

# Frequency Performance Payments (FPP) Frequently Asked Questions (FAQ)

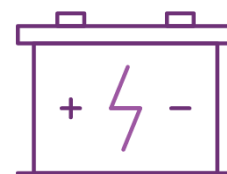
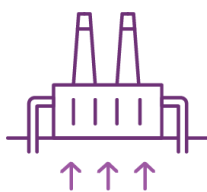
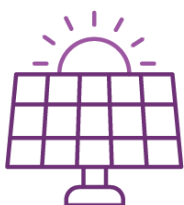
## Executive Summary

This FAQ has been developed as stakeholder resource for use during the implementation of the FPP Reform. There are answers provided to 47 important questions, as listed in the contents, about the basis for the reform, how the new arrangements will work, the period of non-financial operation, project timeline and other ways to engage with the implementation process.

This FAQ will be maintained as a living document and updated as stakeholders ask new questions and the reform process progresses.

This FAQ is part of a suite of resources that AEMO has developed to assist stakeholders to navigate the FPP implementation process. All resources are available on, or from, the [FPP project page on AEMO's website](#).

Any questions about the FPP reform can be directed to [NEMReform@aemo.com.au](mailto:NEMReform@aemo.com.au).



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## Version History

Version	Date	Summary of changes
1.0	16 February 2024	First issue



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# Frequently Asked Questions (FAQs)

FAQs are presented across five topics:

1. **Overview of the FPP reform**, including its origins, intended purpose and expected impacts.
2. **Measurements and calculations** used in the new system, including in determining the different contribution factors (CFs) used to allocate incentive payments and penalties.
3. **Non-financial operation (NFO)**, including its purpose and timing.
4. **Implementation of the FPP reform**, including how stakeholders can participate in the process at varying levels.
5. **Further information** that is available to participants and other stakeholders, including detailed specific documents and other resources.

AEMO intends to add more questions and answers to this document, as additional elements requiring explanation are revealed through stakeholder inquiries.

## 1. Overview of the FPP reform

### Who made the decision to introduce the FPP reform?

The Australian Energy Market Commission (AEMC) recognised the need for a new framework of incentives for NEM participants to improve their provision of primary frequency response (PFR). The AEMC made a final determination in [the Primary Frequency Response Incentives rule change](#) on 8 September 2022.

The AEMC mandated a suite of measures, intended to:

- “give AEMO the tools it needs to manage the secure operation of the power system” in accordance with the FOS
- “deliver more efficient operation of power system plant and encourage innovation and investment in new capability to help control power system frequency, thereby lowering costs for consumers over the long term”, through a system of incentives and penalties based on individual unit performance.

The AEMC characterised the changes as fitting into three categories:


1. **The extension of mandatory PFR requirements** for all scheduled and semi-scheduled generators and scheduled loads (removing an existing June 2023 sunset to such arrangements).
2. **Introducing the new FPP process**, which creates a new double-sided system of incentive payments and penalties based on units’ impact on system frequency.
3. **New reporting obligations** on AEMO and the Australian Energy Regulator, related to reporting on the aggregate level of frequency response and the total cost of the scheme.<sup>1</sup>

### Why is the FPP reform needed?

Frequency can be thought of as the ‘speed’ at which a power system operates. System frequency varies whenever the electricity supply does not exactly match consumer demand. Stable frequency is a fundamental

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<sup>1</sup> AEMC, Primary Frequency Response Incentive arrangements - Final Determination, 8 September 2022, p1.



requirement to maintain the secure operation of power system. The changing National Electricity Market (NEM) generation mix and increasing number of inverter-based resources such as large-scale wind and solar farms, as well as the high uptake of rooftop PVs, make maintaining the supply-demand balance more challenging. Consequently, keeping the frequency within a limited range around its nominal value has become more difficult. This means new measures are required to support the operation of the power system in accordance with the standards stipulated in the Frequency Operating Standard (FOS).

The new arrangements encourage all facilities to operate in a way that helps maintain power system frequency within the normal operating band, at the lowest cost to consumers.

### **What are the elements of the new FPP system?**

As outlined in the FAQ “Who made the decision to introduce the FPP reform?”, the AEMC characterised the new FPP system as one of three elements of the PRF incentives rule change. The new FPP process, one of those elements, is itself divided into two parts, being to:

- Introduce a new system of incentives and penalties that will see scheduled generators and semi-scheduled generators, scheduled loads and semi-scheduled loads either receive or be liable for payments, based on whether they have had a helpful or unhelpful impact on system frequency. These are the frequency performance payments that give their name to the overall reform.
- Use the CFs determined for FPPs, which are calculated for every five-minute interval, to allocate the cost of Regulation Frequency Control Ancillary Services (FCAS). The cost of Regulation FCAS is currently allocated via the Causer Pays framework.


### **Where does the new bucket of money come from and how is it allocated?**

The new FPP process is a financial mechanism to incentivise plant behaviour that helps to control power system frequency. Participants that have a helpful impact on system frequency will receive payments, while those that have an unhelpful impact will pay penalties. The total amount of penalties equals that of incentives in each five-minute interval. The total amount of FPPs is determined based on the price of Regulation FCAS and the size of helpful response by units. Effectively, those facilities that have a helpful impact on power system frequency receive payments, which are funded by the penalties paid by facilities that had an unhelpful impact on power system frequency.

### **What changes are being made to Causer Pays?**

The cost of Regulation FCAS is currently allocated to market participants using the methodology known as Causer Pays. Under Causer Pays, if a unit has more unhelpful frequency performance than helpful, then it is charged a share of Regulation FCAS costs. If a unit has more helpful frequency performance, it can avoid paying for Regulation FCAS. The share of each market participant (contribution factor) is multiplied by the cost of Regulation FCAS to calculate a debit amount in settlement. The performance of units for a market participant is assessed over a 28-day period and the determined contribution factor is applied for 28-days. The same factor applies to both Raise and Lower Regulation FCAS.

