MINUTES

MEETING:	Intermittent Generator Forum
DATE:	Friday, 22 February 2019
TIME:	10:00am – 12:30pm ADST
LOCATION:	Melbourne, Sydney, WebEx

ATTENDEES:

NAME	COMPANY / DEPARTMENT	LOCATION
Christian Suprijatna	ACCIONA	MEL
Neale Scott	AEMO	MEL
Petar Pantic	AEMO	MEL
Rob Selbie	AEMO	MEL
Peter Young	AGL	MEL
Nasim Amiri	AMP CONTROL	MEL
Philip Cohn	ARENA	MEL
Peter Oxley	BEON ES	MEL
Rahul Victor	BEON ES	MEL
Lillian Patterson	CEC	MEL
Andres Maasing	CUBICOINVEST	MEL
Graham Slack	DNV GL	MEL
Trenton Gilbert	DNV GL	MEL
Rimma Mitelman	ESCO PACIFIC	MEL
Johnatan Feuillye	GOLDWIND	MEL
Jonathon Dyson	GREENVIEW CONSULTING	MEL
Harley Mackenzie	HARD SOFTWARE	MEL
Venetia Roberts	IMPACT INVESTMENT GROUP	MEL
Alick Zhang	MERIDIAN ENERGY	MEL
Daniel Hillier	MERIDIAN ENERGY	MEL
Kate Summers	PACIFIC HYDRO	MEL
Matthew Jeppesen	PROA ANALYTICS	MEL
Victor Depoorter	PROA ANALYTICS	MEL
Nick Engerer	SOLCAST	MEL
Steen Nielsen	SUZLON	MEL
Chloe Green	TILT	MEL
Marcelle Gannon	TILT	MEL
Manas Patankar	VESTAS	MEL
Jack Fox	AEMO	SYD
Ross Gillett	AEMO	SYD
Shevy Moss Feiglin	AGL	SYD
Lucy Cooper	ARENA	SYD
John Goodrich	ARENA	SYD
Zoe Von Batenburg	ARENA	SYD
Tim Mead	BJCE AUSTRALIA	SYD
David Smith	CUBICOINVEST	SYD
Hsin Chern Lim	EPURON	SYD
Jessica Andrews	EPURON	SYD
Aaron Hawkins	FIRST SOLAR	SYD
Nick Morley	FIRST SOLAR	SYD

Nicole Ghiotto	FIRST SOLAR	SYD
Alan Robinson	FRV	SYD
Javier Herrera Torrubia	FRV	SYD
Patrick Vera	FRV	SYD
Jo Hume	FULCRUM 3D	SYD
Daniel Murphy	FULCRUM 3D	SYD
Colin Bonner	FULCRUM 3D	SYD
Jack Han	FULCRUM 3D	SYD
Emily Liu	GOLDWIND	SYD
Tim Snell	IMCONTROL	SYD
Stephanie Easton	INFIGEN	SYD
Amir Jesmi	UGL	SYD
Merlinde Kay	UNSW	SYD
Various Attendees	-	WebEx

References to slides are from "Intermittent Generator Forum – Presentation Slides – 22 February 2019.pdf", available from the Intermittent Generator Forum webpage.

Session 1: Intermittent Generator Forum

1. Welcome and Introduction

Neale Scott [MEL] opened the forum at 10am, introducing the presenters and noting that the meeting would be recorded for minute-taking, and that the recording would not be distributed outside AEMO.

Petar Pantic [MEL] then presented the forum objectives [slide 7].

2. ECM & AWEFS/ASEFS Registration

Petar discussed the Energy Conversion Model and recent changes [slides 8-12], then discussed why an expedited model was needed [slides 13-15]. Kate Summers [MEL] supported this change, however expressed concern with the overall approach of falling back to a persistence forecast for use in constraints during commissioning stages, without any additional logic to prevent target MW eroding to zero during capped intervals. AEMO noted it was investigating ways to address this behaviour by defining the farm's output on the RHS of certain security constraint equations during commissioning stages.

3. Availability Submissions

Petar discussed the reporting of availability submissions [slide 17] and asked whether it would be beneficial for AEMO to publish all availability submissions for the previous trading day. Jonathon Dyson [MEL] supported this change, noting it would improve market transparency and understanding of semi-scheduled generator capabilities. Kate Summers noted that scheduled generator bids are currently also published. There were no objections to the proposal.

Marcelle Gannon [MEL] asked whether there were new MMS Data Model tables provided for the participant to receive their generator availability privately. Petar confirmed that there are new tables (INTERMITTENT_GEN_LIMIT, INTERMITTENT_GEN_LIMIT_DAY, INTERMITTENT_CLUSTER_AVAIL, INTERMITTENT_CLUSTER_AVAIL_DAY).

Petar discussed how currently, if no availability submission is made for a particular trading day, AWEFS/ASEFS by default uses the latest availability submission for the previous trading day [slide 18]. Petar asked whether the markets portal should provide a selectable option to automatically create a submission with availability set to the registered Maximum Capacity for the next trading day following a trading day submission with reduced availability. There was no interest expressed for this change, and it was noted that the new reporting of availability may assist operators to make more timely updates to availability.

