

12 February 2020

Mr Ben Hiron
Australian Energy Market Commission
Submitted online
AEMC Ref: ERC0274

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Dear Mr Hiron

National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020

AEMO welcomes the Draft Determination to require scheduled and semi-scheduled generating units in the NEM to provide primary frequency response outside a narrow deadband, including the:

- recognition that primary frequency response capability of existing generation in the NEM is required to stabilise frequency within the normal operating frequency band and to assist in maintaining power system security under non-credible contingency events;
- ability to set different deadbands, as appropriate, for each scheduled and semi-scheduled generating system;
- flexibility to exempt or vary the requirements where the costs of compliance are excessive; and
- commitment to ongoing improvements in the frequency response arrangements, including the potential development of complementary incentives within a three-year period.

You will find attached AEMO's comments on the draft determination and rule.

Of note is discussion as to what the sunset date implies regarding a complementary longer-term market or incentive-based mechanism for primary frequency response.

AEMO understands that the AEMC will put forward, in the September 2020 Draft Determination of the Removal of Disincentives to Primary Frequency Response rule change proposal, an incentive that will work with, and not replace, the mandatory requirement.

Given there is much work to do to improve the frequency performance of the NEM, AEMO is encouraged by this first step and is committed to collaborating with the AEMC on the Frequency Work Plan.

AEMO welcomes the opportunity to discuss the matters raised in this submission further. Should you have any questions, please contact Kevin Ly, Group Manager Regulation on kevin.ly@aemo.com.au.

Yours sincerely



Peter Geers
Chief Strategy & Markets Officer

Attachments: AEMO Submission to Draft Rule Determination



AEMO Submission to Draft Rule Determination

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National Electricity Amendment (Mandatory
Primary Frequency Response) Rule 2020

Executive summary

AEMO welcomes the opportunity to respond to the Australian Energy Market Commission's (AEMC) Draft Rule Determination National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020 (Draft Determination). As the proponent of two of the rule change requests supporting the provision of primary frequency response (PFR), AEMO continues to advocate for a regulatory outcome that will increase the amount of PFR in the National Electricity Market (NEM) in the short and medium term by mandating its provision from all technically capable generating systems.

AEMO's submission addresses several issues arising out of the Draft Determination:

- The proposed rule largely achieves the objectives of AEMO's proposal, but some observations in the Draft Determination about the relationship of PFR and performance standards require clarification. They could otherwise potentially undermine implementation.
- While AEMO understands the rationale behind the requirement that PFR be only required when a generating system receives a dispatch instruction of more than 0MW, the drafting may have unintended consequences and AEMO suggests a preferable solution to a small problem that this part of the proposed rule was trying to address.
- Some of the principles that apply to the Primary Frequency Response Requirements (PFRR) are likely to give rise to difficulty in application. AEMO has made some suggestions for the AEMC's consideration to clarify and simplify these principles, facilitating their transparent implementation. AEMO has also taken the opportunity to comment on certain aspects of the PFRR in preparation for the upcoming consultation.
- Further consideration should be given to the interaction between implementation of the PFRR and clause 5.3.9 of the NER so as not to give rise to unnecessary processes where only minor changes to plant are required to meet the PFRR.
- The potential longer term solution and proposed sunset provision could create issues on the basis that the longer term solution is potentially more complex than suggested.

Finally, AEMO looks forward to working with the AEMC and industry on developing a longer term solution that rewards Generators appropriately and efficiently for the frequency services they provide.

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1. Overview

AEMO's welcomes the recognition by the Australian Energy Market Commission (**AEMC**) and many key stakeholders that there is a need for the immediate improvement in power system frequency performance. The AEMC's draft determination to make the Draft National Electricity Amendment (Mandatory primary frequency response) Rule 2020 (**Draft Determination**) requiring the provision of primary frequency response (**PFR**) is a significant positive step, even on an interim basis.

The challenges the AEMC and industry face in determining an efficient market-based solution to power system frequency performance in the longer term should not be underestimated. AEMO's submission touches on some of the issues raised by the AEMC about the longer term solution, but the focus of this submission is on the Draft Determination and its implementation.

2. Interaction with Performance Standards

2.1 Draft Determination

AEMO's rule change proposal was predicated on the assumption that its proposed rule requiring the provision of PFR arising out of new obligations in Chapter 4 of the NER would override any potentially inconsistent registered performance standard (GPS), subject to genuine technical performance limitations that would be addressed in an exemption regime. Chapter 4 obligations centre on power system security, which is of paramount consideration and PFR is essential to maintain power system security and enhance resilience.

