28 November 2022

Mr Ben Jones
Manager, Reliability and Operability Forecasting
Australian Energy Market Operator (AEMO)
GPO Box 2008
Melbourne VIC 3001

Lodged electronically: energy.forecasting@aemo.com.au

EnergyAustralia Pty Ltd
ABN 99 086 014 968

Level 19
Two Melbourne Quarter
697 Collins Street
Docklands Victoria 3008

Phone +61 3 8628 1000
Facsimile +61 3 8628 1050

enq@energyaustralia.com.au
energyaustralia.com.au

NEM Reliability Forecasting guideline and Methodology — Consultation paper — 31 October 2022

EnergyAustralia is one of Australia's largest energy companies with around 2.4 million electricity and gas accounts across eastern Australia. We also own, operate and contract a diversified energy generation portfolio across Australia, including coal, gas, battery storage, demand response, wind and solar assets, with control of over 4,500MW of generation capacity.

We support AEMO reflecting on the events of winter 2022 and what this means for its suite of reliability forecasts. We also support AEMO generally in identifying improvements to its modelling approaches and data inputs.

AEMO's work in this area forms part of a broader discussion on how we measure and respond to changing risks in the energy system. This includes increasing weather dependency, shared risks across electricity and gas supply, evolution of demand-side technologies, and integration of adjacent sectors like transport and industry which will also be fundamentally affected by the transition to a net zero future.

We appreciate AEMO is bound to various requirements and functions under the National Electricity Rules (NER) that define its reliability forecasting publications, associated guidelines and datasets. It is critical that participants have transparency over various discretionary elements within this framework, particularly in how AEMO calculates unserved energy (USE) and related metrics. Such transparency should give stakeholders confidence that AEMO is giving effect to the Reliability Standard in accordance with the long-term interests of consumers.

For stage 2 of this consultation, we encourage AEMO to quantify the likely impact of each of its proposed changes. In many cases we consider they will result in higher forecast amounts of USE. For example, the data presented in AEMO's consultation paper on commissioning dates suggests AEMO has materially overestimated forecast operational capacities, and it suggests it has omitted outage types observed in June 2022. These data could be used to recast and assess earlier USE projections. A 'worst case' low thermal fuel scenario in the Energy Adequacy Assessment Projection (EAAP) would signal high reliability risk, however the very low likelihood of this scenario occurring needs to be carefully communicated to avoid raising alarm amongst policy-makers.

Our observations on each section of AEMO's consultation paper are as follows.

AEMO should take a broader and more considered approach around fuel limits

The various pressures leading to the exit of coal-fired generation also affect the ongoing viability and certainty of upstream coal supply. Gas-fired generation will play a diminishing albeit critical role during the transition in providing flexible backup capacity, with more intermittent gas fuel offtakes[1] leading to similar questions around the commercial viability of upstream infrastructure. Modelling of fuel supply costs and volumes tends to be simplistic given the difficulties in capturing data and behaviours around contracting. Recent market events also illustrate the role of participants' intertemporal decisions in the face of uncertainty, which can materialise in terms of pricing and physical availability, which are again difficult to model.

In spite of these challenges, we encourage AEMO in exploring evolving reliability risks arising from coal and gas fuel supply. Further investigation would inform whether there is value in communicating fuel limitations on a regular basis and in a way that enables participants to respond. This might require new measures to be reflected in MT PASA projections rather than, or in addition to, a deterministic 'worst case' scenario in annual EAAP publications.

This scope of works is somewhat broader than that proposed by AEMO, whose motivations around energy limits and proposed approach reflect:

- energy limits arising in operational timeframes in June 2022
- AEMO's forecasting models not identifying energy constraint issues on the basis of information provided by participants
- the EAAP being specifically defined to explore energy adequacy in NER 3.7C.[2]

The events of winter 2022 and the risk of recurrence have spurred various actions from market bodies and policy-makers. It is not clear, however, whether there was a failure of participants in providing necessary data on energy limits or in AEMO's current set of forecasting models. AEMO's proposal to develop a 'worst case' scenario in the EAAP and expand its GELF parameters also does not seem to address any needs arising in operational timeframes. Moreover, such a scenario would presumably be constructed on the basis of assumed (low or zero) fuel supplies rather than using information submitted by participants. Finally, gathering additional GELF data for a 'most likely' scenario would tend to reiterate the energy limits (in GWh) already submitted to AEMO, hence add little value.

