

16 July 2020

Mr Peter Adams
General Manager, Market Performance
Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

By email: wholesaleperformance@aer.gov.au

Dear Mr Adams,

Issues Paper - Semi Scheduled Generator rule change(s)

Pacific Hydro welcomes the opportunity to make a submission in response to the Australian Energy Regulator's *Issues Paper Semi Scheduled Generator Rule Change(s)* and appreciates the engagement with stakeholders prior to the AER lodging a rule change request with the AEMC.

Pacific Hydro currently owns and operates 13 generation assets in the NEM.

Four of these are Semi-Scheduled assets comprising of 3 wind farms and 1 large scale solar farm totalling 341 MW installed capacity.

Introduction

The Semi Scheduled Generator Category was introduced into the NER in 2008. Previously generators had been classified by output capacity as either Scheduled or Non-Scheduled.

The introduction of the Semi-Scheduled Generator category recognised, due to technology differences utilising Variable Renewable Energy (VRE) resources, that it was unreasonable for VRE generators to forecast their energy supply through a fixed availability bid, instead providing forecasting via Australian Wind Energy Forecasting System (AWEFS) and Australian Solar Energy Forecasting System (ASEFS).

Recently, it has been observed the Semi-Scheduled Generator Rules in the NER have led to Market participant behaviour that was not anticipated at the time the Semi-Scheduled Generator category was implemented. The Issues paper indicates these behaviours are anticipated to increase over time, and have a significant impact to the operation of the NEM.

Pacific Hydro recognises there may be a driver for a rule change to Semi-Scheduled Generators, and is supportive of the engagement with affected stakeholders in seeking a resolution to the issue. This submission attempts to address the questions and other issues related to the issue paper discussion.

Questions for Stakeholders Section 3.5 of the Issues Paper

1. *Is a rule change required to address the issues described in the paper?*

Pacific Hydro acknowledges the proposed issue by the AER, and that the AER believes a rule change is required for a resolution. However, regardless of the mitigating measures or rule changes to be put in place, Pacific Hydro does not view that it is appropriate for this rule change to be fast-tracked given the significant impact to Semi-Scheduled participants.

As both preferred proposals in the issues paper will involve significant impacts to the participation of Semi-Scheduled Generators within the NEM, Pacific Hydro views that the timeframe for lodging a response to the issues paper does not allow for a reasonable assessment of these impacts. As Pacific Hydro is unable to appropriately anticipate and review these impacts in the given timeframe, we consider it is unreasonable to support a rule change in these circumstances.

2. *Are there other impacts on the market that are not presented in the paper?*

Pacific Hydro recognises that there are other impacts to the market that are not presented in the paper. Refer to the response to question 6

3. *Are there other impacts not considered from the difference in the requirements for scheduled and semi scheduled generators to follow dispatch instructions?*

Most VRE Wind Turbine Generators (WTG's) have difficulty following a dispatch target in a linear trajectory across its entire power curve. Please refer to the Discussion Topics section of this submission.

4. *Has the semi scheduled category done its job?*

It depends on the context of this question. If the context is that of "is the Semi-Scheduled category working?", then Yes it has been doing its job. However, if the context is "the Semi-Scheduled category is no longer required" then No. The semi-scheduled category is still required to recognise the differences in the performance characteristics and resource availability of VRE generators vs those of scheduled generators.

5. *Are the four options presented in the paper the most efficient way to achieve the desired outcomes?*

It is Pacific Hydro's view that part of the solution, and the most efficient approach is to forbid curtailment of plant output purely for the purpose of reacting to price without the asset receiving a semi-dispatch cap through the AEMO dispatch process. This option was discounted as impractical; however, it addresses the issue more directly and it provides the most efficient solution if the rule-change process is to be fast-tracked. This approach would not incur:

- cost to the market systems,
- cost to the participants,
- adjustment to control systems, and

- significant revisions of the rules

The other proposed options require further technical feasibility reviews to assess if their objectives can be met by all semi scheduled generators. These reviews require time and allocation of costs to properly explore the options, which cannot be managed when change requests are managed through a fast track avenue.

6. Are there other options that haven't been considered?

Within the issues paper it is mentioned that:

“The key issue this rule change is seeking to address is the potential for semi scheduled generators moving from their anticipated level of output without informing the market operator of that intention through a rebid and waiting to receive a revised dispatch target”.

