

INTERIM PRIMARY FREQUENCY RESPONSE REQUIREMENTS CONSULTATION FORUM NOTES

DATE: Monday, 20 April 2020

TIME: 3.30 pm

VIDEOCONFERENCE: Zoom

ATTENDEES:¹

COMPANY	NAME
AEMO	Mark Stedwell, Andrew Groom, Andrew Paver, Matthew Holmes, Evy Papadopoulos, Paul Johnson
Alinta Energy	Kunan Patel
Australian Energy Council	Duncan Mackinnon, Ben Skinner
CS Energy	Barry Downes, Henry Gorniak
Delta Electricity	Simon Bolt
Engie	David Hoch
Horizon Power	Shan Paramasibam
Hydro Tasmania	Peter Palencia, Lingxiao Situ
Infigen Energy	Joel Gilmore, Tahlia Nolan
InterGen	Francis Holmes, Bruce Powdrill
Origin Energy	Alex Fattal, Derek Freeman
Snowy Hydro	Nick Kamenyitzky, Greg Falconer
Stanwell Corporation	Nicholas Buckley, Trevor Johnson
Alinta Energy	M Scheebeli
Alinta Energy	J Mackenzie
Snowy Hydro	Manas Choudhary

The forum was organised by the Australian Energy Council (AEC) as part of AEMO's consultation on the draft Interim Primary Frequency Response Requirements (IPFRR). These notes are structured around a list of questions submitted by the AEC.

The numbers refer to the AEC questions. The blue text is AEMO's response to the question above it.

1. Clause 2 – Commence PFR > 0MW – The clause could be clarified further. For example, do the words "in accordance with its PFR Settings" imply a participant's obligations will include clause 4.2 Range of Response settings, in which case for some technologies, response is not required until above "Minimum Operating Level" and no exemption application for aspects of Clause 2 would therefore be required?

¹ There was a total of 30 participants for most of the time. Not all participants' names appeared are known as they were dialling by mobile.

AEMO agrees that it should be subject to section 4.2, as well.

- a. Can AEMO confirm whether or not this includes dispatch in the energy market and dispatch (AGC signal) into regulation markets, and that it does not include enablement in regulation markets and enablement in contingency markets?

New clause 4.4.2(c1) of the NER refers to a dispatch instruction to generate a volume greater than zero MW. AEMO understands this to refer to dispatch targets issued by NEMDE of more than zero MW, including for Regulation or Contingency FCAS.

- b. In addition to point a. if it does include an AGC signal, more clarity should be given here about the interaction of AGC signals and PFR. For example, if PFR requires reduction in output and AGC increasing output, should the response be the sum of the signals or should the AGC be discarded?

A generating system's response should be the sum of the AGC signals and PFR.

In response to an ad hoc question about the potential difficulty over the lag time of AGC signals, AEMO commented that the expectation was that there would be lower incidents of that lag having an impact if tighter frequency control were achieved and will consider how this could be expressed in the PFRR.

- c. Some wind technology will not provide frequency response until it reaches a minimum stable level (~10% of max capacity). A minimum load may also have to apply to wind technologies. Is AEMO aware of this?

Yes.

2. Clause 3.2 – The Rule 4.4.2A requires the PFRR to detail maximum deadbands that must not be narrower than the PFCB. The draft PFRR clause requires deadbands to not be wider than the PFCB. There would appear to be no scope in the draft Interim PFRR for compromise maximum deadband settings other than PFCB being acceptable if PFCB setting causes problems for the participant and/or AEMO as observed either in self-assessments or implementation. What is AEMO's viewpoint? Should the PFRR acknowledge this possibility in clause 3.2?

AEMO confirmed that the reference to 'wider' in section 3.2 should be 'narrower'. AEMO will amend this section to make it clearer.

- a. Section 4 of the draft Interim PFRR Appendix A allows participants to nominate an intermediate step to +/- 50 mHz. Will AEMO agree to extended delays for participants in moving to +/- 15 mHz or be accepting of wider deadbands without the need for exemptions?

Exemptions will be required only by those Generators whose plant cannot be made frequency responsive.

The program of changing settings including deadbands will be co-ordinated by AEMO and Generators notified under section 6.3 of the PFRR. Exemptions will not be used for this purpose.

- b. Will exemptions be required if AEMO determines that a wider deadband is required for specific affected GS? Does it need to be stated “unless approved under an exemption or variation”?

These situations will be addressed as variations.

3. Clause 3.3 - For all Affected GS, Droop must be set to less than or equal to 5%.

- a. Frequency Control clause S5.2.5.11. in a GS performance standard may have a droop higher or lower than the PFRP droop requirement of 5%. Can the PFR droop setting be set differently to the droop setting nominated in a GS performance standard?

The majority of generator performance standards (GPS) do not specify a droop setting. Where they do, or there might be some other inconsistency, there will be a need to vary the GPS.

AEMO commented that clause S5.2.5.11 has traditionally been difficult for Generators to translate into control settings.

