22 May 2019

Australian Energy Market Operator
GPO Box 2008
Melbourne VICTORIA 3001

By email to energy.forecasting@aemo.com.au

Dear Sir/Madam

Reliability Forecasting Methodology Issues Paper

Energy Queensland welcomes the opportunity to provide comment to the Australian Energy Market Operator (AEMO) on its Reliability Forecasting Methodology Issues Paper (the Issues Paper) and Addendum Paper.

Energy Queensland is largely supportive of the enhanced transparency AEMO intends to adopt in preparing the reliability forecasts for each National Electricity Market (NEM) region, ahead of the Forecasting Best Practice Guideline and the Reliability Forecast Guideline being developed by the Australian Energy Regulator and AEMO respectively. However we take this opportunity to make the following comments in respect to the Issues Paper.

1. Demand Forecasts

We note AEMO intends to use the same demand forecast methodology to calculate the one in two year peak demand forecast, with “Generated Sent Out” (Gen-SO) converted to “As Generated” (As-Gen) demand. In our view, while such an approach would suit the needs of generators, retailers settle purchases as “Generation at the Regional Reference Node” (Gen@Node). We are therefore of the view that demand forecasts should be reported as As-Gen, Gen-SO and Gen@Node.

2. Large Industrial Loads

We understand that AEMO intends to only include the effect of new large industrial loads on the reliability of peak demand. However the response of all large-scale industrial loads to peak demand should be modelled and understood. If large smelters are able to reduce their loads in response to high prices and over-peak demand, then this too will reduce the number of unserved energy occurrences and lessen the need for smaller retailers to respond to Lack of Reserve events.

3. Distributed Energy Resources

We note that AEMO intends to model separate traces for Energy Storage Systems (ESS) and Electric Vehicles (EV), and remove their effects from the demand traces. The Virtual Power Plant (VPP) aggregated component of ESS will also be used as large scale storage fully optimised to minimise unserved energy. VPP aggregated batteries can also be used as qualifying contracts to meet peak demand. While we agree with this approach, we add that batteries are located at the National Metering Identifier meaning estimated losses must be added in order to calculate the size of the storage at the As-Gen, Gen-SO and Gen@Node levels.

We also suggest that improved data capture of current installs of photovoltaics (PV), ESS and EV should be undertaken to improve forecast reliability of Distributed Energy Resources. Currently, historical installs of PV are not published or verified. There is also no requirement to capture install information of ESS or EV. In our view such data should be captured to improve the quality and reliability of forecasts.

4. Demand Side Participation

While we agree with the Demand Side Participation (DSP) methodology used, we are of the view that DSP could also be used as qualifying contracts to meet peak demand. Consequently this data should be reported at the As-Gen, Gen-SO and Gen@Node levels.

5. Generation Capacity

AEMO models generation on an As-Gen basis and then uses generic auxiliaries to calculate Gen-SO to match demand whilst using specific current year Marginal Loss Factors (MLFs) to obtain Gen@Node. In our view, such an approach hides the unique plant-specific auxiliary factors that would improve the evaluation of individual plant reliability.

Historically, as new thermal capacity entered the market, aggregating and averaging auxiliaries, Planned Outage Rates (POR) and Forced Outage Rates (FOR) may have been appropriate. However with renewable generation now the dominant market entrant, the remaining thermal plants are aging and levels of reliability are declining at different rates for the same plant type, such that the true level of plant reliability will be less than the current modelling suggests.

Further, the addition of new renewable generation connecting to thin transmission grids (particularly in Queensland) is increasing marginal losses on the remaining generation over time. We therefore suggest a forecast of individual plant MLF's should be added to reliability modelling as a separate set of sensitivities to each Integrated System Plan scenario (due to each scenario having a different plant mix which will change the MLFs for each plant). In our view, the use of forecast plant MLFs alongside plant specific auxiliary rates will produce a more accurate picture of plant generation capacity.

Individual station reliability forecasts should also be considered at the Planned, Routine and Forced outage levels in periods of peak demand.

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6. Plant Outages

We note AEMO is proposing to publish aggregated outage parameters on a technology aggregation level using three years of plant specific FOR data with no change to the aggregate publication of POR in the Medium-Term Projected Assessment of System Adequacy (MTPASA). However, it is our view that all plant specific information that contributes to plant specific reliability should be individually reported.

7. Planned Outages

We suggest that the MTPASA be carried out for three years to match the T-3 reliability forecast, and that each plant should have their individual PORs published to support the assessment of individual generator reliability.

8. Routine Outages

In our view, generator portfolios should estimate their level of routine outages that could occur during periods of peak demand. Currently, routine outages are placed in the MTPASA. However the MTPASA only includes routine outages in the initial week of its two year publication update. As such, this builds up in the MTPASA historical dataset but is not reflected in the forecast outlook. It is our view that routine outages should not be placed in the MTPASA but reported separately.

