T-3 Reliability Instrument

New South Wales 2024

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AUSTRALIAN ENERGY REGULATOR

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Amendment Record

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1 AER decision

In accordance with section 14K of the National Electricity Law (Electricity Law) the Australian Energy Regulator (AER) has made a T-3 reliability instrument for New South Wales for the forecast reliability gap period 1 January 2024 to 29 February 2024 (reliability instrument). The AER is satisfied that the Australian Energy Market Operator's (AEMO) forecast reliability gap in New South Wales is forecast to occur. The AER also considers it is appropriate in the circumstances, having regard to the decision making criteria set out in clause 4A.C.11 of the National Electricity Rules (Electricity Rules) to make the reliability instrument. The reliability instrument can be found in Appendix A.

The AER is required to review the reliability instrument request from AEMO in accordance with the decision making criteria set out in clause 4A.C.11 of the National Electricity Rules (Electricity Rules). Under the Electricity Rules, AEMO's inclusion of a forecast reliability gap in its Electricity Statement of Opportunities (ESOO) means that it must request the AER consider making an instrument with respect to that gap. Our assessment of that request must be made by reference to the reliability forecast in the 2020 ESOO.

Our review of the reliability instrument request found no material errors in AEMO's calculations or input data. The assumptions that underpin AEMO's forecast data and their impact on unserved energy are not inaccurate and were considered to represent the forecast future circumstances. We are satisfied that accuracy, comprehensiveness and lack of bias have been achieved.

We consider that AEMO has used reasonable endeavours to prepare its reliability forecast in accordance with the interim Forecasting Best Practice Guidelines (FBPG). The inputs, assumptions and methodologies that underpin the forecast were disclosed to stakeholders and AEMO provided consultation opportunities throughout the development of the 2020 ESOO and subsequent reliability forecast.

AEMO's consultation processes for the inputs and assumptions that informed the ESOO and subsequent reliability forecast did not strictly follow the approach and stages recommended in the interim FBPG. However, the process AEMO undertook provided stakeholders with opportunities to engage with the data. As the first reliability forecast prepared under the interim FBPG, we are satisfied that AEMO has taken steps towards following the principles and intent outlined in the guideline that satisfy the reasonable endeavours expectation. We expect AEMO to follow the process as set out in the final Forecasting Best Practice Guideline when consulting on inputs and assumptions for future years reliability forecasts.

While submissions from stakeholders were not supportive of the reliability instrument being made, further clarification on a number of issues raised in submissions was provided by AEMO and having had regard to this additional information, the AER considers it appropriate in the circumstances to make the reliability instrument.

As the RRO has been triggered, Market Liquidity Obligation (MLO) generators for New South Wales—currently AGL, Origin and Snowy Hydro—are required to perform the liquidity obligation, and offer MLO products onto the ASX to ensure contracts are available. There is

now an incentive for liable entities in New South Wales to enter into sufficient qualifying contracts to cover their share of one-in-two year peak demand throughout the forecast reliability gap.

2 Background

AEMO regularly examines the 10 year outlook for supply and demand and publishes its results in the ESOO. Where there is insufficient capacity available to meet forecast demand resulting in unserved energy greater than the prescribed reliability standard, AEMO will identify a reliability gap and must request the AER to consider making a reliability instrument.[1] The AER must consider the request, and may decide to make a reliability instrument only if the AER is satisfied it is appropriate in the circumstances to make a reliability instrument having regard to whether: [2,3]

- there are no material errors in AEMO's calculations or input data as it relates to the reliability forecast;
- AEMO has not made any assumptions underpinning its forecast data that are inaccurate and which have had a material impact on unserved energy outcomes in the reliability forecast; and
- AEMO has used reasonable endeavours to prepare the reliability forecast in accordance with the Forecasting Best Practice Guidelines (FBPG).

Our review of this request has been completed under the interim Reliability Instrument Guidelines, which explain how the AER will have regard to the criteria on material errors and inaccurate assumptions when assessing whether or not to make a reliability instrument following the request from AEMO.[4]

Our assessment of whether AEMO has used reasonable endeavours to prepare the reliability forecast is referenced against the interim Forecasting Best Practices Guideline.[5]

As this request was made under the interim reliability measures implemented through the National Electricity Amendment (Retailer Reliability Obligation trigger) Rule 2020, which commenced on 26 November 2020, compressed timeframes apply to our assessment of, and consultation on, this decision, which must be made by 31 December 2020.[6]

