AEMC

RULE

Australian Energy Market Commission

CONSULTATION PAPER

NATIONAL ELECTRICITY AMENDMENT (MONITORING AND REPORTING ON FREQUENCY CONTROL FRAMEWORK) RULE 2019

PROPONENTS

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30 MAY 2019

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Reference: ERC0273

CITATION

AEMC, Monitoring and reporting on frequency control framework, Consultation paper, 30 May 2019

ABOUT THE AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

CONTENTS

1 INTRODUCTION

On 5 February 2019, the Australian Energy Regulator (AER) submitted the *Monitoring and reporting of FCAS market performance* rule change request to the Australian Energy Market Commission (AEMC or Commission) seeking to place reporting requirements on the AER in relation to frequency control ancillary services (FCAS) market outcomes.

On 8 May 2019, the Australian Energy Market Operator (AEMO) submitted the *Monitoring and reporting on frequency control framework* rule change request to the Commission seeking to establish ongoing reporting requirements on AEMO in relation to frequency performance and frequency control performance.

Both rule change requests are consistent with recommendations made by the Commission in its *Frequency control frameworks review* final report, published in July 2018.[1] Both rule changes seek to amend provisions of the National Electricity Rules (rules or NER) to improve information transparency around frequency control issues and existing frequency control markets. The proposed rules seek to make current reporting more consistent and predictable, given the importance of monitoring frequency performance.

Given that both rule change requests relate to frequency monitoring and reporting, the Commission has determined under s.93 of the National Electricity Law (NEL), that the rule change requests be dealt with together and treated as one request. Both rule changes will be progressed under the title and project code *Monitoring and reporting on frequency control framework* (ERC0273).

This consultation paper refers to the two rule change requests as one rule change request, and covers issues raised in both.

This consultation paper:

- provides a summary of, and background to, the rule change request
- identifies a number of questions and issues to facilitate consultation on this rule change request
- outlines the process for making submissions.

1.1 Background

1.1.1 AEMC's recommendations on frequency monitoring and reporting

The AEMC commenced the *Frequency control frameworks review* in July 2017. The purpose of the review was to explore and provide advice to the COAG Energy Council and market participants on changes to the market and regulatory frameworks that may be required to meet the challenges in maintaining effective frequency control arising from, and harness the opportunities presented by, the changing generating mix. An overview of the frequency control framework is in Appendix A.

1 For more information, see: https://www.aemc.gov.au/markets-reviews-advice/frequency-control-frameworks-review.

Based on stakeholder input and the AEMC's own analysis, in the final report published in July 2018, the AEMC concluded that there is a lack of transparency regarding:

- the general performance of FCAS markets
- the frequency performance of the power system under normal operating conditions.

The *Frequency control frameworks review* explored ways in which the existing frequency reporting arrangements could be adjusted to enhance the operation of the frequency control framework. The review was progressed in extensive consultation with stakeholders, including through the publication of an issues paper, progress update, draft and final reports; and through a Technical Working Group[2] and a Reference Group.[3]

The final report proposed a number of changes to the NER to promote transparency of the frequency performance of the power system and the competitiveness of FCAS markets. The AEMC recommended amending the NER to require:

- AEMO to publish:
  - weekly reports on frequency outcomes with respect to the frequency operating standard[4]
  - quarterly reports providing AEMO's analysis of key trends and specific events
- the AER to report quarterly on the performance of FCAS markets, specifically:
  - the total costs of FCAS
  - volumes (both enabled and utilised), prices, number of participants for each of the eight FCAS markets and the technology types of those participants
  - commentary on key trends
  - an assessment of whether the FCAS markets are effective.

Stakeholders have shown strong support for such reporting requirements (including for more frequent and detailed reporting), as evidenced by submissions to the AEMC's *Frequency control frameworks review*.

AEMO and the AER have submitted the rule change requests, which are the subject to this consultation paper, to action the AEMC's recommendations described above.

The *Frequency control frameworks review* final report also included some proposed drafting of the recommended rules to be submitted to the AEMC by AEMO and the AER. In the rule change requests submitted by AEMO and the AER, there were some differences in the proposed rules to what the AEMC had proposed in its final report. These differences are discussed further in this consultation paper.

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2 The AEMC established a Technical Working Group to provide technical advice to the AEMC and assist with the development of recommendations for the review. The group comprised representatives from the AER and AEMO, consumer groups, large energy users, conventional generators, renewable energy generators, retailers, energy service providers, and transmission and distribution network service providers.

3 A Reference Group comprising senior representatives of the AEMC, AEMO, the AER and the Senior Committee of Officials was established to provide high-level input and strategic advice to the AEMC throughout the course of the review.

