



Market Ancillary Service Specification and Causer Pays Procedure

June 2020

Final Determination

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EXECUTIVE SUMMARY

This Final Report and Determination (Final Report) concludes the consultation conducted by AEMO to consider proposed amendments to the *market ancillary services specification* (MASS) under the National Electricity Rules (NER).

AEMO is required by clause 3.11.2(b) to make and *publish a market ancillary services specification (MASS)*, which AEMO may subsequently amend at any time subject to the *Rules consultation procedures* in rule 8.9. AEMO commenced this consultation on 1 November 2019 and received ten submissions in response to an issues paper on the proposed changes to the MASS (Issues Paper) and a further three submissions on the Draft Determination.

The submissions to the Draft Determination were largely supportive of AEMO's proposed changes, which were focused on a reformulation of a methodology to recognise the provision of Contingency FCAS before frequency exits the *normal operating frequency band* (NOFB).

In response to submissions on the Draft Determination, AEMO has determined to proceed with the methodology set out in the Draft Determination and has provided further clarifying information in the MASS as to how that methodology is applied. This methodology does not explicitly concern any particular type of Contingency FCAS but will be applied consistently across all Contingency FCAS and will focus on the measurement of the response rather than the mechanism by which it is delivered, or the service it applies to. AEMO's determination is to amend the MASS in the form published with this Final Report.

AEMO wishes to acknowledge the time and effort from Consulted Persons in making submissions throughout this consultation. The submissions were very helpful in reaching a satisfactory determination on a complex issue. AEMO recognises that the National Electricity Amendment (Mandatory primary frequency response) Rule 2020 No. 5 is yet to be implemented, and that there might be a need to revisit FCAS measurement (amongst other issues) once experience in operating under that rule is gained.

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1. Consultation Process

As required by clause 3.11.2(c) and (d) of the NER, AEMO is consulting on proposed amendments to the *market ancillary services specification* (MASS) in accordance with the consultation process in rule 8.9 of the National Electricity Rules (NER).

AEMO's timeline for this consultation is outlined below.

Deliverable	Indicative date
Notice of first stage consultation and Issues Paper published	1 November 2019
First stage submissions closed	6 December 2019
Draft Report and Determination (Draft Report) & Notice of Second Stage Consultation published	25 February 2020
Submissions due on Draft Report	16 March 2020
Final Report and Determination published	1 June 2020

The publication of this Final Report marks the conclusion of the consultation.

A glossary of terms used in this Draft Report can be found at Appendix A.

2. Background

2.1 NER requirements

AEMO is required by clause 3.11.2(b) to make and *publish a market ancillary services specification (MASS)*, which AEMO may subsequently amend at any time subject to the rules consultation process in rule 8.9.

2.2 Context for this consultation

In August 2019, AEMO submitted two proposals to the Australian Energy Market Commission (AEMC) requesting to amend the NER to facilitate the provision of primary frequency response (PFR) by *Generators* under normal operating conditions (AEMO's Rule Change Proposals). In response to these, the AEMC has separated the two and is progressing the one referred to as the Mandatory Primary Response rule change proposal (ERC0274) and has published a Final Determination on the National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020¹.

AEMO commenced a consultation on updates to the MASS concurrently with the AEMC's consultation on ERC0274.

While this consultation was prompted by potential new rules for the provision of PFR, the matter contemplated by this consultation does not depend on the making of those rules.

This consultation does not replace the need for a broader review of the MASS, which AEMO will conduct separately.

2.3 First stage consultation

AEMO issued a Notice of First Stage Consultation on 1 November 2019 along with an issues paper (Issues Paper) and a mark-up of the proposed changes to the MASS.

AEMO received ten written submissions in the first stage of consultation.

¹ Available at: <https://www.aemc.gov.au/news-centre/media-releases/consultation-commences-proposed-rules-better-control-power-system>.

AEMO also held a meeting with CS Energy on 9 December 2019 to gain a better understanding of the alternative method of measurement it proposed in its submission.