1 NER, cl 4A.C.1
2 NEL, 14K (3)
3 NER, cl. 4A.C.11
4 AER, Interim Reliability Instrument Guidelines: https://www.aer.gov.au/system/files/Interim%20Reliability%20Instrument%20Guidelines%20-%20RRO%20-%20July%202019.pdf
5 AER, Interim Forecasting Best Practice Guidelines: https://www.aer.gov.au/system/files/AER%20-%20Final%20Determination%20-%20Interim%20Forecasting%20Best%20Practice%20Guidelines%20-%20September%202019.pdf
6 Energy Security Board, Retailer Reliability Obligation trigger Rule: http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/National%20Electricity%20Amendment%20%28Retailer%20Reliability%20Obligation%20trigger%29%20Rule%202020.pdf

3 AEMO reliability instrument request

On 27 November 2020 AEMO provided the AER with a T-3 reliability instrument request for a forecast reliability gap in New South Wales. The request set out the details of the forecast reliability gap:

- The size of the gap: 154 MW
- The gap period: 1 January 2024 to 29 February 2024
- The gap region: New South Wales
- The one-in-two year peak demand forecast: 13,710 MW
- The gap trading intervals: between 3 pm and 8 pm on weekdays.[7]

AEMO provided the following documents as part of its reliability instrument request:

- 2020 Inputs Assumptions and Scenarios (IAS) workbook
- 2020 Inputs Assumptions and Scenarios report (IASR)
- 2020 Electricity Statement of Opportunities (ESOO)
- Compliance Report for Interim Forecasting Best Practice Guidelines
- 2020 Electricity demand forecasting methodology information paper
- Demand Side Participation Forecast Methodology
- ESOO and Reliability Forecast Methodology document.

7 National Electricity Market time

4 AER review

The following sections detail the AER's review of the New South Wales T-3 reliability instrument request against the decision making criteria as set out in clause 4A.C.11 of the Electricity Rules. Issues raised by stakeholders in submissions to the reliability instrument request are also considered.

The reliability analysis performed by AEMO in the preparation of the ESOO is based on a substantial volume of complex data. In the time available, the AER could not critically examine every element. In line with the guidance given in the interim Reliability Instrument Guidelines we selected a range of input parameters on which the determination of the level of reliability is critically dependant. We also investigated parameters raised by participants in their submissions.

4.1 Whether there are material errors in AEMO's calculations, input data or inaccurate assumptions that materially impact the forecast reliability gap

The AER's review of the reliability instrument request has had regard to whether there are material errors in AEMO's calculations or input data as it relates to the reliability forecast and whether AEMO has made any assumptions underpinning its forecast data that are inaccurate and which have had a material impact on unserved energy outcomes in the reliability forecast.[8] The 2020 Inputs Assumptions and Scenarios workbook provided by AEMO contains the data on which the reliability instrument request was created.[9] This was accompanied by a guide in the reliability instrument request for key inputs, calculations, assumptions and methodologies used in the reliability forecast and number of accompanying methodology reports.

Our review, which examined the 2020 Inputs Assumptions and Scenarios workbook and the reports accompanying the reliability instrument request, did not identify any material errors or inaccurate assumptions that would have a material impact on unserved energy outcomes in the reliability forecast.

The following sections summarise the information that was reviewed to assist in forming the decision on the reliability instrument request.

4.1.1 Generation availability

Data checked:

- Summer seasonal rating for existing generators and committed projects
- Maximum capacity for existing generators and committed projects
- Firm capacity of existing thermal generators

8 NER, cl. 4A.C.11(a) and (b).

9 The Reliability Forecast is based on AEMO's Central Scenario for all inputs and assumptions.

No inexplicable changes in the dataset were identified. The summer seasonal ratings for existing generators and committed projects are consistent with the summer scheduled capacities recorded in the AEMO NEM Generator Information spreadsheet.[10] The maximum capacity for existing generators and committed projects is consistent with the capacities listed in the AEMO NEM Generator Information spreadsheet and the NEM Registration and Exemptions spreadsheet.[11] The firm capacity of existing thermal generators is consistent with the summer ratings listed in the NEM Generator Information spreadsheet.

