



Review of the Frequency Operating Standard – Terms of Reference

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Under section 38 of the National Electricity Law (NEL) and clause 8.8.3(c) of the National Electricity Rules (NER), the Australian Energy Market Commission (AEMC) requests that the Reliability Panel (the Panel) undertake a review of the frequency operating standard that applies in the National Electricity Market (NEM). This review is related to and is intended to complement the ongoing AEMC work program to support the maintenance of power system security in the NEM.

The Commission flagged in its draft determination for the *Primary frequency response incentive arrangements* rule change that it intended to ask the Panel to review the frequency operating standard for normal operation. The Commission notes that it has received stakeholder submissions in support of such a review being undertaken to complement the Commission's considerations in its recent frequency rule changes: *Mandatory Primary frequency response* and *Primary frequency response incentive arrangements*.

Background

The frequency operating standard (FOS): The frequency operating standard forms part of the power system security standards as defined in Chapter 10 of the NER. The FOS may include various matters relating to standards for the frequency of the power system in operation but at present sets out the standards for the range of allowable frequency of the power system under different conditions, including normal operation and following contingencies.

The FOS set out the frequency standards to which AEMO operates the power system. This includes defined frequency bands and timeframes in which the system frequency must be restored to these bands following different events, such as the failure of a transmission line or separation of a region from the rest of the NEM. These requirements then inform how AEMO operates the power system, including through applying constraints to the dispatch of generation or procuring ancillary services.

The Panel's role and responsibility in relation to the FOS: Clause 8.8.1(a)(2) of the NER requires the Reliability Panel to: "review and, on the advice of AEMO, determine the power system security standards". The Reliability Panel is required to determine the FOS as a subset of the power system security standards.

The FOS for Tasmania and the mainland were last reviewed and determined by the Reliability Panel on 18 April 2019.

Scope of the review

The Panel is requested to undertake a review of the frequency operating standards for the NEM mainland and Tasmania.

In undertaking this review, the Panel should give consideration to key system security issues currently being considered and addressed by the AEMC and AEMO. This includes, but is not

limited to, the consequences of the changing NEM generation fleet, including the impacts of decreased system inertia and associated rates of change of frequency following a contingency event.

Among other things, the revised FOS is expected to clarify the system standards for frequency control as an input to AEMO's activities associated with the commencement of market ancillary service arrangements for Fast frequency response (FFR), consistent with the *Fast frequency response market ancillary service rule 2021*. These arrangements will commence on 9 October 2023.

In accordance with clause 8.8.1(a)(2) of the NER, the Panel should coordinate the provision of advice from AEMO to inform its review and determination of the FOS. Relatedly, the Panel should give consideration to the findings and recommendations of related work programs, including:

- AEMO's engineering studies including:
 - The technical white paper, *Enduring primary frequency response requirements for the NEM*, published in August 2021;¹
 - Technical advice on the development of FFR arrangements in the NEM, *Fast Frequency Response Implementation Options*², published in April 2021;
 - the 2022 *Integrated system plan*³;
 - the *Engineering Framework*⁴ and subsequent technical studies;
 - the 2022 *Power system frequency risk review*⁵.
- AEMC Rule change requests currently on foot that are relevant to the issues that will need to be considered in the review, including:
 - the *Primary frequency response incentive arrangements rule change*⁶
 - The *Operational security mechanism rule change*⁷.

Given these key issues and the ongoing work programs, in undertaking this review, the Panel should consider:

- Whether the terminology, standards and settings and definitions in the FOS remain appropriate.
- The settings in the FOS that apply for normal operation, including:
 - The normal operating frequency band (NOFB)
 - The normal operating frequency excursion band (NOFEB)
 - The requirement that:
“except as a result of a contingency event or a load event, system frequency:

¹ Further detail available at: <https://aemo.com.au/-/media/files/initiatives/primary-frequency-response/2021/enduring-pfr-requirements-for-the-nem-technical-white-paper.pdf?la=en>

² Further details are available at: <https://www.aemc.gov.au/sites/default/files/2021-04/FFR%20Implementation%20options%20-%20FINAL.pdf>

³ Further detail available at: <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isps/2022-integrated-system-plan-isps>

⁴ Further detail available at: <https://aemo.com.au/en/initiatives/major-programs/engineering-framework>

⁵ Further detail available at: <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-frequency-risk-review>

⁶ Further detail available at: <https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements>

⁷ Further detail available at: <https://www.aemc.gov.au/rule-changes/operational-security-mechanism>

- a) shall be maintained within the applicable normal operating frequency excursion band, and
 - b) shall not be outside of the applicable normal operating frequency band for more than 5 minutes on any occasion and not for more than 1% of the time over any 30-day period."
- the Primary frequency control band referred to in clause 4.4.2A of the NER
- The settings in the FOS for credible contingency events.
- The settings in the FOS for non-credible contingency events.
- What amendments to the FOS may be necessary and appropriate to support the implementation of market arrangements for FFR. This may include the specification of system operating standards for the rate of change of frequency (RoCoF) and other settings as appropriate.
- Other issues related to the FOS as determined by the Panel.

The Panel's determination of the FOS should be guided by the National Energy Objective (NEO) which is set out under section 7 of the NEL.

The NEO states that :

"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 with respect to:

- Price, quality, safety, reliability and security of supply of electricity; and
- The reliability, safety and security of the national electricity system."

The Panel's review of the FOS must consider and determine FOS to apply to both Tasmania and the mainland regions of the NEM. This must include consideration of the different physical and market characteristics relating to the power system. Given that Tasmania and the mainland are electrically separated in terms of frequency, the review shall consider the different physical and market characteristics of each of these regions in determining the settings for the FOS.

Timing and Consultation Process

In conducting this review the Panel should carry out the review to develop the FOS in accordance with the following consultation processes:

- Give notice to all registered participants of commencement of this review.
- Publish an issues paper for consultation with stakeholders following the notification of the commencement of the review and invite submissions for a period of at least four weeks. This paper should outline the key issues and questions the Panel will consider when determining the FOS.
- Publish a draft report or reports and invite submissions for a period of at least four weeks.
- At the time of publishing the draft report(s), notify stakeholders that they may request a public meeting on the draft report(s) within five business days of the draft report(s) being published.
- If stakeholders have requested a public meeting, notify stakeholders that a public meeting will be held. At least two weeks' notice of the public meeting must be given.

- Publish a final report or reports and submit this report(s) to the AEMC.

The Panel may decide on its own timing for delivery of the review and any additional consultation processes, provided the review is completed by 7 April 2023. This will allow for a period of at least 6 months from the date the revised FOS is determined to the date that the new market ancillary service arrangements for the very fast raise service and very fast lower service commence on 9 October 2023.

The Commission also suggests that the Panel include in its final report a recommendation as to when it may be an appropriate time to review the FOS in future.