MINUTES – Energy Conversion Model (ECM) Guidelines Consultation

MEETING:	Meeting with AGL
DATE:	Tuesday, 21 June 2016
TIME:	11.30am – 1.00pm
LOCATION:	AEMO Melbourne Office
MEETING #:	1

ATTENDEES:

NAME	COMPANY / DEPARTMENT
Leanna Tedesco	AEMO
Hitesh Bavarva	AEMO
Clare Greenwood	AEMO
Marcelle Gannon	AEMO
Rhys Albanese	AEMO
Kong Min Yep	AGL
Rob Cabion	AGL
Andrew Grey	AGL
Saravanan Ramaiya (Sam)	AGL
Jonathon Dyson	Greenview Consulting

AEMO welcomed AGL to the meeting and explained that AEMO are currently going through the submissions received to the Issues Paper. The consultation timeline has been extended by 25 business days due to meeting requested between AGL and AEMO. The final report is due to be published on 7 October 2016.

1) AEMO sought clarification on AGL's interpretation of the consultation paper regarding the automation of SCADA Local Limit, and the factors that could contribute to the prohibitive cost of implementation.

   AGL explained using Oaklands as an example that has Voltage run back schemes and Current run back schemes, which automatically set the set-point values for the wind farm and total fire ban limits. The setting of limits is a dynamic process, which could produce a series of set-points that could take a number of turbines out of services (e.g 10 turbines) (which could include DVAR or STATCON being unavailable). AGL indicated that the process of dynamic setting can become complex as there may be many possible scenarios.

2) AEMO was keen to understand if automation of SCADA Local Limit could still be a viable solution given its potential complexity.

   AGL noted that in most instances, automation of SCADA Local Limit is still a viable solution as the setting of dynamic set-points that limit the output cannot operate in manual mode. However, in situations where a number of turbines are out of service and the potential that the turbines would be out of services for a long period of time (say a day), then a manual

approach may still be applied. Hence, it is possible that both automatic and manual operations may be required.

AGL indicated that the set point for wind farms is normally set to the plant's maximum capacity. When there is a restriction imposed on the wind farm output by AEMO, the set point would be automatically set to reflect the required MW value and sent to AEMO through the SCADA.

However, AEMO pointed out that the set point AGL indicated above is different from the MW set point for local limit and is not the SCADA local limit AEMO is referring to in the consultation paper.

AGL indicated that these local limits should be fed into AWEFS as part of the process in determining the semi-dispatch cap.

AEMO advised that the local limit allows wind farms to indicate that the dispatch forecast should be capped at the local limit. Hence, the MW set point signal proposed in the consultation paper is to allow wind farms to inform AWEFS that there is a limitation transmitted via SCADA signal.

AGL sought clarifications on the possible exclusion of distribution network limitations. AGL indicated that potential limits on generation output could be due to a number of possible factors: distribution or transmission network constraints, or internal plant and equipment operation and maintenance. AGL believes all these possible limits should be taken into account; and these limits should be fed through to AWEFS as the local limit and MW set point.

AEMO indicated that it will look into the definition of local limits to provide guidance on what contributes to local limit as intended in the consultation paper.

AGL sought clarification on what may be the extent of automation that AEMO would consider necessary for the setting of local limits bearing in mind the potential complexities it may bring.

AEMO indicated that it is likely to recommend that all SCADA inputs be automated but recognises there are some situations where this needs to be manual.

(3) AEMO sought clarification with AGL on how the different parts of the ECM changes contribute to the total cost estimate provided.

AGL advised that costs were broken down to initial and on-going costs. The initial cost consists of setting up the SCADA and the system that support the new data requirements.

AGL advised that the initial cost for setting up the SCADA should be around $35,000 to $45,000 for each site. This does not include other initial cost consisting of AGL internal system set up and potential costs from vendors of Wind or Solar sites.

AGL estimated that it may cost approximately $300,000 to $400,000 to set up the nine AGL sites (which includes 7 wind farms and 2 solar farms) to send extra SCADA signals. In addition, it may cost at least an additional $300,000 to integrate the new signals with the AGL dispatch system.

