4th November 2016

Attn. Clare Greenwood
Forecasting, AEMO
GPO Box 2008
Melbourne VIC 3001

Dear Clare Greenwood,

Thank you for providing Pacific Hydro with the opportunity to provide input into the third stage consultation on the Energy Conversion Model guidelines for solar and wind farms. Pacific Hydro owns two semi-scheduled wind farms Clements Gap Wind Farm and Taralga Wind Farm.

Pacific Hydro has provided its responses to the second stage draft determination report below.

4.2 – Dispatch Forecast with Extreme Wind Speed and Direction Cut-out

In Pacific Hydro's second stage submission it was highlighted that the proposed "Estimated Power" signal would provide better information than an extreme wind speed cut-out signal. Pacific Hydro's opinion has not changed.

4.3 – SCADA Wind Speed

Pacific Hydro welcomes AEMO's position that a sampling frequency for wind speed less than or equal to ten seconds is acceptable.

4.4 – Estimated Power SCADA Signal

1. Do you agree with the name "Estimated Power"

Estimated power appears to sufficiently capture the nature of the signal.

2. Should limits on connection assets be included or excluded from this definition?

Connection asset limitations are implicitly included in the Estimated Power definition. Pacific Hydro believes this is the correct approach, as the intent of the signal is to provide an estimation of active power output at the end of the next dispatch interval.

3. Is one signal enough? Is there a need for a second signal such as a dynamic rate of change?

It is not clear how a dynamic rate of change signal will be sufficient to describe the non-linearities involved in ramping wind generators. A wind turbine that is presently synchronising to the grid may achieve full power output within a dispatch interval, but will not achieve this linearly across a five minute dispatch interval.

Pacific Hydro believes that a second signal indicating unconstrained power similar to a UIGF, or an Estimated Power signal for a pre-dispatch interval (DI+2 as opposed to DI+1) may prove beneficial to dispatch and pre-dispatch outcomes.

If a DI+2 solution were pursued over a wind farm provided "UIGF" better dispatch outcomes may result, but it would be a more expensive solution.

4. Do you have concerns about interaction between the “Estimated Power” value and the existing bid of ramp rate?

As outlined in 3, a wind farm is not always capable of maintaining a linear ramp rate. Additionally, the definition of estimated power includes the maximum ramp rate of the turbines within its definition. For example:

> “SCADA Estimated Power is the Generator’s forecast in MW of *active power at the end of the next dispatch interval*, subject only to technical factors affecting operation of its generation and connection assets.”

Therefore by definition the estimated power signal accounts for the predicted available power at the end of the next dispatch interval, and thus ramp rate. Consequently, Pacific Hydro does not have any concerns about the interaction between the proposed Estimated Power signal and the existing bid of ramp rate.

As outlined in 3, a second signal would help improve visibility of wind farm behaviour.

5. Do you agree with the level of detail in the definition?

Pacific Hydro believes that the current definition for estimated power as opposed to an overly restrictive definition allows scope for future improvement of the signal without the requirement for further ECM consultations. The current definition gives adequate degrees of freedom to implement estimates that account for the differences between turbine manufacturers.

By explicitly defining the estimated power value as the active power at the end of the next dispatch interval, it removes any doubt from implementations as to what the signal should take into account.

4.8 – Transparency and Bidding of Availability

Any improvements to the usability of the EMMS portal or bidding systems are encouraged. Thought should be given as to automated availability bidding via SCADA as wind farm availability depends significantly on environmental conditions and maintenance.

Yours sincerely,

Ryan Jennings
Electrical Engineer
Pacific Hydro Australia

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