- b. In the droop calculation, deltaF is defined as the freq deviation beyond the limits of the PFCB. Does this imply that deltaF is the actual frequency minus 50.015Hz or 49.985Hz as opposed to actual frequency minus 50Hz?

The change in frequency should be measured from the edge of the deadband.

In response to an ad hoc question about the droop being relative to P_{max} , AEMO advised that the requirement be applied per operating generating unit and asked for Consulted Persons to submit other parameters, if they considered them to be more appropriate.

4. Clause 3.4 – Response Time.

- a. This clause may best be suited in section 4 of the PFRR. Response times will be complex to commit to due to too many variations resulting from Network and plant conditions. 10s will not be achievable in all cases and as the clause permits, is only required for “a sufficiently large change in frequency, less than or equal to 0.5 Hz”. Applying the words “should be capable” suggests there ought to be no consequences where the response time is not achieved. Hence the requirement should be moved to section 4. What is AEMOs viewpoint?

AEMO will consider this.

- b. The words “ greater than the Affected GS’ Deadband and less than or equal to 0.5 Hz”:

- Can AEMO explain the relevance of the 0.5 Hz?

This is the level of change the FCAS markets are designed around.

- Is it fair to say that when demonstrating this capability, a frequency of 50.14 to 50.5 Hz can be simulated to show that a -5% change in active power was reached within 10 sec and visa-versa for 49.86 to 49.5 Hz. (50.14/49.86 Hz are

the points above which the active power requirement is equal to or greater than $\pm 5\%$)

AEMO anticipates that physical tests will be required. Test can be demonstrated for a step response in either direction.

- c. If FCAS services are provided outside of the NOFB of 50.15 and 49.85 Hz, then the PFR requirement for active power would only be for the frequency range of 50.015 to 50.15 Hz (and 49.985 and 49.85 Hz) which equates to a max active power requirement of 5.4% Pmax raise and lower. What is AEMOs viewpoint of this interpretation?

This is not AEMO's interpretation. The response continues beyond these limits.

In response to an ad hoc question as to whether this is intended to overlap with FCAS, AEMO's response was that they are to work alongside each other. The new rule will apply all the time, not just where the FCAS market does not operate.

- d. There is no guidance provided for nominating/demonstrating the length of time sustained capability is provided. A GS may be able to only provide 3.5% change in active power with little to no sag over a 10 to 20 minute period, however it could provide a 20 to 30% change in active power for 16sec (10sec to get there + 6sec hold), which is a more likely requirement scenario. In the assessment process GS's may determine and nominate their longer time sustained capability as their PFR capability as opposed to of short time capability. Can AEMO comment and provide direction on this uncertainty?

There is no definitive answer. Generators who want to be paid for providing PFR through FCAS can use the Market Ancillary Service Specification (MASS) for guidance on the required speed, size and sustain time of response. The MASS will specify hurdles to overcome, and response must comply with the MASS. It is clear that a faster delivery of PFR than what is specified in MASS for Contingency FCAS will be important, in some areas, at some time. It is not clear whether using steam turbines to achieve this is the most appropriate way to do it. How each Generator changes its settings to provide PFR under the new rule will be up to them.

AEMO is interested in feedback from Generators as to what factors affect their decisions regarding speed, size and sustain time of response.

5. Clause 4 – There are foreseeable operational needs that will warrant Generators temporarily deactivating PFR such as:
- Some forms of testing including that which involved bidding inflexible
 - Automatically due to a Unit runback and control mode change to turbine follow mode, or
 - if an operator needs to manually turn it off to stabilize a unit.

Clause 4.3 should include "or unless limited by factors covered in 4.2". What is AEMOs viewpoint?

AEMO agrees.

- a. Will participants be able to propose to AEMO and TNSP operational tests that require temporary PFR deactivation in accordance with Rules such as 5.7.5 when operational needs require the PFR temporarily deactivated?

These types of situations do not warrant variations.

AEMO wants all affected generating systems to provide PFR unless this is not possible, typically due to short term operational conditions, limitations or requirements. AEMO does not intend to list every circumstance where a generating system might not be able to provide PFR.

- b. It is impractical to expect generators to notify AEMO let alone seek their agreement, every time PFR is turned off for short periods or trips off so it is suggested it should be unnecessary for participant to “provide evidence” as specified in clause 7.1.5 in such circumstances. What is AEMOs viewpoint? Does AEMO expect participants to process temporary deactivations as PFRR variations?

As above.

6. Clause 4.2 – Range of response –

- a. Does AEMO acknowledge that PFR will function with FCAS? If so, is it agreed that PFR need only provide the response that is effectively limited by a droop reaction to NOFB – PFR Deadband?

Yes, in response to first part of question, PFR will function with FCAS. In response to second part of question, no, if the question is suggesting that PFR is only provided up to the point where FCAS can be provided. As stated earlier, delivery of PFR should not be restricted only to frequency ranges were FCAS is not currently used to manage frequency.