4 The frequency operating standard defines the range of allowable frequencies for the electricity power system under different conditions, including normal operation and following contingencies. Generator, network and end-user equipment must be capable of operating within the range of frequencies defined by the frequency operating standard, while AEMO is responsible for maintaining the frequency within the ranges defined by the standard.

1.1.2 Current arrangements for frequency monitoring and reporting

Reporting on frequency performance of the power system

AEMO is required to report on frequency in relation to "reviewable operating incidents", which include events where the frequency of the power system is outside limits specified in the power system security standards.[5] The NER do not contain a requirement for AEMO to report regularly on power system frequency performance during normal operation.

Currently, AEMO produces frequency monitoring reports voluntarily on a periodic basis, with the most recent reports being published in December 2016 and August 2017.[6] These reports provide a summary of emerging trends in power system frequency performance in the NEM over a three-year period. Specifically, they include:

- monthly averages for the percentage of time that the power system frequency is within the normal operating frequency band over a 30-day period for the mainland NEM and Tasmania
- the number of exceedance events on a monthly basis for each of the bands in the frequency operating standard.

The AEMO website also contains an archive of frequency and time error monitoring reports.[7] This includes monthly reports from January 2011 through to June 2013, quarterly reports from the third quarter of 2013 through to the third quarter of 2014, reports for each quarter of 2017 (published in March 2018) and 2018. The most recent reports focus on:

- whether the one per cent requirement of the frequency operating standard was met[8]
- events that resulted in excursions outside the normal operating frequency band
- events where the requirements of the frequency operating standard were not met (e.g. load or generation events)
- whether the requirements of the frequency operating standard with respect to accumulated time error were met
- area control error[9]
- planned actions to improve frequency control performance.

Reporting on FCAS market performance

The existing FCAS market reporting requirements in the NER are primarily related to individual events. Specifically, the AER must report on incidences when FCAS prices at a

5 See clause 4.8.15(a)(iii) of the NER.

6 For more information, see: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Ancillary-services/Frequency-and-time-error-monitoring

7 Ibid.

8 A requirement of the frequency operating standard is that frequency must not exceed the normal operating frequency band for more than one per cent of the time over a 30-day period (excluding contingency events).

9 Automatic governor control (AGC) estimates of the additional electrical power required to be produced or consumed to correct a given power system frequency deviation.

regional reference node significantly exceed the spot price for energy and FCAS prices exceed $5,000/MWh for a number of trading intervals in that period.[10]

The AER has an obligation under the NEL to monitor and report on the performance of wholesale electricity markets.[11] In December 2018, the AER released its inaugural report where, among other things, it assessed competition in the FCAS market.[12] The NEL only requires public reporting on the results of the performance of the AER's wholesale market monitoring functions at least once every two years.[13] It does not require FCAS markets to be the focus of subsequent AER reviews.

The AER also produces *Electricity weekly reports*. As part of these reports, the AER publishes FCAS costs by service type. However, these reports are not published regularly as primarily they focus on significant price variations between forecast and actual prices (monitoring whether any such significant variation has occurred is the AER's obligation under the NER[14]). The most recent AER's *Electricity weekly report* was published in January 2019.[15]

The statistics section of the AER's website also contains weekly ancillary services costs data since January 2009.[16]

1.1.3 Related work

The AEMC's *Frequency control frameworks review* final report details the Frequency control work plan that sets out actions the Commission, AEMO and the AER will take to support the stable and secure operation of the power system in relation to frequency control. More transparent and regular reporting of frequency performance is part of this collaborative work plan. The work plan also includes new rules and operating techniques, in particular:

- AEMO-led trials and other actions to determine how frequency performance can be improved in the short term and to facilitate the integration of new business models like virtual power plants.
- Detailed consideration of ways to procure essential frequency services in the longer term in a way that recognises the capabilities of all potential technologies and service providers.
- New rules to enable new technologies and service providers to provide frequency control services.

An overview of the status of the Frequency control work plan could be found at the AEMC's website.[17]

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10 See clause 3.13.7 of the NER. For more information, see: https://www.aer.gov.au/wholesale-markets/market-performance?f%5B0%5D=field_accc_aer_report_type%3A310

11 The obligation was introduced in 2016 under Part 3, Division 1A of the NEL.

12 For more information, see: https://www.aer.gov.au/wholesale-markets/market-performance/aer-wholesale-electricity-market-performance-report-2018

13 See section 18C(2)(a) of the NEL.

14 Clause 3.13.7(a) of the NER.

15 For more information, see: https://www.aer.gov.au/taxonomy/term/324?page=2

16 For more information, see: https://www.aer.gov.au/wholesale-markets/wholesale-statistics/weekly-ancillary-services-costs

17 For more information, see: https://www.aemc.gov.au/our-work/our-forward-looking-work-program/system-security/frequency-control-work-plan

1.2 Issues raised in the rule change request

The issues raised by AEMO and the AER in the rule change request primarily relate to reporting obligations in relation to frequency performance and FCAS market outcomes.