The significance of recent events should also be taken in the context of trends arising as a result of the transition. The Reliability Panel has proposed reviewing of the form of the Reliability Standard to capture tail risk, where energy (rather than capacity) limitations are more prominent. A reliability framework has also now been proposed to supplement AEMO's new gas market intervention powers[3], which will be consulted on over 2023. Any articulation of coal and gas fuel limits will need to integrate into these changing reliability frameworks. Within these frameworks or at least as part of AEMO's proposed EAAP

[1] AEMO 2022 Integrated System Plan, *Appendix 4 System Operability*, June 2022, pp. 39-42.
[2] AEMO, *NEM Reliability Forecasting guideline and methodology consultation - Consultation Paper*, 31 October 2022, p. 9.
[3] https://www.energy.gov.au/government-priorities/energy-ministers/priorities/gas/proposed-regulatory-amendments-extend-aemos-functions-and-powers-manage-east-coast-gas-supply-adequacy

analysis, we see value in AEMO publishing measures on energy adequacy, for example in terms of a fuel or energy reserve margin. An example of this is in the monitoring and reporting of hydro storage levels under the Tasmanian Energy Security Framework, which includes monthly dashboard[4] publications by the Tasmanian regulator. Equivalents for thermal plant would be in reporting coal stockpiles and gas storages, which could be projected forward under probabilistic or deterministic settings. Development of a 'worse case' EAAP fuel limit scenario would be useful in helping to identify:

- dimensions around prudent levels of fuel reserve, including costs of holding reserves
- relationships between different fuel sources and multiple generating units, including substitution between coal and gas, with links to analysis in the Gas Statement of Opportunities
- seasonality, particularly gas storage levels at different time of year
- the types of information required from participants to model this, and over what timeframes (noting AEMO has now proposed a new set of data inputs)
- intertemporal decision-making in the face of scarcity and high price events, and the limitations of using perfect foresight in modelling exercises
- interactions with weather events. In extreme cases, fuel supply chains could be cut otherwise periods of fuel scarcity could arise due to renewables droughts and unanticipated fuel demand
- issues around the treatment of commercially sensitive information. A central EAAP scenario would presumably be based on participant contracting and other data, in which case it may be necessary to aggregate fuel stockpile and delivery volumes, which could be skewed in the presence of very large facilities. Scenarios based on fabricated or assumed participant data could be presented at a more granular level.

Any new scenario in the EAAP needs to be carefully considered as part of the reliability framework and also communicated to stakeholders. AEMO suggests that it will only declare Low Reserve Conditions (LRC) for scenarios that are "reasonably probable" and refers to the 2018 EAAP where LRC was not declared in spite of forecast USE.[5] We note that AEMO did not go further to comment that, by design, a 'worst case' scenario would be improbable and so is being developed solely for exploratory reasons. AEMO's comment that it "will incorporate the EAAP analysis within the ESOO"[6] should also be clarified, as we would not expect improbable fuel limits to affect reliability calculations.

We are generally concerned that stakeholders are highly concerned about physical supply shortfalls in the wake of recent events, and the publishing of a scenario that illustrates this risk will not be taken in appropriate context. Even with best efforts to

[4] https://www.economicregulator.tas.gov.au/about-us/energy-security-monitor-and-assessor/tasmanian-energy-security-monthly-dashboard

[5] AEMO, pp. 10-11.

[6] ibid., p. 12.

communicate low probability of these outcomes, it could draw attention from commentators and policy-makers, possibly inviting further intervention in markets.

In addition to future EAAP reporting, AEMO could work to gather data and publish analysis on the events of winter 2022 to put this into perspective, namely whether the combination of price, fuel, outages and weather events reflected a credible planning scenario, and where these outcomes sit in the tail of risk distributions.

AEMO also proposes to amend the EAAP to allow it to create other scenarios without having to go through rules consultation. In the absence of understanding how this might affect LRC notifications and other AEMO actions, we are not supportive of this open-ended ability. We note that the Reliability Panel can prescribe scenarios for the EAAP under NER 3.7C(k)(1), which may be an expeditious pathway while still ensuring oversight by participant and other stakeholder representatives. We expect AEMO to liaise with the Panel in any case as it progresses with this consultation.

