Forecasting Reference Group Minutes

Forum:	August FRG 2023 (#6)
Date & time:	Wednesday 30 August 2023, 2:00pm – 4:00pm AEST

Disclaimer

This document provides an overview of the main points of discussion on the 30 August 2023 Forecasting Reference Group (FRG) meeting agenda. Readers, please note that:

- *This document is a summary only and is not a complete record of discussion at the forum.*
- *For presentation purposes, some points have been grouped together by theme and do not necessarily appear in the order they were discussed.*
- *The views expressed at the forum and reflected here are not necessarily those of AEMO.*

1 Welcome and Introductions

Levi Rosenbaum (AEMO) welcomed everyone and covered the following:

- Publication of past FRG meeting minutes.
- Publication of the 2023 Electricity Statement of Opportunities (ESOO) on 31 August and webinar invitation for 7 September 2023.
- Correspondence via Energy.forecasting@aemo.com.au

2 Presentation 1 – Gas Statement of Opportunities survey changes

Tim Abernathy (AEMO) presented proposed changes to GSOO data collection for the upcoming 2024 GSOO.

Key topics raised by stakeholders during this session included:

- Ron Logan (Shell Energy): The timing, of circulating the survey two days after the meeting, does not give time for FRG feedback to be implemented.
  - AEMO: The timeframe for sending the surveys out this year has been tight, so consultation on the survey content was not feasible. AEMO is accepting feedback during the survey process and will ensure that feedback is incorporated into the 2025 GSOO survey process.

3 Presentation 2 – Review of Forecasting Accuracy Report Methodology

Nigel Bean (The University of Adelaide (UoA)) presented UoA's review of AEMO's Forecasting Accuracy Report methodology and the metrics used within it. Nigel Bean is a Professor of Applied Mathematics at the University of Adelaide, interested in energy transformation and has spent quite a bit of time discussing these issues since reviewing the methodology four years ago. Nigel was invited by AEMO to review the methodology again this year from a mathematical rather than energy aspect with a fresh eye with a clean perspective.

Key topics raised by stakeholders during this session included:

- Ron Logan (Shell Energy): I disagree with the recommendation on restricting the simulation graph to the central 95%. You can get some outliers in the remaining 5%.
  - UoA: The forecast does not exclude outlier events. Figures are easier to interpret when restricting the graph to the central 95%.

4 Presentation 3 – Synthetic wind traces

Leslie Lay (AEMO) presented on AEMO's work on synthetic wind traces.

Key topics raised by stakeholders during this session included:

- Connor McLeod (Shell Energy): What does the time label mean in the CSV file?
  - AEMO: The published CSV traces format is intended to be used with PLEXOS software. Each column represents the end of a half-hourly interval in the day, numbered 1-48.
- Connor McLeod (Shell Energy): Is it worth considering an improving power curve over time for the generic new build? How do you think about the evolution of that trace?
  - AEMO: The wind farms selected to produce the representative power curve reflect newly installed wind technology. The farms selected may change as new wind farms enter the NEM and new trends in wind technology are observed. Technological improvements over time were previously incorporated as reductions in generic new build costs. However, CSIRO no longer assumes improvements in NEM wind capacity factors in GenCost due to stakeholder feedback and the lack of significant improvement over time.
- Connor McLeod (Shell Energy): Stakeholder want more granular data; is it better to publish smaller granularity data, rather than averaging? It would also be better to model each site individually to improve visibility of the specific generation profiles.
  - AEMO: The half-hourly average better reflects reality. The large capacity of developments will likely be spread out across multiple wind farms with varying wind conditions in each Renewable Energy Zone (REZ). Therefore, each REZ has two tranches. Modelling each site separately would not be computationally feasible.
- David Osmond (Windlab): What is the bias correction for anticipated REZ wind farms?
  - AEMO: It is a general bias correction applied to the data as a whole; a more sophisticated location or terrain specific approach may be considered in the future.
- David Osmond (Windlab): Different power curves should be applied based on wind resources.
  - AEMO: Once representative power curve is used for all plants that do not have power curve. Using resource quality based power curves at each site may be considered in future.
- Jennifer Brownie (QEUN): The Intergovernmental Panel on Climate Change[1] forecast a stilling of wind globally. How does AEMO account for changes not reflected in historical data?
  - AEMO: Climate change is not considered in the wind traces due to uncertainty in overall trend and lack of available data. AEMO and CSIRO's Electricity Sector Climate Information (ESCI) project[2] produced a projected climate dataset under different Representative Concentration Pathways (RCP) and did not find any long-term trends. AEMO will continue to monitor emerging science on this topic.
- Jennifer Brownie (QEUN): Siemens announced problems with installed wind turbines which could take 2 years to rectify. This problem may occur to other wind turbine manufacturers as wind rotor diameter and hub heights have increased dramatically over the last decade. Does AEMO include Forced Outage Rates (FOR) for wind farms in its modelling?