AGL also advised that a one off change with a vendor may be significant but could not obtain an estimate from the vendors at this stage. However, an indicative cost could be around $50,000 per system.

AEMO indicated that it would like to understand the estimated costs for each site.

(4) AGL commented that the use of wind speed and possible power from every single wind turbine across all sites to determine the "most likely output" from wind farm could become expensive, and it depends on how far the alternatives may be applied.

AGL indicated that in the case of wind speed, one of the concepts in AEMO's Issues paper was trying to find the right levels of aggregated power (ie cluster level) instead of the power generated by every turbine based on wind speed, as the later approach could lead to a high volume of data points. AGL suggested the idea of having the wind farm nominating a reasonable level of data points and sought AEMO's view if this is a concept that might work more effectively.

AGL further indicated that AWEFS's possible power could be adopted to replace the use of average wind speed to improve the accuracy of forecasting the output.

AEMO advised that wind farms are typically set up with a few clusters of turbines.

AEMO advised that this ECM Consultation proposes to explicitly state that wind farms can provide an average wind speed for each site, which is an improvement to the current approach of providing a single measurement of wind spend.

AGL sought to clarify if possible power provided by the wind farm should be used rather than AWEFS forecasting the possible output base on average wind speed. AGL believed this is likely to provide more accurate forecast.

AEMO noted AGL's suggestion to use possible power provided by each wind farm as an alternative to AWEFS computing the potential output based on average wind speed. AEMO also advised the use of possible power as an alternative had been suggested in the consultation paper as an "optional signal". AEMO indicated that further analysis is needed on possible power before a decision can be made.

Additionally, AGL indicated that if AWEFS had an estimate of power curve, it would provide an effective way to determine the potential output from the wind farm. AEMO advised that AWEFS does have an estimate of power curve for each wind farm as a starting point, which is then adjusted for different wind conditions to derive the forecast.

AEMO advised that it is currently collating information from all participants and wind speed based approach to forecasting power is being assessed. As possible power was suggested as an optional approach, AEMO needs to work out what information it will be providing in its next draft report.

AEMO sought clarifications on the two types of Possible Power suggested by AGL – Possible Power for Turbines Generating and Possible Power for Turbines Available. AEMO is also keen to clarify whether the Suzlon turbines include either of these, given that the calculation includes turbines out of service.

AGL explained that an example for Turbines Available is that if 10 turbines that are on "Pause", it is available for generation but will require at least 90 - 240 seconds before the first generation can be sent out. Therefore, if AEMO were to consider generation forecast for longer period, possible power would be higher as both types of Possible Power will need to be included, compared to when the forecast is for the next 0 to 5 minutes when only Possible Power Generating is available.

AGL suggested that both concepts should be considered: Option 1 is to reduce possible power to a 3 to 8 minute period; and Option 2 is to use a rate of change to produce the Possible Power in that time. AGL suggested that either option 1 or 2 should be adopted because "possible power available" as it is currently understood or defined may not accurately reflect the actual power capability of wind farms.

AGL further commented that Figure 1 shown in its submission to the Consultation paper provided a good reference to the discussion on possible power, which explained the correct sequence to determine the actual capability of the wind farm in the dispatch timeframe.

AGL suggested the use of "dynamic rate of change" as an input to AWEFS may also significantly improve the accuracy of forecast.

AGL further explained that Possible Power Available (denoted as PPa) is power that would be available from turbines in pause mode. However, the paused turbines will need time to ramp to the target possible power. AGL indicated that this does not affect the level of possible power from the generating turbines, but will affect the possible power forecast in 7 to 8 minutes time. AGL further indicated if the correct possible power calculations are adopted, it may be possible for wind farms to develop the capability to provide FCAS in the future.

(5) AEMO sought clarification on the historical examples provided by AGL in its submission on the actual operation of AGL control systems.

In the case of Macarthur windfarm, the example showed that the set point was set at 200MW for the relevant intervals. However, AGL indicated that it was unclear if the target was set by AEMO as the Semi-dispatch cap. AGL sought clarification that if AEMO had issued the dispatch cap, would the cap be set at 200 MW. AEMO advised that AWEFS was not issuing the limit as the 200MW set point was provided by AGL. It was discussed that either way, the conclusion stated in AGL's submission would remain unchanged.