1.2.1 Reporting on FCAS market outcomes by the AER

The AER proposes reporting requirements in relation to FCAS market outcomes.

In its rule change request, the AER notes FCAS market dynamics have changed recently due to the entry of new providers, and changes in the types of technologies providing FCAS. Further, significant trends in the market can now manifest over comparatively short periods.[18] According to the AER, it is important to analyse the markets looking across a range of timeframes in order to draw robust conclusions about market outcomes.[19] The AER is of the view that there is a gap between weekly FCAS costs data reporting, which current occurs, and longer term trends in effectiveness of competition reporting, which is not an existing requirement.[20]

1.2.2 Reporting on frequency performance of the power system by AEMO

AEMO proposes introducing reporting requirements in relation to frequency performance (of the system as a whole as against the frequency operating standard) and frequency control performance.

In its rule change request, AEMO notes the behaviour of system frequency in the NEM is of increasing concern, as has been reported in various reviews and analysis. It notes that a significant flattening of power system frequency 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.[21]

As part of a broad range of initiatives to address unsatisfactory frequency performance, AEMO recognises the importance of information transparency and timeliness. Currently, there are no obligations in the NER for AEMO to report on frequency performance.[22]

> QUESTION 1: ISSUES RAISED
>
> 1) What are stakeholders' views on the issues raised by AEMO and the AER?
>
> 2) Are there any other issues relevant to this rule change request that the AEMC should consider?

18 AER, *Request for change to the National Electricity Rules - monitoring and reporting of FCAS market performance,* February 2019, p. 7.

19 Ibid, p. 5.

20 Ibid.

21 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 2.

22 Ibid, p. 3.

1.3 Proposed solutions

AEMO and the AER propose the following amendments to the NER to address issues identified above.

1.3.1 Reporting on FCAS market outcomes

The AER proposes reporting requirements on it in relation to FCAS market outcomes, specifically to publish (on a quarterly basis) reporting on:[23]

- the total costs of FCAS
- volumes (both enabled and utilised), prices, number of participants for each of the eight FCAS markets and the technology types of those participants
- commentary on key trends.

The AER considers that reporting on FCAS market outcomes aligns well with its formal responsibility under the NEL to publish performance reports into the operation of the markets, retailer performance and the performance of the network businesses.[24] The AEMC agrees with the AER's view that proposed reporting requirements are aligned with the AER's obligation under the NEL[25] to monitor and report on the performance of wholesale electricity markets, which includes the FCAS markets.

The AER considers that one of the benefits of having a formal reporting requirement in the rules in relation to the FCAS markets would be to ensure that stakeholders and policy-makers have access to FCAS market data on an ongoing basis.[26] Specifically, stakeholders would have ongoing access to data about costs to meet frequency requirements, and, given that the AER would report on costs and prices on an ongoing basis, stakeholders would have access to trend information that may be useful in making investment and operational decisions. Access to FCAS cost and price information would also help inform appropriate policy.[27]

The benefits of providing the information required by this rule change proposal outweigh the costs involved, given that the AER already reports on most of the information required.[28]

1.3.2 Reporting on frequency performance of the power system

AEMO proposes a rule setting out specific obligations on it to report on frequency and frequency control performance. The obligations are for AEMO to publish weekly reports on:[29]

- frequency performance against the following measures specified in the frequency operating standard:
  - the proportion of time spent inside the normal operating frequency band

23 AER, *Request for change to the National Electricity Rules - monitoring and reporting of FCAS market performance,* February 2019, p. 4.

24 Ibid.

25 Part 3, Division 1A of the NEL.

26 Ibid, p. 7.

27 Ibid, p. 8.

28 Ibid, p. 7.

29 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 8.

  - the recovery times where frequency has left the normal operating frequency band
  - the time error requirements
- the regulating FCAS dispatched by AEMO per region
- measures indicating the average utilisation of the regulating FCAS dispatched.

AEMO also proposes an obligation for it to publish quarterly reports on:[30]

- the impact of any actions taken by AEMO to improve frequency control outcomes
- AEMO's assessment of achievement of the frequency operating standard
- the rate of change of system frequency associated with the largest frequency deviation in each month
- automatic governor control (AGC) estimates of the additional electrical power required to be produced or consumed to correct a given power system frequency deviation (commonly referred to as "area control error")
- a list of any reviewable operating incidents that affected power system frequency.

