



27 March 2014

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
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SYDNEY SOUTH NSW 1235

Submitted via [www.aemc.gov.au](http://www.aemc.gov.au)

Dear Mr Pierce

### **Generator ramp rates and dispatch inflexibility in bidding**

Alinta Energy welcomes the opportunity to make a submission in response to the consultation paper on the proposed *National Electricity Amendment (Generator ramp rates and dispatch inflexibility in bidding) Rule 2015* (the proposed rule or the proposal).

Alinta Energy is an active investor in the energy retail, wholesale and generation markets across Australia. Alinta Energy has around 2500 megawatts of generation capacity in Australia (and New Zealand) and a growing retail customer base of over 750,000.

The impact of ramp rates on dispatch in the National Electricity Market (NEM) is a matter that is due for detailed consideration. The Australian Energy Regulator's (AER) proposed rule has delivered this opportunity and this is welcomed by Alinta Energy.

As a principle, generator bids should reflect actual unit capability and conversely what generators can't do should be based on those same characteristics. The proposed rule meets this standard and as such is supported in-principle by Alinta Energy.

Nevertheless, whether the proposed rule is ultimately the best way of managing the adverse impacts of existing ramp rate usage depends on management of implementation issues. These implementation issues are likely to drive a number of significant concerns amongst generators and also suggest if alternatives exist they should also be assessed at this time.

This submission details Alinta Energy's initial views, based on our observations in the market and detailed experience, to assist the Australian Energy Market Commission (AEMC) consider the proposed rule and resolve implementation arrangements.

### **Discussion**

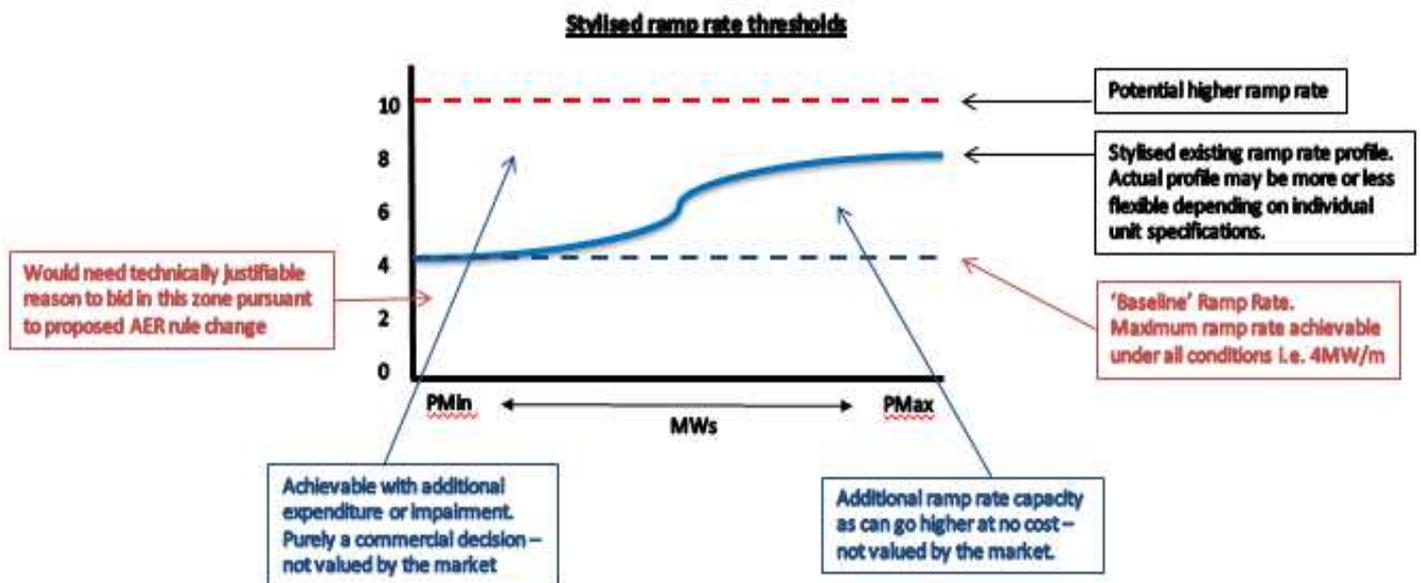
#### Conceptualising the rule change

The consultation paper raises a number of issues both directly relevant to the rule change and issues that are not addressed by the rule change that by implication require further consideration. Alinta Energy addresses these issues in the following sequence.