Copies of all written submissions (excluding any confidential information) have been published on AEMO's website at: <https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-under-normal-operating-conditions>.

2.4 Second stage consultation

AEMO issued a Notice of Second Stage Consultation on 25 February 2020 along with a draft determination (Draft Determination) and a mark-up of the proposed changes to the MASS.

AEMO received three written submissions in the second stage of consultation.

Copies of all written submissions (excluding any confidential information) have been published on AEMO's website at: <https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-under-normal-operating-conditions>.

3. Discussion of Material Issues

A detailed summary of issues raised by Consulted Persons in submissions to the Draft Determination may be found in Appendix B. This section discusses the material issues.

3.1 Clarification of the revised FCAS assessment window

3.1.1 Issue summary and submissions

Delta's submission argued that the Draft Determination was not entirely clear about the applicable FCAS assessment windows (i.e. the applicable measurement times) for the different types of FCAS. In particular, it noted that it was not immediately clear whether AEMO intended that the Fast FCAS window be *extended* to the time of the event, or that it would be *shifted* to commence from the time of the event but remain of the same duration.

Delta also noted that it is not always apparent exactly when a contingency event occurred, whereas the point at which frequency crosses the NOFB is easier to identify consistently.

3.1.2 AEMO's assessment

AEMO's intention is that the Fast FCAS window be *extended* (where applicable) to the time of the event. Thus, rather than the first phase of the Fast FCAS window being fixed at 6 seconds in duration, it will be increased by the time between the actual generation or load contingency event and the time by which the frequency exits the NOFB. The second phase of Fast FCAS assessment will remain at 60 seconds.

Figures 1 and 2 contrast the existing Fast FCAS methodology with the revised methodology for a low frequency event starting from 50 Hz and falling at the Standard Frequency Ramp (mainland) as defined in the MASS (0.125 Hz/s). Figure 1 shows the existing methodology, while Figure 2 shows the revised methodology. At a frequency ramp in this case, the first phase of the Fast FCAS response (i.e. the '6 second' part of the 6 and 60 second phases) extends to 7.2 seconds.