AEMO considers that there are two key benefits to formalising reporting requirements in the NER in relation to frequency reporting:[31]

- To ensure all stakeholders have current, standardised access to relevant data that is readily available on an ongoing basis. 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 considers that the benefits of the 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 $100,000 to $200,000.[32] AEMO states that these costs are not solely related to this reporting obligation; implementing such a system/process is also expected to deliver efficiency benefits for existing reporting processes.[33]

QUESTION 2: THE PROPOSED SOLUTIONS

1) What are stakeholders' views on the solutions proposed?

2) Do stakeholders envisage any costs or issues associated with the proposed solutions?

30 Ibid.
31 Ibid, p. 7.
32 Ibid, p. 7.
33 Ibid.

1.4 Specific issues for consultation

As noted above, the AEMC's *Frequency control frameworks review* final report included proposed drafting of the recommended rules, which are the subject of this consultation paper. How the rule change requests submitted by AEMO and the AER differ from the AEMC's recommended drafting, and issues that raise, are discussed further in this section.

1.4.1 Reporting on FCAS market outcomes

Timing of reporting

In its *Frequency control frameworks review* final report, the AEMC recommended the AER publish quarterly reports on the performance of FCAS markets no later than four weeks after the end of each three month period.[34] The Commission also noted that ideally this would occur as soon as possible after the relevant reporting period has ended, but would also depend on how quickly AEMO is able to provide the relevant data to the AER. Other reporting requirements have similar timeframes, for example the existing requirement for the AER to publish a report on significant variations between forecast and actual spot prices no later than four weeks after the end of each three month period.[35]

The AER's preferred option is not to impose any such time limit, but rather, to make the reports available as soon as practicable from the end of the relevant quarter.[36] The AER intends to publish a consolidated quarterly analysis not only for FCAS markets outcomes, but also for the electricity spot market and contract markets.[37] The AER also states that complex market outcomes can, on occasion, take some time to analyse. The removal of the time limit, according to the AER, would allow it to undertake fulsome analysis of complex and potentially interrelated market outcomes.[38]

The AEMC noted the following as relevant to determining timeframes:[39]

- whether all necessary data is available to the AER
- any costs to the AER of requiring the reports to be published very soon after the period
- the extent to which data collection and reporting could be automated
- any relevant additional information that the AER may wish to include in its report.

Assessment of effectiveness of competition

In its *Frequency control frameworks review* final report, the AEMC recommended the AER include in these quarterly reports the AER's assessment of whether the FCAS market is functioning efficiently and whether there is effective competition.[40]

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34 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 150.

35 Ibid, p. 149. See clause 3.13.7(b)(1) of the NER.

36 AER, *Request for change to the National Electricity Rules - monitoring and reporting of FCAS market performance,* February 2019, p. 6.

37 Ibid, p. 5.

38 Ibid.

39 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 149.

40 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 150.

The AER notes that under the NEL it is required to monitor the wholesale market and report on its performance at least every two years.[41] As part of this, the AER is required to identify and analyse whether there is 'effective competition' within the relevant wholesale market.[42] The AER have done this for the FCAS markets as part of its inaugural report into effective competition.[43] The AER argues, for completeness and to maintain consistency, it makes sense to continue to consider all relevant wholesale markets (including FCAS) as part of its ongoing review into the effectiveness of competition in those markets.[44]

Another option, as proposed by the AEMC in its *Frequency control frameworks review* final report, is for the AER to include its commentary on the effectiveness of the FCAS market competition in the proposed quarterly reports.[45] This was because the Commission was conscious that FCAS markets may not be the focus of subsequent AER's wholesale electricity market performance reports. Further, the NEL only requires public reporting on the AER's wholesale market monitoring functions every two years. The AEMC considers that these quarterly reports would reflect the wholesale monitoring function of the AER - the difference would be that the quarterly reports would be more regular, with more granular metrics prescribed.

The AEMC invites stakeholders comments on what are the more preferable arrangements to report on the FCAS market competition effectiveness. These include the options described above and other arrangements that stakeholders may consider appropriate, for example, the AER may aggregate the quarterly reports into its two-yearly wholesale market monitoring report.

QUESTION 3: AER'S QUARTERLY REPORTS ON FCAS MARKETS OUTCOMES

1) Timing of reporting

(a) Do stakeholders agree with the AER proposal to publish quarterly reports as soon as practicable after the end of the relevant quarter, rather than imposing a time limit?

(b) If not, within what time frame would stakeholders prefer the AER to publish its quarterly reports on FCAS market outcomes?