- National Electricity Objective assessment of the proposed rule.
- Concerns with the existing 3MW per minute minimum.
- Operation of baseline ramp rates.
- AER enforcement of the proposed rule.
- An alternative approach based on existing arrangements.
- The failure of the NEM to appropriately value ramping capability.

Prior to analysing these issues, the stylised diagram below illustrates how Alinta Energy considers the proposed rule is expected to operate and where issues arise that have not been contemplated in the consultation paper.

The diagram provides a stylised (and thus simplified) ramp rate profile for a generator whose maximum existing ramping capacity ranges from 4 megawatts per minute (MW/m) at minimum generation to 8MW/m near maximum generation. Under this example this generation unit has the possibility to ramp up to 10MW/m if further investment were to be undertaken.



The two mauve coloured boxes with text highlight the issues contemplated explicitly by the rule change. Namely, the establishment through guidelines of what will be from herein called the 'baseline' ramp rate which is 4MW/m in this instance. This is the ramp rate at which a generator would, as a minimum bid up and down under all circumstances. Where a lower ramp rate accompanied bids or rebids this should require a technically justifiable reason. Conversely, where a ramp rate above this was provided for commercial reasons this should not require justification in bidding reasons.

These issues are those which require assessment against the National Electricity Objective in order to justify implementation of the rule change.

The two blue coloured boxes with text denote matters not dealt with by this rule change but discussed in this submission. Notably, ramp rate capability, above the baseline, that is not valued by the market. As it is not valued by the market there is no incentive to provide services that the market may value but the individual generator may not. This additional capability may or may not come at an additional cost to the generator depending on the ramp rate profile of the unit under consideration. This is illustrated by the section above and below the stylised ramp rate profile.

These latter issues are matters that require further consideration; however, their resolution is not dependent on this rule change proposal.

These matters are enunciated below.

#### National Electricity Objective assessment

The proposed rule seeks to place greater restrictions on generator ramp rates by requiring generators to always submit ramp rates that reflect their baseline technical capability on the basis that it is commercially advantageous to circumvent requirements to ramp down in some instances and this creates inefficiencies in the market.

Alinta Energy agrees that the assessment criteria for the proposed rule is the efficient operation of electricity services with respect to the reliability and security of the national electricity system and the price of supply of electricity.

Notably, the AER have expressed the following concerns with the current arrangements that the proposed rule seeks to overcome.

- Compromises system security as constraints are not alleviated as quickly or flexibly as would be the case if generators bid ramp rates at their technical baseline.
- Increases transmission charges and generates additional counter-priced flows.
- Can lead to inefficient short-term investment in transmission solutions to alleviate network congestion.
- Increases spot price volatility and therefore the price of hedge contracts and ultimately the retail prices paid by consumers.

Prima facie, Alinta Energy agrees there is a reasonable case to support progress of the proposed rule as on a qualitative basis the proposal would address three of the four concerns outlined above.

First, measures which increase system security and allow for more efficient resolution of constraints are supported by Alinta Energy where the costs of implementation are manageable. The views of the Australian Energy Market Operator (AEMO) may be particularly relevant in this regard.

Second, Alinta Energy agrees with AER's view regarding the inefficiency of counter-priced flows to which artificial ramp rates would appear to contribute. A reduction in counter-priced flows would benefit the market and would improve efficient dispatch and price discovery. In many respects the impact of artificial ramp rates in the face of constraints is similar to the impacts of disorderly bidding more generally. Both undermine the operation of the market.

Third, avoiding the need for short-term investment in transmission infrastructure would be a desirable outcome for consumers; however, Alinta Energy is unsure the extent to which this has actually resulted in significant investment at consumers' expense.

