methodology Information Paper** April 2019 (for the 2019 ESOO); and

- The most recent **Forecast Accuracy Report 2018**.

- Public submissions – where we note some substantial concerns. For example, ERM Power's submission to AEMO on the Reliability Forecasting Methodology Issues Paper stated they believe ***"AEMO is intending to apply an excessively conservative approach to forecasting USE in the 2019 Electricity Statement of Opportunities"***.

Less frequent interventions would be better for consumers

It is our premise that the long-term interests of consumers would be better served by less-frequent occurrences of intervention under the Retailer Reliability Obligation ("RRO").

The interventions occur when AEMO requests (and is likely granted by the AER) a Reliability Instrument ("RI"), based on an ESOO forecast of a Reliability Gap ("RG") three years in the future. The RI will either:

- **have no effect** (in the case where all retailers collectively agree with AEMO that the reliability risk is present and so, needs to be managed in their businesses via contracting in the normal course); or
- **cause retailers to undertake additional contracting for compliance purposes**, in excess of their commercial judgement (when they judge that AEMO's forecast is overly conservative).

In the latter case, demand for contracts will rise.

To meet that demand, market participants will deliver a combination of:

1. **new sources of reliability** (such as additional demand response, batteries, pumped hydro, peaking generation); and
2. **additional contracting from existing sources** (such as higher levels of contracting from existing thermal plant units).

In the first case, total systems costs are increased by the new capacity. In the second case, additional risk is being taken by the suppliers of reliability contracts at the margin, where an unplanned outage of the supporting capacity could lead to large contractual losses.

The outcome is passed directly to consumers: the cost of such contracts entered into by retailers is the basis for their Cost of Goods Sold, essentially a hedged version of the wholesale pool price exposure.

The more contracting is compelled, the less relevant is the outcomes for the spot price – the assertions that the RRO would drive down spot prices are not really relevant. All that matters to consumers is the retailers' overall Cost of Goods Sold, driven by contracts prices, not spot prices.

In short, when AEMO proves to be too conservative in driving compliance activity under the RRO, consumer prices will be higher than otherwise.

AEMO's ESOO processes can tend to the conservative

Until the advent of the RRO, the ESOO was informational – in a sense, AEMO's ESOO was a means to "ring the alarm bells" to highlight the potential need for further capacity investment to meet the Reliability Standard.

Since it was market participants who were exposed to the risks and opportunities, they would use the information in the ESOO but form their own judgement as to whether AEMO's forecast was the appropriate basis for their investment decisions.

Clearly, the consequence for AEMO of being too relaxed in relation to future reliability were worse than being too conservative: it is much more embarrassing if the lights go out when you said they wouldn't, than if they stay on when you said they might not.

Furthermore, there was no real consequence for AEMO in being too conservative, because they are only one view – ultimately participants would face the consequences of their own decisions.

This changes when the ESOO forecast creates a specific compliance obligation via the RRO.

As a result, we should critically examine whether the ESOO process as it stands is an appropriately balanced method to compel participant activity, rather than suggest or recommend it.

"False Positive" risks to consider and potentially, challenge

In this section we present a few areas of concern to us, based on our review of AEMO and AER materials, and associated submissions.

Is the trigger for a RI the "expected" USE?

It is unclear whether the process AEMO undertakes for the ESOO really leads to an "expected" USE forecast, where "expected" is commonly defined and understood to mean a P50 (or 50% probability of exceedance) case in any given year.

Other terms such as "maximum expected USE" crop up (e.g. the introduction to the ESOO Methodology Document) – which could be something else entirely, such as the "USE expected in an extreme weather year" or some other far more conservative interpretation.

Whether or not the actual nature of AEMO's version of the term "expected USE" is acceptable from the point of view of the ESOO in general, or the purposes of the Reliability Panel and the Reliability Standard is outside our scope here.

The concern we have is that the RRO – based on our understanding from the policy design process – was only meant to be invoked in the case of very clear shortfalls in future capacity, implicitly due to a market failure (since in hindsight, the NEM has met the Reliability Standard in the past without the RRO).

We understand that was to mean forecast USE exceeding the Reliability Standard in the P50 case, or with a 1-in-2 year probability.

Recommendation 1: ESB and AEMO should (a) clarify what the ESOO USE forecast really represents (b) clarify what the RRO USE forecast trigger is intended to be and (c) adjust the RRO process to differ from the ESOO USE forecast if the two are not identical.

Have AEMO's forecasts proved to be skewed conservatively, or not?

In reviewing AEMO's 2018 Forecast Accuracy Report, we note there is no statistical back-testing of the forecast accuracy of AEMO's maximum demand forecasts over time – the ultimate top-down view of whether AEMO has been forecasting well or poorly (albeit, backwards-looking).

In our view, this would involve:

1. Gathering the set of historical maximum demand outcomes in each of the 5 NEM regions for a given year;
2. Comparing these outcomes with the immediately preceding AEMO ESOO forecasts for P90, P50 and P10 maximum demand in that region.

The first of these are shown clearly in the Report (e.g. Figure 10 for NSW, etc.), but there is no lookback to AEMO's prior forecasts, only those for (in this case) the preceding 2017 ESOO.

The data set may be a bit sparse, but over time we would expect to see the P90 forecasts exceeded in 90% of the years, P50 in half the years, P10 in 10% of the years. There would also be an opportunity to identify any apparent trend in forecast accuracy – getting better or worse over time?