As highlighted in the reliability instrument request, an updated version of AEMO's Generator Information spreadsheet was published in November 2020. This update included additional peak summer generation capacity in New South Wales in 2023-24. Subsequent analysis by AEMO indicates that this capacity would decrease the reliability gap by approximately 50-100 MW, however would not remove the forecast reliability gap completely. As AEMO determined this additional capacity became committed outside the timeframe of the reliability instrument request and it does not remove the forecast reliability gap, we still consider it appropriate in the circumstances to make the reliability instrument.[12]

Submissions from ERM Power (ERM), AGL, Origin, The Major Energy Users (MEU), Energy Users' Association of Australia (EUAA), Public Interest Advocacy Centre (PIAC) raised the issue of the additional capacity AEMO discussed in the reliability instrument request, along with the announcement of additional New South Wales capacity (through the Emerging Energy Program and the Electricity Infrastructure Roadmap), as a reason why the reliability instrument should not be made.

AEMO stated in the ESOO that the 170 MW of dispatchable capacity from the New South Wales governments Emerging Energy Program is expected to reduce unserved energy below 0.0002% in 2023-24. While the policy indicates that programs designed to deliver additional capacity in to New South Wales are being enacted, at the time the ESOO and reliability forecast was completed the projects associated with these programs did not meet AEMO's commitment criteria.

The AER does not consider that this represents a material error in the reliability forecast.

4.1.2 Energy consumption

Data checked:

- The underlying demand (GWh) input data in ESOO 2020 and 2019
- The operational demand (GWh) input data in ESOO 2020 and 2019
- The Rooftop PV generation (GWh) input data in ESOO 2020 and 2019
- The Demand Input Summary input data

10 NEM Generator Information: https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information

11 NEM Registration and Exemption List: https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/registration

12 AEMO's framework for projects to be considered committed is set out in its Generation Information Workbook.

The 2020 IASR and the BIS Oxford's COVID-19 Economic forecast update were reviewed.

No issues were identified in the dataset. The underlying energy demand in the Central Scenario for 2020-21 and 2021-22 decreased from the previous year's forecast, and that for 2022-23 and 2023-24 increased. The operational energy demand in the Central Scenario decreased from the previous year's forecast. The AER considers that the changes from the previous year's forecast are consistent with the impact of COVID-19 on the energy demand and the increased forecast of rooftop PV energy generation.

4.1.3 Maximum demand

Data checked:

- The 50% probability of exceedance (POE) maximum demand input data in the Summer Central Scenario in ESOO 2020 and 2019

The 2020 electricity demand forecast methodology information paper was reviewed.

No issues were identified in the dataset. The maximum demand (MW) in the Summer Central Scenario for 2020-21, 2021-22 and 2022-23 decreased from the previous year's forecast, and that for the 2023-24 increased from the previous year's forecast by 233 MW. The AER considers that the changes from the previous year's forecast are consistent with the near-term COVID-19 impact and the expected economic recovery.

4.1.4 Rooftop PV and PV non-scheduled generation

Data checked:

- Rooftop PV capacity (MW) and energy output (GWh)
- PV non scheduled generation (PVNSG) capacity (MW) and energy (GWh)

The reliability instrument request stated that at the time of maximum 50% POE demand in summer forecast rooftop PV contribution is approximately 422 MW and PVNSG is approximately 98 MW. This is considered reasonable when compared to the 365 MW of rooftop PV generation and 13 MW of PVNSG observed in New South Wales peak demand trading interval in the 2020 summer period. The increase in AEMO's forecast is also explained in the IASR, which notes that there has been an upward revision in its 2020 forecast due to a number of factors including lower PV cost assumptions and larger average rooftop PV installations.[13]

ERM and PIAC submissions raised the issue of rooftop PV installations, suggesting that the actual connections of rooftop PV are higher than forecast. They cited the AEMO Forecasting Reference Group as a source. The AER has not been provided with sufficient evidence that a material error in the rooftop PV forecasts has occurred that would result in a reduction of the reliability gap sufficient to close the gap completely.

13 AEMO, Inputs, Assumptions and Scenarios Report 2020, p. 26.

4.1.5 Gross State Product

AEMO's Gross State Product (GSP) forecast was adjusted for Covid-19 impacts, by BIS Oxford in June 2020, which resulted in a large decrease in GSP in New South Wales in 2020-21, followed by a large increase in 2021-22. The GSP forecast from the New South Wales 2020-21 budget, released in November 2020, forecasts a smaller decrease in 2020-21 followed by a small increase in 2021-22.[14]

However by the forecast reliability gap period in 2023-24, the variations in AEMO's forecast in 2020-21 and 2021-22 are largely offset and overall the forecast is considered reasonable. As highlighted in the AEMO's reliability instrument request, economic growth is of medium materiality to the forecast and therefore the AER considers that minor discrepancies in the GSP forecast would not have a material impact on the unserved energy outcomes in the reliability forecast.