The effects of changed modelling approaches should be quantified

AEMO's consultation paper proposes the following:

- EAAP methodology and model to predominantly align with the ESOO. GELF parameters will be added to the ESOO model instead of the most recent MT PASA run model.
- EAAP to apply material outages submitted to MT PASA that are not recallable.
- EAAP to apply operational assumptions from AEMO's Inputs, Assumptions and Scenarios Report that are relevant to each EAAP scenario. This may include minimum stable level, ramp rates, and/or minimum operational timeframes.
- Relevant GELF and ISP operational assumptions may be applied to all reliability forecasts.
- MT PASA submitted energy limits to be applied to the MT PASA Loss of Load Probability (LOLP) run.[7]

AEMO states these changes are required to transition the EAAP to provide strategic insights about energy adequacy risks in the NEM with rigour and accuracy. Including energy limits in the MT PASA LOLP run will better provide insights about worst case risks.[8]

We support consistency in data inputs and methodological elements of AEMO's forecasting models. Our general understanding is that changes are necessary to improve the accuracy of the EAAP model and effectively aligning it to the ESOO, including data collection and publication by mid-year. Some other changes including reflection of consistent operational assumptions across all reliability forecasts may materially impact measurement of USE and this should be explicitly quantified by AEMO.

[7] ibid., pp. 11-12.
[8] Ibid.

We support more accurate 'in service' dates and committed status

Improvements to modelling of 'in service' dates and of commitments seem justified. A better solution to addressing any bias in forecast operational capacity would be to obtain accurate input data from participants, rather than adjusting these data. AEMO could also explore any ambiguities in how it requests information. This notwithstanding, the prospects and consequences of delays in commissioning large infrastructure are now likely to be material enough to justify sensitivity analyses in AEMO's forecasts.

The approach to forced outages seems somewhat burdensome

AEMO's approach to capturing more detail on forced outage rates seems prudent in principle, however a less burdensome approach that still provides reasonable outcomes may be simply to benchmark outage rates against historic data. In practice it would be extremely challenging to define and accurately capture outages according to different mutually exclusive causes, degrees of discretion, and the influence of system stress events or market conditions. As noted elsewhere, it would be useful for AEMO to illustrate the impact of its proposed approach on forecasting reliability risks.

Further guidance on MT PASA reason codes and recall times is required

The reason codes for the MT PASA seem reasonable however further guidance should be provided on how participants submit information for economic shutdowns, and how AEMO intends to use this information.

The example in table 6 of AEMO's consultation paper shows one MT PASA submission and would benefit from more details on the use of economic reasons, including when and why participants might change availability status between PASA submissions. The example is somewhat unrealistic in showing a three day economic shutdown in the middle of January on the back of a planned outage, whereas some thermal units may withdraw for extended periods in shoulder seasons. It would be more useful to illustrate events leading to changes in availability for economic reasons, particularly since these types of shutdowns and interactions with notice of closure requirements (including AER compliance monitoring) were the main policy driver for introducing new availability codes. That is, AEMO's MT PASA forecasts would presumably override such discretionary shutdowns depending on weather and other assumptions, so participants' input data may be more of interest to the AER, or policy-makers.

Potential inconsistencies seem likely to arise between the proposed participant designations of recall times versus the NER definition of 'PASA Availability' which applies a 24 hour recall threshold. For example, if a participant specifies a unit recall time of greater than 24 hours for a discretionary economic outage it could be inappropriately treated as 'PASA unavailable', leading AEMO's forecasts to potentially overstate the risk of USE.

Further granularity of data associated with unit unavailability linked to fuel limits (including because of high coal or gas prices, or rationing in the face of uncertainty and scarcity events) may be useful if these types of risks are to be signalled more often than in annual EAAP publications (see our suggestions above).

More analysis is needed to inform changes to reliability gap calculations

AEMO states it departed from the current consulted upon methodology in the 2022 ESOO on the basis of inconsistency with the NEL and NER. We note there was no departure in the case of NSW reliability gap calculations, suggesting conditions in South Australia modelled in the 2022 ESOO may have been unusual. AEMO states that this modelling incorporated more variable renewable uptake than previously assumed. Further analysis should be presented to identify this as an underlying trend, as well as how loss of load probabilities are expected to change over time and in different regions with different types and rates of technology uptake. AEMO also identifies a possible issue in using a limited sample from 12 reference years, and we understand there is ongoing work to expand this, including possibly supplementing this with synthetic data. A more fulsome analysis would inform the appropriateness and durability of any change in approach in the face of longer-term trends. Based on information in the consultation paper, setting a threshold of capturing at least 90% of forecast USE would have altered the dimensions of reliability gaps declared for NSW in the most recent ESOO, and it is not clear that this would have been AEMO's intention.

AEMO should also explore the implications of its assumption that resources procured to address any declared reliability gap are not available for other trading intervals, which would seem to counter the bias it is attempting to correct.

If you would like to discuss this submission, please contact me on 03 9060 0612 or Lawrence.irlam@energyaustralia.com.au.

Regards

Lawrence Irlam
Regulatory Affairs Lead