The FPP reform will completely replace the current Causer Pays methodology with new arrangements, under which:

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- The Regulation FCAS costs used in a trading interval will be allocated based on negative contribution factors determined for the trading interval.
  - The Regulation FCAS costs not used in a trading interval will be allocated based on default contribution factors, which are intended to reflect the longer-term historical performance of a facility.

### Who will be the winners and losers of the new scheme?

The new arrangements are designed to promote the provision of good frequency control in the NEM at the lowest cost to consumers. This is achieved by more clearly pricing the impact of helpful and unhelpful behaviour by facilities and providing information about performance in a timeframe that allows for plant operators to respond to these price signals.

Facilities behaving in a way that is helpful for system frequency – including by closely following their expected output trajectory or by providing PFR – are expected to see positive FPP flows.

Facilities that experience variable output, especially generation that falls short of forecasts levels, are likely to be liable for FPP penalties, as well relatively higher liability for Regulation FCAS costs.

### How can a participant improve their FPP outcomes?

Under the FPP reform, market participants will be rewarded for helpful performance and penalised for unhelpful performance. The amount debited is strongly linked to how closely a unit's output follows its expected trajectory. Facilities that deviate from their Reference Trajectories in an unhelpful manner can expect to receive FPP penalties.

Market participants can improve the alignment of a unit's behaviour with its Reference Trajectory through the options listed below.

- Capital investments in technologies that are able to follow plant's set points more closely and/or provide primary frequency response would improve the FPP outcomes of variable renewable energy (VRE) facilities such as solar and wind farms. For example, the helpful performance of a co-located battery can compensate for the variation from solar/wind farms, especially when their generation falls short of forecasted output (i.e. “firming” the renewable output).
- Increasing their headroom to compensate for the inherent limitations on forecasting VRE output. If facilities have a larger buffer for when they cannot meet their targets, they can reduce the degree to which they deviate from their reference target at that time.
- Improving the accuracy of their self-forecasts. The expected output provided to AEMO by participants who self-forecast directly impacts their Reference Trajectory, other than when there are limitations in the network. The more accurate these forecasts are to their actual output the smaller their deviations.

## 2. Measurements and calculations

### How are FPPs calculated?

The process runs every 5 minutes to ascertain the FPP trading amounts and the allocated Regulation FCAS costs for each unit in the past trading interval.

- AEMO evaluates the performance of a unit based on whether it behaved in a way that helped to correct power system frequency towards 50 Hz.
- The unit's performance is used to calculate a CF. This CF is between -1 and 1, with negative values indicating an unhelpful response and positive values a helpful one.
- AEMO also uses the historical performance of the unit to determine a Default Contribution Factor (DCF).
- To assign a monetary value to the unit's performance for FPP, AEMO multiplies the CF by a scaling factor, which is the system's valuation of frequency response within the trading interval.
- Finally, AEMO uses both the CF and the DCF to determine the allocated Regulation FCAS costs for the unit.

The figure below illustrates the calculation overview workflow.

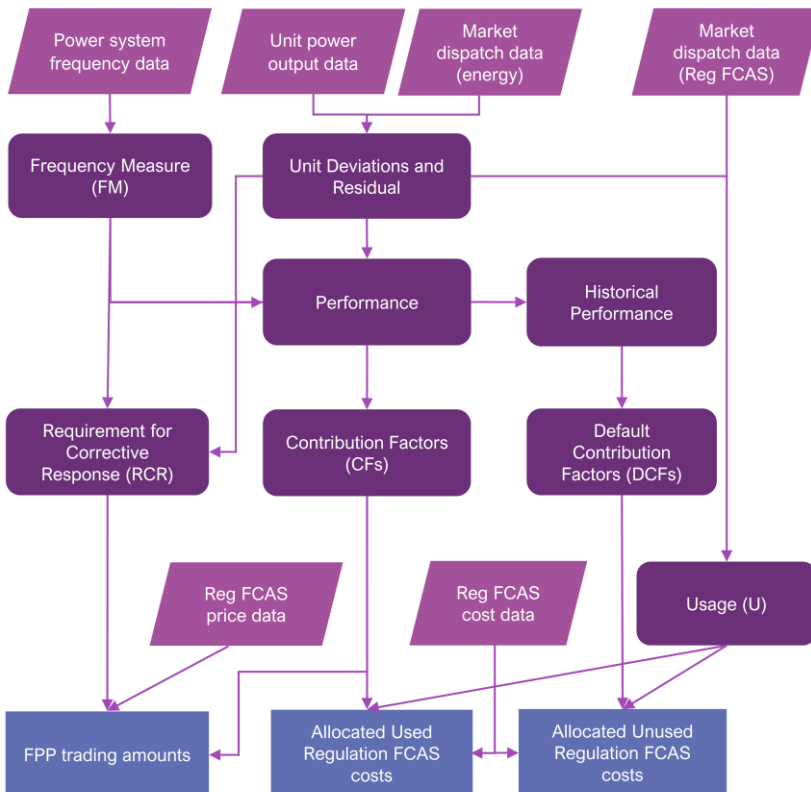


Figure 1 Flow chart of the FPP process





## How is Performance calculated?

Performance refers to the degree to which a unit contributes to the need to raise or lower the frequency of the power system. For each unit, AEMO calculates two performance values every 4 seconds – one for when there is a need to increase the system frequency and the other for when there is a need to lower the system frequency. The aggregates of these 4-second performances respectively form the unit's Raise and Lower Performance over the 5-minute trading interval. A unit's 4-second performance is calculated based on the Frequency Measure (FM) and the deviation of the unit from its Reference Trajectory.

Further details on the formulation of Raise Performance and Lower Performance can be found in Sections 6.2.1. and 6.2.3. of the FCFP respectively.

