



15th July 2020

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

Lodged via AEMC website: wholesaleperformance@aer.gov.au

Dear Mr Adams,

ISSUES PAPER ON SEMI-SCHEDULED GENERATORS - PROPOSED RULE CHANGES: DISCUSSION PAPER

Established in the 1980's within the UK's Sir Robert McAlpine engineering and construction group, today, RES (Renewable Energy Systems) is the world's largest independent renewable energy company, with the expertise to develop, construct and operate projects around the globe. Headquartered in the UK, we operate globally with offices in 10 countries across the Americas, Europe and Asia Pacific. RES has delivered over 17GW of renewable generation over the last 38 years, driven by our vision of a future where everyone has access to affordable zero carbon energy.

Established in 2004, RES Australia is an industry leading renewable energy developer specialising in wind, solar and battery storage development and asset management across Australia. With a talented and experienced team, we have achieved financial close on over 600MW of new renewable generation and have 726MW of wind and solar assets under operational management. RES Australia has a development pipeline of 2.5GW across several states.

RES Australia welcomes the opportunity to provide input to the Australian Energy Regulator's (AER's) investigation into semi-scheduled generators in the National Electricity Market (NEM). We support the need for greater confidence in semi-scheduled generator output and understand the detrimental system impacts of rapidly reducing generator output in response to negative pricing events.

We agree that this problem needs to be addressed; however, the preferred option of removing the semi-scheduled forecast and replacing it with *a megawatt target for the end of the dispatch interval and a ramp rate* removes numerous advantages of the semi-scheduled category. We believe there are better solutions to address the underlying issue without the unintended

consequences and increased system costs that implementation of the AER’s preferred option would introduce.

Issues with Preferred Solution

The key issue from the preferred option is not allowing semi-scheduled generators to exceed their forecast values (which would become firm targets):

Since the semi scheduled generator would be required to follow its target, output above the target, for example if the wind or solar input increased above what was forecast, would not be allowed given the potential impact on FCAS and ultimately on system security. This would be reflected in subsequent dispatch targets once either the self-forecast of the higher output has come into effect with a rebid, or AWEFS/ASEFS has recognised the change in circumstance and adjusted the available capacity. Output below the target caused by

reduced wind or solar resource would be accepted. Arrangements for the submission of PASA and offer data would remain as they are.

Implementing a system in which semi-scheduled generators cannot exceed their forecast value (i.e. if the forecast value were to become a stricter “target”) has numerous disadvantages which appear to have been not considered by the AER’s issues paper which are detailed below.

Lost Energy

Using 6 months’ worth of historical NEM dispatch data, the 5-minute dispatch interval forecasting error was calculated for existing semi-scheduled generators. This forecasting error was used to estimate the level of lost energy expected by the implementation of a firm target and broken down by technology type across all semi-scheduled generators in the NEM as shown in Figure 1 below. Our analysis has suggested that the AER’s preferred option will lead to approximately 3.2% lost energy for solar farms and 1.7% lost energy for wind farms.

