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Draft Interim Reliability Forecasting Guidelines consultation

Industry workshop – 17 October 2019

Agenda

1. Welcome
2. Overview
3. Applying best practice forecasting principles
4. Inputs, assumptions and methodologies
5. Improvement process
6. General Questions & Answers time

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Overview

Progress to date

AEMO is preparing to deliver Reliability Forecasts under the Retailer Reliability Obligation (RRO) Rules and in accordance with the AER Interim Forecasting Best Practice Guidelines (FBPG). As part of this, AEMO has:

- Consulted of Reliability Forecast methodology: April – June 2019.
- Engaged academics to review method for assessing forecast performance
- Published ESOO 2019 in August with a dedicated Reliability Forecast section
- Commenced improvements based on feedback through this process:
  - Inclusion of Operational As-generated demand in the Forecasting Portal
  - Preparation of adjusted actual demand time series for publication near real time
  - Incorporation of findings of academic review in the upcoming Forecast Accuracy Report
  - Flagged upcoming changes at FRG to:
    - Generation Information data collected and utilised (second Summer rating)
    - DSP data collected (clarification of potential response and future DSP estimate)
- Published Draft Interim Reliability Forecast Guidelines for consultation
  - Purpose of this workshop

Purpose of Guidelines

The purpose of the Interim Reliability Forecast Guidelines is to:

a) explain to liable entities and other interested parties how a reliability forecast is prepared, and the underlying procedures, information requirements and methodologies that govern its preparation and operation; and

b) describe how AEMO will implement the Interim Forecasting Best Practice Guidelines produced by the Australian Energy Regulator (AER) in preparing a reliability forecast

Timeline for consultation

Stage	Indicative date	Status
Draft Interim Reliability Forecast Guidelines published for consultation	Thursday 3 October 2019	Active
Industry workshop	Thursday 17 October 2019	
Consultation submissions due	Thursday 31 October 2019	
Consultation determination published	Thursday 28 November 2019	
Interim reliability forecast guidelines published	Thursday 19 December 2019	

The Interim Reliability Forecast Guidelines are to be published by AEMO by 31 December 2019. Final Reliability Forecast Guidelines are to be published by 28 February 2021 as per NER clause 11.116.4.

Workshop objective

- Provide a recap of AEMO's draft interim guidelines and considerations.
- Provide participants with opportunities to ask clarifying questions.
- Help to inform submissions being prepared by participants and other interested parties.

- AEMO is not consulting on the actual methodologies for demand, DSP, or forecasting performance – these consultations will be scheduled for 2020.

Applying best practice forecasting principles

Accuracy – Transparency – Effective Engagement

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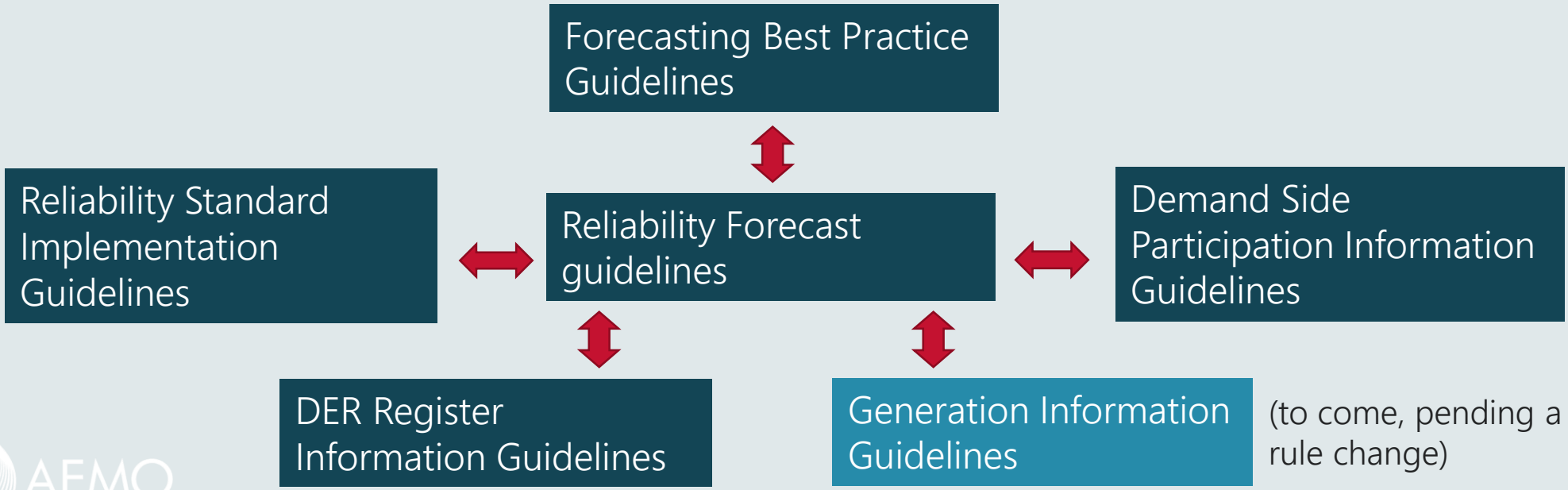
Principles behind the guidelines