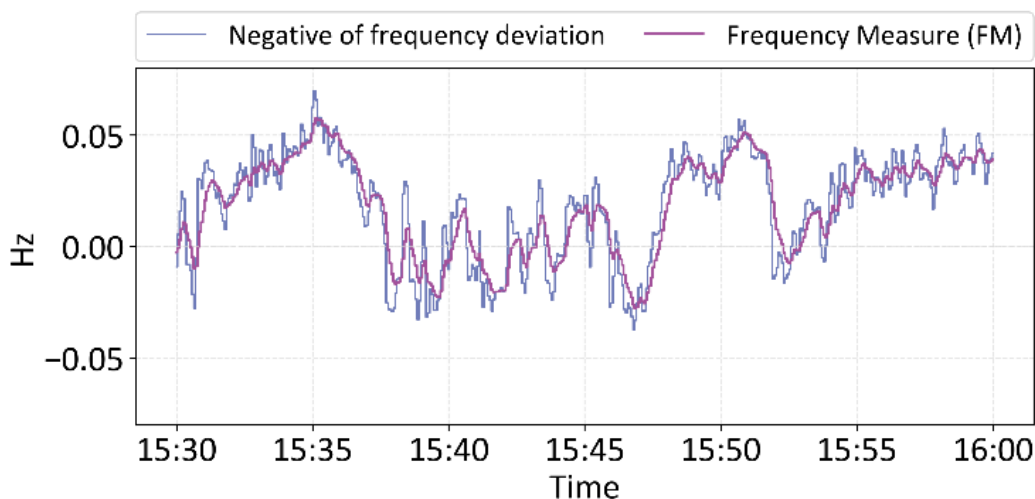
## What is the Frequency Measure (FM)?

Frequency Measure (FM) reflects the need to raise or lower power system frequency towards 50 Hz:

- A positive FM means the frequency should be increased.
- A negative FM means the frequency should be decreased.
- The larger the FM, the bigger the need.

## How is the Frequency Measure calculated?

For every region, an FM value is calculated at each 4-second interval, using the frequency deviations (difference between instantaneous frequency and 50Hz) within that region. The figure below shows the frequency deviations and FM of a region over six trading intervals.



**Figure 2** Example regional frequency deviation and frequency measure

Further details on the formulation of FM can be found in Section 4.1 of the FCFP.



### What is a Reference Trajectory?

A unit's Reference Trajectory shows its expected active power output or consumption. Simply put, it is a straight line between two dispatch targets five minutes apart.

### What is an example of a units Reference Trajectory?

The Reference Trajectory of Scheduled and Semi Scheduled units is a straight line between the previous and current dispatch targets.

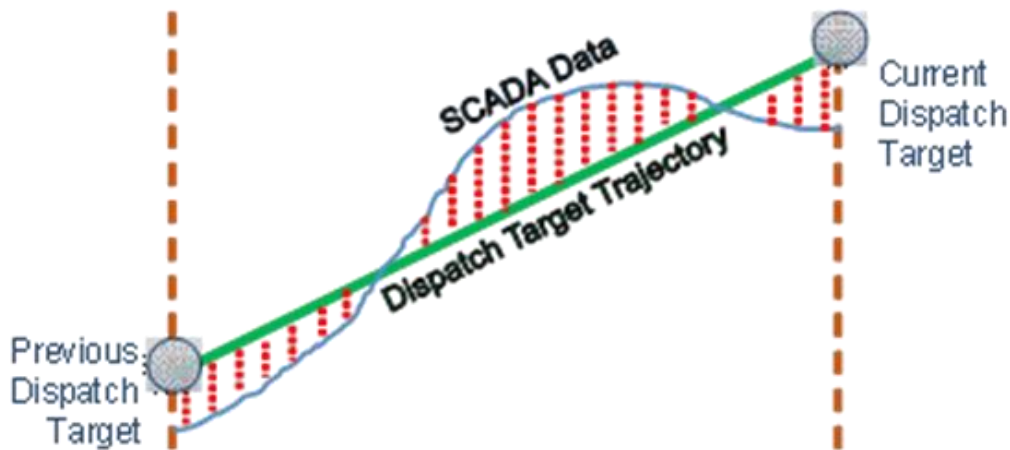


Figure 3 Reference trajectory of a scheduled unit

The Reference Trajectory of Non-Scheduled units is a continuation of the unit generation at the start of the current trading interval.

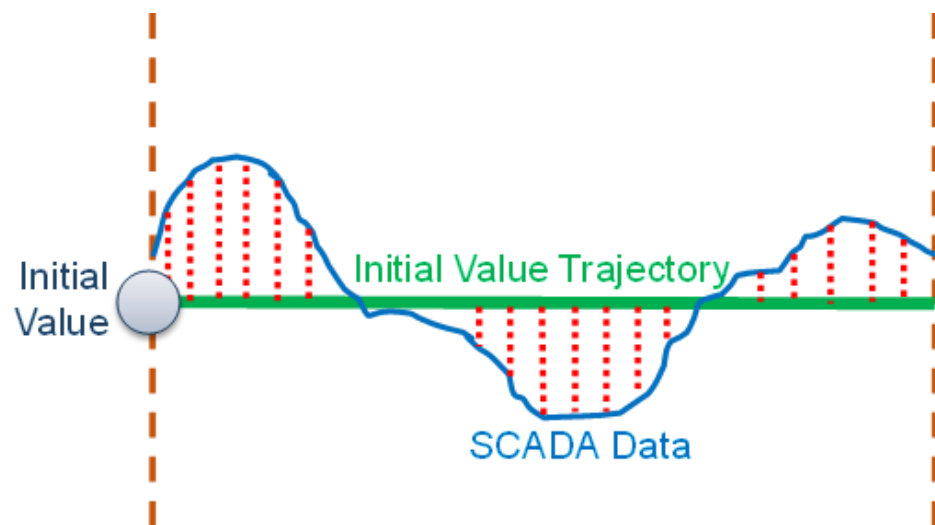


Figure 4 Reference trajectory of a non-scheduled unit



### What is unit deviation?

AEMO calculates 4-second unit deviations (in MW) by comparing SCADA measurements against its Reference Trajectory. The sign of deviations is always with respect to the relevant region – a positive deviation is one that increases the net amount of energy within that region (more generation or less load), and a negative deviation has the opposite effect. The figure below shows the Reference Trajectory, 4-second SCADA measurements, and deviations of a unit over six trading intervals.