Less clear, is the view that the proposed rule could result in reduced wholesale spot price volatility and the assumption that this is of benefit to consumers as any additional costs will no longer flow through to consumers via retail tariffs. This conclusion may be inaccurate or at least poorly stated and may derive from a general apprehension or concern that some stakeholders have when considering volatility in any form. Volatility of itself is not a bad thing and is an important part of the market. In the circumstances being referred to consumers will pay a premium only if the distortion from artificial ramp rates resulted in markedly different outcomes than would otherwise have been the case.

Additionally, if the rule was to be implemented, and should generators be unable to recover revenues they otherwise did via the use of artificial ramp rates, it may be rational that those generators will adjust their bidding strategies or running profiles accordingly. It is difficult to say how adjusted bidding strategies or running profiles would precisely affect wholesale price outcomes in the absence of more detailed analysis.

Nevertheless, it remains likely that where generators have the opportunity to recover revenues through alternative bidding strategies they are likely to do so within the rules of the market. Where generators are unable to do so, unless they continue to recover their costs they will cease running over the relevant periods. Those generators may be less likely to offer the same number of hedge contracts into the market.

As such, the position that less volatility derived from ramp rate usage reduces hedge contract costs is considered to be rather one-sided. In a dynamic market like the NEM there are a number of forces driving behaviour and the level of hedge contract availability and price. Hence, it may be more appropriate if the proposed rule focused on removing distortions created by artificial ramp rates which will ultimately ensure cost-reflective pricing, as opposed to narrowly assuming one form of behaviour or another will lower costs to consumers.

This does not mean that known generator's behaviours in response to known patterns of constraints will not and has not moved the forward curve for specific products within a limited timeframe. Alinta Energy would suggest the AER's observations have merit in this regard. Nevertheless, Alinta Energy's view is that any cited examples are not necessarily evidence of overall market outcomes over the long term, since participants will most likely adjust and develop new hedging strategies, and that price outcomes are unlikely to uniformly move in one direction over another.

#### Concerns with the existing 3MW per minute minimum

Alinta Energy's primary interest is that generator ramp rates are transparent, and that should generators be able to change ramp rates as part of their bidding or re-bidding any changes can be verified and substantiated. It is arguable that at present this is not the case.

Alinta Energy notes a number of issues with existing ramp rates arrangements.

- A generator's ramp rates and bid price offer do not necessarily interact at time of bid even though ramp rates can impact on dispatch and market pricing outcomes.
- Current arrangements impair capacity to dispatch on the basis of price and quantity only.
- Generators are failing to meet ramp rates in accordance with bids.
- Ramp rate bids and performance not aligning for the purpose of creating volatility or price outcomes which would otherwise not be expected.
- Registered ramp rates are inconsistent with actual performance and technical characteristics.
- Inconsistent treatment of inflexibility profiles and minimum load.
- Inconsistent treatment of non-scheduled generation.
- Undermines the use of inter-regional products.

In the NEM, price and quantity bids are the determinants of dispatch outcomes. In that context ramp rates can have the effect of changing dispatch outcomes by preventing changes between dispatch intervals that would otherwise have occurred if all plants could be ramped up or down without limitation.

The purpose of ramp rates are, or should be, to take account of the fact that all plant cannot be turned up or down without physical limitations. Physical limitations are an inherent feature of the electrical

system and ancillary and network support services have been developed for the purpose of managing and overcoming these physical limitations.

Nevertheless, physical limitations should not interfere with competition based on price and quantity where they can be readily overcome. In Alinta Energy's view, in some instances ramp rates are having this effect. This is because dispatch outcomes in one dispatch interval flow into subsequent intervals where generators artificially limit their ability to be ramped down. This is likely to be inefficient.

If NEMDE took ramp rates into consideration and gave less preference to lower ramping generators then there could be an argument that dispatch could trade-off the differences and costs between different ramping profiles; however, this is not the case. Hence, unless AEMO determined a methodology to discount bids that had lower ramp rates (i.e. discount [increase] the bid offer price to reflect the additional ancillary service requirements and cost of inflexibly managing constraints) then a better arrangement would be that price and quantity are used to determine dispatch and ramp rate impacts are minimised.

In relation to the arguments made by the AER, outcomes which deviate from dispatch based on price and quantity are likely to result in productive inefficiencies even if at the margins. Thus where generators need to take into account all their costs – physical and contractual - their bid outcomes are likely to be the most efficient.

