DRAFT MINUTES – Forecasting Reference Group (FRG)

MEETING: #4

DATE: WEDNESDAY 25TH MARCH 2020

CONTACT: Energy.Forecasting@aemo.com.au

Attendee	Company	Site
Marike de Waard	ACIL Allen Consulting	Teleconference
Ben Skinner	AEC	Teleconference
Carol Tran	AEC	Teleconference
Adrian Grantham	AEMO	Teleconference
Ali Habibi Khalaj	AEMO	Teleconference
Andrew Turley	AEMO	Teleconference
Bella Pennington	AEMO	Teleconference
Ben Jones	AEMO	Teleconference
Daniel Collins	AEMO	Teleconference
David Weinholz	AEMO	Teleconference
Dean Soste	AEMO	Teleconference
Debborah Marsh	AEMO	Teleconference
Grace Liu	AEMO	Teleconference
Greg Staib	AEMO	Teleconference
Helen Wang	AEMO	Teleconference
Hua Min Situ	AEMO	Teleconference
Joachim Tan	AEMO	Teleconference
Justine Park	AEMO	Teleconference
Kent Hanh	AEMO	Teleconference
Laura Tomkins	AEMO	Teleconference
Leslie Lay	AEMO	Teleconference
Levi Rosenbaum	AEMO	Teleconference
Luke Dowling	AEMO	Teleconference
Luke Sumner	AEMO	Teleconference
Magnus Hindsberger	AEMO	Teleconference
Manus Higgins	AEMO	Teleconference
Natasha Sinclair	AEMO	Teleconference
Nicola Falcon	AEMO	Teleconference
Rachel Tandy	AEMO	Teleconference

Rebecca Petchey	AEMO	Teleconference
Roberta Maher	AEMO	Teleconference
Sangita Bista	AEMO	Teleconference
Vivian Mai	AEMO	Teleconference
Peter Young	AGL	Teleconference
Andrew Godfrey	Alinta Energy	Teleconference
Audelle Hong	Alinta Energy	Teleconference
Michelle Nguyen	Alinta Energy	Teleconference
Michael Puls	APA	Teleconference
Damian Dwyer	APPEA	Teleconference
Craig Tupper	Ausgrid	Teleconference
Ed White	Ausgrid	Teleconference
Jacqui Bridge	AusNet Services	Teleconference
Nick Cimdins	AusNet Services	Teleconference
Baden Hughes	Buildings Alive	Teleconference
Thakshila Gunaratna	Clean Energy Council	Teleconference
Henry Gorniak	CS Energy	Teleconference
Lachlan O'Neil	CSIRO	Teleconference
Paul Graham	CSIRO	Teleconference
Shira Samocha	Deloitte	Teleconference
Diwaker Basnet	DELWP	Teleconference
Kaleem Ansari	DELWP	Teleconference
Norman Jip	DELWP	Teleconference
Sharon Raymond	Department of State Growth, Tasmanian Government	Teleconference
Alex Driscoll	Edge Energy Services	Teleconference
Richard Paprzycki	Energy Australia	Teleconference
David Havyatt	Energy Consumers Australia	Teleconference
Chris McKeague	Energy Queensland	Teleconference
Shervin Mohebbi	Energy Queensland	Teleconference
David Hoch	Engie	Teleconference
Julian Fairhall	ERAWA	Teleconference
Ron Logan	ERM Power	Teleconference
Wendy Ng	ERM Power	Teleconference
Abu Abdulah	ESCOSA	Teleconference
Brent Hudson	Essential Energy	Teleconference
Mark Grenning	EUAA	Teleconference
Tristan Edis	GEM	Teleconference
Cameron Potter	Hydro Tasmania	Teleconference
Mark Kowalczyk	Hydro Tasmania	Teleconference
Prateek Beri	Hydro Tasmania	Teleconference