When a generator fails to meet its target, then appropriate analysis should be conducted to ascertain the context and root cause – a blanket approach assessing the generators output at a point in time against the AWEFS target will miss details that affect the accuracy of the analysis.

The issues paper discussion indicates that deviations from the target result in a security issue and are caused by the operator's intent, but it fails to address whether the deviation is related to:

- Units responding to frequency,
- an error in AWEFS/ASEFS forecasting,
- non-linearities within the control system of generating units that cannot be mitigated.

Non linearities are discussed in the Discussion Topics section below

7. Are there any differences in how the four options would apply to wind or solar?

Yes, the target-following performance characteristics of the technologies are significantly different, as are the variability characteristics of the renewable resource

8. Do stakeholders have views on the potential costs and benefits of each of the options presented in this paper?

Pacific Hydro considers that the option to remove the semi-scheduled classification and make all semi-scheduled generators scheduled, would incur the highest cost and provide the least benefit to the market. Both preferred options in the issues paper are likely to lead to over curtailment of renewable energy in the NEM and increase prices, ultimately failing the NEO.

9. What are the potential impacts of each of the options presented in this paper on participants that are likely to be affected?

Refer to Discussion Topics Section of this submission

10. How can the flow of data and information to AEMO be improved?

Pacific Hydro believes that the flow of information should be considered both to and from AEMO. It is our belief that if it is relevant to control (such as MW dispatch, FCAS service enablement etc), then it should be sent via the SCADA system.

11. Only two options appear to satisfy the Energy Council's intention for semi-scheduled generators to follow dispatch instructions. Should further consideration be given to the options that were noted as not practicable (sharper causer pays factors and amendments to registration of semi scheduled generators)?

Pacific Hydro anticipates that either of the 2 options provided will create knock on effects that will have to be addressed. Therefore, further consideration to the options that were noted as not practical by the AER are supported by Pacific Hydro.

Pacific Hydro believes that applying penalties for responding to price outside of the dispatch process merits further consideration. This is a low cost option to both participants and the NEM, whilst addressing one of the paper's discussion points.

More consideration should be applied to the issues that have led to these behaviours and in implementing changes that affect the cause.

Discussion Topics

1. Forecasting

Pacific Hydro notes that a resultant increase in the uptake of self-forecasting systems would be a positive outcome. Although more work needs to be done to incorporate parameters of the generator control systems regarding design constraints.

2. Ramp Rates – Technical capability

As for all types of generation, at certain levels of resource availability VRE is constrained in its ability to respond quickly to dispatch targets. This can be compared in some manner to the fast-start inflexibility profile¹, however with different constraints and the added complication of distributed generation.

For instance, there are technical limitations on wind farms which depend on the Original Equipment Manufacturer (OEM) of the station, turbine model and age, that have an impact on the minimum rated power output that the WTGs are able to dispatch, before they must be shut down to further reduce the output of the wind farm. Therefore, controlling to setpoints at low site capacity values is not always technically possible to achieve in a linear fashion for all technologies.

Further, this issue impacts the ability to ramp up production if required in the next interval, akin to the fast-start inflexibility profile. Consequently, these instances contribute to issues regarding the use of a VRE generator's forecast as a target.

3. Start-up/Shutdown Delays

Other limitations may exist that make a linear response unachievable, depending on the technology, including:

- A delay of 5 to 10 minutes between starting turbines (start-up delay)
- A delay between switching off turbines (shutdown delay)

¹ Fast Start Inflexibility Profile – Process Description, AEMO, Published October 2014

These delays play important roles in ensuring a WTG's safe operation, and that WTGs are not switched on or off repeatedly, leading to both cycling and added fatigue on the turbine components. The impact these delays have on the ability to control active power at low levels depends on the manufacturer's implementation and, in some cases the manufacturer may no longer be available if modifications outside of the delays are required.

Like the fast-start dispatch inflexibility profile, WTGs also have varying ramp capabilities based on many additional factors.

4. Variable Renewable Energy (VRE) Generators

The adoption of a semi-scheduled generators forecast as an immutable target for a dispatch interval, directly mitigates the impact that VRE generators have in reducing carbon emissions and combating climate change.

Ideally a generator contributing in the NEM should be expected to provide frequency control. Any generation in excess of its forecast availability, would be subject to the frequency within the power system.

Any rule change attempting to address the variability of VRE, should not be the subject of a fast-tracked process. Pacific Hydro believes if any fast-tracked rules are to be taken, the prohibition of automated and manual intervention to mitigate a generator's exposure to negative pricing is the most efficient course of action, in line with the National Electricity Objective (NEO), and to better meet carbon emissions reduction targets.