This would mean that generators would potentially better use price bands at increments which maximise their chances of accessing desirable prices and retaining preference in the merit order as opposed to relying on artificially low ramp rates. This would seem an appropriate outcome. In this way, all generators would be competing on price and quantity and not relying on ramp rates to recover revenues. This is precisely why Alinta Energy does not consider the rule proposal offends clause 3.1.4(a)(1) or limits a generator's ability to operate with the greatest amount of commercial freedom. The proposal is ensuring that bids are appropriately valued and specific generators are not able to take advantage of constraint formulation to receive preference via artificially low ramp rates.

Additionally, the AER suggests that productive inefficiencies are likely to arise in the face of constraints by the use of artificial ramp rates. Alinta Energy agrees this is the case but notes that the use of disorderly bidding down to -\$1000 is likely to impede least cost dispatch in any case. This is the case with any price cap, either negative or positive, as it has the effect of muting the ability of the participants to reveal the true extent of their preferences.

This does not obviate the need to advance the rule change, as even with -\$1000 bids, ramp rates can create additional and significant distortions by changing the order in which generators are backed off, but that there are a number of wider issues that would need to be resolved as part of the Optional Firm Access work program. For clarity, Alinta Energy does not believe the proposed rule should be delayed in order to await Optional Firm Access work program outcomes.

There are occasions where generators nominated ramp rates do not correspond with the actual physical performance capability of plant. It can be suggested that at times this is an intentional strategy by some plant. This is an undesirable feature of the market and supports the concerns raised by the AER; however, it is not a consequence of having artificially low ramp rates and thus will not be resolved via the proposed rule.

Whether or not generators can change ramp rates away from a baseline threshold there needs to be assurances that those ramp rates are followed as part of dispatch. This will continue to be the case whether or not the proposed rule was to be implemented.

Likewise, generator registered ramp rates should better reflect actual plant capability. Whether inconsistency is a reflection of registered rates incorporating trip tests or other exceptional circumstances is unclear; however, registered data suggests some thermal black coal generators

have ramp rates over 50MW/m, or even 100MW/m, which is clearly inconsistent with technological capability. Whether these registered characteristics provide a cloak under which bids can be lodged with high ramp rates that are never actually meet warrants further consideration.

A related issue, not explicitly covered in the consultation paper, is the inconsistent treatment of inflexibility profiles and notably minimum load for fast start generators. Alinta Energy is concerned fast start inflexibility profiles, including the minimum load and “T-times” entered into the bidding system bid do not actually reflect technical plant characteristics.

This is evidenced by the behaviour of participants whereby fast start plant utilise T-times and minimum load to avoid being ramp down or generate price volatility. For instance, plant have been known to rebid and change their inflexibility profiles and change minimum load when commercially beneficial. This has the effect of backing off other generation that would otherwise be dispatched.

In Alinta Energy’s view technical characteristics or environmental regulations should establish minimum load requirements and fast start plant should not be able to arrange and change minimum load and T-times in a manner which distorts dispatch based on price and quantity. Further, it is difficult to understand how an inflexibility profile can be change once bid, this is hardly inflexible. This matter warrants further investigation by the AEMC.

The current inconsistent treatment of non-scheduled generation and demand side participants is also relevant to this rule proposal. There are a number of non-scheduled generators and demand side participants, some of which are large in size, which have ramp rates that enable them to quickly turn on and off to respond to the market. This can result in price spikes not eventuating when expected in pre-dispatch to unexpected price spikes when those units rapidly ramp down or turn off. Alinta Energy considers it necessary to better capture these units in the dispatch process including their ramping capability and behaviour.

Artificial ramp rates, but more so disorderly bidding and the absence of firm access to the regional reference node, undermine the ability of market participants to use inter-regional products. Alinta Energy has long advocated for market design reforms which would improve the availability and usage of inter-regional products, notably inter-regional settlement residues. Minimising the distortion of dispatch outcomes would have the impact of improving the firmness of inter-regional products; however, it is difficult to assess whether this would be anything other than marginal as it relates to the issue of ramp rates. For clarity, Alinta Energy uses inter-regional products across multiple regions.