Jennifer Abedin	IESYS	Teleconference
Peter Kolf	KPKSAS	Teleconference
David Headberry	Major Energy Users	Teleconference
Bill Nixey	NSW Department of Planning, Industry and Environment	Teleconference
Sarah Derby	Origin	Teleconference
Stephen Archer	Pearl Clean Energy	Teleconference
Elizabeth Aitken	Perth Energy	Teleconference
Anna Livsey	PIAC	Teleconference
Jennifer Brownie	QEUN	Teleconference
Jose Viada Galvez	Queensland Government	Teleconference
Chris Yi	Red Energy	Teleconference
Guerlain Appriou	Red Energy	Teleconference
Bret Harper	RepuTex Energy	Teleconference
Elisia Reed	SA Power Networks	Teleconference
James Bennet	SA Power Networks	Teleconference
John Sligar	Sligar & Associates	Teleconference
Joe Hemingway	Stanwell	Teleconference
Herath Samarakoon	TasNetworks	Teleconference
Rod Littlejohn	Tersum Energy	Teleconference
Arindam Sen	TransGrid	Teleconference
Sujeewa Vithana	United Energy	Teleconference
Peter Condon	Western Power	Teleconference

1. Welcome and Introductions

Luke Sumner (AEMO) welcomed everyone to the March FRG meeting, the first held as a webinar.

2. COVID-19 (Coronavirus Disease 2019) Update

Nicola Falcon (AEMO) provided an update on AEMO's response to the COVID-19 crisis and the necessity to revise forecasts for the Easter period and beyond. The situation has escalated more than originally accounted for and current economic forecasts are out-of-date. No accurate assessment of economic damage and recovery trajectory can be determined until peak contagion has been reached and the beginning of economic recovery in other countries has been observed. High-level scenarios of economic impact and consequences for energy consumption, maximum and minimum demand are being developed in the interim.

Key topics raised by stakeholders during this section included:

- Lachlan O'Neil (CSIRO) inquired into how COVID-19 has impacted AEMO's operations. Nicola Falcon (AEMO) assured the FRG that AEMO will maintain its mission of energy security and reliability through its pandemic plan.
- Mark Grenning (EUAA) asked how COVID-19 would impact the upcoming Integrated System Plan (ISP). Nicola Falcon (AEMO) highlighted that the ISP already includes a slow growth scenario, which provides perspective on what a long term limited growth trend may have on the development opportunities. At this stage, COVID-19 is expected to most significantly impact the short to medium term and therefore the long-term needs of the power system should remain robust. AEMO still intends to publish the Final ISP mid year, and if the long-term outlook changes materially later in the year, this would trigger an ISP Update.
- Ben Skinner (AEC) requested for the deferral of the ISP and ESOO publications until long term impacts are known. Cameron Potter (Hydro Tasmania) opposed this view, citing the need for ready-to-go infrastructure projects when stimulus starts to flow.

3. Distributed Energy Resource (DER) Forecast Update

Luke Dowling (AEMO) provided an update on the draft consultant DER forecasts and introduced AEMO's proposed approach to applying the two sets of consultant forecasts under each scenario.

Key topics raised by stakeholders during this section included:

- Cameron Potter (Hydro Tasmania) asked what battery durations were assumed in the forecasts and commented that if 2-4 hr battery durations were used in the

forecasts, it would mean overbuilding for personal use. Luke Dowling (AEMO) replied that the average residential battery duration used by the consultants was approximately 2.5 hrs, based on the size of historically installed batteries, and that commercial and residential battery systems were not homogenous sizes. Cameron asked whether the driver for battery installation was supplying to the grid or for personal supply. Luke replied that the main driver was the expected payback period based on personal supply, although some installations are expected to be configured as Virtual Power Plants (VPP), with higher VPP installations in the Step Change scenario.

