

31 October 2019

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Mr Charles Popple
Ms Michelle Shepherd
Ms Allison Warburton
Ms Merryn York
Australian Energy Market Commission
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Lodged electronically: www.aemc.gov.au (ERC0263, ERC0274, ERC0277)

Dear Commissioners,



EnergyAustralia

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AEMC 2019, Primary Frequency Response Rule Changes, Consultation Paper

We welcome the opportunity to comment on the AEMC's consultation paper on the 3 rule changes lodged by AEMO and Dr Peter Sokolowski¹.

EnergyAustralia is one of Australia's largest energy companies with around 2.6 million electricity and gas accounts in NSW, Victoria, Queensland, South Australia, and the Australian Capital Territory. We also own, operate and contract an energy generation portfolio across Australia, including coal, gas, battery storage, demand response, solar and wind assets with control of over 4,500MW of generation capacity in the National Electricity Market (NEM).

Within the last few years there has been significant work completed (and ongoing) around how frequency should be controlled for the long-term security of the NEM. This includes the Ancillary Services Technical Advisory Group (ASTAG) which EnergyAustralia is a member of, and the AEMC's Frequency Control Frameworks Review (FCFR) in which we were also closely involved.

We do not dispute that there has been a decline in frequency control in the NEM due to increasing penetration of Variable Renewable Energy (VRE), declining capacity of traditional synchronous generation and other regulatory changes that occurred with the introduction of the current Frequency Control Ancillary Services (FCAS) markets. The inadequacy of the current NEM frequency framework was highlighted in the AEMC's final FCFR report in mid-2018 which identified that in the future the current FCAS markets may no longer be fit for purpose as the power system changes and that the best approach to the procurement of frequency services in the longer-term is one that is performance-based, dynamic and transparent².

EnergyAustralia appreciates that AEMO's key responsibility is ensuring system security and reliability and we are also aware of our responsibility to customers to play our part in maintaining security and reliability in the NEM. What is not clear to us, is the change in urgency (since the 25th August event) from the work program that had previously been laid out with close engagement from the AEMC and industry participants. The

¹ <https://www.aemc.gov.au/sites/default/files/2019-09/Primary%20frequency%20response%20rule%20changes%20-%20Consultation%20paper%20-%20FOR%20PUBLI...pdf>

² <https://www.aemc.gov.au/sites/default/files/2018-07/Final%20report.pdf>

events on the 25th of August 2018 which while being a serious power system event, do not justify mandating narrow band Primary Frequency Response (PFR) without further consideration of other associated impacts. The very recent work completed by Undrill³ which presented new observations of frequency oscillations in the NEM has been used as further evidence by AEMO to justify the proposed changes. The concerns raised about observed oscillations within the Normal Frequency Operating Band (NFOB) is new to the industry and has not been raised previously, we consider that this phenomenon requires further analysis as at this time it is not clear if the proposed solution to mandate PFR would address these issues.

Before simply mandating PFR on all technical capable generators as proposed, both the AEMC and AEMO should seek to define the problem before enforcing this requirement. The first step should be requiring the Reliability Panel to make changes to the current Frequency Operating Standard (FOS)⁴, then changes to the current framework and markets can be developed to achieve these. It remains unclear to EnergyAustralia the number of generators (or MW's enabled) that are required to provide satisfactory PFR for the NEM. We are keen to work closely with AEMO and the AEMC to understand this issue in more detail and recommend that mainland primary frequency trials (as was the initial plan) would be valuable in providing more information on these questions.

We are also seriously concerned about the likely impact that mandating PFR on all generators will have on the current FCAS markets. The NEM is increasingly failing to value essential security services that were once provided as a by-product of energy but which the market is now increasingly struggling to deliver. Mandating the provision of PFR does not align with these challenges and appears contrary to recent public comments AEMO has made around valuing these security services⁵.

EnergyAustralia supports the notion that a market or incentive-based mechanism to procure the desired level PFR, whatever that level maybe, is the correct long-term solution for both the NEM and customers. As the NEM transitions to include more VRE it is essential that the current system security services that are provided as a by-product of energy are unbundled and separately valued to ensure an orderly transition. This was also highlighted by the Energy Security Board (ESB) in their post 2025 market design issues paper⁶.

If the AEMC decides to mandate PFR on all (or some) technical capable generators then consideration should be given to an appropriate compensation mechanism, for example the AEMC should consider utilising existing Non-Market Ancillary Service (NMAS) frameworks or a regulated payment to all generators (scheduled or semi-scheduled) which could be determined by the AER.

The remainder of this submission provides additional details on our views on the issues raised in the 3 rule changes.

