DRAFT MINUTES – Forecasting Reference Group (FRG)

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| MEETING: | #12 |
| DATE: | Wednesday 24 October 2018 |
| Contact: | [Energy.Forecasting@aemo.com.au](mailto:Energy.Forecasting@aemo.com.au) |

**ATTENDEES:**

| **NAME** | **ORGANISATION** | **LOCATION** |
| --- | --- | --- |
| Marino Bolzon | Department for Energy and Mining | Adelaide |
| Andrew Turley | AEMO | Brisbane |
| Dane Winch | AEMO | Brisbane |
| Sam Ingram | Queensland Treasury Corporation | Brisbane |
| Joe Hemingway | Queensland Treasury Corporation | Brisbane |
| Azadeh Keshavarzmohammadian | AEMO | Melbourne |
| Craig Price | AEMO | Melbourne |
| Greg Staib | AEMO | Melbourne |
| Neale Scott (Chair) | AEMO | Melbourne |
| Nicola Falcon | AEMO | Melbourne |
| Vivian Mai | AEMO | Melbourne |
| Ben Skinner | Australian Energy Council | Melbourne |
| Kyle Ly | Energy Australia | Melbourne |
| Richard Paprzycki | Energy Australia | Melbourne |
| James Osborne | Jemena | Melbourne |
| James Osborne | Jemena | Melbourne |
| Thanh Bui | Jemena | Melbourne |
| Steven Rawlins | Powerlink | Melbourne |
| Joseph Nunez | AEMC | Sydney |
| Alex Fattal | Origin | Sydney |
| John Sligar | Sligar and Associates | Sydney |
| Craig Oakeshott | AER | Teleconference |
| Damian Dwyer | APPEA | Teleconference |
| David Headberry | Major Energy Users | Teleconference |
| Ed White | Ausgrid | Teleconference |
| David Whitelaw | Department of Environment and Energy | Teleconference |
| Franki Lee | Endeavour Energy | Teleconference |
| Andrew Godfrey | Energy Australia | Teleconference |
| Shane Brunker | Energy Queensland | Teleconference |
| David Hoch | Engie | Teleconference |
| Maya Muthuswamy | Engie | Teleconference |
| Ron Logan | ERM Power | Teleconference |
| Mark Grenning | EUAA | Teleconference |
| David Xu | Origin Energy | Teleconference |
| Jennifer Brownie | Queensland Electricity Users Network | Teleconference |
| Win Arefta | Stanwell | Teleconference |
| Panos Priftakis | Snowy Hydro | Teleconference |
| Herath Samarakoon | Tas Networks | Teleconference |

# Welcome and Introductions

Neale Scott (AEMO) welcomed attendees to the October 2018 Forecasting Reference Group (FRG) meeting.

# Previous minutes and action items

The meeting minutes from the 25 September 2018 FRG were accepted by attendees and finalised after making an amendment to the comment comparing native demand to grid demand. A link to AEMO definitions of Native and Operational Demand has been added into the footnote of 25 September 2018 FRG meeting minutes to provide clarification, in response to a query from Ron Logan (ERM Power).

# Forward Plan for FRG

Nicola Falcon (AEMO) advised FRG participants that the Data Portal workshop has been revised and moved to 2 November 2018 (Post FRG update: 27 November 2018). A forward agenda to December 2018 is available on the FRG [page](https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Other-meetings/Forecasting-Reference-Group) on the AEMO website. Stakeholders are encouraged to forward agenda items to interested colleagues within their organisation as well as give feedback to AEMO on the agenda items and proposed dates.

# 2019 Input Assumptions

Dane Winch (AEMO) and Greg Staib (AEMO) presented on the *Input Assumptions for 2019 Planning and Forecasting Scenarios* slides (included in the October 2018 meeting pack). The presentation provided a review of input assumptions on distributed energy resources, generation technology costs, development lead times and regional cost factors to be used by Forecasting and Planning in 2019.

Key points raised by stakeholders during this presentation included:

* Craig Oakeshott (AER) questioned how the renewable energy zones are decided and chosen and whether those that were considered not viable last year will be reconsidered this year? Andrew Turley (AEMO) answered that the zones presented in this forum are a full collection of zones, not a subset to be used for the modelling next year. Nicola Falcon (AEMO) identified that future Integrated System Plans may leverage off the analysis provided in previous versions to limit initial renewable energy zone expansion based on available transmission capacity and renewable resources.
* Nicola Falcon (AEMO) raised a question to FRG participants to facilitate further discussion on what extent could a future ISP use the previous ISP assumptions, and how could these assumptions be refined given recent market developments.
* David Hoch (Engie) asked for a full set of criteria including market and project costs for the information to be complete. There are also two parameters that should be considered. The first parameter is the notion of regional cost factors which needs to be granular enough to influence the project costs in those zones. Secondly, the modelling needs to take into account the penetration of technologies and negative impact which they can cause subsequent developments. Craig Price (AEMO) stated that the modelling does not select areas that should become renewable energy zones, but assesses defined renewable energy zones. To produce the 2018 ISP, AEMO worked with a wide range of stakeholders and held a number of workshops to work out the concept of renewable zones and to identify candidate zones. The zones were then refined based on capabilities and characteristics before being put into the modelling for assessment. This modelling involves not only market modelling but also power market system modelling.
* Ron Logan (ERM Power) asked for explanation on how regional cost factors are calculated, how they are applied to transmission and generation, and why NSW costs are higher than Victoria costs. Dane Winch (AEMO) replied that the consultant’s (GHD) scope is to focus on generation development with additional costs considered, such as transport and labour. In determining the regional cost factors, Victoria is used as the reference for the cost, with all other costs relative to Victoria. GHD provided several components influencing capital expenditure (CAPEX) and the regional cost factors will be applied to these components individually to calculate CAPEX costs in other regions. The low, high, and medium categories in the regional cost factor calculation consider the approximate distance to available ports, labour and raw material costs. Dane Winch (AEMO) informed the participants that AEMO would release the GHD report to FRG participants for feedback as soon as it is ready. The report will capture additional information on the assumptions and methodology used to calculate the presented numbers. (Action item 12.4.1). Nicola Falcon (AEMO) reiterated that today’s FRG meeting is the first platform to consult on the assumptions with stakeholders on these inputs, and refine the assumptions to use in future modelling.
* John Sligar (Sligar and Associates) commented that the lead times appeared “extremely optimistic”, requiring reconsideration. Dane Winch (AEMO) replied that the values provided by GHD have not had an extensive industry review and welcomed the FRG to provide feedback for what is representative, with data or evidence to support this if available. AEMO will consider stakeholders’ feedback and where appropriate consult and refine these assumptions. Dane Winch (AEMO) identified that the lead times represented technical minimum development timeframes. John Sligar (Sligar and Associates) suggested AEMO to review projects from its Generation Information list to review observed developments and identify how long it takes for projects to be built.
* Craig Price (AEMO) asked for explanation of the reduction in build costs from GHD reports compared to last year report, for instance, cheaper build cost for gas turbines. Dane Winch (AEMO) replied with an example of thermal generators – one of the key drivers is around leveraging equipment and labour cost reductions. Also noting that providing a detailed comparison of other parties and the GHD values was outside the GHD scope, rather their scope was to provide their best independent estimate of current technology costs and capabilities.
* Craig Oakeshott (AER) suggested that the build cost of a Wind generator at $2,018 was approximately $700 higher than what he would expect. Nicola Falcon (AEMO) explained that the build costs from GHD were based on the actual projects that they are involved in, however, Nicola Falcon (AEMO) sought further comments and data from participants to assist in refining the number if too high. David Headberry (Major Energy Users) recommended that it may be worthwhile to perform further investigation into the pricing of renewables as recent observations suggest that the prices offered by the developers of new wind and solar farms are much lower. Nicola Falcon (AEMO) stated that the challenge is that the financing cost is also factored into the $/MWh costs commonly reported and it is difficult to extract that from a dollar per kilowatt value. Nicola Falcon (AEMO) also stated that it is critical to ensure build costs are representative of the market, and acknowledged that AEMO relies on consultants for such information as specifics of each project are not provided to AEMO. FRG stakeholders are invited to share data to assist AEMO in applying appropriate costs to modelling, particularly when FRG participants have greater access to true project development costs. (Action item 12.4.2)
* Ron Logan (ERM Power) queried whether there would be an option of bundle costs applied on solar farms or wind farms with an installed battery storage system instead of individual costs. Furthermore, why are large-scale battery storage systems limited to two hours storage. Andrew Turley (AEMO) responded that ideally the flexibility of the model will enable many more combinations of renewables and storage to be assessed and with any particular ratio to come out of that. Andrew Turley (AEMO) also stated that the item showing “two-hour storage” is for presentation purposes as a two-hour battery was used in the previous ISP but the storage to energy ratio can be altered in the new GHD dataset.
* Craig Price (AEMO) questioned if a learning curve is considered in the build costs. Nicola Falcon (AEMO) replied that CSIRO is working to improve learning cost trajectories applied to the initial build costs provided by GHD. Dane Winch (AEMO) presented preliminary learning cost trajectories, although these preliminary trajectories reflected preliminary GHD data (inconsistent with the final GHD data presented). There were questions raised seeking for explanation and clarification of the presented build cost trajectories. It was advised that there would be a workshop with CSIRO on the following Tuesday to obtain further information and clarification.
* Ron Logan (ERM Power) suggested that it would be helpful if AEMO can provide the energy forecast broken down into peak and off-peak as there are more distributed solar photovoltaic (PV) in the system. Greg Staib (AEMO) advised that AEMO calculate maximum demand at time of peak, and internally track what maximum demand is for an underlying demand to consider the contribution of solar PV and at what time of day the peak occurs.
* Herath Samarakoon (Tas Networks) noted that some Hydro plants in Tasmania are non-scheduled generators but are in schemes with scheduled generators , therefore, there is the need to consider in more detail operational demand for Tasmania. Nicola Falcon (AEMO) noted that it is understood that there is a small number of non-scheduled generators within the Hydro Tasmania portfolio. From an ISP perspective, AEMO will include non-scheduled demand from those generators in the models, although including these generator does deviate slightly from AEMO published demand definitions. For the purpose of ISP it will be explained why certain generators are included/excluded.
* Richard Paprzycki (Energy Australia) queried if AEMO can publish the electric vehicles (EV), solar PV and battery traces used in Plexos models, so that stakeholders can take these out and replace with their own assumptions. Greg Staib (AEMO) advised that EV and battery traces are not yet available on AEMO’s forecasting interface, but solar PV traces are currently provided. Nicola Falcon (AEMO) stated that AEMO will work on the possibility of publishing traces at more disaggregated level in future reports.haha y (Action item 12.4.3)
* Kyle Ly (Energy Australia) questioned whether AEMO specifies the timing for small battery discharge to be coordinated by spot prices or some other mechanisms. Greg Staib (AEMO) advised that the discharge of batteries is categorised into two types: (1) Unaggregated batteries, those that are operating to serve a consumers own load profile, with no additional discharge to support the broader network, and (2) Aggregated Batteries, where it is assumed that a certain capacity of the installed batteries are operated by an aggregator or retailer. Their operation is an input into the electricity supply modelling, linked to wholesale prices with the time of discharge an output of the model.
* There were questions raised on the charging profile of electric vehicles (EV), Nicola Falcon (AEMO) advised that AEMO is working to gain further insights on EV charging profiles. Furthermore, FRG participants are invited to share data and insights where possible to assist AEMO in exploring the effect of new technologies on consumer behaviours. (Action item 12.4.4)
* Ben Skinner (Australian Energy Council) asked whether the maximum demand forecast incorporated small-scale batteries. Greg Staib (AEMO) noted that only the unaggregated batteries are factored into maximum demand when reported on an operational as sent-out basis. It was also advised that comprehensive information on battery charging and discharging profiles is available in 2018 Electricity Statement of Opportunities Report (2018 ESOO).