- Cameron Potter (Hydro Tasmania) noted that he liked the GEM forecasts for the Fast Change scenario as it is focuses on greater centralisation with lower DER uptake, which is more consistent with the scenario narrative. (GEM's Fast Change scenario flagged a potential dampening effect that higher grid-scale solar generation may have on the uptake of DER systems).
- Ron Logan (ERM Power) asked what due diligence AEMO had done to determine that the forecasts provided are reasonable. Luke Dowling (AEMO) replied that AEMO Forecasting has been doing quality assurance on the forecasts, including reviews of their assumptions and inputs and model drivers, such as assumed system size, penetration rate relative to household connections, etc.
- Peter Condon (Western Power) stated that some economists forecast potential permanent economic changes due to COVID-19 and people's buying practices have tended to be more self-sufficient. Peter asked whether those changes will be included in these rounds of forecasts. Nicola Falcon (AEMO) reiterated that there is currently a high level of uncertainty surrounding the economic impact of COVID-19, and consequently the potential short to medium term impact on demand. AEMO is therefore proposing to apply a high-level adjustment (in talking with the economic consultants) to forecasts in the first instance using a scenario-based approach. Updated consumption forecasts will be developed after the economic impacts of COVID-19 and likely speed of recovery become clearer.
- Nick Cimdins (AusNet Services) asked how AEMO will assess the accuracy of the input assumptions in the Forecasting Accuracy Report if a weighted approach (to applying the consultant DER forecasts to the AEMO scenarios) is applied. Luke Dowling (AEMO) agreed that the drivers for installations may differ subtly between consultants, however the accuracy of AEMO's forecasts as reported by the Forecast Accuracy Report will be able to be assessed, as the level of uptake is what is assessed, rather than the accuracy of uptake drivers.
- Jennifer Brownie (QEUN) commented that she believes that the draft DER forecasts are too high and added that she felt payback period was a poor measure to assess consumer uptake. In terms of the DER register, Jennifer also asked when AEMO was going to look at reconciliation between DER and CER

data. Luke Dowling (AEMO) noted that GEM includes installer feedback in determining its forecasts, and installers are validating the development trends. The PV forecasts include a degradation factor to erode the PV output with age, however some poorer quality systems may erode faster than assumed. Anecdotally early failures may lead to earlier replacement with newer, better systems, however limited data exists to clarify whether system failures are leading to replacement. AEMO would welcome any data from FRG participants on poor performing systems and replacement trends. Andrew Turley (AEMO) noted that the consultant methodologies included consideration for reducing incentive schemes and end-of-life assumptions. Magnus Hindsberger (AEMO) also added that AEMO are doing checks on the DER Register, however, it is too early to provide conclusions.

- David Havyatt (Energy Consumers Australia) commented that DER should be endogenous outputs rather than exogenous assumptions. Nicola Falcon (AEMO) agreed that it would be ideal if DER was endogenous, but to truly optimise it, it is necessary to understand not only the cost of DER, but also the cost from a distribution point of view, which includes distribution planning in addition to transmission planning. Peter Condon (Western Power) added that there is a similar product on the west coast to the ISP. In going through the next iteration, efforts have been devoted to understanding the cost of wholesale electricity and the cost of PV but noted that there were difficulties to work out as the simulation will step through years very slowly. Therefore, it is reasonable to use the current exogenous-based method for DER with the sensitivity test applying to the input assumptions.
- Abu Abdullah (ESCOSA) asked if the same degradation was applied to the whole range of PV and battery forecasts. Luke Dowling (AEMO) replied that the same degradation was applied across all PV forecasts (0.5% per year in CSIRO, 0.7% per year in GEM), and a higher degradation was applied to batteries (1.6% per year for CSIRO, 5% per year for GEM).

4. ESOO 2020 Inputs and Assumptions Update

Greg Staib, Debborah Marsh and Andrew Turley (AEMO) presented an update on the ESOO 2020 Inputs and Assumptions. Greg provided a refresh of the residential and business component models used in the annual consumptions forecasts and presented updates on some of the key model inputs. Debborah provided a refresh of the appliance index and presented on energy efficiency focusing on its scope, input drivers, application to models, updates, and future improvements.