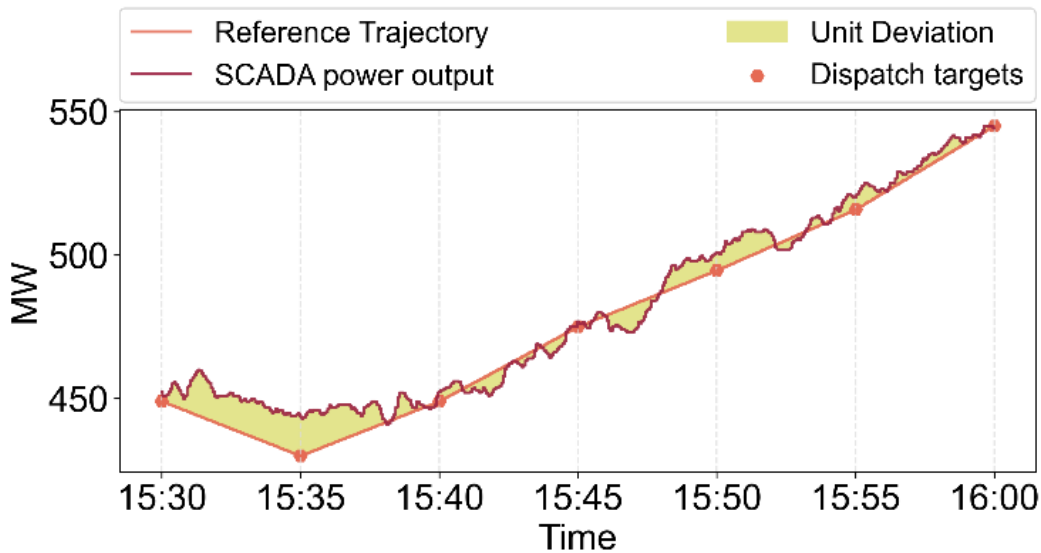
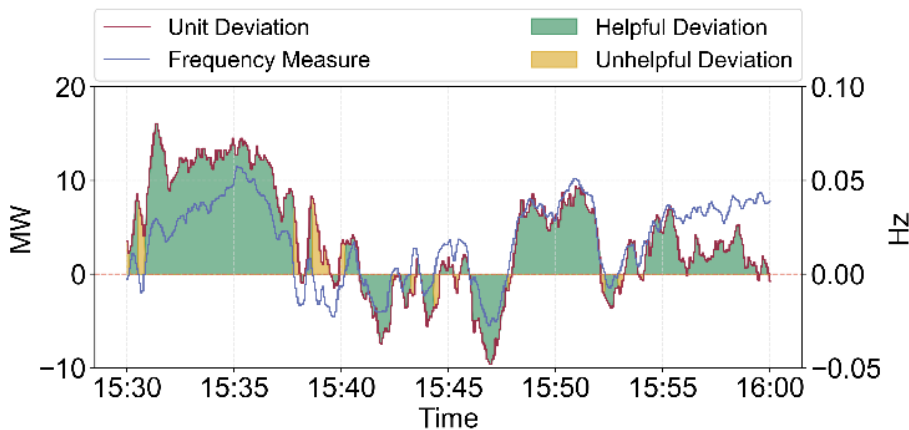


Figure 5 Example unit reference trajectory and deviation

Further details on the formulation of unit deviation can be found in Section 5 of the FCFP.

### Is a positive deviation always a good thing?

No, a deviation that shares the same sign as the FM is deemed helpful and results in good performance and vice versa for a deviation that opposes the FM. The figure below illustrates this for a generating unit with PFR capability over six trading intervals.



**Figure 6 Helpful/unhelpful unit deviation visual**

### What is a contribution factor?

A contribution factor reflects the extent to which the unit contributed to the helpful or unhelpful control of system frequency control.

### What is the difference between a negative and a positive contribution (CF) factor?

A CF is between -1 and 1, where:

Negative values show a unit’s unhelpful frequency performance and are used to determine penalties in the FPP system.

Positive values reflect a unit’s helpful performance in frequency control and are used to determine incentives in the FPP system.

### How is a contribution factor calculated?

In every trading interval, AEMO calculates a CF for a unit in relation to each Regulation FCAS Requirement that is related to the unit.

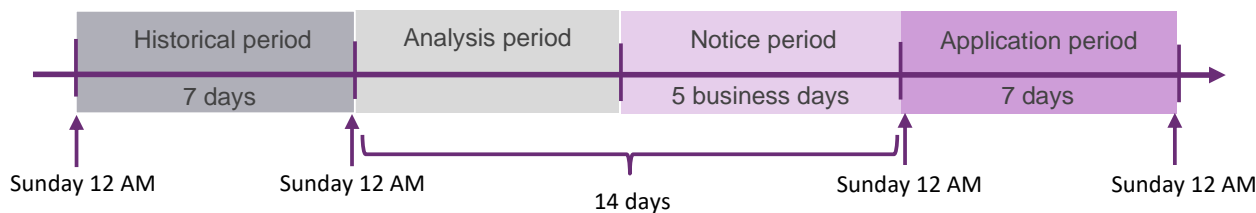
For each unit, within each trading interval and respective to a requirement, the CF of a unit is determined based on the Performance values as follows:

$$CF = \frac{\text{Unit's Performance}}{\text{Total Performance of all units in the requirement that have the same sign}}$$

Further details on the formulation of a unit’s Raise CF and Lower CF can be found in Sections 6.2.2. and 6.2.4. of the FCFP respectively.

### What is the historical performance period (HPP)?

A seven-day period, starting at 12:00 AM on a Sunday and ending at 12:00 AM on the following Sunday, which concludes 14 days prior to the commencement of the billing period, inclusive of the 5 business days’ notice period, as referred to in NER 3.15.6AA(i). The figure below illustrates the timing for of the HPP.



**Figure 7 HPP and DCF calculation timeline**

## What is Historical performance?

Historical Performance quantifies how helpful/unhelpful the unit's frequency performance was over the 7-day historical period (HPP).

## How is Historical performance calculated?

AEMO calculates Raise and Lower Historical Performances for each unit, every week, based on the unit's Performance values over a 7-day historical period.