9. Forced Outage Rates.

AEMO is proposing to use the past three years of individual station full and partial forced outage data to establish an average forced outage rate for each station. For each fuel type the forecast outages will be averaged and published. In our view, this approach will conceal the true level of plant reliability available to meet peak demand.

Instead, FORs should be calculated based on a full plant life model (not just three years) that identifies the type of FOR and relates to the station's planned outage program. The historical performance of plant FOR's over periods of peak demand should be considered when determining the likely level of plant reliability over peak demand. Individual plant forced outage rates (full and partial) should also be published and updated annually.

10. Reliability Gap Calculations

The size of the reliability gap should be mentioned in megawatts (MW) for As-Gen, Gen-SO and Gen@Node.

In addition, we have provided detailed comments responding to the questions outlined in the Issues Paper in the attached table.

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Should you require additional information or wish to discuss any aspect of this submission, please do not hesitate to contact myself or Andrea Wold on (07) 3664 4970.

Yours sincerely

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Encl: Energy Queensland's response to the Issues Paper

AEMO Question	Energy Queensland Comments
1. **Transparency**	
1.1 Is the level of detail provided in this issues paper and referred methodology papers sufficient to allow you to constructively critique and provide feedback on the appropriateness of the methodology? If not, what additional information/explanations are required?	We note that a reliability gap is proposed to be expressed in megawatts (MW) while unserved energy is expressed in gigawatt hours (GWh). We therefore raise the need for the proposed Reliability Forecast Guideline to be clear in how it will address differences in forecasting MW and GWh. We are also interested to understand whether the Australian Energy Regulator's proposed Forecasting Best Practice Guidelines will incorporate network forecasts in addition to the reliability forecast. If so, then the methodology may need to be expanded to consider additional network related inputs.
2. **Open processes**	
2.1 In addition to this consultation and associated workshop, what other means of engagement could be considered for this year's ESOO, taking into account the time available and balancing timeliness and relevancy of information with need for consultation?	We make no comment.
3. **Accuracy and lack of bias**	
3.1 Are the proposed assumptions and methodologies for calculating supply and transmission inputs to the Reliability Forecast (e.g. forced outage rates and auxiliary loads) reasonable for the purpose of assessing unserved energy? If not, what refinements should be	Energy Queensland supports AEMO's approach to use forecast sent-out consumption and maximum demand in reliability forecast modelling. We do suggest that the MTPASA planned and forced outage rates and temperature derating levels should not be aggregated over a

AEMO Question	Energy Queensland Comments
considered?	technology type as this creates a bias. Instead it should be known for each plant out to T-3, as different thermal plant has different levels of reliability. The history of each generator portfolio should also be examined over a Probability of Exceedance (POE)10 summer peak to identify whether only reduced (N-1) generation will be available or whether the whole portfolio is likely to be available. We also question whether the following input refinements may contribute additional rigour to the forecasting methodology: • reactive demand and energy balances; • network capacity; • average and standard deviations of demand; • trends in customer electricity consumption and behaviour; and • trends in electricity price.
4. **Reliability Forecast and reliability instrument methodologies**	
4.1 Are the outlined assumptions and approaches to calculate the reliability gap size, reliability gap period and likely trading intervals reasonable?	In our view, there is a need to add forecast MLFs which will change with increased renewable generation connecting over time, and to calculate the reliability balance at " Gen@Node" out to T-3. This will consider loss factor constraints of renewable plant over Lack of Reserve periods. The Reliability Gap should also be understood at the regional reference node (the node) level as this will assist retailers to understand the volume needed to meet their Retailer Reliability Obligation, and the energy sources and their levels of reliability required to hedge

	AEMO Question	Energy Queensland Comments
		effectively. However, we question whether the cost of reliability and the cost of unserved energy should also be factored into reliability forecasts and decisions. We also suggest that demand forecasting across the NEM is sufficiently mature to produce longer-term load and energy forecasts, potentially out to 10 years.
4.2	Is the proposed demand definition to be used for the 1-in-2 year peak demand forecast reasonable? If not, what alternative definition should be considered and why?	We acknowledge that the calculation of unserved energy is a complex matter linked to factors dictated by the impact of market dynamics on demand trends generally forecasted by certain levels of POE. Given this, we generally support a 50 POE operational forecast due to the relatively short reliability gap horizons. However, in our view, the demand forecast should be defined at the node in addition to “As-Gen” so that users know exactly how much dispatched load must be purchased.
4.3	Does the set of result visualisations provided in the conceptual example provide information that assists participants in responding to any reliability instrument? What additional information would support decision-making in response to any reliability instrument?	We make no comment.