25 May 2016

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

Dear Ms Greenwood,

Energy Conversion Model Consultation May 2016

Thank you for providing Pacific Hydro with the opportunity to provide input into the consultation on the Energy Conversion Model guidelines for solar and wind farms.

As a participant in the NEM Pacific Hydro believe that improvements to the ECM guidelines allows for both an improved dispatch for semi-scheduled generators, and positive outcomes for the NEM.

Pacific Hydros replies to the questions raised in the ECM Guidelines consultation issues paper are provided below.

3.1.7 - SCADA Local Limit

1. Do you agree that the requirement for a SCADA Local Limit will improve your dispatch outcomes?

Clements Gap is transmission connected and it is not envisaged that the transformer or connection assets would be constrained to the point that the local limit signal will impact dispatch level. If an internal feeder is offline then this would be reflected in the local limit; however this should already be accounted for with the turbines available / generating points.

2. Do you agree with the proposed validation of the SCADA Local Limit, and the proposed validation range (see Section 3.1.6)? If not, how should quality be handled?

The check for the Local Limit point exceeding the generating systems nameplate rating feels superfluous, as the Local Limit is intended to override the Dispatch UIGF. Instead the local limit should be applied if it is less than the Dispatch UIGF rather than the nameplate rating. In all cases where limits are intended to reduce the UIGF, it is not pragmatic to require this value to be less than the UIGF.

3. What types of limits affect your semi-scheduled generating unit? Who is responsible for determining those limits, how dynamic are they, how often do they occur, and how they are applied?

Limits that affect Clements Gap are primarily network constraints that are part of the AEMO constraint system.

4. Please quantify for your wind/solar farm(s) the likely impact of the exclusion of distribution network constraints not managed by AEMO from the SCADA 'Local Limit' definition (see Section 3.1.1).

For Clements Gap which is not directly subject to distribution constraints, there is no material effect.

5. What do you estimate are your upfront and ongoing costs in providing and maintaining a SCADA 'Local Limit'?

Costs would vary depending on the DNSP/TNSP interface. Retrofit to an existing wind farm would require a larger investment. For example however, at Clements Gap a SCADA local limit signal would not provide much benefit to the market operator. Despite this Pacific Hydro believes that the provision of a local limit signal as a whole is beneficial to market dispatch outcomes.

6. Are there any other related matters you wish to raise?

Distribution limits should be included as an additional signal to AEMO. Implementation in this manner allows AEMO to see both distribution and connection asset constraints. Whilst updates to the ECM are being conducted, it is sensible to add the impact of distribution constraints which are not currently taken into account by AEMO for dispatch.

Although a rule amendment is required to incorporate distribution limits (Section 3.1.3), acquiring the signal now is sensible in terms of future outcomes.

As such, the term "local limit" would prove to be ambiguous as from its name it is not clear whether it takes into account distribution level constraints.

3.2.3 - Changes to SCADA Wind Speed

1. Do you agree that the proposed changes will improve your dispatch outcomes?

Yes.

2. What do you estimate are your upfront and ongoing costs in applying this proposed definition?

Pacific Hydro estimates the ongoing cost to be low, with a small initial capital outlay.

3. The vendor of AWEFS prefers wind speed measurements from turbine nacelle anemometers over meteorological mast measurements. Do you agree, and what information can you give about the suitability and relative accuracy of the two measurement types for your wind farm(s)?

Experience shows that a class 1 anemometer mounted on a mast is able to determine the wind speed within 2 % accuracy. A well setup (transfer function) nacelle anemometer rarely reaches accuracy levels below 4 % more often in the range of > 5 %.

Generally data coverage and reliability is higher in a Nacelle based system than in a met mast, and is guaranteed. We note that the preference for turbine nacelle anemometers differs from the original preference which was for meteorological mast measurements – this needs to be communicated to all wind farms providing wind speed data.

3.3.4 - SCADA Possible Power

1. Do you agree with the definition of SCADA Possible Power?

Pacific Hydro agrees with the current definition of SCADA Possible power. It is an important distinction to use available turbines rather than generating turbines.

2. Does your wind farm control system currently produce an estimate of Possible Power, or an equivalent? If not equivalent, what can it produce?

The control system of the wind farm is capable of providing what "the power output could actually be if a set-point is released". It is not currently activated.

3. How is this estimate calculated?

The estimate is calculated from the nacelle anemometer 10 minute average wind speed and the power curve of the turbine. Turbines that do not have the ability to generate are not included. Turbines that are not communicating with the main park controller are also not included in the calculation.

4. If the control system does not currently produce a suitable Possible Power estimate, what would be the implementation costs of doing so?

Implementation costs would still exist despite the fact that the calculation is already performed. A software upgrade on the wind turbines and power park controller would be required in order to provide this signal. Cost is likely to be less than $10,000. Provision of a possible power estimate based on a smaller average period of 30 seconds rather than ten minutes may be possible and is subject to an investigation by the manufacturer.

5. How should data quality, validation and update frequency issues be handled for Possible Power?

Possible power should be greater than zero, and less than or equal to registered capacity (not maximum capacity). Maximum capacity is addressed in Section 3.4 of the ECM consultation, and addresses the issues where UIGF exceeds maximum power.

If possible power is to be used in AWEFS predictions or analysis, then values greater than the registered capacity should be interpreted as registered capacity. The update frequency of this tag should ideally be instantaneous to reflect the availability of generators at any particular point in time.

It should be noted that whilst a possible power estimate can give an estimate of wind farm curtailment, it cannot provide an accurate measure of what the wind farm is capable of producing in the next dispatch interval.

Due to an inherent lag in starting turbines, the expected ramp rate may not be achieved if turbines are not generating. By providing a forward forecast of turbine availability or possible power in future dispatch interval timeframes, it would be possible to provide improved dispatch outcomes. It is suggested that the relevance of an optional tag future possible power is investigated to allow a wind farm operator to predict the wind farm output based on turbines available or wind speed estimations from remote sensing devices such as LIDAR or SODAR. This would also improve the frequency control of the NEM as the dispatch could be predicted with much greater accuracy.

Thought should also be given on the future integration of wind farms into the ancillary services market. If a generating unit is to submit an offer for lower services and is not dispatched, a signal should be provided to enable or disable lower services as required. This would help the market to move towards a higher renewables penetration system.

Yours sincerely,

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Pacific Hydro Australia

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