# Other Business

Nicola Falcon (AEMO) notified FRG participants that the Forecasting Methodology Report for 2018 ESOO has been published and now is available on AEMO website. Stakeholders are encouraged to send written feedback to [Energy.Forecasting@aemo.com.au](mailto:Energy.Forecasting@aemo.com.au) on how effective the document is in communicating the approach and methodology undertaken in 2018 ESOO. (Action item 12.5.1)

Nicola Falcon (AEMO) also reiterated that AEMO will circulate the GHD report which covers detailed information on costs and assumptions presented in this FRG. Stakeholders are encouraged to send written feedback to [Energy.Forecasting@aemo.com.au](mailto:Energy.Forecasting@aemo.com.au) for revision and refinement of those costs and assumptions.

# Meeting Close

The next FRG meeting is scheduled for Wednesday 27 November 2018.

**Forecasting Reference Group (FRG) Actions Items**

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| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Date Raised** | **Topic** | **Action required** | **Responsible** | **By** | **Status** |
| **11.4.1** | 25/09/2018 | Hydrogen Production Sensitivities | Participants to suggest ideas on hydrogen generation-based scenarios for upcoming workshop | FRG Participants | 22 November 2018 | **Ongoing** |
| **11.4.2** | 25/09/2018 | Forecasting Scenarios | Participants to email AEMO feedback on forecasting scenarios | FRG Participants | 24 October 2018 | **Ongoing** |
| **12.4.1** | 24/10/2018 | 2019 Input Assumptions | AEMO to circulate the GHD report for participant’s feedback | Dane Winch | 27 November 2018 | **Ongoing** |
| **12.4.2** | 24/10/2018 | 2019 Input Assumptions | FRG Participants are invited to share data to assist AEMO in applying appropriate costs to modelling | FRG Participants | 27 November 2018 | **Ongoing** |
| **12.4.3** | 24/10/2018 | Electric Vehicle and Battery Traces | AEMO to investigate publishing disaggregated electric vehicle and battery traces. | Greg Staib | 27 November 2018 | **Ongoing** |
| **12.4.4** | 24/10/2018 | 2019 Input Assumptions | FRG participants are invited to share data and insights where possible to assist AEMO in exploring the effect of new technologies on consumer behaviours | FRG Participants | 27 November 2018 | **Ongoing** |
| **12.5.1** | 24/10/2018 | ESOO Methodology Feedback | Participants to provide feedback on whether the 2018 ESOO methodology paper | FRG Participants | 27 November 2018 | **Ongoing** |