Historical Performances are calculated differently for Regulation FCAS cost and FPP:

- For Used and Unused Regulation FCAS recovery: Performances at each 5-min interval in the historical period capped at zero, then averaged.
- For FPP: Performances averaged over the historical period, then capped at zero.

Further details on the formulation of default historical performance can be found in Section 6.4 of the FCFP.

## What is a default contribution factor?

A Default Contribution Factor is a contribution factor that is determined based on the historical performance of units.

Further details on the formulation of default contribution factors can be found in Section 6.4. of the FCFP.

## How is a default contribution factor used?

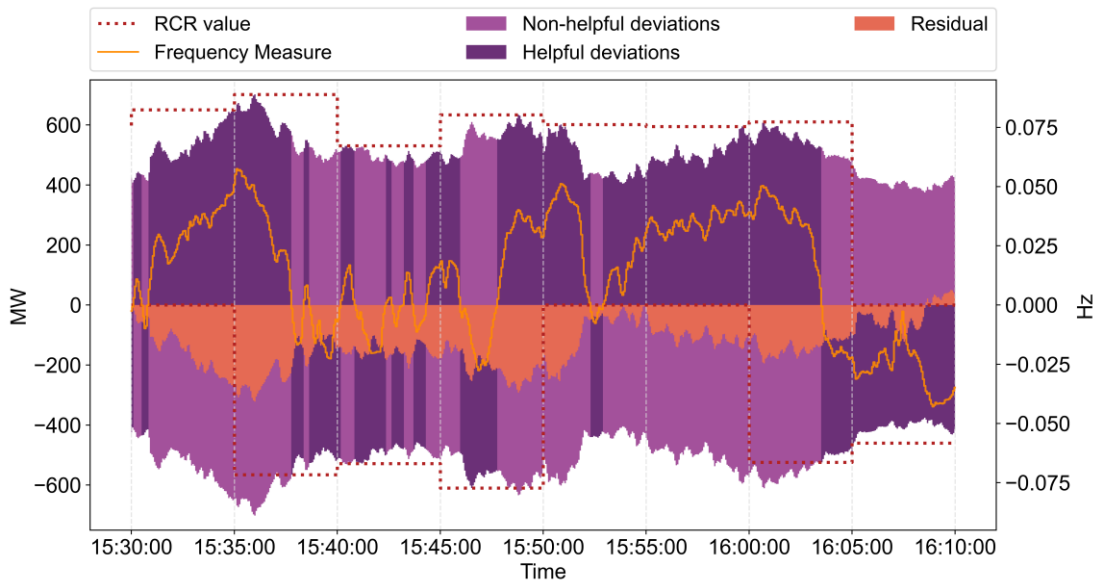
Default Contribution Factor are used in two different ways:

1. For Unused Regulation FCAS cost allocation, DCFs are always used.
2. For Used Regulation FCAS cost allocation and FPP, DCFs are used only when the performance of a unit cannot be calculated in a trading interval.

## What is the Requirement for Corrective Response (RCR)?

The RCR represents the peak volume of helpful response provided by all units in a given trading interval. An RCR is determined with respect to each Regulation FCAS Requirement and is used to scale the monetary value of FPP trading amounts.

The figure below depicts how the RCR corresponds to the maximum of the sum of all helpful deviations (including both units and Residual) during that interval.



**Figure 8 Visualization of Requirement for Corrective Response (RCR)**

Further details on the formulation of Raise RCR and Lower RCR can be found in Sections 7.3. and 7.4. of the FCFP respectively.

### What determines the total amount of FPPs in a trading interval?

The total amount of FPPs is calculated in each trading interval and with respect to each Regulation FCAS Requirement. AEMO determines a price for FPPs based on the marginal cost of each Regulation FCAS Requirement as determined by the market management systems. This price is then multiplied by the RCR to calculate the total amount of FPPs based on the amount of frequency response provided by eligible units.

### How is a unit's FPP trading amount calculated?

The FPP trading amount for units with appropriate real-time telemetry will be determined as:

$$TA = CF \times \frac{P_{regulation}}{12} \times RCR$$

Where:

*CF* - Contribution Factor.

*P<sub>regulation</sub>* - marginal cost of the Regulation FCAS Requirement.

*RCR* - Requirement for Corrective Response

## What is Usage?

Usage reflects the proportion of enabled Regulation FCAS that was used within a trading interval. Usage determines the percentage of Regulation FCAS costs to be recovered on the basis of NCFs and the percentage to be recovered on the basis of DCFs.

## How is usage calculated?

In each trading interval, Usage is calculated for each Regulation FCAS Requirement. Raise Usage is the maximum of the sum of units' positive deviations that are enabled for a raise Regulation requirement. Lower Usage is the maximum of the absolute sum of units' negative deviations that are enabled for a lower Regulation requirement.

Further details on the formulation of Usage can be found in Section 8. of the FCFP.

## How will Regulation FCAS costs be allocated under FPP?

Under FPP reforms, the cost of Regulation FCAS will be recovered from units that have unhelpful frequency performance. The trading amounts will be allocated based on the amount of enabled Regulation FCAS that was used and unused within a trading interval, as follows:

$$TA_{used} = TSFCAS \times U \times NCF$$
$$TA_{unused} = TSFCAS \times (1 - U) \times DCF$$

Where:

*TSFCAS* – the total cost of the Regulation FCAS requirement.

*U* – Usage. Usage reflects the proportion of enabled Regulation FCAS that was used within a trading interval.

*NCF* – Negative Contribution Factor.

*DCF* – Default Contribution Factor.

## Will the reform increase the cost of Regulation FCAS?

AEMO does not expect the reform to increase the price of Regulation FCAS itself.

The new FPPs will create a new bucket of money into which facilities with unhelpful frequency performance will pay. The amount of FPP costs in any five-minute interval will depend on the price of Regulation FCAS and the size of deviations of all units in the system from their expected generation / consumption (the bigger the deviations, the higher the FPP amounts).