4. Participant Web Portal and Data

Ross Gillett [SYD] presented the recent portal changes [slide 20] and asked whether there were any ways that the Intermittent Generation interface of the web portal can be improved.

Stephanie Easton [SYD] noted that the current portal interface was slow to operate, however was the only option available to maintain business continuity during periods when the Participant File Server goes offline.

Marcelle Gannon noted that it would be useful to have the ability for faster data entry into the Intermittent Generation – Availability interface by allowing a "fill down" functionality, rather than having to enter the same value multiple times into each of the 48 half-hourly cells (which currently requires 48 x double mouse clicks).

Ross Gillett then discussed approaches to improve forecast reporting [slide 23] and asked whether region-aggregate Unconstrained Intermittent Generation Forecast (UIGF) should be separately reported for semi-scheduled wind and solar generation. Stephanie Easton agreed with this change and asked whether the aggregated solar generation would include concentrated solar generators (for future-proofing). Ross Gillett clarified these new data fields would include all semi-scheduled generators and exclude non-scheduled generators.

5. Other Business and Questions

Ross Gillett opened up the forum for general questions [slide 24]. Marcelle Gannon asked whether during new farm commissioning (where AWEFS/ASEFS dispatch forecasts are still not available) it would be possible to temporarily allow the semi-scheduled generator to operate as a non-scheduled generator by modelling their output on the right-hand side of constraints. This would effectively remove any constraint on that generator's output, assuming they are still capping their output at the commissioning hold points agreed with AEMO. Marcelle Gannon noted that the current approach delays commissioning when a constraint (e.g. SA system strength) is applied and erodes semi-scheduled generator targets to zero MW. Ross Gillett noted that AEMO would consider this. Stephanie Easton noted that another option in this scenario was to use a fixed load bid.

Session 2: Participant Dispatch Self-Forecasting

1. Self-Forecast Project – Overview

Lucy Cooper [SYD] presented an overview of the Self-Forecast project [slides 28-30].

2. System Changes and Self-Forecast Registration

Rob Selbie [MEL] discussed the changes implemented within the Self-Forecast project and how participants can register to provide dispatch self-forecasts [slides 32-34]. Kate Summers asked whether the gate-closure time for submissions was measured based on AEMO receipt time, as opposed to the time participants send the submission. Rob Selbie confirmed that

gate-closure time was measured based on when AEMO receives the submission, and that it was still possible for a submission made later than this time to be used in dispatch, but that AEMO could not guarantee that.

Rob Selbie then discussed the new datasets available [slide 35]. Nick Engerer [MEL] asked whether the published metadata disclosed which third-party forecast provider created the forecast. Rob Selbie clarified that this metadata is only published via the 'Model' and 'Comments' fields privately back to the participant (INTERMITTENT_DS_RUN table), and that the public data only includes whether the forecast originated from the participant or AWEFS/ASEFS.

Rob Selbie noted that participants can currently subscribe to a file in Data Interchange that is sent privately when their self-forecast is suppressed. Rob Selbie asked whether participants would like to have additional notification options for this suppression event, such as SMS and email. Kate Summers supported additional notification. Marcelle Gannon asked whether the INTERMITTENT_FORECAST_TRK table indicated when the forecast fell back to persistence (SCADA), and Rob Selbie confirmed it did. Marcelle Gannon noted it would also be useful to have additional notification for this event (i.e. when AWEFS/ASEFS forecast is suppressed).

Harley Mackenzie [MEL] noted a concern that third-party forecast providers would not be able to submit self-forecasts to the API via MarketNet. Rob Selbie clarified that **submissions can also be made from a public internet address, provided they were granted the appropriate rights through MSATS User Rights Management and that internet address was whitelisted by AEMO**.

3. Self-Forecast Assessment

Ross Gillett discussed the self-forecast assessment process [slides 37-43]. Lucy Cooper asked how suppression by the participant affected the assessment process. Ross Gillett clarified that if the participant suppressed its self-forecast for a specific dispatch interval, it indicated to AEMO that the participant was not confident in that self-forecast for that interval, Therefore, **AEMO would not include a suppressed dispatch forecast in any initial or ongoing performance assessments**. Rob Selbie added that during the initial assessment stage, although the participant is submitting unsuppressed forecasts to the production environment for assessment purposes, these are not used in dispatch because **AEMO will apply its own master suppression to all self-forecasts for that unit until the self-forecast passes the initial assessment stage**. For the purpose of ARENA collecting trial data from its funded applicants, both participant-suppressed and participant-unsuppressed forecasts will be used for analysis.

Marcelle Gannon expressed a concern that the Possible Power benchmark used during constrained periods did not provide an accurate measurement of what generation would have been during constrained periods. Ross Gillett suggested that using the same self-forecast algorithm to now-cast the Possible Power could be one option. Marcelle noted that this data was difficult to feed back into the SCADA system and asked whether it was possible for AEMO to allow submissions of Possible Power via the API. Ross Gillett noted **there was general agreement to allow submissions of Possible Power via the API, and that AEMO would investigate the feasibility implementing this**.