³ <https://www.aemc.gov.au/sites/default/files/2019-08/International%20Expert%20Advice%20-%20Notes%20on%20frequency%20control.pdf>

⁴NER 4.4.1(b) requires AEMO to use its reasonable endeavours to ensure that the frequency operating standards ... are achieved.

⁵ <https://www.afr.com/companies/energy/gulfs-emerge-on-electricity-market-overhaul-20190909-p52pgg>

⁶ http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/EC%20-%20Post%202025%20Market%20Design%20Issues%20Paper%20-%202020190902_0.pdf

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Regards

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Industry Regulation Leader

1. The need for a solution

EnergyAustralia has been constructively involved in ongoing work on NEM frequency control over the last few years through membership of the ASTAG, other industry forums and close engagement in the development of the FCFR culminating in the final report last year⁷. The FCFR final report highlighted that frequency performance under normal operating conditions has been deteriorating in recent times, but that AEMO advised that there was no immediate need to implement regulatory change to address the deterioration before the results of its short-term actions to understand the issues are known. Further, AEMO indicated that current tools are expected to be adequate to manage frequency performance in a manner consistent with the requirements of the frequency operating standard within this timeframe⁸.

While the results and conclusions of the FCFR final report published on the 26th of July 2018 were relatively open ended, they did at least present a planned future pathway for frequency control in the NEM. This included immediate actions that AEMO should take to better understand the drivers of recently observed deterioration in frequency control and then subsequently address issues with the current regulatory and market arrangements for frequency control⁹. This included a review of the market ancillary services specification (MASS), the tuning of their Automatic Governor Control (AGC), investigating the need to increase the quantity of regulating FCAS on a static or dynamic basis, complete a trial of revised primary frequency control in the mainland building on experience from the Tasmanian trial, which were to all feed into the development of a future long term market solution to manage frequency in the NEM. This path of action was widely supported by the AEMC, Reliability Panel, AEMO and industry.

EnergyAustralia supported the work frequency work plan including the development of a mainland primary frequency trial to be co-ordinated by AEMO which would have provided learnings on the required and efficient amount of primary frequency control that is required in the NEM. The events of the 25th of August effectively put a stop to the ongoing work that was occurring including the potential for a trial and has led to AEMO proposing the current mandatory rule

2. Urgency of required change

The August 25th 2018 event has primarily been used as justification for the AEMO proposal of mandatory governor control. While this was a significant power system non-credible event which requires in depth analysis and learnings, the outcomes do not appear to provide direct evidence for expedited mandatory PFR. AEMO has made significant comparisons to previous separation events notably the 28th of February 2008 and the more adverse frequency response including under frequency load shedding (UFLS) in the 25th August event due to lower PFR available. We do not agree with all points raised in this analysis from AEMO¹⁰.

The power system conditions that resulted from this event in EnergyAustralia's view relate to resilience of the power system. Such events should be able to be managed

⁷ <https://www.aemc.gov.au/sites/default/files/2018-07/Final%20report.pdf>

⁸ Ibid, page iii

⁹ Ibid, page 60

¹⁰ Please see the AEC submission for a more detailed discussion of the difference between these events.

using changes to current frameworks for example, changes to existing contingency FCAS requirements to include local regional enablement or introducing wider mandatory PFR outside of the current NFOB. We note that the current AEMC review of the South Australia black system is considering the resilience of the power system¹¹.

Oscillations within the NFOB identified by Undrill in his recent report (that was commissioned by AEMO) has been used as further evidence to justify the proposed changes. These concerns/issues are new to the industry and have not been raised previously and given the short timeframe and qualitative nature of the report it appears prudent that this should be followed by more in-depth analysis to further understand the issue and identify potential solutions. Without adequate understanding of the exact nature of the issue there remains the risk that PFR as proposed does not address the problem or at its worst, further exacerbates the issue.

3. Appropriate steps forward

As operators of a number of large generating units EnergyAustralia is keen to continue to work with the AEMC and AEMO to attempt to determine appropriate steps forward to ensure appropriate PFR in the NEM.

EnergyAustralia remains supportive of mainland frequency trials (as was the previous intent from FCFR) to understand the PFR requirements that a market or new mechanism should then deliver. The AEC has recently taken steps to attempt re-establishment of a mainland trial which had co-operation of a number of AEC members and the AEMC, with the aim that this could improve frequency in the short term to address the current security concerns from AEMO while also providing additional data around number of generators that need to be enabled for PFR. This would then provide the AEMC with additional time to develop a more wholesome long-term market or incentive framework solution. We remain keen to work with AEMO and AEMC to ensure this can occur.