- The Reliability Forecast is a critical input for triggering obligations for liable parties under the RRO.
- AEMO's reliability forecast is to be guided by AER's Interim FBPG published on 20 September 2019.
- These guidelines clarify how AEMO applies the principles set out in the rules (NER clause 4A.B.5):
  - **Accuracy:** Forecasts should be as accurate as possible, based on comprehensive information and prepared in an unbiased manner.
  - **Transparency:** The basic inputs, assumptions and methodology that underpin forecasts should be disclosed.
  - **Effective Engagement:** Stakeholders should have as much opportunity to engage as is practicable, through effective consultation and access to documents and information.

Considerations behind these guidelines

- In developing these guidelines, AEMO has endeavoured to strike the right balance between providing detail and maintaining flexibility.
- The considerations behind this trade-off include:
  - The dynamic nature of the energy industry, where technology and trends can change quickly
  - Acknowledging interdependences of existing and potentially new guidelines



Accuracy – FBPG requirements

For ensuring accuracy, AER's FBPG highlight the importance of:

- The transparency of the forecasting process
- The examination of historical forecast performance to provide stakeholder confidence

Also, the FBPG requires AEMO to report to AER, when publishing an ESOO, outlining how it has (and where it has not) prepared the relevant forecasts in accordance with the FBPG.

Delivering accuracy

Accuracy will be delivered by:

- Following best practice methodologies, sources of data and assumptions.
- Ensuring thorough quality assurance processes.
- Applying continuous learning through the production of an annual forecast accuracy report and associated forecast improvement plan.
- Following completion of an ESOO, reporting to the AER on how AEMO has followed the Interim FBPG in developing the reliability forecast.

Quality Assurance

- AEMO will consult on planned changes to assumptions and methodologies when required.
- Throughout the reliability forecasting process, AEMO will:
  - undertake validation of data and assumptions, for example through the use of reputable sources, validation against other available sources and explaining changes from previous versions;
  - undertake verification of model implementations underpinning each subprocess; and
  - engage with industry on interim results, both for individual components and for demand and supply forecasts overall.
- After the reliability forecasting process, AEMO will publish final methodology documents and supporting material.

Delivering transparency

In line with the FBPG, AEMO will deliver transparency through:

- Publishing and consulting on methodologies, inputs and assumptions, including publication of independent consultant reports where relevant.
- Consulting on preliminary demand forecasts, by component.
- Releasing final input data, models and resulting data sets, as supporting material.

Transparency through consultation

- The AER Interim FBPG introduced the Forecasting Best Practice Consultation Procedure, which AEMO should use every four years to determine:
  - The fundamental methodologies needed in the forecasting processes.
  - The components on which the forecasts are to be based, and they way they are to be determined and used.
  - The stakeholder engagement process for determining the forecasting methodologies, inputs and assumptions (covered through this guidelines consultation).
- Any material updates to the fundamental methodologies required within each four year period should also use this consultation process.