Key topics raised by stakeholders during this section included:

- Jennifer Brownie (QEUN) asked how close AEMO's connections forecasts were when compared with the DNSPs' connection forecasts. Greg Staib (AEMO) responded that due to AEMO's regional level focus, AEMO had not compared its connection forecast with individual DNSPs' forecasts.
- Jennifer Brownie (QEUN) asked whether AEMO broke down its new NMIs into new business and residential connections. Greg Staib (AEMO) responded that AEMO does not forecast business activity based on the *number* of connections, as business consumption may differ significantly depending on the type of business connected, but uses business consumption load history to inform forecasts and consider the impacts of economic indicators. (AEMO does disaggregate NMIs into residential and business consumers, with the residential category applying connection trends to inform future consumption).
- Jennifer Brownie (QEUN) believed that AEMO's forecast of large businesses was performing well, but small and medium enterprises (SME) forecasts were less accurate. Jennifer noted that according to AER's statistics on retail performance, in the past three to four years Queensland had lost over 9,000 businesses. Jennifer suggested that AEMO validate its forecast using other useful data sets, such as from the AER. Greg Staib (AEMO) responded that AEMO does cross check data sets and noted that when businesses close, their NMIs don't necessarily disappear but maybe replaced by new businesses which are tracked through structural aspects in AEMO's model. Debborah Marsh (AEMO) added that the SME model was developed on a different basis to the residential model, using linear regression techniques to define relationships of energy consumption over time with economic indicators. As such, the SME model is not developed on a 'per connection' basis, but connection numbers are implicit within the consumption / economic indicator relationship trends.
- David Headberry (Major Energy Users) stated that there was a difference in AEMO's forecasts for the next 6 years compared with Victorian distribution businesses' (DBs) forecasts. David noted that these DBs' forecasts were based on real time data from smart meters and that AEMO should look to use this data and do cross checking with DBs' forecast. Greg Staib (AEMO) agreed and noted that this make sense for a distributor to focus on particular sub-regional trends in their distribution patch but as AEMO is currently focussed on regional accuracy (which show stable historical trend) investigating DNSP sub-regional trends is currently not a focus area. However, Greg explained that AEMO is currently exploring a NMI forecast based on climate zones, and so a distribution level forecast may provide a further dataset for benchmarking in future updates.
- Cameron Potter (Hydro Tasmania) commented that in AEMO's retail price index forecast on slide 9, there was only one overlap between the 2019 forecast and 2020 forecast. Cameron noted that for a multidecadal forecast going from one

year to another, little overlapping implied that a lot of weight was placed on present data and not enough weight was placed on the drivers. Cameron noted that the overlapping seen on AEMO's connections forecast was what he expected for the price index forecasts. Nicola Falcon (AEMO) responded that for all price forecasts, the price dispersion over time will be impacted by different factors such as the cost of generation for new entrants, variation in gas prices and balance of plant costs. Nicola added that the lower price index in the 2020 forecasts were partly attributed to gas setting the prices less frequently due to increases in renewable generation. Luke Sumner (AEMO) added that the forward market was currently in decline and that the drop in prices was observed across VIC, QLD, SA and NSW.

Andrew Turley (AEMO) addressed economic forecast assumptions, and the inherent inaccuracy in the economic forecasts that were prepared largely before the scale of COVID-19 impacts were understood. As such, and as outlined by Nicola Falcon in the earlier presentation, AEMO is working closely with BIS Oxford Economics to provide an updated economic forecast, including possible impacts of fiscal and monetary policy and possible recovery timelines to revert to previous economic trends post COVID-19.

Key topics raised by stakeholders during this section included:

- Arindam Sen (TransGrid) suggested that AEMO use income elasticity estimates to gauge the COVID-19 impact on energy. Greg Staib (AEMO) responded that AEMO's methodology includes price elasticities rather than income elasticities. Greg asked the FRG participants for submissions regarding income elasticities and stated that meter data analytics remains a core method for understanding the variance that can be expected in short term demand changes.
- Jennifer Brownie (QEUN) was concerned about the heavy reliance on macroeconomic data and submitted, through the energy forecasting inbox, building industry data which shows the industry is currently experiencing a regression to 1990 levels which points to a sharp reduction in consumer economic activity. Greg Staib (AEMO) welcomed the submission and explained that AEMO will consider all potential data options and insights to forecast this unprecedented event.
- Ron Logan (ERM Power) asked about the discrepancy between large industrial load survey responses and actual data and whether historical discrepancies are considered when accepting the industrial survey responses. Greg Staib (AEMO) explained that forecast survey responses are matched with meter data and forecasts may be revised following discussions with individual industrials. Consistent over-forecast submissions may be revised down to ensure accuracy. The process of industrial reviews will be included in future methodology reports.

