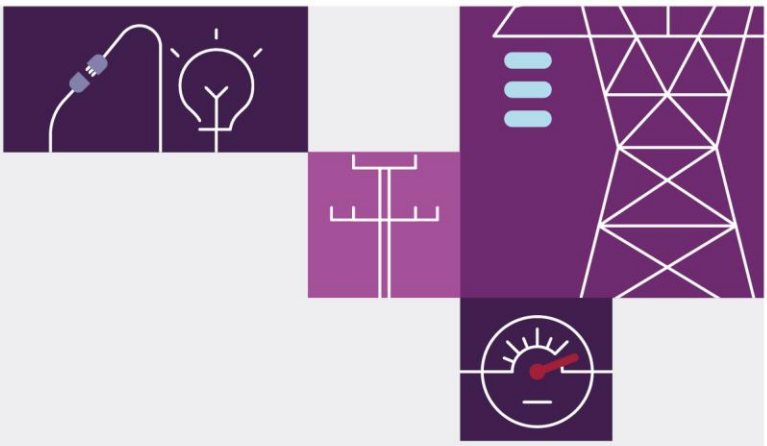
Market Ancillary Service Specification Consultation

June 2022

Issues Paper Addendum 1 – Further studies with increased FCAS volumes



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Addendum 1 – Further studies with increased FCAS volumes

This is an addendum to AEMO's Issues Paper on amendment of the Market Ancillary Service Specification (MASS) for Very Fast Frequency Control Ancillary Services (FCAS), which was published on 2 May 2022.

Based on feedback from AEMO's public forum on the MASS Issues Paper, AEMO conducted additional modelling of Very Fast FCAS options with increased FCAS volumes. Specifically, these studies build on the studies presented in Section 5 and Appendix A of the Issues Paper, which examined how 2-second, 1-second and 0.5-second Very Fast FCAS specifications affect frequency nadir in mainland scenarios as well as South Australia and Queensland island scenarios.

These additional studies, which employ the same key assumptions as the previous modelling, show the impact of increasing FCAS volumes to levels substantially greater than the LCR.

Results are shown in Figure 1. The FCAS volumes modelled for each FCAS service are listed in Table 1.

Table 1 FCAS volumes of each FCAS service being modelled

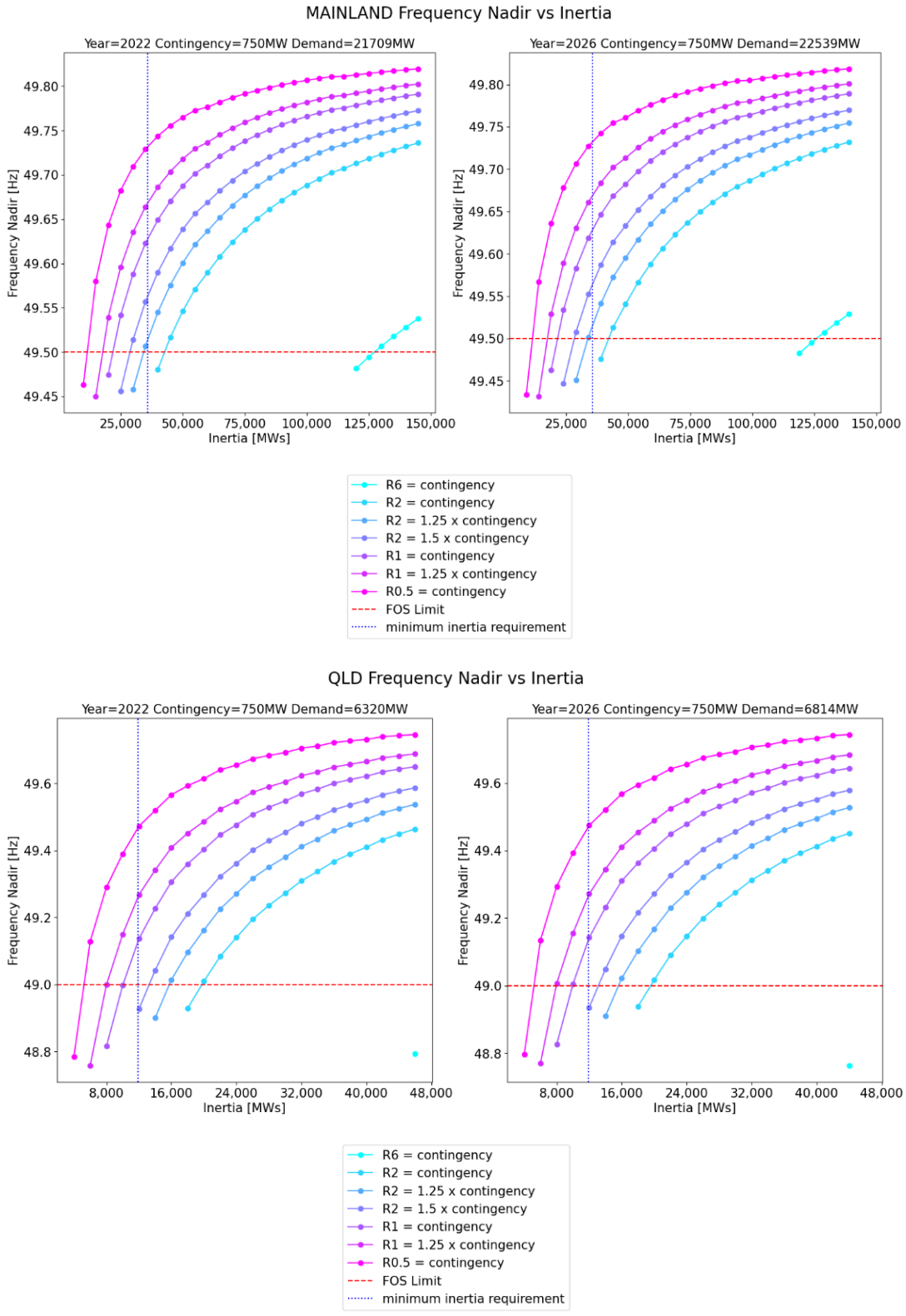
FCAS service	FCAS volumes modelled
R6	1x LCR
R2	1x, 1.25x, and 1.5x LCR
R1	1x and 1.25x LCR
R0.5	1x LCR