To remove any doubt, AEMO's submission to the AEMC's Consultation Paper¹ proposed to make clause S5.2.5.11(b)(2) and (c)(2) subject to the PFRR.

The draft rule did not include AEMO's proposal; instead, it proposes to include notes to clause S5.2.5.11(b)(2) and (c)(2) pointing out the obligations to provide PFR. AEMO has no objection to this proposal.

In its Draft Determination, however, the AEMC addresses the relationship between the performance standards and the PFRR in Appendix A in a way that causes concern:

The Commission notes AEMO's proposal in its rule change request that the generator performance standards under S5.2.5.11 in the NER be amended to remove any potential ambiguity with respect to the PFRR. AEMO proposed that compliance with the automatic and minimum access standards would be 'subject to the primary frequency response requirements. The Commission has considered AEMO's proposal and has determined not to include this proposed change as part of the draft rule.

The Commission considers that the minimum and automatic generator access standards set out under clause S5.2.5.11 of the NER should take priority over any potential obligations set out in the PFRR. Any changes to the capability requirements for new connecting generation should be undertaken through the rule change process. By including AEMO's proposed wording as part of S5.2.5.11, the access standards would in effect be subordinate to any future changes to the PFRR.

The Commission considers that the conditions set out in the PFRR should be specified so as not to conflict with the generators access standards as set out in the NER. Indeed, the Commission acknowledges AEMO's statement in its submission on the consultation paper that the capabilities required under the draft PFRR are

¹ AEMC, Primary frequency response rule changes, Consultation paper, 19 September 2019.

not more onerous than the access standards on clause S5.2.5.11, or in other existing minimum access standards in clause S5.2.5.

In addition, given that the draft rule places a primary frequency response requirement on all scheduled and semi-scheduled generation, which would meet AEMO's system security needs, then any changes to the generator performance standards are unnecessary and duplicative.²

The mixed references to access standards and GPS in this section of Appendix A have the potential to undermine the proposed rule because they could be relied on to interpret it in a way that subordinates the PFRR to a Generator's GPS.

2.2 AEMO's concerns

AEMO's primary concern is that, while the access standards in the current version of the NER are consistent with the PFRR, the GPS that apply to the majority of generating systems are based on pre-2018 versions of Schedule 5.2. These did not require generating systems to have frequency response capability other than outside the normal operating frequency band (NOFB). This is notwithstanding the fact that almost all large generating systems at the start of the NEM had primary frequency response capability and were also assigned to regulating duty under clause 4.4.2 of the NER and its predecessor provisions under the National Electricity Code.

It is important to be clear that, even if there is no conflict between the PFRR and the current version of the access standards in the NER, any inconsistency between the PFRR and a generating system's GPS does not relieve a Generator of its obligation to provide PFRR.

The second paragraph of the extract is problematic as it states that the access standards in clause S5.2.5.11 of the NER 'should take priority over any potential obligations' in the PFRR. This is inconsistent with the draft rule as understood by AEMO, where the notes within the access standards point to the PFR obligations in Chapter 4 to acknowledge the coexistence of both sets of obligations relating to aspects of frequency control. Both must be complied with, and any exceptions or variations of the PFRR relating to the physical capability of the plant are addressed in Chapter 4.

The access standards framework is designed to assist AEMO in its management of power system security. Clause 5.3.4A(b)(2) in particular, emphasises the principle that negotiated access standards are subordinate to power system security, which is the paramount consideration when third parties seek access to the network.

2.3 Preferable outcome

AEMO requests the AEMC to clarify in its final determination that compliance with the PFRR is required, subject only to the exemption and variation process in the PFRR. Specifically, a GPS relating to frequency response capability of a generating system does not override this obligation.

To be clear, AEMO does not seek any change to the proposed rule to address this issue, simply clarification that, while the access standards in clause S5.2.5.11 do not conflict with the PFRR, the PFRR obligations of Scheduled and Semi-Scheduled Generators are not subordinated to any potentially inconsistent GPS.

² Pages 79-80, AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019.

3. Application of PFRR when not dispatched

3.1 Draft Determination

Draft clause 4.4.2(c1) indicates that Scheduled Generators and Semi-Scheduled Generators are only required to operate their generating systems in accordance with the Primary Frequency Response Requirements (PFRR) if they have received a dispatch instruction of more than zero MW.

3.2 AEMO's concerns

Conceptually, a requirement that generating systems need only operate in accordance with the PFRR if they have received a dispatch instruction of more than zero MW implies that Generators can change their control system settings or disable frequency response mode when not dispatched for energy. This would inherently conflict with other NER requirements (clauses 4.9.4(e) and S5.2.2) for Generators to seek Network Service Provider (NSP) and AEMO's approval prior to any changes.