2) Assessment of effectiveness of competition

(a) Do stakeholders prefer the AER to assess the effectiveness of competition in FCAS markets as part of wholesale electricity market performance reports required under the NEL (at least every two years), or as part of quarterly reports on the performance of FCAS markets?

41 AER, *Request for change to the National Electricity Rules - monitoring and reporting of FCAS market performance,* February 2019, p. 6.

42 Under Part 3, Division 1A of the NEL.

43 For more information, see: AER, *Wholesale electricity market performance report*, December 2018.

44 AER, *Request for change to the National Electricity Rules - monitoring and reporting of FCAS market performance,* February 2019, p. 6.

45 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 150.

1.4.2 Reporting on frequency performance of the power system

Quarterly reports - reporting metrics

In its *Frequency control frameworks review* final report, the AEMC recommended AEMO publish quarterly reports providing commentary on key trends or particular events with respect to system frequency. The reporting metrics proposed in the AEMO rule change request differ from the AEMC's proposal in some respect. This is discussed in more detail below.

Effectiveness of FCAS

Among other things, in its *Frequency control frameworks review* final report, the AEMC recommended AEMO report on the effectiveness of any market ancillary services enabled and utilised by AEMO over the relevant period.[46] In its rule change request, AEMO argues that "effectiveness" is not something that can be objectively measured. According to AEMO, this is better considered qualitatively in the discussion included in quarterly reports, so that all aspects can be considered in their proper context.[47]

Rates of change of frequency

In its *Frequency control frameworks review* final report, the AEMC recommended that AEMO report on rates of change of frequency, but did not specify the exact metrics for doing this.[48]

In its proposed rule drafting (which is attached to the rule change request) AEMO suggests to report on the rate of change of frequency associated with the largest frequency deviation in each month of a quarter.[49]

Under AEMO's proposal, there is a possibility that some significant frequency events would not be reported on, if they occur during the same month, as it would only be required to report on the largest frequency deviation.

The AEMC welcomes stakeholders' views on AEMO's proposed matric to be used to report on the rates of change of frequency, and any other feedback that stakeholders may have on the appropriate metric.

For example, AEMO could report on rates of change of frequency associated with the three largest frequency deviations. AEMO could also report on rates of change of frequency during normal operating conditions e.g. this could be represented as maximum absolute values of the instantaneous increase and decrease in frequency during normal operation in a quarter;

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46 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 144.

47 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 5.

48 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 144. The rate at which the frequency changes following a contingency event determines the amount of time that is available to arrest the change in frequency before it moves outside of the permitted bands of the frequency operating standard. The rate of change of frequency is proportional to the change in supply or demand as a result of the contingency event and inversely proportional to the level of system inertia at the time that the contingency occurs. The greater the size of the contingency event, or the lower the system inertia, the faster the frequency will change. More inertia in the power system means as lower initial decline of power system frequency. However, inertia is not able to stabilise or restore the power system frequency on its own – this is a role for frequency control services.

49 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 8.

or as a moving average of rates of change of frequency over a specified period in a quarter; or as monthly distribution of rate of change of frequency over a quarter (frequency of exceedance on y-axis and rate of change of frequency on x-axis).[50]

The AEMC also notes that in considering which metrics are appropriate, it will also consider the extent to which data collection and reporting could be automated by AEMO.

Reviewable incidents affecting frequency

In its *Frequency control frameworks review* final report, the AEMC recommended AEMO publish a summary of any reports prepared by AEMO on reviewable operating incidents which affect frequency over the reporting period.[51]

AEMO proposes to change how reviewable operating incidents may be referred to in the quarterly reports. According to AEMO, this is in light of the significant amount of time it can take to investigate when such incidents occur. Therefore, AEMO proposes that reviewable incidents that occurred during the reporting period are *listed* in the quarterly report, not summarised.[52]

Quarterly reports - timing of reporting

Further, in relation to timing of reporting, AEMO proposes that the quarterly reports be published within 30 days of the end of the reporting period, rather than two weeks - as recommended by the AEMC in its *Frequency control frameworks review* final report. According to AEMO, this is guided by its assessment of the effort required to produce these reports. AEMO also 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.[53]

In its final report, the AEMC noted the following should be considered when considering timing:[54]

- whether all necessary data is available to AEMO
- any costs to AEMO of requiring the reports to be published very soon after the period
- the extent to which data collection and reporting could be automated.

QUESTION 4: AEMO'S QUARTERLY REPORTS ON FREQUENCY PERFORMANCE

1) With respect to the quarterly reporting metrics, do stakeholders agree with AEMO's proposed changes described in this section?

50 Currently, frequency performance is reported quarterly on similar metrics - frequency of exceedance is on y-axis and frequency on x-axis.