We appreciate that AEMO is increasingly having challenges maintaining the frequency to within the requirements of the FOS, although we note that recent more minor changes by AEMO have improved frequency control within the NFOB¹². Before simply mandating PFR on all technical capable generators as proposed, both the AEMC and AEMO should seek to define the problem that is trying to be solved before progressing to a solution. The first step should be requiring the Reliability Panel to make changes to the current FOS¹³ then changes to the current framework and markets can be developed to achieve these.

To EnergyAustralia there remains a number of unanswered questions from AEMO's rule change proposal including; whether $\pm 0.015\text{Hz}$ (or $\pm 0.025\text{Hz}$) is a sensible deadband noting that these tight deadbands are unprecedented in Australia, the number of generators (or MW's enabled) that are required to provide satisfactory PFR for the NEM and what potential adverse outcomes may exist. We request the AEMC to encourage AEMO to provide more details or provide modelling results around these issues.

¹¹ <https://www.aemc.gov.au/news-centre/media-releases/south-australian-black-system-review>

¹² Figure 3.2, https://www.aemc.gov.au/sites/default/files/2019-09/Primary%20frequency%20response%20rule%20changes%20-%20Consultation%20paper%20-%20FOR%20PUBLI..._0.pdf

¹³NER 4.4.1(b) requires AEMO to use its reasonable endeavours to ensure that the frequency operating standards ... are achieved.

EnergyAustralia supports the notion that a market or incentive-based mechanism to procure the desired level PFR, whatever that level maybe, is the correct long-term solution for both the NEM and customers. As the NEM transitions to include more VRE it is essential that the current system security services that are provided as a by-product of energy are unbundled and separately valued to ensure an orderly transition.

It would appear prudent for more minor changes to current frameworks to be implemented and these impacts understood before mandating PFR, including among others; continued changes to secondary control including FCAS regulating volumes, tuning of AEMO AGC system and some more minor changes to causer pays as proposed in ERC0263. AEMO also made a commitment last year to review the current MASS, this has not yet occurred.

4. Impacts on existing FCAS markets

EnergyAustralia is very concerned about the likely impact on the current FCAS markets that the proposed mandated rule could have.

The current FCAS market arrangements and continued uptake of controllable governors in more recent years has enable participants to signal their marginal cost of providing frequency services through their offers to AEMO's NEM Dispatch Engine (NEMDE). Mandating a tight deadband on all technically capable units (both scheduled and semi-scheduled) means that a participant will be required to have their governor responding, regardless of their willingness to participate in FCAS markets and therefore effectively reduces the marginal cost (or opportunity cost) of providing these services to zero. This is likely to have a serious impact on participant offers to NEMDE and subsequently a large impact on the FCAS bid stack and price.

AEMO is aware of this impact and has appeared to represent this as a benefit. We disagree. The NEM is increasingly failing to deliver essential system security services (which AEMO and other market bodies have previously acknowledged) that were once provided as a by-product of energy deliver. Mandating the provision of PFR is contrary to these challenges and risks removing market signals such as FCAS that have increasingly been used by emerging technologies (for example, batteries) as a key revenue stream to establish business cases.

We note that AEMO is increasingly focussed on the role that distributed energy resources (DER) is able to play in the energy transition including their large work program on DER and Virtual Power Plants trials (VPPs)¹⁴. Significant recent work has been completed on DER participation in FCAS markets and these changes risk these value streams and continued innovation¹⁵.

5. Implementation and exemptions

It remains unclear how the proposed changes (if made) would be co-ordinated and implemented across the generation fleet. Due to the proposed tight dead bands there will be significant first mover disadvantage to the first few major plants to implement

¹⁴ <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/DER-program>

¹⁵ https://www.aemo.com.au/-/media/Files/Electricity/NEM/DER/2019/VPP-Demonstrations/NEM-VPP-Demonstrations_Final-Design.pdf

this change. AEMO's Primary Frequency Response Requirements (PFRR) document provides no details around how AEMO would manage implementation¹⁶.

The PFRR in its current form gives AEMO total control over what constitutes an uneconomic change to meet the mandatory requirements. We have concerns that depending on the technology, age of plant and final PFRR that there could also be significant costs (from a market exposure sense) incurred from major outages of generating units to make the required changes. As currently drafted, it appears that the compensation arrangements do not cover such risks and we would encourage this to be further considered by the AEMC.

It has also been indicated by AEMO that the exemption framework may be used so as not every generating unit would be required to meet all the technical requirements if they would adversely impact system security¹⁷. This apparent treatment raises further questions around the selection of such a tight deadband and whether AEMO has sufficient understanding of the impacts on the power system.

We appreciate the clarity that has been provided from AEMO¹⁸ around how the testing of any implemented changes for mandatory PFR would be completed, particularly around testing of plant with mechanical governors.