Effective engagement

Engagement with stakeholders will be delivered through formal and informal information-gathering and consultative processes before, during, and after the reliability forecast process.

It will use different forms and levels of engagement, including

- Industry Forums/Workshops
- Technical Working Groups/Advisory Boards
- One-on-one discussions
- Written consultations

Levels of engagement

Type of consultation/engagement	Level of engagement	Time/cost spend
1 – Information only	Low	Low
2 - FRG discussion	↓	↓
3 - FRG consultation	↓	↓
4 - Written consultation	↓	↓
5 - Rules consultation procedure	High	High

Criteria for selecting the level of engagement

a) Examples of high risk/materiality:
   - New/novel technologies or trends, currently with limited experience and understanding – potential to have significant impact in a 10 year horizon.
   - Significant changes to data, assumptions or methodologies proposed, for example in response to FAR recommendations.

b) Examples of medium risk/materiality:
   - Minor updates to inputs, assumptions and methodologies that may have significant impact in reliability forecast outcomes, but are generally well understood, or new/novel technologies and trends, which are unlikely to have significant impact within 10 years.

c) Examples of low risk/materiality:
   - Minor updates to inputs, assumptions and methodologies that will have a negligible impact on reliability forecast outcomes, correction of obvious errors.

Questions?

Inputs, assumptions and methodologies

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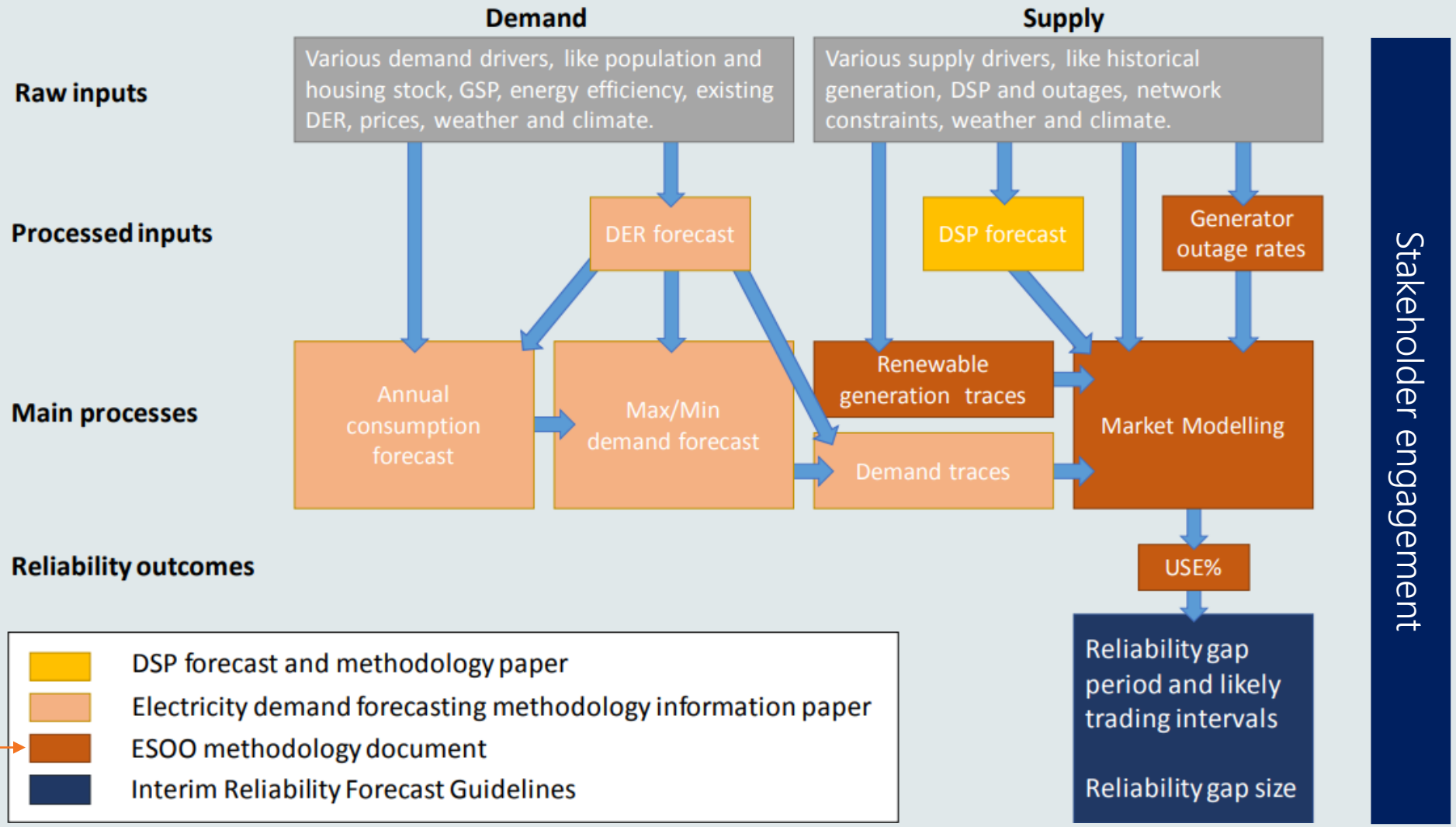
Key elements of a reliability forecast