AEMO understands that the AEMC included the dispatch qualification to address a concern that some technologies (currently only battery systems) may otherwise be required to respond to changes in frequency when they are neither producing nor consuming energy. By seeking to address this issue in a generic manner, however, the draft rule inadvertently implies a right or even a requirement for all generating systems to change or disable PFR settings whenever they are offline or otherwise not generating energy. Clearly it is neither necessary nor desirable for PFR modes of operation to be changed without oversight.

3.3 Preferable outcome

The attempt to address an issue that affects only one very small proportion of Generators has given rise to an undesirable conflict with other NER requirements and could give rise to unforeseen operational issues if Generators saw the need to switch their generating systems' frequency response mode off when not generating. AEMO considers that a derogation of sorts covering battery system owner/operators would be preferable.

4. Primary Frequency Response Requirements

4.1 Overview

This section provides feedback on some aspects of the draft rule relating to the principles and content for the PFRR. It also provides AEMO's initial responses to several stakeholder views on the proposed content of the PFRR itself. Although not part of the AEMC's draft rule, and properly matters for consultation by AEMO on the PFRR, they are discussed in some detail in the Draft Determination. On that basis it seems useful for AEMO to set out its key considerations in this submission.

4.2 Exemptions and variations

4.2.1 Draft Determination

AEMO had proposed that all performance and exemption requirements applicable to PFR be in the proposed Primary Frequency Response Requirements (PFRR).

The draft rule embeds certain variables in the NER and is more prescriptive around the exemption and variation process and principles. While we understand that this is intended to address stakeholder concerns about any arbitrariness in AEMO's implementation, it also requires a high degree of certainty for successful implementation. AEMO highlights a couple of concerns arising from these provisions.

4.2.2 AEMO's concerns

The AEMC has included proposed principles that AEMO must adhere to when considering applications for exemption or variation from the PFRR. While the provision of guidance to AEMO is welcomed, there are some issues with these proposed principles:

Costs of augmentation relative to turnover

Proposed clause 4.4.2B(a)(2) requires AEMO to have regard to:

the costs that are likely to be incurred in augmenting the generating system to be able to operate in frequency response mode relative to the turnover derived from, and the operating hours of, the generating system in relation to its operation in the national electricity market

AEMO is concerned that this provision will be difficult to interpret and apply.

1. 'Augmentation' in its italicised form is a NER-defined term involving an increase in size or capacity, which reflects its natural meaning. 'Modifying' a generating system's control systems would better describe the requirements here.
2. AEMO is required to compare costs vs turnover. Turnover, by definition, includes revenue from all sources, including secondary markets or over-the-counter financial instruments, provided they cover the hours of operation by the relevant generating system in the national electricity market (NEM).

AEMO considers it appropriate and necessary to restrict any consideration of Generator revenue to their revenue from the markets administered by AEMO, which are inherently capable of verification. These markets should be restricted to the energy market and ancillary services markets and should be based on past performance.

3. If the sources of revenue are specified as suggested, it will not be necessary to refer to the 'operating hours' of a generating system. The purpose of this reference as it stands is unclear. Hours of operation of a generating system can vary significantly from year to year for many reasons, including commercial decisions, and may not necessarily have a direct relationship with revenue earned in the AEMO markets.

In summary, draft clause 4.4.2B(a)(2) is likely to result in misinterpretation and dispute. The exemption and variation criteria must be very clear and practical to determine and apply.

Confidentiality

There are two principles in clause 4.4.2B(a) that are likely to require Generators to provide AEMO with sensitive commercial information:

1. Clause 4.4.2B(a)(2) requires the provision of information related to the costs of augmentation (or modification, if the AEMC accepts AEMO's suggestion) and turnover, or revenue (assuming this may involve more than historical revenue from AEMO-operated markets).
2. Clause 4.4.2B(a)(4) requires the provision of information related to the ongoing costs of operating a generating system in frequency response mode.

Generators might be subject to other restrictions on the operation of their generating systems that might arise from their commercial arrangements with others, such as retailers or NSPs. AEMO should be able to verify such claims by reviewing source documents, such as power purchase agreements, or connection agreements.

To alleviate any concerns of Generators over the provision of commercially sensitive information to AEMO, the NER should declare that commercially sensitive information provided to AEMO for the purposes of seeking an exemption or variation on commercial grounds is confidential information as defined in the NER.

No other principles

Clause 4.4.2B appears to prescribe an exhaustive list of factors to be considered by AEMO.