#### Operation of baseline ramp rates

The AER proposes that ramp rates reflect the true capability of the plant. While generators would generally be able to operate at their baseline ramp rates, any new rule would need to take risk, reliability, controllability and sustainability into account. This is interpreted as the ramp rate provided to AEMO would be the baseline the generator can safely attain with reference to technical specification that is auditable.

In this context, it is important to clarify the conditions under which baseline ramp rates should be determined. Alinta Energy makes a number of observations in this regard.

- The baseline ramp rate is one that can be used under all normal operating circumstances between maximum unit output and minimum generation. This rate is not the actual maximum that could be achieved in all circumstances at no or additional cost but what can be achieved under most or all normal operating conditions.
- Baseline ramp rates should not increase the risk of failure either in the long term or short term and will not result in a reduced life expectancy beyond that which would be expected due to normal operations.

- Baseline ramp rates should be set at a level that can maintain output as per dispatch instructions and can reliably move in either direction in subsequent intervals i.e. X up, X down or a up/down combination equating to X.
- Setting a baseline ramp rate does not prohibit revisions based on permanent changes to plant, including upgrades that increase ramp rates, or decreased ramp rates for the purpose of minimising wear and tear where those changes are broadly symmetrical or at least technologically justifiable.
- Baseline ramp rates should be set on a unit not generation facility basis. Other things being equal ramp rates should be set on a per unit basis and not aggregated across facilities.

If a generator submits a ramp rate lower than the baseline that a unit is technically capable of achieving then it would be required to accompany the bid with a brief, verifiable, and specific reason relating to the relevant technical limitation on their generating plant. Deviations below the baseline ramp rates may be encountered from time to time but should not be expected to only occur at times of constraints and if they reflect permanent changes should not be asymmetrical for most technologies.

If these conditions are taken into account, Alinta Energy would be supportive of a change that aligns all of the rules related to ramp rates and dispatch inflexibility profiles to ensure they at all times reflect the true characteristics of plant and cannot be manipulated for short-term commercial gain at cost to the market.

#### AER's enforcement of the proposed rule

The proposed rule lacks some clarity as to how the AER will enforce the proposed arrangements.

The AER intention to amend the Rebidding and Technical Parameters Guideline is appropriate but it is difficult to support the proposed rule in the absence of these draft amendments. As a general rule Alinta Energy supports consultations on associated supporting documentation taking place in parallel or in advance of proposed rules taking effect.

Further work is required to clarify how the proposed rule defines baseline ramp rates and how a generators baseline technical ramp rate can be determined. Further work within the context of the proposed rule, or in advance of the proposed rule, is preferred to creating a new and wide-ranging discretionary function for the AER.

This is also important as the proposed rule may create incentives for generators to actively reduce their ramp rates, especially if they believe they can do so asymmetrically, for the purpose of circumventing these new obligations.

#### An alternative approach based on existing arrangements

There is a view that the proposal aims to better reflect the principles behind the existing rule whereby each unit should ramp at a rate of 3MW/m or thereabouts. This compares with outcomes under the existing rule whereby generators whether aggregated or not aggregated limit ramping capability to 3MW/m regardless of the number of units when it suits their interests.

If this is the case, and Alinta Energy is unclear if it is so, than an alternative proposal would be to enforce stricter adherence to the 3MW/m per unit principle. This would mean an aggregated facility would have a minimum ramp rate of 3MW/m per unit.

For smaller units below 100 megawatts a lower threshold of 3 per cent of capacity, rounded up to the nearest whole number, may be appropriate. This alternative approach would ensure multiple units cannot avoid adherence to 3MW/m rule as currently expressed and may be simpler to implement at lower cost.

To assist, a comparison table of aggregated and non-aggregated generators by size has been set out below with the aggregated facilities current assumed ramp rates and then the alternates under a 3MW/m unit or 3 per cent capacity requirement.