51 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 144.

52 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 6.

53 Ibid, p. 5.

54 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 142.

2) Do stakeholders agree with AEMO's proposal for it to publish quarterly reports on frequency performance within 30 days of the end of the reporting period, rather than two weeks?

Weekly reports

In its *Frequency control frameworks review* final report, the AEMC recommended AEMO publish weekly reports on:

- Frequency outcomes with respect to the requirements of the frequency operating standard (FOS).[55] In its rule change request, AEMO proposes measures indicating whether "key measures" in the FOS were met, rather than a complete test indicating compliance/non-compliance with the FOS. According to AEMO, 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.[56]
- Quantities of regulation services enabled and utilised in each region.[57] In its rule change request, AEMO states that 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.[58]

QUESTION 5: AEMO'S WEEKLY REPORTS ON FREQUENCY PERFORMANCE

With respect to the weekly reporting metrics, do stakeholders agree with the AEMO's proposed changes as described above?

Removal of specific reporting requirements

In the rule change request, AEMO suggests removing some existing reporting requirements. AEMO is of the view that they will conflict and overlap with the proposed rule. Specifically, AEMO proposes to delete:[59]

- Clause 3.13.4A(b1) of the NER, which requires AEMO to publish annually the actual quantities and types of market ancillary services.

55 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 143.

56 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 5.

57 AEMC, *Frequency control frameworks review*, final report, July 2018, p. 143.

58 AEMO, *Electricity rule change proposal - monitoring and reporting of frequency and frequency control performance,* May 2019, p. 5.

59 Ibid, pp. 8-9.

- Clause 3.13.5(a) of the NER, which requires AEMO to publish annually the costs of all its operations associated with its acquisition of market ancillary services and non-market ancillary services.

AEMO explains that ancillary service quantities and prices are published daily as for energy. Further, AEMO states that for non-market ancillary services[60], clauses 3.13.5(b)[61] and 3.13.5(c)[62] of the NER deal with network support and control ancillary services, while clause 3.11.10(a)[63] of the NER covers system restart ancillary services.

> QUESTION 6: REMOVAL OF SPECIFIC REPORTING REQUIREMENTS
>
> Do stakeholders agree with the AEMO's view that the reporting requirements described above conflict and overlap with the proposed rule?

1.5 Assessment framework

1.5.1 Achieving the NEO

Under the NEL the Commission may only make a rule if it is satisfied that the rule will, or is likely to, contribute to the achievement of the national electricity objective (NEO).[64] This is the decision-making framework that the Commission must apply.

The NEO is:[65]

> to promote efficient investment in, and efficient operation and use of, electricity services for the longer term interests of consumers of electricity with respect to -
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system.

The Commission will consider whether implementing the proposed rules promote the NEO. The proposed rules may promote efficient investment and efficient operation. Specifically, the provision of new and consistent information may give stakeholders the ability to collect and use this information that will assist them in making investment and operational decisions. In particular, the Commission will consider promoting the following principles:

- **Improving transparency:** The provision of relevant and accurate information to the market in a manner desired by stakeholders may improve transparency regarding the

60 Non-market ancillary services include network support and control ancillary services, and system restart ancillary services.

61 Clauses 3.13.5(b) of the NER provides that AEMO must publish annually the quantities and types on network support and control ancillary services covered under existing ancillary services agreements.

62 Clauses 3.13.5(c) of the NER provides that information published under clauses 3.13.5(b) of the NER must include a breakdown of the actual costs and quantities relating to each facility contracted under ancillary services agreements.

63 Clauses 3.11.10(a) of the NER provides that at least once each year, AEMO must prepare and publish a report detailing the total estimated annual cost for the provision of system restart ancillary services, broken down to charges for availability and use, for each electrical sub-network and for each region.

64 Section 88 of the NEL.

65 Section 7 of the NEL.

performance of frequency control frameworks, which in turn is important in supporting the overall efficiency of the power system.

- **Improving consistency:** The provision of consistent information, both in terms of how often it is published and what metrics it is reported on, may inform market participants more regularly about the issues affecting the power system; this will also assist the market in understanding the impact of any changes to existing mechanisms, or the introduction of new mechanisms.

> QUESTION 7: ASSESSMENT FRAMEWORK
>
> 1) Is the assessment framework appropriate for considering the rule change request?
>
> 2) Are there other relevant considerations that should be included in the assessment framework?

1.5.2 Consolidating rule change requests

Given that both rule change requests relate to frequency monitoring and reporting, the Commission has determined under s.93 of the NEL, that it is desirable that the rule change requests proposed by AEMO and the AER be dealt with together and treated as one request. Both rule changes will be progressed under the title and project code *Monitoring and reporting on frequency control framework* (ERC0273).