(6) AEMO noted that AGL's submission to the issue paper included an example of the Available capacity, which was available to AEMO through AGL's bidding process into the dispatch system. AEMO explained that the "Availability" bid data capture by AEMO's EMMS was not used by the AWEFS in determining the UIGF.

AGL sought AEMO's view on whether AEMO may plan to change the process whereby AWEFS will use the Available Capacity in setting the semi-dispatch targets. AEMO advised that it will need to consider this further and will provide a response in the upcoming draft report.

(7) AEMO sought clarifications on page 6 of AGL's submission regarding a graph on pre-dispatch. AEMO pointed out that the graph appeared to show an offset in the timeline, and that the output from the wind farm appeared to rise faster than the registered ramp rate. AEMO explained that AWEFS provided a forecast of 300MW based on the actual generation of around 300 WM during those intervals. AEMO would like AGL to review and provide feedback on this query.

(8) AGL sought clarification from AEMO on the definition of a "Good Quality" SCADA Local Limit, and on how the SCADA Local Limit would influence AWEFS's power curve tuning.

AEMO indicated that it will need to look into this further and will get back to AGL with more information on what would constitute "Good Quality" data and will respond to this query in the draft consultation report.

AGL sought clarification on the sort of data that AWEFS would disregard in determining the targets. AEMO advised that in case of the wind speed, AWEFS will not use any data that are considered not reliable for AWEFS to produce a UIGF.

AGL suggested that as SCADA at a site is best placed to provide the right information for estimating a forecast of 5 minutes, it seems to make sense that wind farms could potentially provide an estimate of the most likely output for each 5 minutes.

(9) AGL indicated that it had provided to AEMO a briefing paper as part of AGL's discussion with AEMO on its report on Scheduling Error. The AGL briefing paper submitted to AEMO discussed about those intervals that were identified with Scheduling Error and highlighted the impact the errors would have on potential dispatched outputs.

The briefing paper discussed the significance of ramp rate with respect to AEMO setting the targets and the wind farm responding to AEMO targets. AGL suggested that if the rate of change concept is merged with the blade trapezium concept, the target setting would be more sensitive to the operation of wind turbines and their capacity to follow and meet the targets that recognised the plant 's operating parameters. This includes "feathering of turbine blades" that enable the turbines to generate at a faster rate. The generation output rate would change when wind farms output falls to or below the blade-feathering % of individual turbines capacity, based on different OEM designs.

AGL pointed out that the briefing paper also suggested that even though "Pitching" of wind turbines was not a major focus of the ECM Guidelines Consultation, it is an important element of plant operation to consider as it provides an important insight into how and what plant can and cannot do. AGL commented that the wind turbine pitching technology for newer turbines can provide different pitching actions differently to older ones which could impact on the forecast produced by AWEFS. AGL suggested that such a difference in pitching actions could be captured as the "Rate of change" to reflect different pitching levels for different turbines.

(10) AEMO sought clarification on which of the proposed changes discussed by AGL may relate to potential FCAS in future.

AGL indicated that if AEMO choose to implement the concepts of possible power and the rate of change, the two functions can be linked to allow for wind farms to offer FCAS in the

market. AGL suggested an example would be where a wind farm chooses to offer to the market a 10MW of raised capability. AGL commented that this could best be achieved if the wind farm forecasting system could recognise what the farm operating characteristics, ie what the physical plant can and cannot do, so that the FCAS co-optimisation can be done correctly and more accurately. A possible scenario could occur in say South Australia, when FCAS is priced at $300 MWh, the wind farms may then be co-optimised from the energy market and offer 10MW into the FCAS market. AGL commented that it believed the MASS (Market Ancillary Service Specification) is not designed for this sort of offer at the moment.

(11) AGL enquired if the proposed changes for ECM may include ASEFS1 for solar plants.

AEMO advised the ECM Guidelines changes also apply to Solar where indicated.