The process for producing a reliability forecast can be split into three overall elements:

- Demand forecasts – the forecast load to be met for the NEM.
- Supply forecasts – the operational parameters applied for generators, demand side participation (DSP), large-scale storage, and transmission network elements.
- Reliability forecast – the assessment of the ability of available supply to meet demand.

High level process



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Methodologies - overall

AEMO has recently consulted on:

- Reliability Forecast methodology (outcome included in draft interim guidelines) building on well established methodologies for ESOO (and covered by the Reliability Standard Implementation Guidelines).
- Demand forecasting methodologies, including DSP:
  - Through regular presentations of methods, draft and final results to FRG
  - Formal consultation on effectiveness of demand forecast methodology documentation

AEMO has also commissioned and reported on academic review of its approach to measuring forecasting performance accuracy

Given the substantial amount of other consultations facing industry, AEMO proposes to formally consult on the established demand forecasting, DSP and FAR methodologies again in 2020, rather than as part of this Guideline consultation, with actual timing and sequence guided by industry feedback.

Reliability Forecast - Inputs

- The assumptions for modelling supply, transmission and storage remain largely unchanged from those consulted on earlier in 2019.

- As discussed in the FRG in August, AEMO will implement a new approach to apply 10% probability of exceedance (POE10) summer capacities to only a subset of the summer period. Further details will be provided in the lead-up to the next Reliability Forecast.

- AEMO will continue to use the same approach to Com* projects (i.e. excluded from the T-1 window) but will review as further data becomes available on these projects.

Reliability Forecast - Inputs

- AEMO's approach to forced outage rates will at this point remain unchanged. AEMO is currently in the early stages of a detailed review to further understand the likelihood of deteriorating reliability in ageing coal generators.

- AEMO reiterates that the outage assumptions are circulated to the plant operators who do have the opportunity to propose and substantiate alternative assumptions if they believe the methodology applied does not represent an accurate projection of that station's reliability.
  - Will become part of the information request for all generators from 2020

Reliability Forecast - Existence of a reliability gap

- Forecast reliability gap and its materiality (RRO Draft Rules clause 4.A.A.2):

> For the purposes of section 14G(1) of the *National Electricity Law*, a *forecast reliability gap* occurs in a *region* in a *financial year* if identified in a *reliability forecast* and is *material* if it exceeds the *reliability standard*.
>
> Note
>
> Section 14G(1) of the *National Electricity Law* states –
>
> A *forecast reliability gap* occurs when the amount of electricity forecast for a *region*, in accordance with the *Rules*, does not meet the *reliability standard* to an extent that, in accordance with the *Rules*, is material.