Recommendation 2: AEMO's Forecasting Report should be supplemented with a lookback of their forecast accuracy on maximum demand over the life of their ESOO-style forecasting of the metric.

Should the generation project pipeline be better assessed?

We are particularly concerned by AEMO's very strict definition of when a generation project is "committed enough" to be included in the modelling of the gap, three years forward.

If there is a tight supply-demand balance looming (such that AEMO may feel obliged to call for an RI), then we would expect a substantial pipeline of capacity to be mobilising to address it three years out – exactly as we observe today. We know from recent history that solar PV, battery storage and gas reciprocating engine capacity projects can be conceived and delivered well within three years, as can the contracting of demand response.

At T-1 this may all be apparent, but by then the damage may be done in terms of driving up contract demand and prices, if at T-3 an RI has been granted by the AER based on AEMO taking an overly pessimistic view on the pipeline as it sees it.

A key concern is the total exclusion of projects which have commenced construction (defined as "**Com***") prior to finalising their grid connection and generator performance standard requirements. These outstanding matters could well lead to delay in the project's stated Commercial Operations Date ("COD"), but it seems very likely indeed that almost all such projects will have sorted this out within the three years.

AEMO applies a high degree of science and rigour in forecasting demand under many more complex variables than this – yet takes a very crude approach indeed to supply, which we believe is far too conservative in light of the consequences of false positives.

In particular, AEMO would be aware that tight supply-demand conditions in three years will be correlated with identified but uncommitted generation capacity projects advancing to completion – in many cases, within the forecast period and so, helping to address any threat to reliability.

Recommendation 3: AEMO should include Com* projects, using a risked basis of the capacity size and timing to account for uncertainty of delivery. These projects should be subject to a relatively high risk-weighting of the capacity being delivered within three years (80%?), with a reasonable delay assumed (6 months on top of project estimated COD?)

Recommendation 4: AEMO should consider a similar pipeline-risking approach to projects which have met some of the five tests for being considered "Committed" (and thus included in the forecast) – particularly in relation to projects which have secured offtake arrangements and internal and external financing commitments.

Do the weightings of P90, P50 and P10 USE cases make sense for an expected USE case?

As a specific subset of the general concern above, we note that as a final step in deriving the "expected USE" forecast, AEMO weight the USE from P10 maximum demand simulations to 30.44% and the USE from P50 maximum demand simulations to 69.56%.[1]

The mathematics and statistics leading up to this outcome is probably sound, but the final step is a simplification of the "right" answer, which would be weighting BOTH the P90 and P10 cases to 30.44% and the P50 case to 39.12%.

The simplification is historically driven by avoiding further computational processes, which does not sound like a critical constraint to us in 2019. AMO's explanation for the validity of the simplification is confusing:

- On one hand AEMO state "The P50 and P90 outcomes are very close and so their weightings can be aggregated".
- Further on, AEMO state they "assume the USE is zero in the P90 case". We expect this is very likely to be the case at the moment – it would be extremely improbable that a simulation would throw up enough forced outages at the same time to cause USE in a P90 max demand case. However this may not always be the case, especially if (e.g.) a major thermal closure was being included in the scenario, ahead of committed replacement capacity.

These two statements can only both be true if both the P50 and P90 cases are in fact, zero USE.

Perhaps the P50 USE case is also zero (or very close to it) today, in which case the issue is immaterial.

[1] Refer to Section 5.2.2 of AEMO's "ESOO Methodology Document", April 2019

However, to the extent that EITHER OR BOTH the P50 case and the P90 case are non-zero, which might well be a plausible circumstance should one more coal plant announce an exit, the methodology used will over-estimate expected USE.

Recommendation 5: AEMO should simulate the P90 maximum demand case and include it explicitly, except in the circumstances that the P50 maximum demand case results in zero USE.

Should there be a materiality threshold?

The concept of a "material reliability gap" appears to have been weakened – it is now defined as any forecast breach of the Reliability Standard, no matter how small.

Since the existence of an RG and the request by AEMO for a RI is a "cliff edge" decision which drives every retailer participant into a compliance task which may increase consumer costs, we do not think this is appropriate.

A better approach would be to reinstate a materiality buffer, to ensure that modest forecasting errors do not prompt costly action based on a false positive.

Recommendation 6: AEMO's process should allow for a proportional buffer – for example, a 20% breach of the Reliability Standard (from 0.0020% to 0.0024%) before requesting an RI from the AER.

Should the T-3 RG be structurally more conservative than the T-1 RG?

AEMO have proposed to apply a broader definition of the RG at the T-3 point at which they request the RI. This is because at the T-1 point, they may only narrow the extent of the RG, not widen it, based on the better information and forecast at that time.[2]

While this is sensible from their perspective in guarding against errors by allowing them to be corrected at T-1, we do not think it is appropriate – because the T-3 RG will drive immediate contracting activity, on a basis that is clearly skewed to be more conservative than the ultimate outcome.

Recommendation 7: AEMO should maintain the same process and threshold for LOLP in defining the RG at both T-3 and T-1.

[2] E.g. if the T-3 RG is Dec-Jan weekdays 4pm-8pm, the T-1 RG can only be a smaller subset of this (e.g. Jan weekdays 6pm-8pm). AEMO do this by applying a looser threshold (Likelihood of Loss Probability of 2% at T-3, rather than 5% at T-1) for including a trading interval in the RG.