This consultation paper, which has been prepared to facilitate public consultation on the rule change request and to seek stakeholder submissions, therefore refers to the two rule change requests as one rule change request, and covers issues raised in both.

1.5.3 Making a more preferable rule

Under s. 91A of the NEL, the Commission may make a rule that is different (including materially different) to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule will or is likely to better contribute to the achievement of the NEO.

1.5.4 Making a differential rule

Under the Northern Territory legislation adopting the NEL, the Commission may make a differential rule if, having regard to any relevant MCE statement of policy principles, a different rule will, or is likely to, better contribute to the achievement of the NEO than a uniform rule. A differential rule is a rule that:

- varies in its term as between:
  - the national electricity system, and
  - one or more, or all, of the local electricity systems, or
- does not have effect with respect to one or more of those systems

but is not a jurisdictional derogation, participant derogation or rule that has effect with respect to an adoptive jurisdiction for the purpose of s. 91(8) of the NEL.

As the proposed rule related to parts of the NER that currently do not apply in the Northern Territory, the Commission does not propose to assess the proposed rule against additional elements required by the Northern Territory legislation.[66]

66 From 1 July 2016, the NER, as amended from time to time, apply in the NT, subject to derogations set out in regulations made under the NT legislation adopting the NEL. Under those regulations, only certain parts of the NER have been adopted in the NT. (See the AEMC website for the NER that applies in the NT.) National Electricity (Northern Territory) (National Uniform Legislation) Act 2015.

2 PROCESS FOR THIS RULE CHANGE

2.1 Treatment as a non-controversial rule change

AEMO and the AER proposed that their respective rule change requests be treated as non-controversial in accordance with s. 96 of the NEL such that they could be processed on an expedited basis. This request was made on the basis that the proposed rules are unlikely to have a significant effect on the national electricity market. Further to this, stakeholders have shown strong support for such reporting requirements, as evidenced by submissions to the AEMC's *Frequency control frameworks review*.

The Commission considers that the consolidated rule change request should be subject to the expedited rule making process under s. 96 of the NEL on the grounds that it considers the rule change request to be non-controversial. The rule change is unlikely to have a significant effect on the national electricity market.[67] This is because the rule change request deals with minor reporting requirements, and AEMO and the AER already report on most of the metrics described in the rule change request.

Rule changes that are considered to be non-controversial may be processed under an expedited (faster) process under which there is only one round of consultation and the AEMC must publish its final rule determination within eight weeks of commencing the rule change process.[68]

The Commission has decided to use an expedited process to consider this rule change request provided that it does not receive any valid requests not to use the expedited process by 13 June 2019. To be valid, an objection should set out the reasons why the rule change request will have a significant effect on the national electricity market.

2.2 Key dates

Given the tightly defined nature of the issues, and the background information provided in the rule change request, this consultation paper is brief. Nevertheless, submissions are invited in relation to the matters identified above, and any other relevant issue.

The key dates for stakeholders in this process are as follows:

- Commencement of this rule change process: 30 May 2019
- Objections to an expedited process to be received by: 13 June 2019
- Submissions to the proposal to be received by: 27 June 2019
- Final decision to be published under an expedited process by: 25 July 2019.

67 Section 87 of the NEL.

68 The AEMC has published a notice under sections 95 and 96 of the NEL to commence and assess this rule change request as a non-controversial rule.

3 LODGING A SUBMISSION

The Commission invites requests not to make a rule under the expedited process and written submissions on this rule change proposal.

All enquiries on this project should be addressed to Olga Iaroshevska on (02) 8296 0613 or olga.iaroshevska@aemc.gov.au.

3.1 Lodging a request not to make a rule under an expedited process

Written requests not to make a rule under the expedited process in accordance with s. 96 of the NEL must include reasons for the request, and must be lodged with the Commission by 13 June 2019 online in accordance with the process specified below.

3.2 Lodging a submission to this rule change request

Written submissions on the rule change request must be lodged with the Commission by 27 June 2019 online in accordance with the process specified below.

Where practicable, submissions should be prepared in accordance with the Commission's guidelines for making written submissions on rule change requests.[69] The Commission publishes all submissions on its website, subject to a claim of confidentiality.

3.3 Lodging online

Submissions, or requests not to make a rule under the expedited process, must be lodged online via the Commission's website, www.aemc.gov.au, using the "lodge a submission" function and selecting the project reference code ERC0273.

The request or submission must be on letterhead (if submitted on behalf of an organisation), signed and dated.