4.2.3 Preferable outcome

AEMO requests the AEMC to consider amendments to the draft rule that:

1. Provide more clarity of both the nature of costs and 'turnover' to be captured by clause 4.4.2B(a)(2), to minimise implementation delays and potential disputes.
2. Specify that commercially sensitive information provided to AEMO for the purposes of seeking an exemption or variation is *confidential information*.
3. Leave room for consideration of other matters as the need arises.

4.3 Timing of Generator Self-Assessments

4.3.1 Generator concerns

Several Generators expressed concern that the proposed timing of the self-assessments required of them by AEMO, at 60 business days for those impacted by the first tranche, was too short³.

4.3.2 AEMO's response

Generators are required to provide details of three operational parameters per generating system:

1. Deadband
2. Droop
3. Response time

AEMO considers that the information required of Generators is not burdensome. It is only if Generators apply for an exemption or variation that they will need to provide supporting documentation which, in most cases, should be accessible through their own records, without resort to original equipment manufacturers or other third parties.

Where changes are needed to plant to ensure that it can meet the PFRR, AEMO's expectations are that those changes should be to software or to secondary systems. AEMO does not expect Generators to change material components of primary plant to meet the PFRR. If this were required, an exemption or variation would be granted.

A period of 60 business days (or around three months) is reasonable to provide responses based around three key variables.

AEMO will be consulting with affected Generators prior to commencing the formal consultation required by proposed clause 11.[XXX].2 and hopes to have addressed any outlier issues during those initial discussions.

Unless compelling reasons to change it are identified, AEMO remains of the opinion that 60 business days is an appropriate period for Generator self-assessments.

³ See, for example, page 89, AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019.

4.4 Tranches

4.4.1 Draft Determination

In the version of the PFRR published with AEMO's submission to the AEMC's Consultation Paper, AEMO proposed to roll out the mandatory PFR requirement in two tranches. Submissions were made to the AEMC for alternatives.⁴

4.4.2 AEMO's response

After further investigation and consideration of the generating systems likely to be in each tranche, the potential issues that may be raised and the likely due diligence requirements, AEMO proposes to stage PFRR implementation in three tranches, splitting the original second tranche into two with 80MW capacity being the lower limit of tranche two. This change ought to alleviate the workload for all parties involved, while still achieving substantial improvements in PFR relatively quickly.

AEMO will outline and discuss further details for the staged provision of PFR by different groups of Generators during consultation.

5. Interaction with clause 5.3.9

5.1 Draft Determination

The Draft Determination does not address whether any changes to generating plant to meet the PFRR will give rise to a requirement to comply with clause 5.3.9 of the NER.

5.2 AEMO's concerns

After having reviewed a substantial number of GPS applicable to the generating systems that will be affected by the proposed rule, AEMO considers that there is a need to expressly confirm that clause 5.3.9 of the NER does not apply to Generators where the only changes made to plant to meet the PFRR are, for example:

- Distributed control systems (DCS) load controllers.
- Deadbands and droop settings in governor control software.
- Governor gains (Kp and Ki) and deadband software.

AEMO does not consider these types of changes warrant compliance with the clause 5.3.9 process.

5.3 Preferable outcome

AEMO considers that the proposed rule should include a provision that suspends the application of clause 5.3.9(d) to the changes approved by AEMO for the purposes of Generators meeting the PFRR.

⁴ See for example Infigen's suggestion, discussed at pages 90-91, AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019.

6. Sunset

6.1 Draft Determination

The AEMC proposes a three-year period during which it hopes to have identified a longer term solution, made a rule to implement this solution, and given AEMO sufficient time to implement it. As proposed in the draft rule, regardless of whether a longer term solution has been implemented, the mandatory PFR rule will expire on 4 June 2023.

6.2 AEMO concerns

It is not clear what is contemplated by a longer term solution. At some points in the Draft Determination, the impression is given that the longer term solution could be anything across a wide spectrum of incentive or market solutions, while other statements indicate that the AEMC could make a rule on the Removal of Disincentives to Primary Frequency Response proposal that will serve as an interim incentive scheme until a wider review can be carried out and a further, holistic solution to frequency control in the NEM is formulated.

AEMO's comments in this submission assume that the AEMC will propose a permanent solution in its draft determination on the Removal of Disincentives to Primary Frequency Response Rule.

AEMO submits that three years might not be a realistic period in which to carry out all activities required to implement a longer term solution. For comparison, implementation of the Five Minute Settlement Rule⁵ requires significant changes to market systems and governance arrangements. The rule change request was made on 4 December 2015 and the final rule on 28 November 2017, with the implementation of the rule postponed until 1 July 2021. Historically, even when market conditions, network interactions, competing demands, IT considerations and commercial interests were arguably more straightforward and less diverse, few significant market reforms have been completed in shorter periods. The conception, design, consultation and implementation of major new market developments like the initial FCAS market mechanism and the causer pays reforms required three years or more to complete.

