

ELECTRICITY RULE CHANGE PROPOSAL

MONITORING AND REPORTING OF FREQUENCY AND
FREQUENCY CONTROL PERFORMANCE

May 2019





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1. SUMMARY

This document sets out Australian Energy Market Operator (AEMO)'s request to the Australian Energy Market Commission (AEMC) to establish in the NER obligations for AEMO to report routinely on frequency performance and frequency control performance in the NEM.

This Rule change request follows the AEMC's July 2017 Final Report under the Frequency Control Frameworks Review (FCFR). The AEMC's key recommendations were designed to address concerns about degrading frequency performance in the NEM and to consider how frequency control services offered by new technologies could be integrated into the current regulatory and market arrangements.

The purpose of this Rule change proposal is to address Recommendation 2 of the AEMC's Final Report for the FCFR. Specifically, this recommendation seeks to establish ongoing reporting requirements on AEMO in relation to frequency performance and frequency control performance.

AEMO considers that reporting on frequency and frequency control performance aligns well with our existing responsibilities to publish performance reports relating to the operation of the NEM, particularly in the areas of security and reliability. An up-to-date standardised reporting framework will improve transparency and ensure participants are more regularly informed about current issues affecting power system security. This will also help participants to make considered investment and operational decisions where frequency control implications exist.

This Rule change request only covers reporting obligations related to frequency and frequency control performance. It does not include FCAS market performance. AEMO notes that reporting obligations on FCAS market performance to be conducted by the AER is the subject of Recommendation 3 of the FCFR.

AEMO considers that this rule change proposal would satisfy the non-controversial test. The National Electricity Law defines a non-controversial Rule as a Rule that is unlikely to have a significant effect on the national electricity market (NEM). This Rule change proposal would improve market transparency and would have no detrimental effects on the market. While the proposed Rule would place further obligations on AEMO, the incremental burden on resourcing would be very small. Stakeholders have showed strong support for such requirements on AEMO, as evidenced by submissions to the FCFR and through feedback supplied to AEMO through its consultative forums.

2. STATEMENT OF ISSUE

The behaviour of system frequency in the NEM is of increasing concern, as has been reported in various reviews and analysis such as DigSILENT's *Review of Frequency Control Performance* in the NEM under Normal Operating Conditions, AEMC's *Frequency Control Frameworks Review*, and AEMO's *Final Report – Queensland and South Australia system separation on 25 August 2018*¹. Figure 1 shows the distribution of power system frequency in the mainland NEM since 2007. In particular, a significant flattening can be seen over time, especially in the last four years, indicating that the power system is no longer being held near the nominal 50 Hz.

While Tasmanian frequency performance is not shown in this figure, it typically follows the behaviour of the mainland. Satisfactory control of frequency is a fundamental requirement of the power system, as poor system frequency behaviour leads to a range of control issues and system security issues, including