As FPPs could be paid to any unit that has helpful frequency performance in a five-minute interval, each unit that pays for FPPs in some five-minute intervals will potentially receive FPPs in some other intervals, depending on its performance. This means, over time, a material amount of positive and negative FPPs for a unit will offset each other. This was explained to stakeholders at the FPP consultation briefing on 15 February 2023 through a historical analysis conducted by AEMO. The analysis showed while the total amount of FPPs could be the same size as Regulation FCAS costs, the net amount of FPP costs would be about 30% of the Regulation FCAS costs.



The actual size of the FPP costs will, however, depend on how generators change their behaviour in response to the signals that the new arrangements will produce. Because of this behavioural change element, as well as the ongoing changes in the generation mix, AEMO is not able to confidently model a final cost impact.

It is important to note that this cost increase is an intended outcome of the reform. Under the new arrangements, this cost would be paid to the units with helpful frequency performance. Over time, these financial incentives for helpful frequency performance should help the control of power system frequency at lowest overall cost to consumers.

### What is the Residual?

The Residual refers to all facilities connected to the grid without appropriate real-time telemetry (4-second SCADA measurements) including small consumers and distributed resources.

### How is the Residual Deviations and performance calculated?

Residual Deviation and Performance is calculated on a regional basis. Since the Residual does not have 4-second data, AEMO aggregates the Deviations of all units with appropriate metering and the interconnectors within the region, then takes the opposite of that sum to determine the Deviation of the Residual. Similar to the units, the Residual Deviation is used to calculate its Performance.

Further details on the formulation of Residual Deviation can be found in Section 5.3. of the FCFP.

### How is the trading amounts of units without appropriate metering calculated?

To find the FPP trading amounts of loads and generators that do not have appropriate metering (i.e., are part of Residual), AEMO distributes the trading amount of the Residual among them with respect to their total adjusted gross energy amounts (in MWh). On this basis, the trading amount of the unit will be determined as:

$$TA = RCF \times \frac{P_{regulation}}{12} \times RCR \times \frac{TE}{ATE}$$

Where:

*RCF* – Residual Contribution Factor.

*P<sub>regulation</sub>* - marginal cost of the Regulation FCAS Requirement.

*RCR* - requirement for corrective response.

*TE* – unit's energy (MW)

*ATE* - total energy (MW)

### How are regulation costs allocated to the units without appropriate metering?

To allocate the Regulation FCAS cost among loads and generators that do not have appropriate metering (i.e., Residual), AEMO distributes the allocated cost of the Residual among them with respect to their total adjusted gross energy amounts (in MWh). On this basis, the cost allocated to each unit is determined as:



$$TA_{used} = TSFCAS \times U \times NRCF \times \frac{TE}{ATE}$$

$$TA_{unused} = TSFCAS \times (1 - U) \times DRCF \times \frac{TE}{ATE}$$

Where:

*TSFCAS* – the total cost of the Regulation FCAS requirement.

*U* – Usage. Usage reflects the proportion of enabled Regulation FCAS that was used within a trading interval.

*NRCF* – negative Residual contribution factor.

*DRCF* – default Residual contribution factor.

*TE* – absolute value of unit’s gross consumed or generated energy amount (MWh)

*ATE* – sum of absolute value of gross consumed or generated energy amount for all units without appropriate metering (MWh)

### Do participants that are part of the Residual have their own contribution factors?

They do not receive a CF based on how helpful an impact they have had on system frequency in each five-minute trading interval. They do, however, receive DCFs, based on their energy consumption over a seven-day period (check/ref).

### How can facilities that are part of the residual get an individual CF?

In some instances, facilities may be able to arrange for the provision of real-time telemetry in order to have an individual contribution factor calculated, which may be more favourable than receiving a proportion of the Residual.

### What data will be reported to facility operators?

The economic theory behind the FPP reform relies on participants receiving very fast feedback (price signals) on their performance, potentially prompting a change in behaviour (that is more beneficial to power system frequency). At the completion of the FPP calculations for each five-minute trading interval, AEMO will provide all performance measurements and underlying calculations, as well as an estimate of financial outcomes (financial outcomes are not final until settlement and the end of each week). AEMO does not yet know how long each calculation will take.

The FPP Reporting Data Model technical specification (DM 5.3.1) will be published by 15 April 2024. In advance of the publication of that tech spec, AEMO has produced the [FPP high level technical data design document](#), to assist participant to understand the changes that will be introduced. The document includes:

- A succinct summary of FPP’s background and intended purpose, as well as how calculations will be done and the remaining stages of the implementation process.
- Column names, business rules and other information about the 15 reports AEMO will provide to participants, including at the completion of each 5min calculation.

- Information about what current reports will be altered or discontinued from 8 June 2025.

The FPP high level technical design document has been provided to assist participants to understand how their own systems will be impacted and commence the process of scoping, and potentially procuring, necessary changes to their systems, ahead of the release of the FPP Reports tech spec (DM5.3.1) in April 2024 (at which point the information can be considered final).

### 3. Non-financial operation (NFO)

#### What is FPP NFO?

The extended period of non-financial operation of the new FPP system is intended to allow market participants to familiarise themselves with its operation and see what FPP outcomes would result from actual performance, prior to the commencement of financial flows under the scheme.

NFO is intended to allow participants the opportunity to consider how they might respond to the price signals being produced by FPP, before the new rules take effect. Especially where facilities face poorer financial outcomes under the scheme, they should provide an opportunity for responses to these price signals to be explored before actual financial penalties take effect.

During NFO, the FPP calculation system will be in production. The FPP engine will use actual expected participant dispatch levels and actual performance to produce and report FPP outcomes. However, money will not be settled based on these calculations.

During NFO, Regulation FCAS will also continue to be recovered under the current Causer Pays arrangements.

#### When is the FPP NFO period?

NFO will begin on 9 December 2024, the day on which the new AEMO systems will be placed in production. The pre-production release for NFO will occur 25 October 2024.

#### Will Causer Pays continue during NFO?

Yes. The current Causer Pays arrangements for the recovery of Regulation FCAS will continue until 8 July 2025, including throughout FPP NFO.