AEMO acknowledges that a longer term solution to a PFR requirement is unlikely to be as complex and multi-faceted as the Five Minute Settlement Rule, but there is a real potential that more than 3 years will be needed for implementation. There is presently considerable uncertainty of the type of solution that is likely to be favoured, and this compounds the difficulty of scoping any implementation plan or cost. The more unique the longer term solution, the higher the likelihood that more time will be required for a successful implementation.

At a minimum, any market or incentive-based scheme for PFR is likely to require:

- Developing new market/incentive procedures (internal and external). Depending on the type of market/incentive scheme, there could be flow-on implications for other procedures, which can add to the scope of work.
- Developing a new process to measure PFR and relevant procedures. AEMO has advised the AEMC through its working group on PFR that the wholesale adoption of foreign processes is unlikely to be successful due to the many differences in systems, rules and procedures, not to mention the differences in technology, state of power system models and availability of high-speed monitoring. There are many possible approaches and refining these to a preferable approach and developing it will take time and consultation.
- New external procedures will probably be subject to consultation, which (given their significance) will require a minimum of 6 months (assuming initial concepts and alternatives for consultation can be

⁵ AEMC, Five Minute Settlement, final determination, 28 November 2017, Sydney.

prepared while the rule change process is in its final stages), unless there is scope for interim procedures without consultation or limited consultation.

- System changes will be required to market, energy management and settlement systems, which will need to be scoped, built and tested. All significant new IT projects in AEMO are taking a minimum of 12 months from scoping to implementation. If new measurement systems are required, this would also be a major piece of work, especially if many parties are affected (e.g. within and outside of AEMO). The significant potential for interactions with other major changes, such as five-minute settlement, needs to be considered.
- If testing of new systems needs to encompass development and testing of interface systems by Generators and other industry participants, this is likely to add significant time to implementation.
- Buffers are always needed to cater for the resolution of unforeseen issues arising from the building and testing of new systems leading to implementation delays.

The Draft Determination indicated September 2020 as the AEMC's preliminary timing to publish a draft determination on the Removal of Disincentives to Primary Frequency Response Rule, to include consideration of approaches to incentivise and reward the provision of frequency control services.⁶

Such an ambitious deadline is capable of achievement only if the solution that is developed is at the incentive end of the spectrum of solutions, rather than the market end.

AEMO considers that work on the development of a feasible, incentive-based approach to mandatory PFR should proceed as diligently as possible.

The more complex the incentive scheme, the more it will be impacted by the hypothetical timeframes indicated above, and a period of 4 years from September 2020 might appear more reasonable and realistic.

6.3 Preferable outcome

It is important that the NEM does not suffer an interval where there will be no requirement for the provision of PFR because the proposed rule expires before the implementation of an incentive scheme. It would be inefficient for AEMO to have to submit a further rule change proposal seeking an extension.

This risk can be mitigated by either:

- A. prescribing an end date that is later, preferably by two years; or
- B. making the sunset provision contingent on implementation of the solution chosen and made into a rule in response to the Removal of Disincentives to Primary Frequency Response rule change proposal.

AEMO's clear preference is (B). As per section 7.1, AEMO endorses the complementary nature of an incentive scheme that could act alongside a near-universal provision of PFR. Hence, consideration should be given to not requiring a sunset date for MPFR and instead replaced with consideration of whether the MPFR complements an incentive scheme.

7. Longer Term Solution

7.1 Draft Determination

AEMO welcomes the AEMC's Draft Determination to support the concept of a mandatory provision of PFR to support power system security and resilience while a longer term solution is worked on.

⁶ Page 42, AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019.

The Draft Determination suggests that any longer term solution will complement the mandatory provision of PFR:

While a mandatory approach may be necessary in the interim in order to meet immediate system security needs, it would be preferable for this approach to be complemented in the longer-term by incentives and rewards for providing frequency response.⁷

7.2 AEMO's comments

While it is not entirely clear from the Draft Determination, AEMO understands that the AEMC is proposing to work with AEMO and industry to develop a potential interim incentive scheme for the provision of PFR and will then focus on a more holistic review of frequency control. AEMO endorses the complementary nature of an incentive scheme that could act alongside a near-universal provision of PFR.

AEMO welcomes the opportunity to work with the AEMC and industry on this very important aspect of improving power system security and resilience.

⁷ Page 22, AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019.