4.1.6 Embedded energy storage

Data checked:

- Embedded energy storages capacity (MWh) of small scale batteries
- Embedded energy storages battery power (MW) of small scale technologies
- The example average normalised residential battery daily charge/discharge profile for summer

No issues were identified in the dataset and the example battery daily charge/discharge profiles were consistent with the published profiles. The assumptions on the storage capacity (MWh) of small scale batteries was consistent with the CSIRO projections for small-scale embedded technologies report from June 2020.[15]

4.1.7 Aggregated energy storage

Data checked:

- The aggregated energy storages input data in ESOO 2020 and 2019
- The embedded energy storages input data in ESOO 2020 and 2019

The reports from CSIRO[16] [17] and Green Energy Markets (GEM)[18] which support ESOO input data were reviewed.

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14 New South Wales, Budget statement 2020-21, Chapter 2: The Economy: https://www.budget.nsw.gov.au/sites/default/files/2020-11/2.%20The%20Economy-BP1%20Budget%202020-21.pdf

15 CSIRO Projection for small-scale embedded technologies report: https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2020/csiro-der-forecast-report.pdf?la=en

16 CSIRO, Projections for small scaled embedded technologies report. June 2020. https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2020/csiro-der-forecast-report.pdf?la=en

17 CSIRO, Projections for small scale embedded energy technologies. June 2019. https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/2019-Projections-for-

The energy generation capacity (MW) and energy generated (MWh) by the aggregated energy storages decreased from the previous year's forecast. The changes from previous year's forecast were consistent with CSIRO and GEM's projection that in the central scenario in that the virtual power plant (VPP) contract will be more common for the small-scale battery storages. The AER considers that the aggregated energy storage is a subset of the embedded energy storage, and the change in the forecast for the aggregated energy storage alone would not have a material impact on the unserved energy outcomes in the reliability forecast.

4.1.8 Electric vehicles

Data checked:

- Electric vehicle energy usage forecasts
- Uptake (number) of electric vehicle forecasts
- Charging profiles

No issues were identified in the dataset and the charging profiles were consistent with the published reports. Assumptions on the uptake of electric vehicles and energy usage figures were supported by other reputable sources reports such as the Electric Vehicle Council 2020 report.[19]

4.1.9 Transmission Augmentation

The submissions from AGL, ERM, MEU, PIAC and Queensland Electricity Users Network raised an issue with the Victoria-New South Wales Interconnector (VNI) minor project. Submissions pointed to the failure of AEMO to include the NSW components and potential benefits to unserved energy in the 2020 ESOO. The ERM submission also raised an issue with the exclusion of two smaller TransGrid projects (the installation of static synchronous series compensation on Upper Tumut-Yass 330kV line and the provision of dynamic line ratings). AGL contended that the revision of the completion date for the Energy Connect interconnector would result in a material impact on the forecast reliability gap. However the 2020 ESOO clarifies that Project Energy Connect will only result in a slight reduction to the unserved energy forecast and therefore we do not consider this issue material.[20]

The AER sought further clarification from AEMO on the VNI minor upgrade issue. AEMO has confirmed that the NSW works on the VNI minor project are not classified as committed while the Victorian works have passed all regulatory and procedural milestones to be classified as committed. Further to this, AEMO has stated that when the VNI minor project is included in its entirety (see Section 6 and Figure 30 of the 2020 ESOO), the impact on New

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18 Small-Scale-Embedded-Technologies-Report-by-CSIRO.pdf

Green Energy Markets, Projections for distributed energy resources – solar PV and stationary energy battery systems. June 2020. https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2020/green-energy-markets-der-forecast-report.pdf?la=en

19 Energy Vehicle council 2020 report: https://electricvehiclecouncil.com.au/wp-content/uploads/2020/08/EVC-State-of-EVs-2020-report.pdf

20 AEMO, 2020 Electricity Statement of Opportunities, p. 64

South Wales unserved energy (USE) is negligible because other transmission constraints limit flows from southern New South Wales to Sydney during periods of forecast unserved energy. AEMO notes that the impact on transfer limits in the IASR are notional, whereas the ESOO models detailed transmission constraint equations rather than notional limits. These constraints are adjusted for the implementation of the specific elements of VNI minor which are committed.