Figure 1 Existing Fast FCAS assessment window

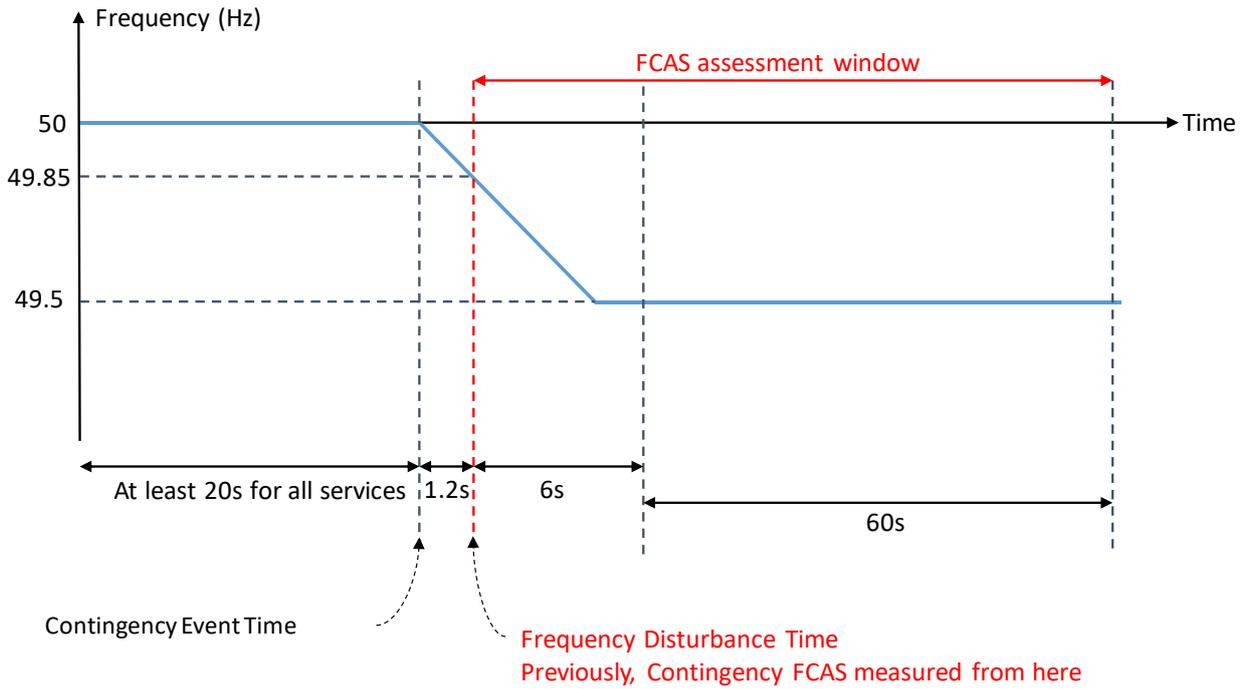
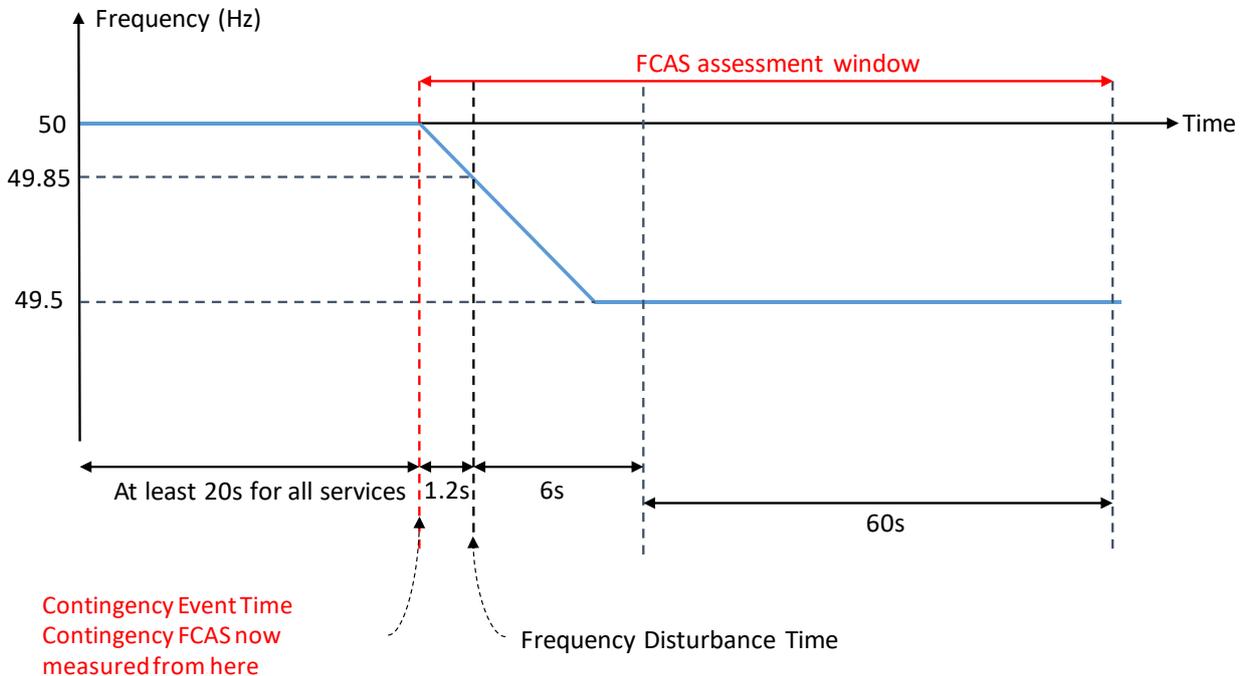


