

5 February 2015

Mr John Pierce  
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By online submission

Dear Mr Pierce

**Options paper - generator ramp rates and dispatch inflexibility in bidding**

AEMO appreciates the opportunity to respond to the AEMC's options paper released for consultation on generator ramp rates and dispatch inflexibility in bidding, published on 18 December 2014.

AEMO confirms that options 1 and 2, as well as the more preferable draft rule, provide sufficient ramp rate capability for AEMO to manage power system security.

The attached submission summarises AEMO's understanding of the implications of the two options in terms of issues raised in submissions for large thermal units and aggregated units.

If you need further information or wish to discuss our submission or any other matter relating to the implementation of the rule change, please contact Brian Nelson on (02) 9239 9132 or [brian.nelson@aemo.com.au](mailto:brian.nelson@aemo.com.au).

Yours sincerely



Peter Geers  
**Executive General Manager Markets**

Attachment: AEMO Submission in response to AEMC Options paper – generator ramp rates and dispatch inflexibility in bidding



**AEMO Submission in response to AEMC Options paper – generator ramp rates and dispatch inflexibility in bidding**

This submission adopts the same abbreviations and definitions used in the AEMC's draft determination and more preferable rule.

**1. Issues raised in submissions on the draft rule**

AEMO notes that many of the submissions indicated that a requirement to offer high ramp rates for aggregated and larger generating units may not be practical and may require higher operating and maintenance costs, or even place the unit at higher risk of failure. However, this is balanced by the existing provisions that allow any Generator to offer a ramp rate that is below the minimum.<sup>1</sup>

**1.1. Aggregated units**

Submissions indicated that the capability for aggregated units to ramp up and down is a function of how many physical units are on line at the time. To see the materiality of this issue, AEMO examined actual ramp rates used in 2014 for aggregated generating units with maximum capacities greater than 300 MW. The results are shown in the Appendix and summarised below:

- Gordon<sup>2</sup> and Darling Downs aggregated generating units ramp rates were low (that is, below the minimum in the draft rule) for more than 80% of all dispatch intervals in 2014. During these periods unit outputs varied from zero to full capacity, indicating the number of physical units in service was not a major factor in deciding whether to offer a low ramp rate (see the Appendix).

Laverton North and Murray aggregated generating units ramp rates were low for less than 1% of all dispatch intervals in 2014. During these periods aggregated unit outputs varied from zero to full capacity, indicating the number of physical units in service was not a major factor in deciding whether to offer a low ramp rate (see the Appendix).

- Valley Power aggregated generating unit ramp rates were low for around 4% of all dispatch intervals in 2014, but were low when the units were in service for less than 1% of all dispatch intervals. As with Laverton North and Murray, the number of physical units in service does not appear to have been a major factor.
- Upper Tumut aggregated generating unit ramp rates were low less than 0.1% of all dispatch intervals in 2014. This indicates the unit would not be materially affected by the draft rule.
- Tumut 3 aggregated generating unit ramp rates were low for less than 0.02% of all dispatch intervals in 2014.

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<sup>1</sup> See clauses 3.8.3A(c) – (e)

<sup>2</sup> Gordon is subject to water licence obligations to minimise bank erosion in the Gordon River that requires a ramp rate of 1 MW/min under specified conditions.

- Bogong/McKay and Pelican Point aggregated generating units ramp rates were above the minimum in the draft rule at all times in 2014.

AEMO concludes there is not a strong correlation between unit output and low ramp rates, indicating that the number of individual units in service has not been a significant factor in lower ramp rates offered by participants. This suggests that the existing provision that allows participants to offer ramp rates below the minimum specified in the rules provides sufficient protections to participants for technical reasons.

## **1.2. Large thermal units**

Submissions indicated that some large generating units are unable to sustain high ramp rates without a potential increase in operating and maintenance costs, or by risking plant availability. A general scan of ramp rate bidding for the larger generating units indicates a greater tendency to use low ramp rates (that is, below the minimum in the draft rule)

This suggests the change proposed in the draft rule would have a material impact on the operation of these units.

## **2. Options for consideration**

### **1.1. Impact on different unit sizes and aggregation**

AEMO confirms that it would be able to manage power system operation under each of the options being considered. AEMO understands the main impacts of each option are summarised in Table 1.

Compared to the current requirements:

- Neither option appears to impact on large non-aggregated generating units.
- Option 1 reduces the requirement for medium sized non-aggregated generating units.
- Both options increase the requirement for large aggregated units at full capacity.

AEMO notes the two options have different treatments for medium-sized units (between 100 and 200 MW), due to the use of a 3 MW/min threshold which is 1% of 300 MW and 3% of 100 MW.

Table 1 Summary of impacts of options compared to current rules

Unit Size	# Units	Max Cap (MW)	Total Cap (MW)	Available (MW)	Current (MW/min)	Option 1 (MW/min)	Option 2 (MW/min)
Small	1	30	30	-	1	1	1
Medium	1	100	100	-	3	1	3
Medium	1	320	320	-	3	3	3
Medium Aggregated	4	80	320	160 320	3	2 4	3
Large	8	200	1600	-	24	16	24
Large Aggregated	8	200	1600	800 1600	3	8 16	24

AEMO also notes the rule would appear to have the greatest impact on units in the Snowy scheme as shown in Table 2.

Table 2 Ramp rate requirements for Snowy Scheme Units

Station	# Units	Unit size (MW)	Max Cap (MW)	* Current (MW/min)	Option 1 (MW/min)	Option 2 (MW/min)
Tumut 1/2	8	72 / 82	665	16 / 3	7	16
Murray	14	95 / 138	1575	32 / 3	16	32
Tumut 3	6	250	1800	18 / 3	18	18

\* The two numbers represent the current requirements for the stations before and after aggregation.

Although Option 2 might appear to place a higher burden on Murray, it is equivalent to the ramp rate requirement without the units being aggregated. AEMO understands this is more likely to be consistent with the AEMC's objectives for ramp rates requirements that can be applied more consistently and proportionately than the current rules.

## 1.2. Treatment of capacities in central dispatch under Option 1

The AEMC has requested AEMO comment on the behaviour of the central dispatch process under the following conditions:

- Unit is at high output (or at least well above zero).

- Capacity is rebid to zero.
- Ramp rates are rebid to zero.

Under these conditions, central dispatch would violate the capacity ahead of the ramp rate and the unit would not be dispatched away from its current measured output.

### **3. Implementation**

AEMO advises it will be undertaking major works on its Brisbane data centre and would prefer to avoid changes to market systems in late 2015. This means the earliest implementation date for this rule would be in the May 2016 release.

## Appendix – Ramp Rates for Aggregated Units in the NEM for 2014 Calendar Year

These charts show the distribution of unit outputs for dispatch intervals where either the ramp up or ramp down rate was less than the minimum required in the more preferable draft rule. Only aggregated units larger than 300 MW are shown. Tumut 3 was offered with a ramp down rate below the minimum in the draft rule in 15 dispatch intervals in 2014 and is also not shown.