Aggregated facility – Current approach				Aggregated facility – Alternative approach				Non-aggregated facility – Comparison			
Units	Size	$\Sigma$ MW 7.9	Rate	Units	Size	$\Sigma$ MW	Rate	Units	Size	$\Sigma$ MW	Rate
<b>Somerton Power Station</b>				<b>Somerton Power Station</b>				<b>Braemar Power Station (1)</b>			
4	40	160	3	4	40	160	8	1	168	168	8
<b>Laverton North Power Station</b>				<b>Laverton North Power Station</b>				<b>Oakey Power Station</b>			
2	156	312	3	2	156	312	6	2	141	282	6
<b>Valley Power Power Station</b>				<b>Valley Power Power Station</b>				<b>Quarantine Power Station</b>			
6	50	300	3	6	50	300	12	4	24	96	4
								1	128	128	3
										224	7
<b>Lower Tumut Power Station</b>				<b>Lower Tumut Power Station</b>				<b>Hazelwood Power Station</b>			
6	300	1800	3	6	300	1800	18	8	220	1760	24
<b>Murray Power Station</b>				<b>Murray Power Station</b>				<b>Torrens Island Power Station</b>			
10	95	950		10	95	950	30	4	200	800	16
4	138	552		4	138	552	12	4	120	480	16
		1502	3			1502	42			1280	32

This analysis suggests the alternative approach would better align generators of similar sizes and may provide a more equitable and likely efficient response to dispatch outcomes.

It can be suggested that this alternative is more desirable as the baseline ramp rates referred to in the earlier stages of this submission are in practical terms unlikely to significantly vary from around 3-5MW/m in most circumstances. Take for example large coal fired generators which were originally designed to operate as base load with little variation. The base load fleet is 30 years old and more and the degradation of design tolerances and operating characteristics is apparent. Thus any move away from a 3-5MW/m will be likely difficult to achieve for most units without investment and may lead to increased instances of failure. As such the alternative approach may be favourable.

Alinta Energy acknowledges that the level of analysis provided here lacks is not sufficient on its own to justify a preferable rule change. Nevertheless, it is recommended the AEMC consider this alternative in further detail.

#### Increased ramping of plant is a separate issue to increasing ramp rates

The issue of ramp rates conforming to baseline technical capability and generators following dispatch instructions is separate to the view that plant will be required to increasingly ramp up and down (or use cycling) to a greater extent due to changing market conditions and the impact that will have on cost recovery and future investment.

Because of component thermal stress and creep impacts there will be increased costs for plant owners if the rate of cycling increases overall (as opposed to the rate of change occurring at any one

point better aligning with baseline technical capability as per the proposal). With more wind and solar photovoltaic generating into the interconnected system it has been suggested the remaining thermal plants may need to better reflect load following characteristics which includes an increasing need to continuously change generation patterns to cover the variations in the supply of wind and solar.

This will mean that there will be significant wear and tear on plant and in particular there will be variation on thermal conditions imposed on large and thick metal components such as turbines and pressure part headers which in turn leads to an increased rate of life consumption including cracking, and thermal fatigue. Additionally dampers, valves, actuators and so on will all be caused to work much harder and more frequently which in turn will lead to an increased failure rate. This can reduce the long term capability for investment and reduce plant safety and security of supply.

Nevertheless, it is apparent that the ability to ramp up and down with greater speed and more often will become necessary in the NEM, including in South Australia where significant wind capacity resides, and is something that is of value to the market and may become more valuable over time. If this is the case, then consideration of how the market can better value ramping capability should occur (perversely, under current arrangements fast ramping generators are penalised during constraints, not rewarded, when backed off first).

While this matter is not the subject of this rule change it is obviously one requiring consideration and the AEMC is encouraged to initiate a review on arrangements for better valuing ramping capability in the NEM.

## Conclusion

Alinta Energy welcomes the proposed rule change and in-principle supports the proposal; however, notes the implementation issues that need to be resolved before the rule can be fully enacted. While the implementation issues are not considered insurmountable they are likely to cause some participants concern and need to be managed accordingly.

Additionally, alternative approaches should be considered by the AEMC where they may satisfy the objectives of the proposal.

Alinta Energy looks forward to further engaging in this rule change process. Should you have any queries in relation to this submission please do not hesitate to contact me on, telephone, 02 9372 2633.

Yours sincerely



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