5. Noncompliance / penalties due to lack of resource

The proposal to remove the Semi-Schedule Generator classification would expose participants to non-compliances / penalties, as a result of a lack of resource. This is an inherent characteristic of VRE generators, for which non-compliances / penalties should not apply.

6. Noncompliance / penalties due to turbine automated operations

It is not possible to predict automated turbine operations 5 minutes in advance. A response to bidding and receipt of a dispatch, would only happen after the event and would require continual monitoring and updating of the bidding profile. Pacific Hydro believes considerations of non-compliances and penalties should be applied, after a period of intervals where a participant has failed to respond its bid to an automated turbine operation, rather than have them apply for failing to predict and act on the bid prior to the automated operation occurring.

For example, while owners understand the turbine logic and parameters regarding an automated high ambient temperature operational response, it is not reasonable to produce a forward prediction of the response trigger, in a given time period (Dispatch Interval).

7. Primary Frequency Response (PFR)

Pacific Hydro considers that the introduction of PFR will have an impact on this issue. This possibility is not addressed in the Issues Paper.

8. Ramp Rates Considerations

During the recent industry discussions on the issues paper, reference was made to the model of a two-step piecewise ramp rate. In this discussion, the AER indicated they would be supportive of this model. It has benefits in reducing participants exposure to causer pays costs, as well as providing a faster response to the new dispatch target. Ramping from the time the dispatch is received, unnecessarily penalises a participant by preventing them from reducing their causer pays costs.

To date, AEMO has not allowed this model to be implemented as it does not consider it to be linear. AEMO has imposed that this model be removed at Pacific Hydro's sites. Pacific Hydro believes that clarity on what constitutes linear will be beneficial to the power system. Given no change in the underlying load, moving to the ideal ramp rate provides the least impact to the system.

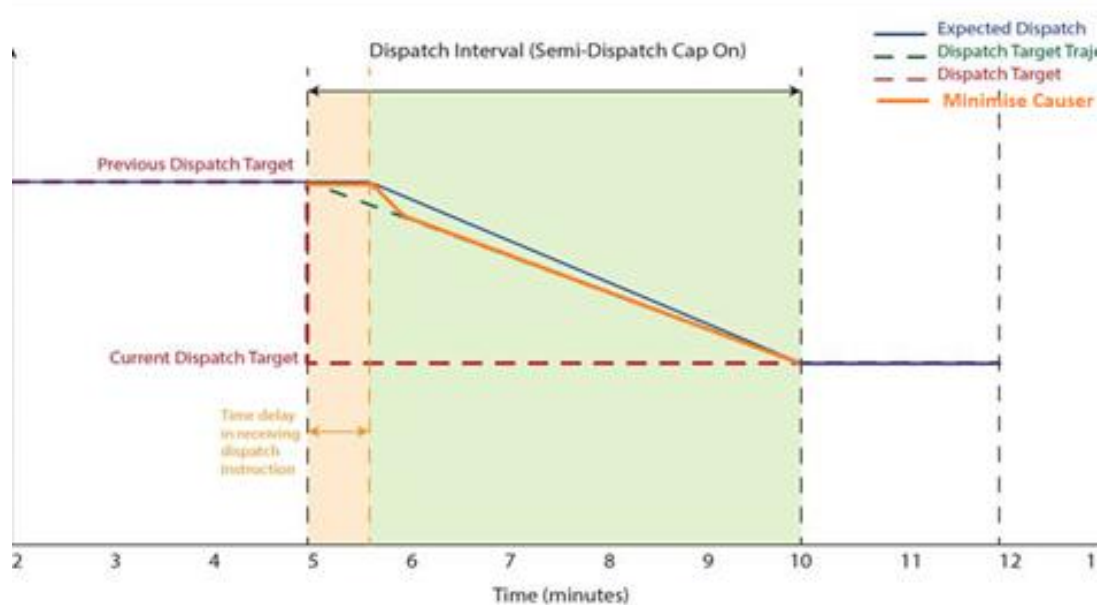


Figure 2: Example of a two-step piecewise ramp rate

Yours sincerely

Julian R King

Julian King
Asset Integrity Manager
Pacific Hydro



For enquiries regarding this letter, please contact:
Julian King
jking@pacifichydro.com.au