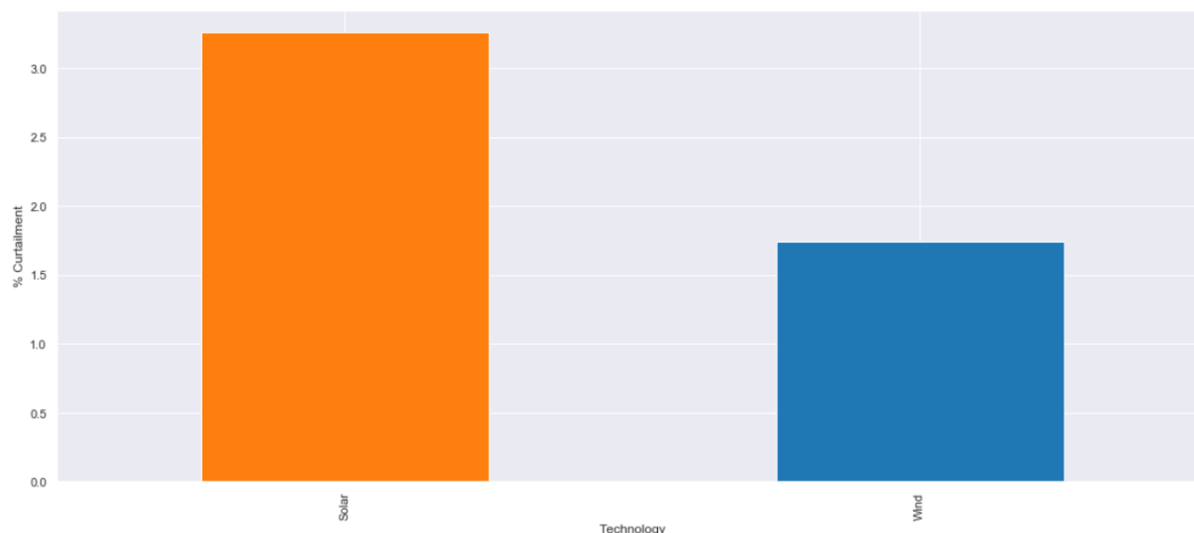


Figure 1: Expected solar and wind curtailment due to the AER’s preferred option

If the AER’s preferred option is implemented, the Levelized Cost of Energy (LCOE) for wind and solar resources will be increased substantially because there will be significantly less energy production without any change to capital or operating costs. The increase in energy costs will eventually be recovered from consumers. In some cases, new entrant projects will not be able to achieve their required rate of returns due to reductions in forecast production, which in turn will

reduce the volume of new entrants and increase fuel costs for consumers. In our view, lost energy is a material issue that needs to be carefully considered. The AER has not presented any quantitative analysis to show that the benefits will outweigh the potentially significant increases in energy costs. We also expect that lost energy will significantly impact upon the profitability of existing generators, further damaging confidence to invest in generation assets in the NEM.

The Average Forecasting Error Will Increase

Currently, semi-scheduled generators that ‘miss’ their forecast values and ‘under-generate’ due to resource availability, are offset by semi-scheduled generators that ‘over-generate’. The aggregation of bi-directional forecasting errors across the NEM significantly reduces the overall requirement for ancillary services.

If this advantage of the semi-scheduled category were to be removed and generators were forced to follow a target, the generators that would have over-generated (i.e. better resource availability than forecast) would be limited to the forecast generation level.

All generators therefore will only ever “under-generate” leading to a significant increase in the total forecasting error and associated FCAS regulation raise requirement.

Figure 2 shows 6 months of historical NEM data for aggregated semi-scheduled generators illustrates this point. The forecast value was compared against the measured value (the INITIAL_MW value for the next DI) for all semi-scheduled generators in the NEM for H1 2020 (excluding generator semi-dispatch intervals and negative pricing intervals).