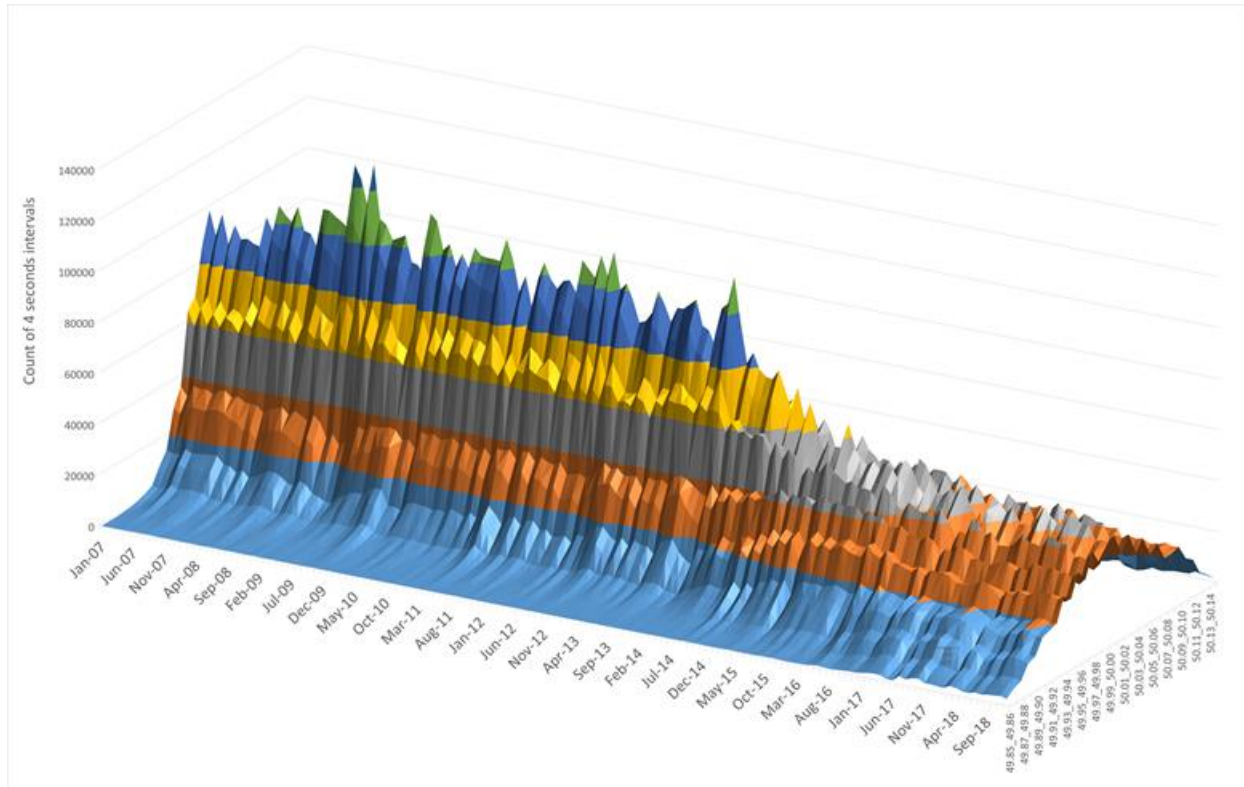
¹ DigSILENT report for AEMO: (https://www.aemo.com.au/-/media/Files/Stakeholder_Consultation/Working_Groups/Other_Meetings/ASTAG/371100-ETR1-Version-30-20170919-AEMO-Review-of-Frequency-Control.pdf)

AEMC's Frequency Control Frameworks Review (<https://www.aemc.gov.au/sites/default/files/2018-07/Final%20report.pdf>)

AEMO's Final Report – Queensland and South Australia system separation on 25 August 2018: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Market_Notices_and_Events/Power_System_Incident_Reports/2018/QLD--SA-Separation-25-August-2018-Incident-Report.pdf

tripping of generation and load, power system oscillation, and in the worst cases, partial or total loss of the system.

Figure 1 Mainland frequency distribution January 2007 to Dec 2018



As part of a broad range of initiatives to address unsatisfactory frequency performance, AEMO and the AEMC recognise the importance of information transparency and timeliness. Currently, there are no obligations in the NER for AEMO to report on frequency performance. To this end, Recommendation 2 of the FCFR suggested that frequency reporting obligations be codified in the NER so that:

- AEMO has certainty about expected content and timeframes to assist in planning and resourcing;
- All parties involved and interested in the energy market are more regularly informed about issues that affect power system security;
- Participants have access to information that helps them make investment and operational decisions that impact frequency control, and;
- The market can understand the need for and impact of any changes made to address frequency control concerns.

2.1 Current Rules

While the current NER (as of version 117) place many reporting obligations on AEMO, including obligations related to FCAS, these obligations relate to the forecast and actual quantities and costs of FCAS. There are no specific requirements on AEMO to report on frequency performance or frequency control performance as a regular activity (obligations do exist for reviewable operating incidents). AEMO does note that the proposed Rule will overlap with these existing FCAS reporting obligations, and therefore AEMO proposes these are amended to avoid duplication or ambiguity. Specifically, AEMO proposes that 3.13.4A (b1) and 3.13.5(a) are removed. This is set out in section 7 which includes the wording of AEMO’s proposed Rule.



3. HOW THE PROPOSAL WILL ADDRESS THE ISSUES

In line with Recommendation 2 of the AEMC's FCFR, AEMO is proposing a Rule setting out specific obligations on AEMO relating to reporting on frequency and frequency control performance. AEMO believes the Rule change proposal contemplated here is consistent with the intention of the suggested wording drafted by the AEMC in the FCFR Final Report. Notable differences include matters of timing and some of the proposed reporting metrics. These changes have been proposed in the interest of clarity and practicality. Discussion regarding this is included in Section 4.