#### Will FPP outcomes be included on settlement statements during NFO?

No, FPP amounts will not appear on settlements statements during NFO. AEMO is still developing the changes to settlements statements that will be made as part of the FPP reform. This detail will be provided to participants in the Settlements Reports Tech Spec (DM5.4), to be released on 22 September 2024.

## 4. Timeline

What is the timeline for the delivery of FPP?

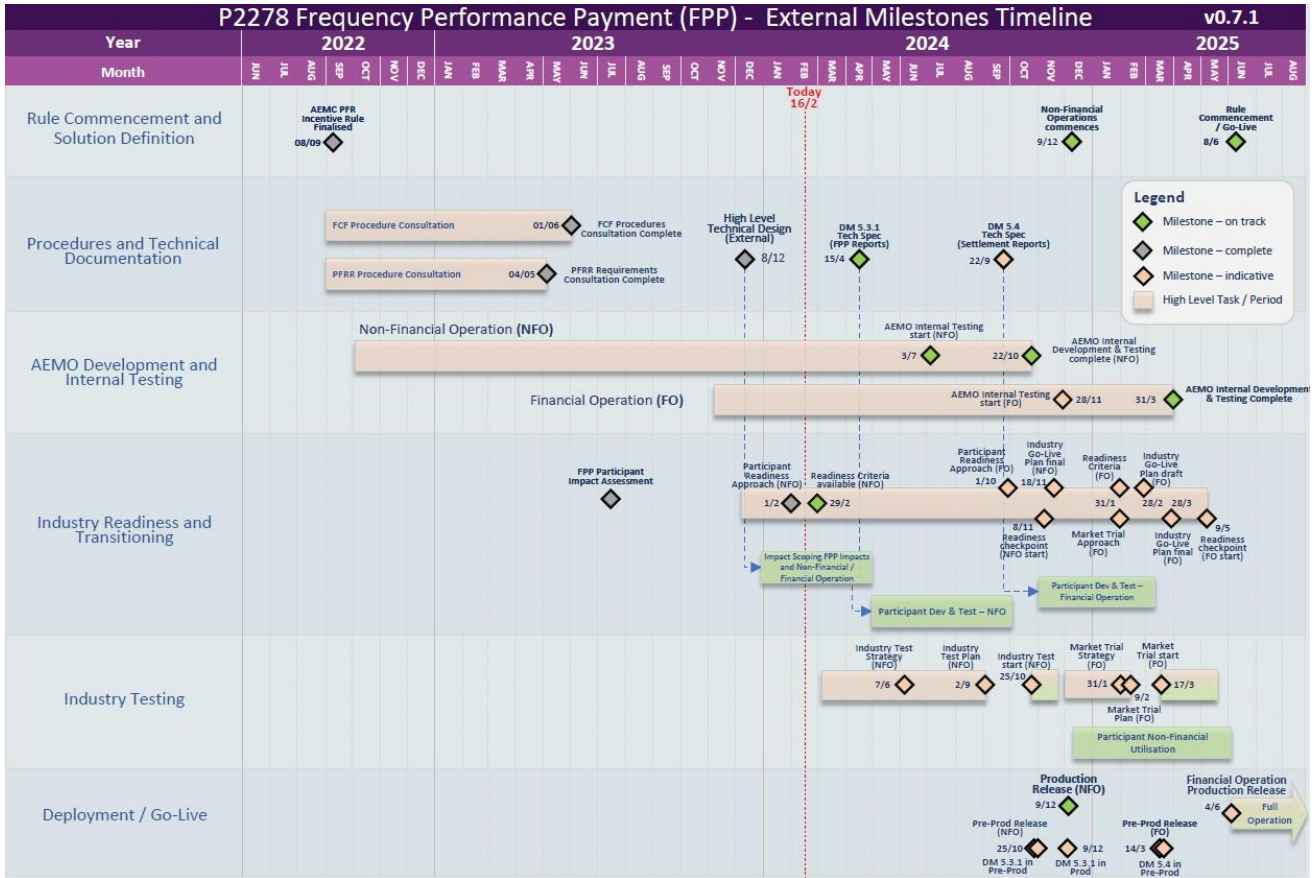


Figure 9 FPP implementation timeline

Figure 9, above, shows the FPP development and implementation timeline. The new arrangements are being implemented in two stages:

1. Release of the FPP calculation engine, which will take performance measurements from facilities, determine FPP outcomes and report these to facility operators as soon as the calculation is complete. This is referred to as non-financial operation (NFO) because the amounts determined by the FPP process will not be settled.

**NFO commences on 9 December 2024.**

2. **Go live of the FPP arrangements is 8 June 2025**, as specified in the National Electricity Rules. FPP outcomes will be settled from this date.

These milestones, as well as the interim steps leading up to them, are outlined above. AEMO will update stakeholders with any changes to the timeline via our regular monthly forums, via electronic correspondence and on the FPP project page on AEMO’s website.

## When will industry testing occur?

There will be two periods of industry testing: one for NFO and one for financial operation.

The first phase of industry testing will commence on 25 October 2024 and run until late November. The precise details will be contained in the Industry Test Strategy and Industry Test Plan, to be released on 7 June 2024 and 2 September 2024, respectively.

The second phase of industry testing is the FPP Market Trial ahead of full go live. The Market Trial is scheduled to commence on 17 March 2025 and run for around two months. The exact parameters of the Market Trial will be specified in the Market Trial Strategy and Market Trial Plan, to be finalised by 31 January 2025 and 9 February 2025, respectively.

The timeline above (Figure 9) includes an Industry Testing swim lane (second from bottom) with further details.

## 5. Resources and opportunities for engagement

### Where can I find more information about the FPP reform?

All AEMO resources related to the FPP reform are accessible on or from the Frequency Performance Payments project page, at <https://aemo.com.au/initiatives/major-programs/frequency-performance-payments-project>. More information about individual resources available on that page is provided under the next question, below.

All documents related to the AEMC process are available on the Primary Frequency Response Incentives Rule Change page, at <https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements>.

### What other resources are available?

Listed below are selected individual resources that are published on AEMO's FPP project page. Links are provided directly to individual PDFs of other resources.