6. Headroom

The AEMO rule change does not mandate any requirement to maintain headroom or stored energy to provide PFR. This indicates that any actual delivery of PFR relies on the sheer chance that there is stored energy available across generating units. It is unclear how this provides any confidence to AEMO around improving PFR. AEMO has indicated that they will rely on the existing contingency markets to provide headroom which means those enabled for FCAS are likely to bearing the brunt of any PFR requirement creating further FCAS market distortions.

AEMO should only have true confidence in PFR if it can rely on stored energy (or headroom) which naturally lends itself, ideally, to any response being co-optimised with the current energy market.

7. Treatment of emerging technologies

EnergyAustralia asks for clarity around the treatment of emerging technologies such as grid scale batteries if AEMO's proposed changes were to be made. Current regulatory arrangements require a battery to register as both a scheduled generator and scheduled load¹⁹ but as drafted the mandatory PFR would capture the scheduled generator component of the battery only.

8. Changes to incentives and causer pays

¹⁶ <https://www.aemc.gov.au/sites/default/files/2019-10/AEMO%20-%20Primary%20frequency%20response%20requirements%20V1.1%20-%20markup.PDF>

¹⁷ Page 9, <https://www.aemc.gov.au/sites/default/files/2019-10/AEMO%20-%20Primary%20frequency%20response%20requirements%20V1.1%20-%20markup.PDF>

¹⁸ In their revised PFRR document published on AEMC consultation page.

¹⁹ We note that AEMO has recently lodged a rule around integration energy storage systems in the NEM. <https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem>

EnergyAustralia supports the change outlined in the AEMO rule change (ERC0263) which clarifies²⁰ that generators will not be seen as non-conforming with dispatch instructions if they are operating in frequency response mode.

We do not support the additional changes as proposed in the AEMO rule change (ERC0263) which exempts generators for the entirety of the causer pays calculation if they operate their plant in a frequency response mode in accordance with the settings in the causer pays procedures. The current causer pays framework already excludes a generator (both scheduled and semi scheduled) from the causer pays calculation in a dispatch interval if its dispatch is helping to restore power system frequency. This already provides an incentive for generators to support PFR and this has become increasingly important as more intermittent generation has entered the NEM. The proposed change by AEMO appears to incentivise an action which in fact AEMO is keen to mandate in their other rule (ERC0277), an apparent redundant requirement. It also does not differentiate between the quality of PFR that would be required across different technologies which further undervalues better delivery of PFR which should increase system security. For example, it would treat an intermittent generator which may only be able to respond in one direction the same as a battery which is able to provide a precise response in both directions. These changes would effectively severely blunt the signal that the causer pays procedure creates, contrary to good long-term outcomes for the NEM.

The rule change also appears to reward (or at the very least excuse) a generator from any exposure to causer pays if they were to trip or unable to follow their targets. This does not appear to be logical as they would in fact caused a deviation from their reference dispatch trajectory assigning the causer pays costs to other not at fault generators.

9. Other short-term solutions

If a frequency trial is unable to be completed and the AEMC feels compelled to make immediate changes to the current provision of frequency control in the NEM, then EnergyAustralia urges that a mandatory requirement should not be seen as the only potential option.

AEMO has indicated that they likely only require PFR from around a third of generation capacity in the NEM to, this was also supported by findings in the Undrill report²¹. This again is an indication that mandating PFR across all generators is unneeded and inefficient and will likely increase costs in the NEM and therefore to consumers. The requirements that not all generator provide PFR lends itself to the potential to using existing competitive frameworks that exist in the NEM to procure NEMAS. AEMO could procure sufficient PFR from generators that would be obliged to deliver this service through contractual arrangements, similar to how other non-market services are procured such as System Restart Ancillary Services (SRAS).

If it is decided that a mandatory approach is required on all capable scheduled and semi-scheduled generators, then the AEMC should consider some regulated payment to cover

²⁰ AEMO proposes changes to NER clauses 4.9.4 and 4.9.8.

²¹ <https://www.aemc.gov.au/sites/default/files/2019-08/International%20Expert%20Advice%20-%20Notes%20on%20frequency%20control.pdf>

ongoing costs of providing the service. This rate could be set by the Australian Energy Regulator (AER) with a short further consultation with participants. This approach would be similar to other jurisdictions where PFR is mandated and compensation through a regulated payment approach²².

We suggest that if the AEMC decides to introduce a mandatory requirement that this should only be in place for an interim period until a long-term solution can be developed. Therefore, the rule should include a sunset clause so as to only exist for 2 years. This should provide sufficient time for a market solution to be developed by the AEMC, AEMO and industry and also ensures that it remains a priority.

²² Appendix E, https://www.aemc.gov.au/sites/default/files/2019-09/Primary%20frequency%20response%20rule%20changes%20-%20Consultation%20paper%20-%20FOR%20PUBLI..._0.pdf