- The assessment of whether the reliability standard is met is described in the Reliability standard Implementation Guidelines (RSIG) and includes weighting of 10% and 50% POE demand outcomes to derive expected unserved energy.
- The ESOO may assess whether the standard is met against multiple scenarios.
- A reliability gap that triggers a reliability instrument request will however always be based on AEMO's central (most likely) scenario.

Reliability Forecast - Identification of the reliability gap period

- Declaration of a gap based on weighted average USE > Reliability standard.
- Reliability gap period:
  - Start-date and end-date based on months were the probability of lost load is above 10%.
    - Any two month gap between months that exceed the threshold triggers a separate instrument request.
    - Periods can be subjectively tightened if the load shedding risks are concentrated towards the start or end of a month.
  - Within each gap period, likely trading intervals based on time-of-day and weekend inclusion based on a 10% threshold on the probability of lost load.
    - Holiday periods and any other periods (e.g. single months with low load shedding risk) can be excluded based on AEMO's judgement.

Size of the reliability gap

- The size of the reliability gap is determined by calculating the additional MW of capacity (assuming this capacity is perfectly reliable) that is required to reduce the expected USE in a region to the reliability standard where this additional capacity only applies during the likely trading intervals within the reliability gap period.
- In addition to the size of the reliability gap, AEMO will also publish in the ESOO the additional MW required to reduce USE to the reliability standard assuming the additional capacity applies in all periods, not just the periods identified in the reliability gap period.

Inputs and assumptions – General considerations

Guided by the principles of accuracy, transparency and engagement, AEMO will:

- Source the input data and assumptions from the most recent and accurate sources of information reasonably available, for example from Registered Participants.
- Use subject matter experts for new/novel technologies and trends that are not yet well understood.
- Validate material inputs and assumptions through second opinion or FRG.
- Include data up to 30 April (for demand) and 30 June (for supply).
- Be transparent about inputs and assumptions, subject to confidentiality.

Sources of the data are outlined in the methodology, input and assumptions reports.

Information requests

Standing requests:

- Will be published by AEMO once a year, typically around the end of January and include:
  - Detailed description of the forecast information requested for that calendar year
  - The Registered Participant categories required to provide the specified information
  - Timeline for provision of the information to AEMO, including where applicable the grounds and deadline for requesting an extension.
- AEMO will consult on any changes to this list from year to year using the FRG consultation process

Ad Hoc requests:

- Can be individual or to a broader group, for example to provide clarification of existing data or to address an emerging issue. AEMO will engage with industry beforehand, and where practically allow at least 20 business days to provide the response.

Dealing with confidential information

- Registered Participants must specifically identify any confidential information provided in response to a request for information.
- To improve forecast accuracy, AEMO will use the confidential information in its modelling but seek to publish sufficient aggregated information to retain a high degree of transparency of inputs.

Questions?

Forecast Improvement Process

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Forecast improvements

As outlined in the NER clause 3.13.3A(h) AEMO will, no less than annually, prepare and publish on its website information related to the accuracy of its demand and supply forecasts, and any other inputs determined by AEMO to be material to its reliability forecasts.

This requirement will be met by the publication of the forecast accuracy report (FAR).

An FAR methodology document will also be developed, consulted on, and published.

The forecast accuracy report

The FAR will include an examination of the forecast performance per NEM region, including:

A. input drivers of demand;
B. energy consumption;
C. maximum and minimum demand;
D. input drivers of supply;
E. supply availability; and
F. reliability.

I. an explanation of the results and any material deviation of trend in differences; and

II. a list of actions (investigation or implementation) undertaken, or to be undertaken, to improve the accuracy of the forecasts

Forecast	Region 1	Region 2	Comments
Drivers of demand			PV actual above forecast
Energy forecasts			Most forecasts accurate
Summer maximum demand			Region 2 actual below forecast
Winter maximum demand			Region 2 actual below forecast
Annual minimum demand			Most forecasts accurate
Connection points			
Installed generation capacity			Some new connections lagging expectation
Forced outage rate for dominant fuel	Coal	Coal	
Supply availability of dominant fuel	Coal	Coal	
Reliability			Outages observed align with forecast

Example accuracy summary demonstrating assessment across forecast components.