- b. Many Units have Ride-through Performance Standards that end if a load rejection exceeds 30%. This is a natural limitation on instantaneous lower responses. Agreed?

Yes. PFR is not intended to require a generating unit to go beyond its existing load rejection capability.

- c. By definitions included in Rules proposals and determinations, PFR is meant to be “Fast-acting”. Many Units that don’t have stored energy, and the PFR does not require it, will therefore not be providing raise PFR. This is a natural limitation. Agreed?

Yes.

- d. Units that utilise stored energy will have limited stores of this energy. This will be natural limitation. Agreed?

Yes.

- e. Will Units that modify the storage of energy need to process a PFRR variation when there is no requirement for stored energy to be maintained under the PFRR?

No.

7. Clause 5.1 – self assessment due “xxx” business days from the commencement date of this document.

a. Can AEMO please clarify that the commencement of the process described by the document is the 4th June 2020? Or is it earlier?

The commencement date of the rule was not known when the draft was published. It is 4 June 2020.

b. What will the timeframe of the whole process look like? – in reading section 6, For example:

- i. Self -assessments are due in 60, 120 or 180 business days dependent on the Unit nameplate ratings of table 2 – are these deadlines therefore explicitly 28 August, 23 November 2020 or 18 February 2021? Or some other dates such as 1 December 2020?
- ii. AEMO assessment – Is there a total limit on AEMOs assessment? 20 days is specified in 6.3. Then there is 10 days for exemption where there is insufficient information in section 7.4.1.
- iii. AEMO timeframe if it requests further information during its activities of clause 6.3 is unknown but has 5 business days to request further information from receiving the Generator’s submitted self-assessment results under clause 6.1.
- iv. Generator provides the further information within 5 business days under clause 6.1(10 days if it is an exemption under 7.4.1?)
- v. AEMO has 20 days to provide a response, total or accumulating?
- vi. AEMO coordinates the commencement in blocks
- vii. If denied an exemption, what timeframes then apply?

AEMO will provide a diagram showing how the timeframes could work, while acknowledging that, with requests for extensions, it will look different for each Generator, and that coordinating changes across many generating systems will also affect any proposed timetable.

In response to an ad hoc question about the 5 business days for Generators to provide further information being too short, AEMO responded that Generators have been put on notice for some months about the need for technical information demonstrating PFR capability. In reality, the timeframe is much longer than 5 business days.

8. Clause 5.1 – assess the ability of each of its Affected GS to meet the PFRP and submit to AEMO the results of that assessment in the form shown in Appendix A:

a. Does this require running tests at the settings defined by the PFRPs and submitting results of these test?

The point of the self-assessment is for Generators to advise AEMO of their assessment of their plant's current capabilities. In principle, it is a desktop exercise.

It is not mandatory that tests be carried out before Generators complete the self-assessment. Testing could be carried out at a later stage.

If a Generator wishes to carry out testing at an earlier stage, and provide results of these tests with their self-assessment, they are welcome to do so. This earlier testing would support timely implementation of the new rule.

- b. What sort of detail is required for the assessments?

The footnote on the first page of the self-assessment form indicates the type of documents that might be relevant.

- c. What happens if the Generator assesses and demonstrates successfully that it does not have the ability to meet the PFRP but doesn't then seek an exemption from or variation to the PFRP?

The Generator will need to apply for an exemption, as well.

9. Clause 7.1.1 – "demonstrate this incapability no matter what changes are made"

- a. What level of evidence is AEMO expecting here? It is very hard to prove a negative. Would the original design incapability be sufficient?

AEMO wants Generators to explore all reasonable options before seeking to demonstrate infeasibility. With some plant, such as hydro, it might be demonstrated through design documentation, with others, it might be through technical specification from the manufacturer.

10. Clause 7.3 – With reference to question 4b above, what does AEMO see the variation process being used for?

As noted earlier, a variation will be required where plant can provide PFR but not in accordance with the parameters specified in the PFRR.

11. Clause 8.2.1 – Step Response Stability Test – Adequately Damped Formulae

Some participants may not have response spreadsheets that carry out this calculation to AEMO's expectations and therefore may determine the adequacy in variation to AEMO's understanding. Can AEMO provide spreadsheet arithmetic that performs the full adequate damping assessment required by the defined term?

AEMO expects Generators to check for stability of responses only.

In response to an ad hoc question that this requirement should be amended, AEMO replied that while 'adequately damped' is a defined term in the NER, its implementation is not a trivial exercise.

Further ad hoc question:

Generators would like an assurance that they will not be required to update their models.

AEMO understands that there are many control systems in generating systems for which AEMO has never had models and does not intend to seek models as part of this process.

If, however, control setting parameters are changed and AEMO already holds a model for that control system, AEMO expects the model to be updated with the new parameters.

Extension of deadline for submissions

AEMO advised that the deadline for submissions to the consultation will be extended to 8 May 2020.