69 This guideline is available on the Commission's website www.aemc.gov.au.

ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AGC	Automatic governor control
Commission	See AEMC
FCAS	Frequency control ancillary services
FOS	Frequency Operating Standard
NEL	National Electricity Law
NEM	National electricity market
NER	National Electricity Rules
NEO	National electricity objective
NOFB	Normal Operating Frequency Band

A FREQUENCY CONTROL FRAMEWORK

Frequency control is an important technical parameter of power system security.[70] The frequency of the power system varies whenever the supply from generation does not precisely match customer demand. Effective control of power system frequency involves the provision of inertia,[71] the use of emergency frequency control schemes and the coordination of a range of frequency control ancillary services (FCAS).

AEMO is required under the National Electricity Rules (NER) to operate and maintain the power system in a "secure operating state".[72] Frequency control is a key element of power system security. To maintain a stable system frequency, AEMO must instantaneously balance the supply of electricity into the power system against consumption of electricity at all times.

The regulatory framework was developed to enable AEMO to meet its obligations with respect to frequency control. The key components of the framework are:

- **Frequency operating standard.** The frequency requirements that AEMO must meet are set out in the frequency operating standard, which is defined in the NER and determined by the Reliability Panel.[73] The purpose of the frequency operating standard is to define the range of allowable frequencies for the electricity power system under different conditions, including normal operation and following contingencies. Generator, network and end-user equipment must be capable of operating within the range of frequencies defined by the frequency operating standard, while AEMO is responsible for maintaining the frequency within the ranges defined by the standard. These requirements then inform how AEMO operates the power system, including through applying constraints to the dispatch of generation, or procuring ancillary services. The frequency operating standard currently consists of two separate standards - one for the mainland NEM and one for Tasmania - to reflect the different physical and market characteristics of the Tasmanian region as opposed to the mainland NEM.
- **Frequency control ancillary services.** FCAS are procured by AEMO to increase or decrease active power over a time frame that satisfies the frequency operating standard. There are two types of FCAS: regulating and contingency. Regulating FCAS regulate the power system frequency to keep it within the normal operating frequency band defined in the frequency operating standard. There are two types of regulating FCAS: 1) Regulating raise service - used to correct a minor drop in frequency; 2) Regulating lower service - used to correct a minor rise in frequency. Contingency FCAS is procured by AEMO to respond to larger deviations in power system frequency that are usually the result of contingency events such as the tripping of a large generator or load. Contingency FCAS is divided into raise and lower services at three different speeds of response and sustain time: fast (6 seconds), slow (60 seconds) and delayed (5 mins). In the NEM, FCAS is

70 In Australia, all generation, transmission, distribution and load components connected to the power system are standardised to operate at a nominal system frequency of 50 Hertz (Hz).

71 Inertia is a measure of the ability of the system to resist changes in frequency due to sudden changes in supply and demand. It is naturally provided by synchronous generators such as coal, hydro and gas-fired power stations.

72 Clause 4.2.6(a) of the NER.

73 Chapter 10 of the NER and clause 4.4.1 of the NER.

sourced from markets operating in parallel to the wholesale energy market, with the energy and FCAS markets being optimised simultaneously so that total costs are minimised. There are eight markets in the NEM for FCAS, one for each type of regulating and contingency service.[74]

- **Generator technical performance standards.** Equipment that makes up and connects to the power system must perform to certain levels of technical capability.[75] The generator technical performance standards in the NER cover a range of technical capabilities for connecting generators to the network, including, among other things, frequency control and response to frequency disturbances during and following contingency events.
- **Emergency frequency control schemes.** Emergency frequency control schemes are schemes that help restore power system frequency in the event of extreme power system events, such as the simultaneous failure of multiple generators and/or transmission elements.[76] The operational goal of emergency frequency control schemes is to act automatically to arrest any severe frequency deviation prior to breaching the extreme frequency excursion tolerance limit, and hence avoid a cascading failure and widespread blackout.

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 tripping of generation and load, power system oscillations, and in the worst cases, partial or total loss of the system (e.g. a state-wide blackout, such as the one that occurred in September 2016 in South Australia).

The behaviour of system frequency in the national electricity market (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*,[77] AEMC's *Frequency Control Frameworks Review*,[78] and AEMO's *Final Report – Queensland and South Australia system separation on 25 August 2018.*[79]

74 "FCAS" is not a term defined by the NER, but it refers to eight "market ancillary services" defined by the NER.

75 For more information, see clause 5.2.1(b), 5.2.5(a), 5.3.7(b) and schedule 5.2 of the NER.

76 See for example, clause 4.2.6 of the NER.

77 For more information, see: 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

78 For more information, see: https://www.aemc.gov.au/sites/default/files/2018-07/Final%20report.pdf

79 For more information, see: 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