Figure 2 Revised Fast FCAS assessment window



The matter of reliably identifying the contingency event time is an issue that needs consideration. This kind of issue already exists, in that participant measurements and AEMO’s measurements routinely exhibit discrepancies and timing inconsistencies and, therefore, it is already the case that the data sources must be aligned in a careful, but ultimately subjective, manner. Therefore, identifying the contingency event time represents the same sort of issue, though it could perhaps be more subjective in certain scenarios. AEMO will take a pragmatic approach to identifying the time of the actual contingency event. Typically, the point where

the steepest RoCoF commences would be flagged as the event time, though this will be subject to checks and balances (e.g. other frequency sources and other data records of the event, if they exist). If there is no clear contingency event time, which would most likely be where there is a slow progressive change in frequency or a series of small steps, AEMO will select a reasonable assessment start point and take into account the circumstances of the disturbance. Note that AEMO has deliberately limited the maximum extension of the Fast FCAS window in the revised methodology so that it conforms to the existing data recording window. That is, participants should not have to record and provide more data to AEMO.

In order to facilitate the FCAS assessment process, AEMO will include a statement of the contingency event time when requesting high speed data for Fast FCAS verification.

3.2 Verification of response during complex events

3.2.1 Issue summary and submissions

AEMO's Draft Determination discussed how during particular kinds of complex frequency events, the verification methods employed by AEMO might not always work reliably. In particular, the MASS Verification Tool² AEMO maintains can handle a variety of events, but there could be events for which it does not produce reliable outputs.

Origin suggested that because of this possibility, AEMO should consider making it clear that test performance data could be used when evaluating responses in such cases.

3.2.2 AEMO's assessment

AEMO agrees that the verification method and, especially the verification tool, does not, and cannot, cater for every possible situation. Particularly complex events to analyse could include factors such as:

- A situation where there is no clear contingency event (e.g. slow frequency drift outside of the NOFB).
- Where frequency cycles in and out of the NOFB over a short time window.
- Where frequency goes to both extreme ends of the NOFB within an FCAS assessment period.
- A situation where there is extremely low inertia.
- A situation where there are other significant faults (perhaps voltage) occurring at the same time as a frequency deviation.

AEMO does not believe it is possible, let alone warranted, to build a cut-and-dried verification methodology that can cater to every possibility. Therefore, despite what the Verification Tool can calculate, AEMO must exercise its discretion and power systems experience to assess the performance of FCAS providers. Test data is just one way to do this.

As stated in the Draft Determination, when assessing Contingency FCAS delivery AEMO always considers the circumstances of the event and how it might impact the measurement (and delivery) of Contingency FCAS. If the reference points happen to be when frequency was not quite close to 50 Hz, AEMO takes this into consideration when evaluating how FCAS delivery compares with enabled Contingency FCAS.

3.2.3 AEMO's conclusion

AEMO has added some further statements to the MASS and Verification Tool User Guide to clarify that test data and other analysis could be used to complement the findings of the Verification Tool in assessing FCAS delivery.

² The FCAS verification tool (FCASVT) is an Excel spreadsheet that has been made available to NEM participants to calculate FCAS delivered by their plant. It is available from AEMO: <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services/market-ancillary-services-specification-and-fcas-verification-tool>

3.3 Documentation of the revised methodology

3.3.1 Issue summary and submissions

Submissions (Delta, Origin) recommended that the revised methodology be spelt out in detail in the appropriate places. Delta's submission noted that in the previous revision of the MASS, the document was modified to focus on the principles of FCAS verification, leaving the exhaustive detail for the verification process to the Verification Tool and User Guide.

3.3.2 AEMO's assessment

AEMO understands Consulted Persons' desire for the verification methodologies to be documented in as much detail as possible and agrees that where practicable, this should be done. The detailed steps of how the Verification Tool works are still best placed in the User Guide so that the MASS is a manageable document, and minor amendments (i.e. 'bug fixes') that remain consistent with the MASS can be made to the procedure / tool without requiring a formal consultation.