The AER also sought further clarification from AEMO on the two smaller transmission projects raised in the ERM submission. AEMO has confirmed that at the time of the 2020 ESOO the project to install static synchronous series compensation on Upper Tumut-Yass 330kV line and the provision of dynamic line ratings were both planned but not committed. AEMO confirmed that it is satisfied that the Upper Tumut-Yass 330kV line project remains not committed and understands that this project will now be considered either within the VNI Minor (NSW side) scope or through other TransGrid planning processes. AEMO confirmed that the provision of dynamic line ratings project is now committed, however AEMO has not been provided with any information to indicate that this project would materially change the 2020 ESOO and reliability forecast. AEMO also clarified to the AER that dynamic line ratings are dependent on ambient temperature conditions, with lower line ratings at times of high temperatures and low wind conditions, when supply scarcity risks are typically greatest.

The AER considers that AEMO has followed correct procedures by excluding the transmission augmentation projects discussed above and that the inclusion of these transmission projects in the 2020 ESOO would not be sufficient to close the forecast reliability gap. For these reasons we do not consider this issue material to the reliability forecast.

4.1.10 Inputs and assumptions based on confidential data, aggregated data or AEMO calculations

A number of inputs and assumptions that are used in the reliability forecast have not been exhaustively reviewed because they are based on confidential data, aggregated data or AEMO calculations. They are:

Forced outage rates

AEMO collects information from all generators via an annual survey process on the timing, duration, and severity of historical unplanned forced outages. This data is used to calculate the probability of full and partial forced outages for each financial year. For the reliability forecast AEMO used a combination of information provided by participants and from AEP Elical. The AER was only provided results of AEMO's calculations to consider the review of the reliability instrument request.

Data checked:

- Full and partial outage rate data for existing generators
- Full and partial outage rate data for new entrant technologies

No unexplainable changes in the dataset were identified. The full outage rate for existing black coal generation steps down in 2024, this is consistent with the retirement of the final

Liddell units in 2023. The full outage rate and partial outage rate for new entrant technologies were consistent with the GHD AEMO costs and technical parameter review report from September 2018.[21] The existing generators full and partial outage rates for 2020-21 were consistent with the AEP Elical assessment of ageing coal-fired generation reliability report.[22]

Demand side participation data

The reliability response data, which forms part of AEMO's demand side participation forecasts, is an estimate by AEMO based on price response for trading intervals exceeding $7,500/MWh. This data is unable to be thoroughly reviewed due to the lack of information available on which the forecast is based

Submissions from ERM, MEU and PIAC raised the issue of demand side participation (DSP). The ERM submission raised a number of issues and questioned:

- If the referenced capacity available under the Reliability and Emergency Trader (RERT) mechanism was included. ERM was also critical of AEMO's use of negative values of DSP in the DSP calculation, believing that this would result in double-counting and overstated potential for unserved energy.
- why AEMO chose to maintain the 285 MW DSP forecast across the 10-year forecast horizon rather than grow the forecast in line with the DSP figures in the IAS workbook (340 MW in 2023-24).
- the use of the 50th percentile value from the probability response curves to assess the level of DSP available to the market as too conservative. ERM proposed that a 90th percentage is a more suitable measure.

The MEU submission pointed to demand side participation as an example of AEMO being excessively conservative in its forecasts. It claimed that AEMO has consistently underestimated the amount of demand side participation that occurs with high spot prices.

PIAC cited ERM's concerns regarding AEMO's methodology leading to conservative assumptions.

The AER sought further clarification from AEMO regarding its treatment of demand side participation in the ESOO. AEMO has confirmed that it considers reliance on existing and committed DSP resources (as with new generation and transmission augmentations), only for the purposes of a reliability assessment. The methodology is detailed in the Demand Side Participation Methodology published by AEMO in August.[23] AEMO's ESOO also states

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21 GHD AEMO costs and technical parameter review report: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/9110715-REP-A-Cost-and-Technical-Parameter-Review---Rev-4-Final.pdf

22 AEP elical assessment of aging coal-fired generation reliability report: https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2020/aep-elical-assessment-of-ageing-coal-fired-generation-reliability.pdf?la=en

23 Demand Side Participation Methodology: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/demand-side-participation/final/dsp-forecast-methodology-final-determination.pdf?la=en

that RERT is specifically excluded from the demand side participation forecasts because it is used as part of AEMO's medium and short term PASA (projected assessment of system adequacy) forecasts, which are used to forecast risk of shortfalls on which it determines the need for RERT capacity.

The AER accepts AEMO's approach to demand side participation for a reliability forecast. However we urge AEMO to further consider if demand side participation should be treated in such a strict matter as new generation and augmentation projects for future reliability forecasts, due to its lower approval and commitment criteria processes.

