**What is the Mandatory Primary Frequency Response rule?**

The Mandatory Primary Frequency Response (PFR) rule commenced on 4 June 2020 and can be found on the [AEMC website](https://www.aemc.gov.au/rule-changes/mandatory-primary-frequency-response).

The PFR rule applies to all Scheduled and Semi-Scheduled Generators (Affected Generators). The PFR rule will require all scheduled and semi-scheduled generating systems to respond to changes in power system frequency whenever they receive a dispatch target of more than 0 MW.

You should read the [rule and AEMC determination](https://www.aemc.gov.au/rule-changes/mandatory-primary-frequency-response), together with AEMO’s Interim Primary Frequency Response Requirements, to understand the detailed requirements. AEMO may allow exemptions or variations on limited technical feasibility grounds, as provided for in the rule and the Interim Primary Frequency Response Requirements (explained below).

**Do I need to make changes to my plant on 4 June 2020?**

No. Self-assessments, as described below, commence on 4 June 2020. Setting changes do not have to be made until the self-assessment process has been completed and AEMO has confirmed the PFR settings for an Affected GS.

It is important that changes are implemented in a managed way, to monitor and address the impacts on each Affected Generator’s plant, and the power system as a whole.

There are no other operational changes: Generators must seek AEMO’s approval before making changes to their frequency control settings, or before performing any testing.

**How and when will the PFR rule be implemented?**

AEMO has consulted on and published the [Interim P](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation)rimary Frequency Response Requirements (IPFRR), which provide information on the implementation of PFR settings to Affected GS. Implementation will occur in three tranches, based on the size of affected generating systems.

The first stage of implementation involves a self-assessment by Affected Generators of their plant’s inherent capability to deliver PFR, with proposed due dates shown below. The nameplate ratings relate to the registered capacity by DUID.

| **Nameplate Rating of Affected GS** | **Self-Assessment Due**  |
| --- | --- |
| >200 MW | 27 August 2020 (60 *business days* after 4 June) |
| Between 200 MW and 80 MW | 19 November 2020 (120 *business days*)  |
| <80 MW | 17 February 2021 (180 *business days*) |

AEMO will then review the self-assessment results and coordinate with the relevant Affected Generators to complete the process of making, testing and implementing any settings or control system changes needed.

**What do I need to do?** The PFR rule will require Affected Generators to make the MW output of their plant responsive to changes in power system frequency on an ongoing basis, but only to the degree this can reasonably be achieved.

First, you need to conduct a self-assessment of your plant’s inherent capability to deliver PFR, for each of your scheduled and semi-scheduled generating systems. This process includes your assessment of any control system or plant changes necessary to achieve the PFRR.

The [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) set out the information and evidence required, including a results template.

Generators are free to contact AEMO prior to submitting the results of their self-assessment, particularly where an exemption or variation is will be sought to ensure that sufficient information is provided to support it.

Self-assessment results should be submitted by the Registered Participant of an Affected GS. If not, the applicant (party submitting the results) should clarify the relationship between the Registered Participant and the applicant.

Once AEMO has reviewed the results of the self-assessments, AEMO will contact Affected Generators to coordinate the changes they need to make to implement the changed settings to their plant, and when. No changes should be made without AEMO’s confirmation of the PFR Settings and timing of the changes to be made.

**What if my plant is running at maximum or minimum output?**

The PFR rule does not require anyone to reserve generation capacity (headroom for raise or foot-room for lower) to provide PFR.

**What deadband settings do I need to apply?**

Plant will be required to respond to changes in power system frequency measured at the plant’s connection point where the change is outside a small band around 50 Hz, called a deadband.

The PFR rule states that the narrowest deadband AEMO can specify is ±0.015 Hz, which is AEMO’s target deadband.

An Affected Generator can operate its plant with a narrower deadband if it wishes to do so, as long as AEMO is informed of the settings.

**Do I have to operate at this very narrow deadband immediately?**

AEMO understands that some plant can meet the narrow deadband immediately, while others need to do it in two stages. The draft [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) give Affected Generators the option of narrowing their plant’s deadbands in one or two stages.

**What droop setting do I need to apply?**

The droop setting determines how much the MW output of the plant changes for a given change in power system frequency.

Droop should be no higher than 5%. A value below this is acceptable.

Different droop settings may be specified for different levels of frequency change, or for frequency above or below 50 Hz, subject to approval by AEMO.

Any droop setting should be continuous and not result in step changes in output as frequency changes above or below any particular level.

The droop setting should be based on the fixed MW capacity of the plant, rather than the variable, instantaneous MW output.

Where there is a partial, temporary outage of part of the Affected GS, resulting in a short-term reduction in MW capacity, Affected Generators are not required to increase the response from the remaining capacity of the Affected GS to compensate for this short-term reduction.

Where part of an Affected GS is exempted from a requirement to provide PFR, the MW capacity of that part of the Affected GS does not need to be considered when assessing droop. For example, the capacity of the steam turbine component of a combined cycle generating system does not need to be taken into account when determining droop settings.

**Does each generating unit have to be controlled within its droop capability?**

Some generating units under certain operating modes or those with inherent variability due to primary energy or fuel availability may, at times, change load in excess of their droop settings and limitations of response. In light of these limitations, AEMO does not expect every generating unit at all times to be controlled to within its droop setting and response.

**How fast should my plant respond to frequency?**

The [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) specify a response speed of a 5% change in output within 10 seconds. The frequency change required to drive this change is described in that document.

AEMO understands that there is a wide range of response capability across generation types.

Where plant is capable of a response speed above the required level, it should not be deliberately slowed to the required level.