5. Presentation 4: WEM ESOO Methodology recap

Joachim Tan and Dean Soste (AEMO) presented a recap of the demand forecasting methodology being used for the Wholesale Electricity Market (WEM) Electricity Statement of Opportunities (ESOO), ahead of the release of the draft forecasts at the WA Electricity Consultative Forum (WAECF). Discussion centred around the methodology for forecasting annual consumption, broken down into residential, small and medium enterprises, and large industrial loads (LILs), and maximum and minimum demand.

Key topics raised by stakeholders during this section included:

- Michelle Nguyen (Alinta Energy) asked how LILs are identified, and whether market participants could assist AEMO in identifying LILs that should be included in the ESOO. Joachim Tan (AEMO) replied that LILs are identified by observing historical consumption and applying the 10MW rule (demand greater than 10MW for at least 10% of the financial year). This is also applied in the NEM.
- Michelle Nguyen (Alinta Energy) asked whether the base year used in forecasts is 2019 or a combination of recent years. Joachim Tan (AEMO) confirmed that the base year is typically the most recent year, in this case 2019. In terms of energy consumption, price impacts aren't as pronounced as they are for economic data, so only the most recent year is needed for basing the forecasts.
- Michelle Nguyen (Alinta Energy) asked whether there will be a draft WEM ESOO released. Joachim Tan (AEMO) replied that the April WA Electricity Consultative Forum will include an agenda item on the draft forecasts.
- Peter Condon (Western Power) commented that retail prices from the WA budget are typically inaccurate and asked whether there have been long-term considerations for alternative sources of budget data. Joachim Tan (AEMO) explained that AEMO currently applies the WA government determinations and has not considered alternative future tariffs. AEMO encourages participants to submit any further suggestions to the Energy Forecasting inbox at energy.forecasting@aemo.com.au.
- Ron Logan (ERM Power) asked why only 20 years of historical weather data was used for maximum demand forecasting, as it might not capture the full range of outputs. Greg Staib (AEMO) explained that the advice from Weatherzone was that older years may not be applicable for simulating weather events due to lack of quality solar insolation data and climate change effects. Hua Min Situ (AEMO) added that there has been an observed 0.031°C per year temperature rise in Perth, which was then applied to reference year data to be more applicable.

6. Other Business

Magnus Hindsberger (AEMO) advised participants of the deadline for Demand Side Participation (DSP) forecast methodology paper submission on Friday 27th March. This deadline was subsequently extended to 1st April 2020 as requested by Ron Logan (ERM Power) in the FRG**.**

Key topics raised by stakeholders during this section included:

- Sujeewa Vithana (United Energy) asked if the DSP and connection point data will be collected as normal for this year despite disruption and uncertainty in the market. Magnus Hindsberger (AEMO) confirmed that the data and timelines for this year will continue as planned, the consultation addresses how the data is used.

7. Meeting Close

The next FRG meeting is scheduled for Wednesday 29th April 2020.

Forecasting Reference Group (FRG) Actions Items – OPEN (as at 8th April 2020)

Item	Date Raised	Topic	Action required	Responsible	By	Status
3.1.2	25/09/2019	Information sharing	Consider developing a mechanism for sharing inbox submissions with the wider FRG group. FRG to provide suggestions to AEMO.	AEMO and FRG	TBC	**OPEN** In interim, have included out of session submissions in meeting pack
6.2.1	29/1/2020	Additions to final report	More detail on the short run and long-run drivers and the transition will be added into the appendix of the report.	Sarah Hunter (BIS Oxford Economics)	Release of final report	**OPEN**

Forecasting Reference Group (FRG) Actions Items - CLOSED

Item	Date Raised	Topic	Action required	Responsible	By	Status
7.7.1	26/2/2020	First stage of consultation on AEMO's DSP forecast methodology	Participants to submit feedback to energy.forecasting@aemo.com.au	FRG Participants	27/3/2020	**CLOSED**