Resource	Date published	Description
<b>Technical documents</b>		
<a href="#">High-level technical data design</a>	8 December 2023	Contains an advanced (but not final) version of the FPP Reporting data model. Intended to support participant planning of IT system development.
<a href="#">Frequency Contribution Factor Tuning Parameters and Input Sources</a>	1 June 2023	The Tuning Parameters and Input sources are variables in the FPP calculation process that are specified by AEMO under the FCFP and NER. AEMO has the power to vary these values.
<a href="#">Frequency Contribution Factors Procedure</a>	1 June 2023	The FCFP was developed and published in accordance with NER 3.15.6AA(f). It defines key elements of the FPP calculation process and methodology.

Resource	Date published	Description
<b>Readiness documents</b>		
<a href="#">Draft Industry Readiness Approach</a>	25 January 2024	Defines the criteria against go-live decisions will be made and forms the basis of participant readiness activities.
<b>Presentations</b>		
<a href="#">FPP Industry impacts and timings workshop</a>	4 September 2023	In this workshop, AEMO presented the expected impacts of the reform to industry stakeholders.
<a href="#">FCFP – Stakeholder technical workshop (reporting)</a>	28 February 2023	This workshop discussed how the data produced by the FPP calculation process would be reported. Now superseded by the High-level technical data design.
<a href="#">FCFP development technical workshop</a>	21 February 2023	An in-depth workshop with stakeholders as part of the development of the FCFP.
<b>Fact Sheets</b>		
<a href="#">Overview of the FPP reform</a>	8 December 2023	Provides a succinct overview of the FPP reforms
<a href="#">FPP calculations and participant outcomes</a>	8 December 2023	Provides a succinct summary of how the FPP calculation process will occur and how the reform will impact different participants.
<a href="#">First FPP fact sheet</a>	21 September 2022	Provides some additional background about the origins of the reform not in other fact sheets.
<b>Video explainers</b>		
Forthcoming at time of publication. Available via the FPP project page or AEMO’s YouTube channel, <a href="https://www.youtube.com/@AEMOenergy">https://www.youtube.com/@AEMOenergy</a>		

## How can I stay engaged with the implementation of the FPP reform?

As part of the NEM Reform Program, AEMO operates a number of stakeholder forums. The implementation of FPP is regularly discussed at the following open monthly forums:

- **Program Consultative Forum** (see: <https://aemo.com.au/consultations/industry-forums-and-workinggroups/list-of-industry-forums-and-working-groups/program-consultative-forum>)
- **Implementation Forum** (see <https://aemo.com.au/consultations/industry-forums-and-working-groups/listof-industry-forums-and-working-groups/implementation-forum>)
- **Electricity Wholesale Consultative Forum** (see <https://aemo.com.au/consultations/industry-forums-andworking-groups/list-of-industry-forums-and-working-groups/electricity-wholesale-consultative-forum>).

All presentations from previous forums are available on each of the above webpages.

To join the invite list for any of the above forums, email [NEMReform@aemo.com.au](mailto:NEMReform@aemo.com.au).



### How can I contact AEMO in relation to the FPP reform?

The best way to get assistance on FPP matters is to send your enquiries via email to [NEMReform@aemo.com.au](mailto:NEMReform@aemo.com.au). Please send any questions at any time and AEMO's experts will be happy to provide written responses or arrange discussions on any aspect of the reform.

# Glossary

Table 1 Glossary

Term	Definition
<b>Cost recovery market participant</b>	Collective term for the different categories of market participants who are subject to the NER. In the case of FPP, primarily generators, bi-directional units (such as energy storage systems) and some loads.
<b>CF (contribution factor)</b>	A factor calculated in respect of, and applied to, an eligible unit with appropriate metering.
<b>DCF (default contribution factor)</b>	A CF calculated and applied to an eligible unit with appropriate metering for either: the allocation of unused Regulation FCAS, or when AEMO is unable to determine an individual factor in a trading interval. Calculated from historical performance over a seven-day period.
<b>DRCF (default residual contribution factor)</b>	A DCF applied to the residual.
<b>Eligible unit with appropriate metering</b>	A generator or large load that will be assigned individual CFs (because it can provide the necessary data).
<b>FM (frequency measure)</b>	The indicator of a need to raise or lower frequency.
<b>FPP (frequency performance payment)</b>	A trading amount payable by, or to, a Cost Recovery Market Participant, determined in accordance with NER.
<b>NCF (negative contribution factor)</b>	A CF that is less than zero.
<b>NRCF (negative residual contribution factor)</b>	A residual contribution factor that is less than zero.
<b>Performance</b>	Collectively refers to Raise Performance and Lower Performance of all units.
<b>PFR</b>	Primary Frequency Response – the initial action by facilities to arrest a deviation in power system frequency.
<b><math>P_{\text{regulation}}</math></b>	The price of Regulation FCAS.
<b>RCF (residual contribution factor)</b>	The contribution factor calculated in respect of, and applied to, the residual.
<b>RCR (requirement for corrective response)</b>	The total volume in MW that contributed to reducing the deviation in frequency of the power system. The RCR is used to scale FPPs and is determined separately for trading amounts for regulating raise services and regulating lower services.
<b>Reference Trajectory</b>	The expected active power output or consumption of an eligible unit with appropriate metering.
<b>Residual</b>	All units without appropriate metering to record four-second unit performance
<b>Residual Deviation</b>	The aggregate deviation of the Residual.

<b>Term</b>	<b>Definition</b>
<b>Residual Performance</b>	The aggregate Performance of the Residual.
<b>SCADA</b>	Supervisory control and data acquisition.
<b>TSFCAS</b>	The total amount of Regulation Raise FCAS or Regulation Lower FCAS in a trading interval.
<b>Usage (U)</b>	The proportion of Regulation FCAS that is deemed to be Used Regulation FCAS,
<b>Unused Regulation FCAS</b>	Regulation FCAS that is deemed to be unused and for which costs are determined in accordance with NER 3.15.6AA(d).
<b>Used Regulation FCAS</b>	Regulation FCAS that is deemed to be Used and for which costs are determined in accordance with NER 3.15.6AA(c).