3.1 Stakeholder engagement

AEMO and the AEMC have been conducting extensive industry consultation on the matter of frequency reporting through the FCFR, AS-TAG, FCWG and other consultations. This input was considered throughout the FCFR and subsequently in AEMO forming this Rule change request.



4. PROPOSED RULE

4.1 Description of the proposed Rule

AEMO's proposed draft Rule may be found in full in Section 7, along with AEMO's proposed changes to existing Rules in order to eliminate overlap and redundancy. AEMO believes the proposed Rule is consistent with the intention of that drafted by the AEMC in its FCFR Final Report. Changes relate to timing, and some of the proposed metrics. These are discussed in more detail below.

Timing of reporting

AEMO has proposed that the quarterly summary reports be published within 30 days of the end of the reporting period, rather than two weeks. This is guided by AEMO's assessment of the effort required to produce these reports. AEMO believes this timing will still provide the required and appropriate level of information on frequency performance for stakeholders, especially when combined with the ongoing weekly summaries.

Proposed reporting metrics

AEMO has carefully considered the practicalities and objectives of the frequency reports and has proposed metrics which we believe are appropriate and reasonable. AEMO has drawn on its expertise on the subject matter and on the information and systems available in order to develop these metrics. Input from stakeholders through formal processes, including stakeholder engagement forums has also been taken into consideration. The reporting metrics differ from the AEMC's proposal in some respects as follows:

- Weekly reports
 - For practicality, AEMO proposes measures indicating whether 'key measures' in the Frequency Operating Standard (FOS) were met, rather than a complete test indicating compliance/non-compliance with the FOS. The numerous conditions of the FOS make it infeasible to automate a reliable compliance test. The measures proposed are the proportion of time spent inside the Normal Operating Frequency Band (NOFB), recovery times where frequency has left the NOFB, and the time error performance.
 - For regulation service quantities and utilisation, statistics are best reported for the mainland and for Tasmania, rather than by region, as the services are not generally procured or used regionally, except in rare circumstances.
- Quarterly reports
 - AEMO proposes to remove reporting on 'effectiveness' of the market ancillary services as proposed in the FCFR Final Report. AEMO acknowledges that the AEMC's intent was aimed at indicating how well the ancillary services are performing, however 'effectiveness' is not something that can be objectively measured. We believe this is better considered qualitatively in the discussion included in quarterly reports, so that all aspects can be considered in their proper context.
 - AEMO proposes to make the rate of change of frequency (RoCoF) reporting criteria more objective, as outlined below in Section 7, and linking this to the largest frequency event in the reporting period.
 - AEMO proposes to change how reviewable operating incidents may be referred to in the quarterly report. This is in light of the significant amount of time it can take to investigate when such incidents occur. Reporting on such events under the restrictions of the quarterly frequency reporting timetable could be impractical and potentially counter-productive. Therefore, AEMO has



proposed that reviewable incidents that occurred during the reporting period are listed in the quarterly report.

4.2 Transitional matters

AEMO does not believe any transitional provisions are required for this rule as there are no dependent processes. The key consideration for timing is to ensure the Rule commencement date allows AEMO sufficient time to implement the necessary systems and process changes to provide the new reporting features. AEMO suggests that at least a 6-month period should be allowed following finalisation of the Rule before the legal obligation takes effect. AEMO would aim to commence the reporting prior to the obligation taking effect in any case, subject to systems and procedures being ready.



5. HOW THE PROPOSED RULE CONTRIBUTES TO THE NATIONAL ELECTRICITY OBJECTIVE (NEO)

The NEO states:

“The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to

- (a) price, quality, safety, reliability and security of supply of electricity
- (b) the reliability, safety and security of the national electricity system.”

In AEMO’s view, the introduction of frequency performance reporting obligations on AEMO is directly compatible with the NEO. In particular, the proposed Rule will improve transparency and the provision of information to the market in a manner desired by stakeholders.

Given this proposed Rule affects AEMO only and makes no changes to the operation of the NEM or the power system in any way, there will be no adverse impacts on competition, price or risk.