[1] See https://www.ipcc.ch/
[2] See https://www.climatechangeinaustralia.gov.au/en/projects/esci/about-esci/

- AEMO: We currently do not see widespread outages in the wind fleet and therefore do not model outages on wind generators. AEMO will continue to monitor and will review as appropriate.

- Jennifer Brownie (QEUN): Does AEMO have all turbine type and model data by wind farm?
  - AEMO: This data is not available for all NEM wind farms, so is not considered in producing wind traces. Machine learning models for each wind farm already capture historically observed site-specific dynamics.
- Peter Degorski (DNV): Have you extended the representativeness of the last 10 years looking at Victorian capacity factor on three coldest days of year, instead of the three hottest?
  - AEMO: This analysis is only on hot days, which tend to align with peak demand periods, representing the most challenging conditions for the system.
- Nick Cutler (EY): What is the horizontal grid resolution for European Centre for Medium-Range Weather Forecasts (ECMWF)? Has its accuracy in Australian terrain been assessed?
  - AEMO: ERA5 reanalysis from ECMWF[3], with a spatial resolution of 0.25°, translates to roughly 25km for the Australian continent. The correlation between ERA5 and actual data was strong, around 0.85 for most NEM sites, but varies between sites and doesn't perform as strongly in areas with more localised terrain features e.g., narrow mountain ridges.
- Huyen Nguyen (QTC): Fixed tilt solar is less seasonal and generation can be valuable in winter. Can AEMO provide the traces for fixed tilt solar?
  - AEMO: Recent solar developments in the NEM have been significantly favouring single-axis tracking (SAT) technology over fixed tilt. If presented with both options, the model will typically favour SAT as the cheaper cost per energy delivered option. Therefore, including both adds computational complexity for the model.
- Metabha Wanninayaka (QTC): In consideration of build limits for high and medium wind candidate REZ, how does AEMO classify pipeline REZ wind projects into the high or medium wind tranches based on percentile performance?
  - AEMO: For ISP modelling, AEMO only includes anticipated or committed projects. If a project is located in a REZ, it is classified into a tranche based on relative expected performance of that REZ. Its capacity then counts towards the tranche and REZ build limit.

5 Meeting close

Visit the FRG webpage for the forward plan of agenda topics for 2023.
The next FRG meeting will be held on 27 September 2023 with discussion on the Demand Side Participation (DSP) methodology and DSP Information Guidelines consultation and a synthetic demand trace update.
Feedback on the 30 August FRG can be submitted to: https://forms.office.com/r/e37GVj3nb2

[3] See https://cds.climate.copernicus.eu/terms#!/dataset/reanalysis-era5-single-levels

A1 Attendees:

Table 1 30 August FRG Attendees

Name	Organisation	Name	Organisation
Derrick Calder	ACCC	Navid Haghdadi	Ausgrid
Wallace Stark	ACCC	Morteza Moallemi	AusNet Services
Precious Mukosera	ACCC	Jessica Kelly	CleanCo Queensland
Kristina Fitzhardinge	ACCC	Eddie Leow	CleanCo Queensland
Sundus Masood	ACCC	Ben Tudman	Cornwall Insight
Finlay Barr	ACCC	Michael Statham	CS Energy
Joshua Otten	ACCC	Sarea Coates	DCCEEW
Harriet Tienstra	ACIL Allen	David Charlwood	DCCEEW
Craig Oakshott	AEMC	Jyotsna Vedi	DCCEEW
Levi Rosenbaum	AEMO	Lucienne Burnham	DCCEEW
Debborah Marsh	AEMO	Azadeh Keshavarzmohammadian	Deloitte
Ben Jones	AEMO	Ben Willey	DELWP (VIC)
Tim Abernethy	AEMO	Arwin Kahlon	DELWP (VIC)
Leslie Lay	AEMO	Mark Kowalczyk	DELWP (VIC)
Claus Larsen	AEMO	Marino Bolzon	DEM (SA)
Eve Phyu	AEMO	Peter Degorski	DNV
Leo Ma	AEMO	Adam Strohfeldt	Edge2020
Magnus Hindsberger	AEMO	Bradley Harrison	ElectraNet
Jieyang Chong	AEMO	Jillian Vanderstoep	Energy Queensland
Jose Viada Galvez	AEMO	Craig Pollard	Energy Queensland
Seb Kilborn	AEMO	Yatra Forudi	Energy Queensland
Navid Mohammadzadeh	AEMO	Shoaib Amjad	EnergyAustralia
Jay Stein	AEMO	Linda Yu	EPW (QLD)
Virginia Chen	AEMO	Haiyan Liu	ERA (WA)
Nick Cimdins	AEMO	Kerina Heath	Ergon Energy
Abbas Mohammadi	AEMO	Alistair Robson	Essential Energy
Dongxiao Wang	AEMO	Brent Hudson	Essential Energy
Ana Orozco Perez	AEMO	Nick Cutler	EY
Matthew Marston	AEMO	Cathy Johnston	Fortescue
Ali Habibi Khalaj	AEMO	Amin Nabipour	Horizon Power
Mark Taylor	AEMO	David Edwards	Horizon Power
Anula Abeygunawardana	AEMO	Anna Matala	Hydro Tasmania
Natasha Sinclair	AEMO	Kate Farnsworth	Hydro Tasmania
Andrew Turley	AEMO	David Allen	Hydro Tasmania
Yee Siong Lee	AEMO	Kateryna Kiemele	Hydro Tasmania
Jess Buttigieg	AEMO	Kevin Morrison	IEEFA
Eduard Munsayac	AEMO	Beverley Hughson	ISP Consumer Panel
Chang Liu	AEMO	Catherine Marshall	Jemena
Sayani Gupta	AEMO	Bob King	King Associates
Eli Pack	AEMO	Chotima Micallef	Lochard Energy
Dominic Price	AEMO	Terrence Mak	Monash University
Tom Ralston	AER	Richard Hickling	Mott MacDonald
Peter Bucki	AGIG	David Xu	Origin Energy
Will Chivell	AGIG	Shervin Mohebbi	Powercor
Elsie Zhao	AGIG	Aaron O'Brien	Powercor
Dean Knight	Powerlink	Steve Meiklejohn	Stanwell
Metabha Wanninayaka	QTC	Michael Nelmes	Synergy
Huyen Nguyen	QTC	Rudy Khong	Synergy

Name	Organisation	Name	Organisation
Paul Connor	QTC	Herath Samarakoon	TasNetworks
Sam Lines	QTC	Dhor Ngor-Apuol	TasNetworks
Sharon Raymond	ReCFIT (TAS)	Jochen Reitz	TasNetworks
Leo Xue	RMHEDGE	Julie Morrison	TasNetworks
Steven Maxwell	SA Power Networks	Arindam Sen	Transgrid
Sophie Arthur	SA Power Networks	Gang Cao	Transgrid
Christina Sutherland	Santos	Joshua Vincent Ross	University of Adelaide
Ron Logan	Shell Energy	Nigel Bean	University of Adelaide
Adam Crudden	Shell Energy	Cara Smith	Western Power
Connor McLeod	Shell Energy	Bijoy George	Western Power
Noel Sligar	Sligar & Associates	Iain Machanick	Western Power
Connie Ganser	Stanwell	David Osmond	Windlab

A2 Forecasting Reference Group (FRG) Actions Items

Table 2 FRG Action Items (at 20 September 2023)

Item	Date Raised	Topic	Action required	Closing comments	Status
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