3.3.3 AEMO's conclusion

The Verification Tool and User Guide will be updated before the commencement date of the amended MASS.

4. Final Determination

Having considered the matters raised in submissions, AEMO has determined to amend the MASS in the form published with this Final Report, in accordance with clause 3.11.2(c) of the NER.

The amended version of the MASS will take effect on 1 July 2020.

For clarity, a marked up copy of the MASS is also published, highlighting the changes from the version published with the Draft Determination.

Appendix A Glossary

In this paper, words in italics have the same meaning as under the NER. Capitalised terms are as defined below.

Term or acronym	Meaning
AEMO's Rule Change Proposals	The following two rule change proposals submitted by AEMO to the AEMC: <ul style="list-style-type: none"> • ERC0274 — Mandatory primary frequency response • ERC0263 — Removal of disincentives to primary frequency response during normal operation
Contingency FCAS	Any of the following: <ul style="list-style-type: none"> • <i>fast raise service</i>; • <i>fast lower service</i>; • <i>slow raise service</i>; • <i>slow lower service</i>; • <i>delayed raise service</i>; and • <i>delayed lower service</i>.
Delayed FCAS	<i>Delayed raise service and delayed lower service.</i>
ERC0274	National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020
Fast FCAS	<i>Fast raise service and fast lower service.</i>
FCAS	<i>frequency control ancillary services</i>
FOS	<i>frequency operating standards</i>
Frequency Disturbance	An occasion when the <i>power system frequency</i> moves outside the NOFB.
Frequency Disturbance Time	The time at which the Local Frequency fall or rises outside the NOFB during a Frequency Disturbance referenced to Australian Eastern Standard Time.
Local Frequency	The <i>frequency</i> of the electricity delivered by an <i>ancillary service generating unit</i> or consumed by an <i>ancillary service load</i> , measured in Hz.
MASS	The <i>market ancillary service specification</i> contemplated by clause 3.11.2(b) of the NER.
RoCoF	Rate of change of <i>frequency</i> .
Slow FCAS	<i>Slow raise service and slow lower service.</i>

Appendix B Summary of submissions and AEMO responses

No.	Consulted person	Issue	AEMO response
1.	Origin	The measurement method specified by AEMO may not accurately measure responses after a complex event. The final determination should specify that if an FCAS supplying generator cannot demonstrate its PFR using the technique being added into the MASS, then AEMO will consider test performance when evaluating the response.	Covered in section 3.2
2.	Tesla	AEMO should be considering areas that had previously been deemed out of scope of a MASS review, specifically: <ul style="list-style-type: none"> - Options for re-definition of the eight ancillary service markets. - Introduction of new or alternative markets (to the extent that this can be managed through the MASS), or clear articulation of market gaps. - Revision of procurement mechanisms (to the extent that this can be managed through the MASS). 	While not within the scope of this consultation, AEMO agrees that further review of the MASS on other matters will be necessary. Some of AEMO's latest work on emerging system services is described in the recently published Renewable Integration Study (RIS). ³
3.	Delta	Delta suggests clarification on several matters in the final determination: <ul style="list-style-type: none"> o Time of the contingency event – this may not be obvious or agreed between participants and AEMO. 	Covered in section 3.1
4.	Delta	The final determination should clarify exactly the proposed measurement method and applicable assessment windows.	Covered in section 3.1
5.	Delta	Delta suggests the MASS Verification Tool "User Guide" be updated to provide guidance in how the calculations should be made to avoid inconsistencies and ambiguity. Delta suggests the following should be made clearer: <ul style="list-style-type: none"> o The assignment of the facility reference point for Fast, Slow and Delayed Contingency FCAS, which Delta understands to be harmonised in the Determination o careful use of terms such as "prior to a frequency disturbance" since this may be interpreted in different ways 	Covered in section 3.1 and 3.3. An updated User Guide will be provided along with an updated Verification Tool prior to the commencement date of the new MASS.

³ <https://aemo.com.au/energy-systems/major-publications/renewable-integration-study-ris>