In line with the efficiency objectives of the NEO, along with the new Rule, AEMO has proposed the removal of existing obligations that would become redundant when the new Rule comes into effect. This is summarised in Section 7.

6. EXPECTED BENEFITS AND COSTS OF THE PROPOSED RULE

AEMO considers that the benefits of providing the information required by this Rule change proposal outweigh the likely costs involved. AEMO expects costs to be small, but not negligible. In particular, AEMO will need to undertake further development of some supporting analytical systems. These are one-off costs, estimated at around \$100-200k. Once established, the frequency reporting would be rolled into BAU processes. These costs are not solely related to this reporting obligation; implementing such a system/process is also expected to deliver efficiency benefits for existing processes, such as AEMO’s current voluntary frequency reporting.

AEMO considers that there are two key benefits to formalising reporting requirements in the NER in relation to frequency reporting:

- To ensure all stakeholders have current, standardised access to relevant data that is readily available on an ongoing basis. The new reporting will align well with existing reporting on FCAS, which covers quantities and costs. The new information will give stakeholders the ability to collect, store and trend information that will assist in making investment and operational decisions.
- To provide certainty to stakeholders regarding the ongoing availability of this reporting.

AEMO notes that the benefits and costs discussed here assume that the proposed Rule is adopted as written in Section 7. Alternative requirements could potentially affect costs significantly, particularly if new systems or processes were to be needed in order to meet the Rule requirements.



7. DRAFT RULE

This draft is based on version 117 of the National Electricity Rules.

4.8.16 Reporting by AEMO on frequency performance

(a) Each week, *AEMO* must prepare and *publish* on its website a report on the following outcomes for the previous week:

(1) an indicative comparison of *power system frequency* performance against the following measures specified in the *frequency operating standard*:

- (i) the proportion of time spent inside the *normal operating frequency band*;
- (ii) the recovery times where frequency has left the *normal operating frequency band*; and
- (iii) the *time error* requirements;

(2) the *regulation services dispatched* by *AEMO* per *region*; and

(3) measures indicating the average utilisation of the *regulation services dispatched*.

(b) Within 30 days of the end of each three-month period of each type of *market ancillary service dispatched* by *AEMO*;

(1) as applicable, the impact of any actions taken by *AEMO* to improve *power system frequency* control outcomes;

(2) *AEMO's* assessment of achievement of the *frequency operating standard*, including (if applicable) analysis of how and why the *frequency operating standard* was not met;

(3) the rate of change of *power system frequency* associated with the largest *frequency* deviation in each month;

(4) AGC estimates of the additional electrical power (in MW) required to be produced or consumed to correct a given *power system frequency* deviation (commonly referred to as 'area control error' or 'ACE'); and

(5) a list of any *reviewable operating incidents* that affected *power system frequency*.

(c) Where necessary, *AEMO* may present information in the reports referred to in paragraphs (a) and (b) separately for the Tasmania *region* and aggregated for the remaining *regions*.

Removal of conflicting or overlapping reporting requirements

3.13.4A Market ancillary services

(a) *AEMO* must each *day*, in accordance with the *timetable*, *publish* a forecast of the requirements for each type of *market ancillary service* for each *region* for each *trading interval* during the period described in clause 3.8.20(a).

(b) *AEMO* must *publish* information describing the key factors which determine the requirement for each type of *market ancillary service* and how they impact on forecast requirements.

~~(b1) *AEMO* must *publish* annually the actual quantities and types of *market ancillary services*. Deleted~~



(c) AEMO must *publish* information detailing any significant changes to the forecast requirement for any *market ancillary service* previously *published* under clause 3.13.4A(a), as soon as reasonably practicable after becoming aware of that information.

3.13.5 Ancillary services contracting by AEMO

(a) ~~AEMO must *publish* annually the costs of all of its operations associated with its acquisition of *market ancillary services* and *non-market ancillary services*.~~ Deleted [Note ancillary service quantities and prices are published daily as for energy. For NMCAS paragraphs (b) and (c) deal with NSCAS, while clause 3.11.10 covers SRAS.]

(b) AEMO must *publish* annually the quantities and types of NSCAS covered under existing *ancillary services agreements*.

(c) Information *published* under paragraph (b) must include a breakdown of the actual costs and quantities relating to each *facility* contracted under *ancillary services agreements*.