Further, the AER is satisfied that the methodology on which AEMO consulted aligns with the guidance given in the interim Forecasting Best Practice Guideline. For these reasons, we still consider it appropriate, under the decision making criteria defined in NER 4A.C.11(a) and 4A.C.11(b), to make the reliability instrument.

Marginal loss factors

AEMO calculates marginal loss factors by applying the forward looking loss factor methodology based on data provided by registered participants, historical market data and its consumption forecasts. This outcome of this calculation is published in the annual report and is used as an input in the reliability forecast.

The AER has checked and found the marginal loss factors used in the reliability forecast were consistent with the values used in the 2020/21 Regions and Marginal Loss Factors report.[24]

Auxiliary

Auxiliary loads used in the reliability forecast were based on scheduled and semi-scheduled generators providing self-reports of typical auxiliary load percentage to AEMO. The final figures used in the reliability forecast match those consulted on in AEMO's IASR. With no issues raised in AEMO's consultation, or by submissions to the reliability instrument request, the AER considers the figures used are reasonable.

4.1.11 Issues raised in submissions in addition to the decision making criteria

The EUAA submission supported the retention of the 0.002% of unserved energy reliability standard.

The submission from Origin raised the materiality of modelled gap. Origin's view is that a modelled shortfall of 154 MW in the context of an estimated peak event of 13,710 MW is not material and is within the margin of error of the modelling exercise.

[24] 2020-21 Regions and Marginal Loss Factors report: https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/loss_factors_and_regional_boundaries/2020-21/marginal-loss-factors-for-the-2020-21-financial-year.pdf?la=en

ERM was concerned by AEMO failing to issue an ESOO update in the 3 month period following the issue of the 2020 report and prior to the reliability instrument request. ERM believes that there was sufficient time for AEMO to incorporate additional committed generation in NSW. It was also concerned that the reliability gap value is overestimated by AEMO's calculation process. Specifically the methodology defining the additional capacity is only available to be dispatched during periods where a forecast reliability gap has been declared.

Clause 4A.C.11 states that the AER, in considering whether it is appropriate in the circumstances to make a reliability instrument, must have regard only to the criteria prescribed in that clause These criteria do not account for issues raised on the reliability standard, materiality of the size of the gap or if AEMO should have published an update to the ESOO, and therefore these matters have not been considered in making the decision to approve the instrument.

The AER notes that AEMO consulted on its methodology to determine the size of the gap in its Interim Reliability Forecast Guidelines and AEMO provided adequate justification for its position in the final report on the guideline.

4.2 Whether AEMO used reasonable endeavours to prepare the reliability forecast in accordance with the Forecasting Best practice Guideline

For the 2020 ESOO and reliability forecast, the applicable version of the Forecasting Best Practice Guideline (FBPG) is the interim FBPG published in September 2019. For future forecasts, these will be superseded by the final FBPG published in August 2020. The final FBPG was not published in time for AEMO to take it into account for its 2020 forecasts.

The interim FBPG provide guidance to AEMO on its forecasting practices and processes which relate to a reliability forecast based on the following principles:[25]

1. forecasts should be as accurate as possible, based on comprehensive information and prepared in an unbiased manner;
2. the basic inputs, assumptions and methodology that underpin forecasts should be disclosed; and
3. stakeholders should have as much opportunity to engage as is practicable, through effective consultation and access to documents and information

In earlier sections of this decision, we have discussed the accuracy of AEMO's calculations and assumptions in developing its reliability forecast. In this section, we have focussed on the interim FBPG's recommendations and requirements to which AEMO must have regard when developing its reliability forecast.

25 NER, cl. 4A.B.5(b).

4.2.1 Forecasting methodologies, inputs and assumptions to be disclosed

The interim FBPG state that the methodologies, assumptions and basic inputs that underpin AEMO's forecasting processes must be transparent, disclosed to stakeholders, and developed and prepared in accordance with the FBPG and the FBPG consultation procedures.

4.2.1.1 Methodologies

The interim FBPG includes consultation procedures that are considered best practice for AEMO in determining and detailing the approach to demand forecasts, supply forecasts and the assessment of the demand and supply balance. The final report from that process should detail:

- the suite of models to be used to perform the forecasting activities;
- the approach to the incorporation of data and its distribution or publication;
- how exogenous factors will be taken into account;
- the representation of resource constraints affecting energy delivery;
- how stakeholders can engage with the interim results, if appropriate, and the final results of the analytical stream; and
- the process AEMO follows internally to verify the approach and its results.