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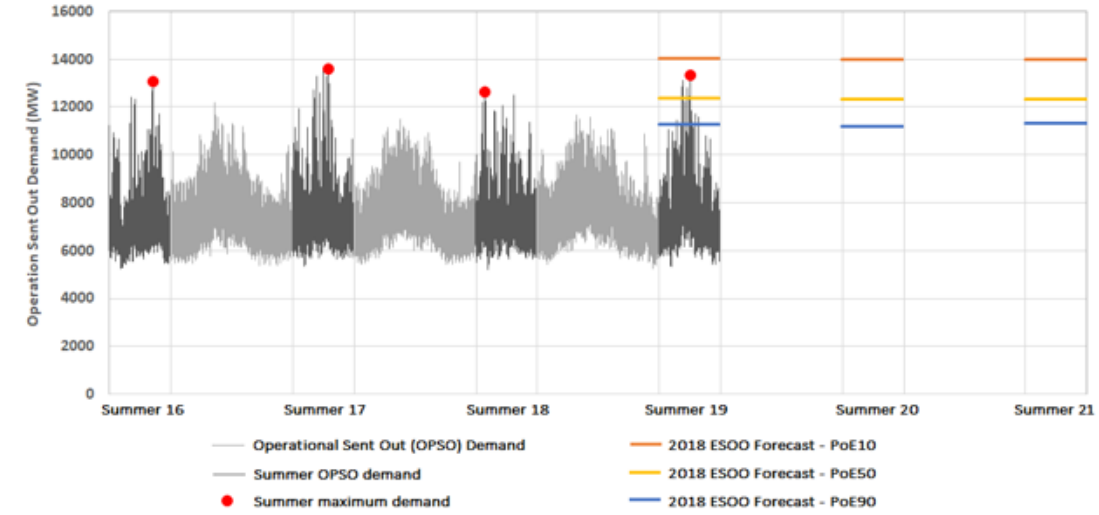
Forecast and observed values

- AEMO will typically publish forecast and observed values alongside forecast accuracy metrics for all forecasts.
- Values may be published in either graph or tabular format.
- Where an input is subject to confidentiality requirements, AEMO may choose to either aggregate or not publish updated data

Figure 7 New South Wales demand history compared to neutral forecast, summer 2016-summer 2021



Example graph based approach to publishing forecast and observed values

Table 12 New South Wales intermittent generation capacity, forecast and actual.

February 2019	Facilities operating (count)	Total summer capacity (MW)	Output during top 10 hottest days relative to summer capacity
2018 ESOO forecast	20	1,871	9%-88%
Actual[11]	20	1,768	26%-57%

Example table based approach to publishing forecast and observed values

Forecast improvement plan

- The FAR will include information related to possible improvements to the forecasting processes that will be explored and consulted on ahead of the next ESOO, with a particular focus on those arising from material forecast deviations.
- Stakeholder consultation on the improvements may begin before or after the forecasting accuracy report publication.
- Upon implementation, improvements will be documented in methodology documents and the ESOO.
- AEMO appreciates suggestions for improvements at any point in time
  - Either at industry forums or by email to energy.forecasting@aemo.com.au

Questions?

Next steps

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Next steps

- AEMO's consultation paper is available on:
  https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Interim-reliability-forecast-guidelines

- Submissions on the Draft Interim Reliability Forecast Guidelines should be submitted before:

  5:00pm (AEST) on 31 October 2019.

- All submissions should be sent by email to: Energy.Forecasting@aemo.com.au

- With the elevated importance of the FRG as part of this process, the Terms of Reference for the FRG will be reviewed as part of the FRG meeting on 27 November 2019. Formation of an Advisory Board (or alternative) will also be discussed.


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