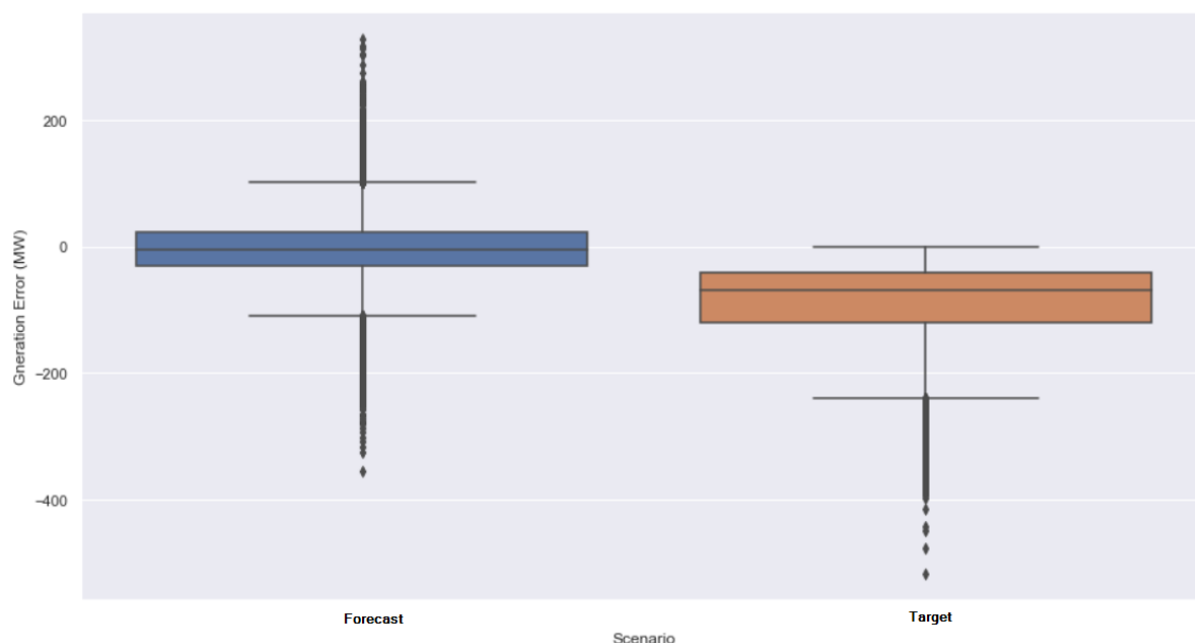


Figure 2

Existing Forecast System: Aggregate Generation Error for all Semi-Scheduled Generators in the NEM per dispatch interval for H1 2020 (negative pricing and generator SDC intervals excluded)

'Preferred' Target System: Aggregate Generation Error for all Semi-Scheduled Generators in the NEM per dispatch interval for H1 2020 (negative pricing and generator SDC intervals excluded) after limiting generators to a target

Not allowing generators to over-generate when there is resource available leads to significant increases in both average dispatch error and maximum dispatch error at the end of a dispatch interval as outlined in Table 1.

Table 1

	Current System (SS Forecast)	'Preferred' Option (SS Target)	Delta
Min	-354 MW	-517 MW	- 163 MW
Mean	-5.5 MW	-87.5 MW	- 82 MW
Max	327 MW	0 MW	- 327 MW

This increases the overall forecasting error in the system and the associated increase in the requirement for FCAS raise services. The preferred option of a target also increases reliance on other fuel sources for FCAS raise because most semi-scheduled renewable generators can provide FCAS lower services.

The introduction of a firm target for semi-scheduled generators unnecessarily reduces the effectiveness of the semi-scheduled category and increases the total requirement for the FCAS raise service. Some parties may argue that the requirement for FCAS lower services has been reduced; however, FCAS lower services can be provided at a low marginal cost by wind and solar generators, so the increased requirement for FCAS raise services is certainly not offset by a reduced requirement for FCAS lower services.

Alternative Options

To address the underlying issue of improving confidence in semi-scheduled generator output and preventing rapid decreases in semi-scheduled generator output including in response to negative pricing, we support the option to *prohibit the installation or use of either systems or procedures that allow for, or automate, a reaction to price that does not match their target.*

This would be a simpler change and there would be negligible implementation as it is expected that the existing systems could be disabled quickly and cheaply.

To enforce this; it is possible to monitor the generator active power set point, and if the set point is below the forecast value then this could be deemed a non-conformance to dispatch. AEMO currently have visibility of the generator active power set point for most semi-scheduled generators. The exact rules and wording would need to be carefully considered to avoid ambiguity in implementation.

Conclusion

By introducing the preferred option of a firm target there will be lost energy for new and existing semi-scheduled generators, increasing energy costs for consumers and degrading investor confidence in the NEM.

As demonstrated, there will also be an increase in forecasting error, always over-forecasting (under-generating) and therefore increasing the requirement for FCAS raise services.

This removes numerous advantages of the semi-scheduled category to resolve an issue that has been limited to small number of generating systems. These two points will both contribute to a raise in energy costs which will ultimately be borne by consumers.

The core issue is significant changes in the level of generation in response to pricing. The solution is to adopt an option to *prohibit the installation or use of either systems or procedures that allow for, or automate, a reaction to price that does not match their target.*

This solution maintains the existing benefits to the power system of the semi-scheduled generator category without the unintended consequences of lost energy and an increase in aggregated forecasting error.

We do not support the other options presented in the paper as they introduce unnecessary complexity without solving the underlying issue.

If stakeholders would like to understand the methodology presented in this submission, please contact Sam Lumley (sam.lumley@res-group.com)

Thank you for the opportunity to provide feedback into this important investigation. For further discussion on the feedback provided in our submission, please reach out to me at martinhemphill@res-group.com.

Yours sincerely,

 Recoverable Signature

X 

Martin Hemphill

Manager - Grid Connections

Signed by: 2b98e917-1d8f-4d93-b01d-52af38d303f5