AEMO listed the following suite of models that make up the reliability forecast in its interim Reliability Forecast Guidelines:

- Electricity Demand Forecasting Methodology Information Paper
- Demand Side Participation (DSP) Forecasting Methodology
- ESOO and Reliability Forecast Methodology
- Forecast Accuracy Report Methodology.

For the 2020 ESOO and reliability forecast, AEMO chose to review the DSP Forecasting Methodology and Forecast Accuracy Report Methodology using the interim FBPG consultation procedures.

AEMO's Interim Forecasting Best Practice Guidelines Compliance Report (Compliance Report) explains AEMO's approach to the other items above, or where they can be found in other AEMO documents. As the Compliance Report highlights, AEMO would often determine its approach to each issue on a case by case basis, rather than adopting a blanket approach to all.

For example, for exogenous factors that AEMO considered to be material to the reliability forecast (such as economic and population forecasts), AEMO's IASR explains how each factor was taken into account. For data verification, AEMO's Compliance Report highlights that AEMO adopted different approaches depending on the data and assumptions it was considering.

AER review

AEMO acknowledges in its Compliance Report that it did not meet some of the timing requirements of the interim FBPG consultation procedures when consulting on the DSP Forecasting Methodology and Forecast Accuracy Report Methodology. The AER expects that AEMO will be more timely with its consultations in the future while acknowledging the level of consultation that did occur on these methodologies. For example, in its consultation on the DSP forecasting methodologies AEMO:

- notified stakeholders of its consultation and invited submissions on a DSP issues paper.
- published a draft report which set out its conclusions and the reasons for them, the principles it used when considering issues raised in submissions and summaries of issues raised by submissions and how it responded to them.
- invited stakeholders to provide further submissions on its draft determination.
- published a final report which again set out its conclusions and the reasons for them, the principles it used when considering issues raised in submissions and summaries of issues raised by submissions and how it responded to them.

AEMO, while not strictly following the interim FBPG consultation procedure, also consulted on the ESOO and Reliability Forecast Methodology. This was completed as part of its consultation on the interim Reliability Forecast Guidelines, and was subject to one round of consultation which provided the opportunity for stakeholders to provide written submissions and attend an industry workshop.

Overall, the AER considers that the consultation undertaken by AEMO in relation to the methodologies used to prepare the reliability forecast was undertaken reasonably in accordance with the requirements in the interim FBPG. Ideally, and to give full effect to the intent of the interim FBPG, AEMO should consult on all methodologies that make up the reliability forecast within the four year time span, as set out in the interim FBPG.

In regards to AEMO's approach to detailing the other factors set out above, AEMO's Compliance Report provided a thorough summary of how this occurred and we consider it highlights AEMO's reasonable endeavours to fulfil the requirements placed upon it by section 2.4 (methodologies) of the interim FBPG.

4.2.1.2 Inputs, assumptions and scenarios

The interim FBPG states that it is best practice for AEMO to use the FBPG consultation procedures to determine the components that will feed into modelling of supply and demand forecasts on which reliability forecasts will be based. The guideline acknowledges that the consultation may involve consideration of a number of elements for each component that feeds in to the model.

AEMO's compliance report states it consulted extensively on the inputs and assumptions that fed in to the 2020 ESOO and reliability forecast. Section 1.1 of the IASR highlights the consultation undertaken on key forecasting inputs,[26] including that AEMO:

[26] https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-

- Invited written submissions on a forecasting inputs and assumptions consultation paper.
- Provided responses to issues raised in submissions in the final IASR.
- Published supplementary information which informed its forecasts including consultancy reports used.
- Provided updates and requested informal feedback on data and forecast updates in its Forecasting Reference Group, which fed in to the final IASR.

AEMO did not consult on scenarios that fed in to the 2020 ESOO and Reliability Forecast as they were established through previous consultation in 2019.

AER review

AEMO did not specifically follow the interim FBPG consultation procedures (which state that two formal rounds of consultation should occur) to consult on its inputs and assumptions. It did however run a thorough consultation process which allowed for stakeholders to provide submissions in many forms. AEMO published a Forecasting inputs and assumptions consultation paper and draft IASR dataset in December 2019. Submissions from stakeholders were requested on this information and a number of components were discussed at Forecasting Reference Group meetings. AEMO also invited stakeholders to provide informal submissions throughout the year. The final IASR and dataset were published in August, when the ESOO and reliability forecast were released.