Ross Gillett continued discussing the self-forecast assessment process [slides 44-46], and noted that only the self-forecast either used in dispatch or which is the latest highest priority unsuppressed self-forecast received 70 seconds prior to gate closure for the interval will be used in the assessment. Lucy Cooper asked whether that means that only one forecast is validated and stored. Ross Gillett clarified that **all submitted self-forecasts are validated**

and stored, however only one self-forecast will be used for assessment purposes (and eventual use in dispatch).

Kate Summers asked why 8 weeks was required for the initial assessment. Ross Gillett responded that this period was determined based on feedback during consultation, and was intended to capture the full range of weather conditions while still using recent forecast data.

Nick Morley [SYD] asked what happens when a participant switches between self-forecasting models after passing the initial assessment. Ross Gillett replied that the ongoing assessments do not distinguish between the performance of different forecasting models, and if a participant switches to a forecasting model which then causes large dispatch errors, AEMO's control room would detect this and suppress all subsequent self-forecasts (regardless of the underlying forecasting model) until reviewed by AEMO at the next weekly assessment. AEMO's weekly assessment might also determine that the self-forecast is performing worse and suppress all self-forecasts until the next weekly assessment. Ross Gillett emphasised the **importance of the participant testing any new or changed forecasting model in their test or pre-production environment before implementing the model into production**.

Lucy Cooper asked what the rationale was for extending the initial assessment out to 16 weeks, as opposed to a rolling 8-week window. Rob Selbie clarified that this was to mitigate the impact of excluded dispatch intervals, for example during extended periods of constrained operation.

Kate Summers asked what action is taken when the AWEFS/ASEFS dispatch forecast is in error, and what improvements to the forecast were being explored. Ross Gillett confirmed that in those scenarios, the AEMO control room may suppress the AWEFS/ASEFS forecast and fall back to persistence forecast. Ross Gillett noted that the assessment results for the AWEFS/ASEFS forecast would also be provided alongside the assessment for the dispatch self-forecast. Ross Gillett noted that the AWEFS/ASEFS dispatch forecast was an important backstop and that AEMO will continue to pursue improvements to the AWEFS/ASEFS dispatch forecast.

Ross Gillett then discussed the ongoing self-forecast assessment process and the control room process [slides 47-48]. Stephanie Easton asked whether participants should continue to pro-actively suppress self-forecasts even after AEMO has applied master suppression after a failed ongoing assessment. Ross Gillett confirmed that selectively filtering out bad self-forecasts would improve the assessed self-forecast performance as participant-suppression effectively removes those dispatch intervals from the assessment. However, AEMO noted that care must still be taken to **ensure that there remains at least 80% of intervals with unsuppressed self-forecasts over any of the 1/4/8 week ongoing assessment windows to ensure that AEMO can conduct a performance assessment**.

Kate Summers noted that this approach appeared overly burdensome compared to scheduled generator bidding, which allows the participant to correct availability errors within 5 minutes through a rebid. Jonathon Dyson [MEL] noted that scheduled generators had 24/7 monitoring for bidding, while typically semi-scheduled generators did not.

Ross Gillett gave an overview of the weekly self-forecast assessment summary report provided by AEMO to the participant [slide 49]. Nick Engerer asked whether the AWEFS/ASEFS error calculation could be made available to public. Ross Gillett replied that the assessment methodology and all the required data is publicly available so that anyone could perform their own error analysis and reconcile their assessment against AEMO's.

Ross Gillett noted that AEMO would review the overall self-forecast assessment process with participants within 6 months following experience with self-forecasting [slide 50].

4. Questions and Resources

Ross Gillett discussed the resources available for self-forecasting [slide 52] and opened the forum to general questions. Colin Bonner [SYD] asked how participant suppression works for ARENA-funded projects with multiple forecasts provided. Jack Fox clarified that **all self-forecast submissions (including their associated model identifier as assigned by AEMO) would be stored by AEMO for later ARENA analysis, regardless of whether the participant has suppressed the self-forecast**.

Ross Gillett noted that the next Intermittent Generator Forum would be held in August 2019 and thanked all attendees for their participation. The forum ended at 12:30pm.

Actions

OWNER	ACTION	FORUM ITEM(S)
AEMO	Rectify the erosion of target MW to zero during constrained intervals (raised by Marcelle Gannon, Kate Summers).	1.2, 1.5
AEMO	Investigate publication of all availability submissions to market for the previous trading day (raised by AEMO).	1.3
AEMO	Investigate improvements to external portal such as easier bulk data entry (raised by Marcelle Gannon) and improved interface speed (raised by Stephanie Easton).	1.4
AEMO	Investigate additional notification options for participant forecast suppression events (raised by AEMO).	2.2
AEMO	Investigate feasibility of allowing submissions of Possible Power via the API (raised by Marcelle Gannon).	2.3
AEMO	Review the overall dispatch self-forecast assessment process with participants within 6 months, including the minimum percentage of dispatch intervals required for assessment (raised by Marcelle Gannon).	2.3