Figure 1 shows that in the interconnected mainland cases, a 1-second or 0.5-second response time is adequate to contain frequency within the applicable containment band of the Frequency Operating Standard (FOS). A 2-second response time is inadequate unless FCAS volume is greater than the largest credible risk (LCR); that is, with procurement of both 1.5x and 1.25x LCR, the frequency nadir is contained with the target 49.5 hertz (Hz) at the minimum inertia requirement level. It is noted that in the case of 1.25x LCR, it is only marginally within the target.

In the Queensland island cases (where the minimum frequency limit is 49 Hz) again 1-second and 0.5-seconds response times would be adequate to contain frequency within the applicable containment band. However, a 2-second market will breach the target frequency nadir at minimum inertia levels even when procurement is increased to 1.25x or 1.5x of LCR.

In the South Australia island cases (again, where the minimum frequency limit is 49 Hz) 1-second and 0.5-second response times suffice. However, a 2-second specification only falls within the allowed frequency nadir when procurement is increased to 1.5x LCR. The 2-second specification fails with procurement levels of both 1.25x LCR and 1x LCR.

Figure 1 Impact of different Very Fast FCAS response times, inertia levels, and FCAS volumes on frequency nadir in South Australia, Queensland, and the mainland National Electricity Market (NEM) in 2022 and 2026



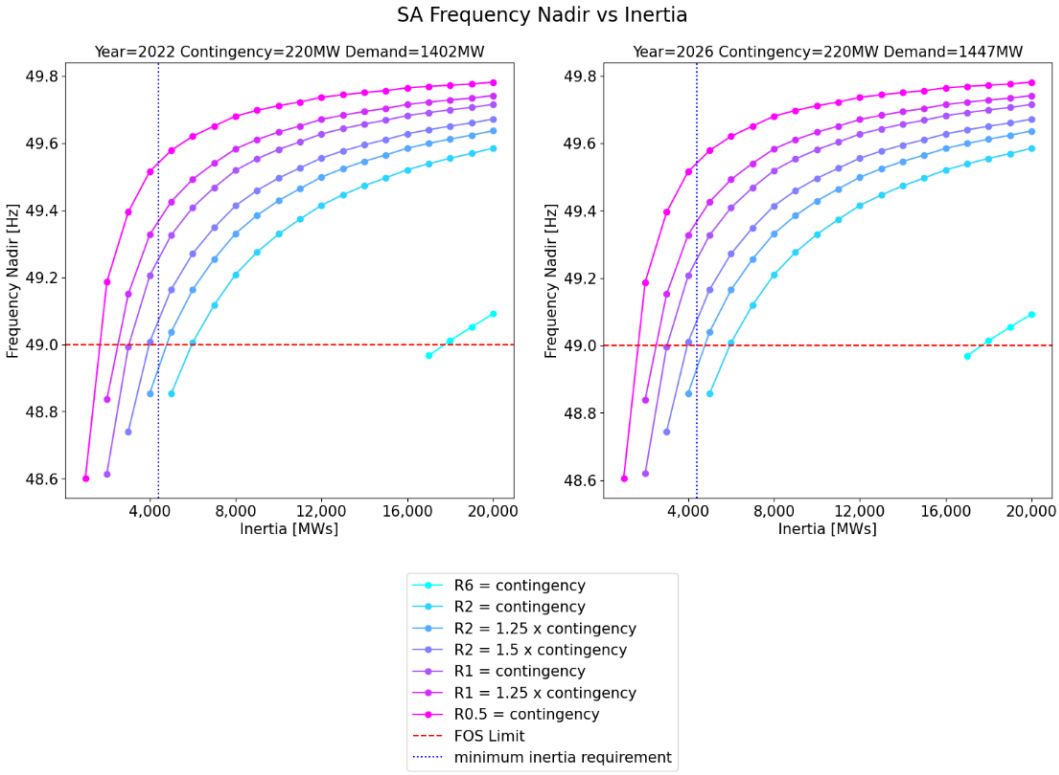


Table 2 summarises the performance of each FCAS service against the FOS. Hence, a 1-second market with an FCAS volume equivalent to the LCR would be adequate to contain frequency within the applicable containment band of the FOS for both the interconnected system and island scenarios studied. While increasing procurement of a 2-second product to 1.5x LCR delivered improved results and met frequency nadir requirements in the Mainland and South Australia island cases, it failed to do so in Queensland. Given that the design of Very Fast FCAS is a 'clean-slate' in terms of the timing specifications, these results indicate that a 2-second design would be quite inefficient in delivering on the technical requirements of Very Fast FCAS.

Table 2 FCAS services FOS performance

FCAS service	Mainland	Queensland	South Australia
R0.5 = 1x contingency	Pass	Pass	Pass
R1 = 1.25x contingency	Pass	Pass	Pass
R1 = 1x contingency	Pass	Pass	Pass
R2 = 1.5x contingency	Pass	Breach	Pass
R2 = 1.25x contingency	Pass	Breach	Breach
R2 = 1x contingency	Breach	Breach	Breach
R6 = 1x contingency	Breach	Breach	Breach