While AEMO did not strictly follow the consultation process set out in the interim FBPG, we understand the process AEMO used to consult on the inputs and assumptions for the ESOO and reliability forecast was transparent and provided multiple opportunities for stakeholders to engage throughout the process. We note that the consultation procedures set out in the final FBPG, which will apply to future reliability forecasts, are more prescriptive.[27]

AEMO did not consult on scenarios used in the 2020 ESOO and reliability forecast, however we note that engagement on these took place in 2019 and do not consider it unreasonable for AEMO to continue to use these scenarios for this year's forecasts.

Overall, considering the level of engagement undertaken, the AER considers that AEMO has taken steps that would satisfy the reasonable endeavours requirement with respect to transparency and engagement with stakeholders on the inputs and assumptions that feed in to the reliability forecast. The stricter requirements on AEMO's processes set out in the final FBPG should provide greater structure and clarity for both AEMO and stakeholders in the future.

4.2.2 Other matters

The interim FBPG provide guidance to AEMO on a number of matters. The following table summarises these and how AEMO has, or has not, applied them in its forecasting

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assumptions-methodologies/2020/2020-forecasting-and-planning-inputs-assumptions-and-scenarios-report-iasr.pdf?la=en

27 AER, Forecasting Best Practice Guidelines, p. 7.

processes. Overall the AER considers it shows that AEMO has used reasonable endeavours to prepare the reliability forecast in line with the principles as set out in the interim FBPG.

Interim FBPG guidance	AEMO Process/work undertaken
The AER considers it best practice for AEMO to analyse, and publish, the performance of its reliability forecasts. At minimum, this performance analysis should include: • an examination of the performance of each component; • an explanation of any material deviation or trend in differences; and • actions undertaken or to be undertaken to improve the accuracy of each component in the forecast.	AEMO published the 2020 Forecasting Accuracy Report in December 2020. The report analysed the accuracy of the summer 2019-20 reliability forecasts made in the 2019 ESOO. The report also analysed accuracy of individual components for each region and provided explanations for observed differences. The report also set out AEMOs improvement plan and priorities for the future based on the issues identified within the report.
When publishing each ESOO, independent of whether the reliability forecast or indicative reliability forecast indicates a gap, AEMO will provide a report to the AER describing how it has, and where it has not, prepared the relevant forecasts in accordance with the FBPG.	AEMO provided its Compliance Report to the AER as part of the reliability instrument request.
AEMO should use the most accurate and relevant data available when preparing a reliability forecast or indicative reliability forecast, including, where appropriate, the use of confidential data. AEMO should also determine the most appropriate aggregation approach such that non-confidential representative information may be published.	Section 3.1.2 of AEMO's Compliance Report highlights where AEMO used confidential data in its reliability forecast and how it was treated.
AEMO should publish indicative samples of the output of each component and its contribution to the overall result, so that the interaction of the components can be more readily discerned. This data should be published in a manner that will facilitate stakeholder engagement, but does not breach confidentiality.	AEMO published the draft datasets supporting its IAS workbook, however it is not clear where it has outlined the contribution of this data to the overall forecast.
The key document coming from the application of the Forecasting Best Practice Consultation Procedures is a report, to be published by AEMO which should detail: • a description of AEMO's forecasting approach; • the procedures AEMO has followed in considering relevant matters; and • summaries of each issue raised during the	AEMO consulted using the interim FBPG consultation procedures on the Forecasting Accuracy Report and DSP methodologies. In both of these processes AEMO's final report highlighted its approach to forecasting, the procedures or principles used to consider relevant matters and summaries of issues raised and AEMO's responses to them AEMO also provided the same information in its

consultation process, and AEMO's considered response to each issue.	final IASR.
AEMO must also, no less than annually, prepare and publish on its website information related to any improvements made by AEMO, or other relevant parties, to the forecasting processes that will apply to the next electricity statement of opportunities.	AEMO included in the Forecasting Accuracy Report, published in December 2019, its forecast improvement plan.

Appendix A - The reliability instrument

The reliability instrument details are:

Reliability instrument for New South Wales 2024	
Region	New South Wales
Size of reliability gap	154 MW
The reliability gap period	Weekdays from 1 January 2024 to 29 February 2024
Trading intervals	Trading intervals on weekdays for the half-hour ending 15:30, 16:00, 16:30, 17:00, 17:30, 18:00, 18:30, 19:00, 19:30, 20:00.
AEMO's one-in-two year peak demand forecast	13,710 MW