**How long should my plant sustain its response to frequency?**

The response should be sustained as long as it is within the reasonable physical capabilities and mode of operation of the plant. As with all other requirements, this is subject to the safety and stability of the Affected GS.

**Do I need to install monitoring equipment? How will compliance with this rule be assessed?**

The PFR rule does **not** require new monitoring equipment, however, Affected Generators may install equipment to monitor their own performance and compliance with the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation).

Note that the metering requirements that apply to Generators wishing to enter the FCAS markets remain unchanged and are still set out in the [Market Ancillary Services Specification](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/ancillary_services/market-ancillary-service-specification-v50--effective-30-july-2017.pdf?la=en) (MASS).

AEMO will require sufficient documentation and test results that demonstrate whether the required PFR settings have been applied and are active. This could be in the form of written confirmation, along with test results from actual frequency response, or from an injected frequency step.

AEMO will use existing monitoring equipment, such as SCADA, high speed monitoring (HSM) devices, or similar, to assess compliance with the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) and may, at any time, request information from an Affected Generator about compliance.

**Can I be exempted from these requirements?**

Exemptions from the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) may be granted at AEMO’s discretion. Affected Generators will only be exempted if it is clearly demonstrated to AEMO’s satisfaction that one or more of the exemption criteria are met, and a variation is not reasonably achievable.

An Affected Generator seeking an exemption should clearly indicate the grounds on which the exemption is being sought.

Variations from the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) may also be granted at AEMO’s discretion, particularly where an Affected Generator can provide a material level of PFR but can only demonstrate partial compliance, and full compliance would impose excessive costs and delay implementation.

AEMO anticipates that variations are likely to be sought on the speed of response, or the ability of plant to sustain a change in output for a sustained change in power system frequency.

**I am a battery operator - what does this mean for me?**

The PFR rule will require you to make the output of your battery system sensitive to power system frequency whenever it receives a dispatch target > 0 MW. It does not require it to maintain any particular state of charge to allow for PFR.

**I am a wind farm operator - what does this mean for me?**

The PFR rule will require the output of affected wind farms to be sensitive to power system frequency, to the degree this can be reasonably achieved. It does **not** require any of the following:

* Headroom to be maintained.
* Curtailment (or "spill") of output to allow for increased output in response to low power system frequency.
* Any form of "synthetic inertia", or similar controls.
* Storage to be installed.

If output is curtailed due to network constraints, the wind farm may increase output above the curtailed level in response to low frequency conditions, based on the specified deadband and droop.

**I am a solar farm operator - what does this mean for me?**

The PFR rule will require the output of solar farms to be sensitive to changes in power system frequency, to the degree this can be reasonably achieved. The rule does **not** require any of the following:

* Headroom to be maintained.
* Curtailment (or "spill") of output to allow for increased output in response to low power system frequency.
* Storage to be installed.

If solar farm output is curtailed due to network constraints, the solar farm may increase output above this curtailed level in response to low frequency conditions, based on the specified deadband and droop.

**Can I recover the costs of these changes?**

You will not be able to recover the costs involved in making control settings changes to meet the PFR rule. If you think the changes you need to make will result in excessive costs, the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) explains how you might apply for either an exemption or variation.

**What does this mean for my causer pays factor?**

Existing processes for determining causer pays factors will continue to operate unchanged.

**Will this affect my GPS?**

It’s possible, especially if S5.2.5.11 of your GPS does not require a frequency response capability within the normal operating frequency band. We expect to discuss these on a case-by-case basis and make changes following consultation with each Affected Generator and connecting NSP.

**Will changes to my generating plant to meet the** [**IPFRR**](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) **trigger a clause 5.3.9 process?**

No. The PFR rule includes a new clause 5.3.9(a1) to confirm this clause will not apply. Changes are to be implemented through the process detailed in the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation),instead.

**What if I believe my plant can't meet these requirements?**

AEMO encourages Affected Generators to engage early with AEMO, rather than wait until the end of the self-assessment period. This will allow the best chance of reaching a solution or making an acceptable variation or exemption application, if appropriate.

**I am currently commissioning generating plant - what does this mean for me?**

If you are registered as a Scheduled or Semi-Scheduled Generator, the PFR rule applies to you. You should read the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) to understand how you are affected and then discuss with your connecting Network Service Provider and AEMO how you propose to implement the required PFR settings to your plant.

You should include tests in your commissioning program to confirm stable operation of your plant with settings that meet the PFR rule. This will avoid having to undertake testing later if there is a delay between commissioning of your generation and the required implementation date for PFR.

Affected GS will be required to implement PFR settings by the required implementation date for the PFR settings (by tranche), or reaching a MW commissioning hold point above the minimum level for the relevant generation tranche, whichever occurs later.

Required implementation dates for generation in tranche 1 (DUID above 200 MW) will be prior to Summer 2020-21. Implementation dates for tranche 2 (DUID 80 – 200 MW) and tranche 3 (DUID < 80 MW) have not been determined at this time, however they will not be earlier than mid December 2020, and mid March 2021.

An Affected Generator is free to implement PFR settings earlier, provided the date is agreed with AEMO.

**I am currently developing a new project – what does this mean for me?**

If you intend to be registered as a Scheduled or Semi-Scheduled Generator, you should read the [IPFRR](https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements-document-consultation) and then discuss with your connecting Network Service Provider and AEMO how you propose to implement the required PFR settings to your plant.

**Who do I contact to discuss how this Rule impacts my plant?**

The best way to get assistance on PFR matters is to send your enquiries via email to pfr@aemo.com.au