

Frequency Performance Payments (FPP) – High-level technical data design

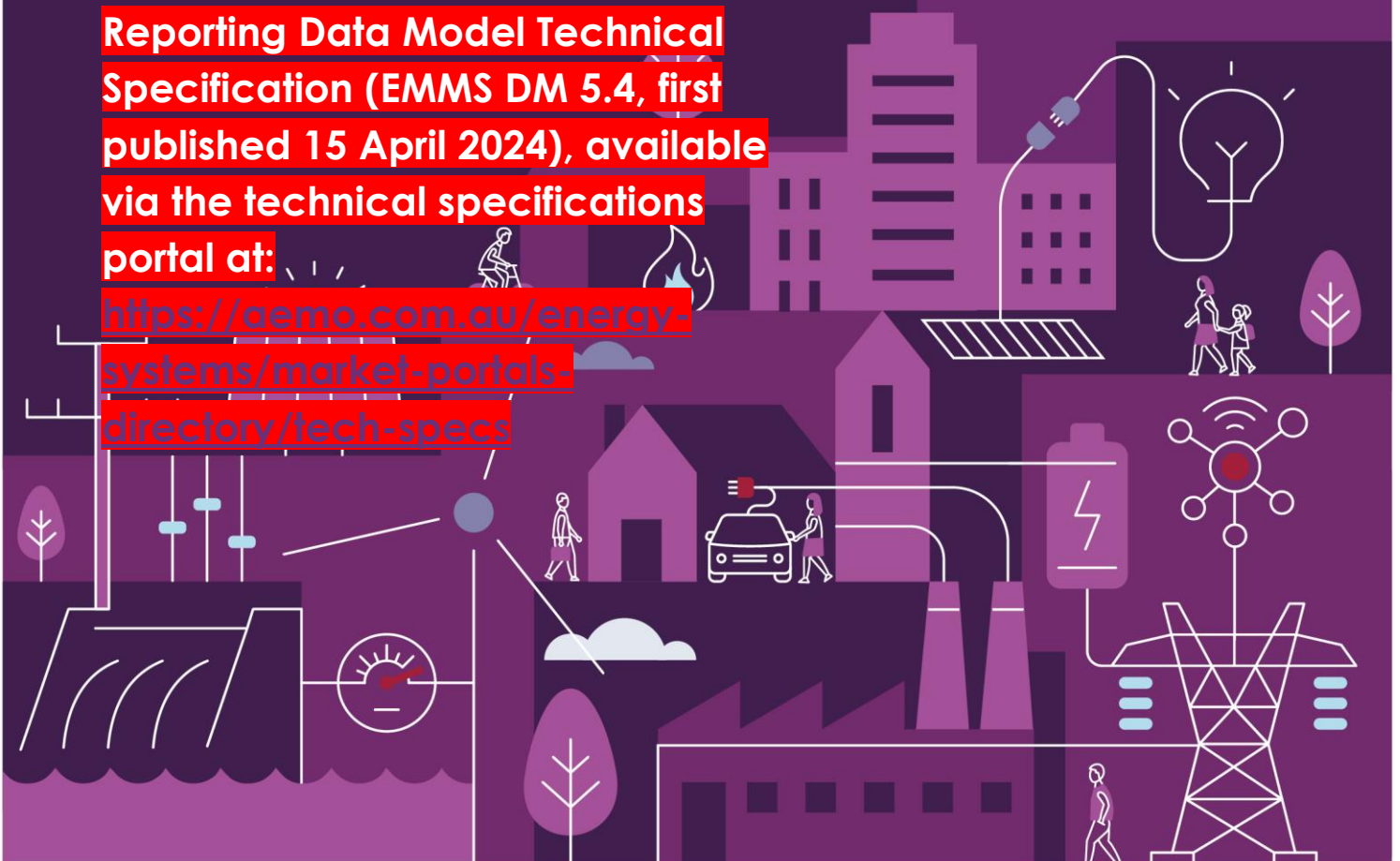
8 December 2023

A resource for NEM market participants and other stakeholders preparing for FPPs implementation

IMPORTANT NOTICE

This document has been SUPERSEDED. Please refer to the FPP Reporting Data Model Technical Specification (EMMS DM 5.4, first published 15 April 2024), available via the technical specifications portal at:

<https://aemo.com.au/energy-systems/market-portals-directory/tech-specs>





Important notice

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Contents

1.	Introduction	5
1.1	Background and context	5
1.2	Purpose of this document	5
1.3	Document outline	6
2.	Primary Frequency Response Incentive Arrangements rule change – purpose and key elements	7
2.1	Purpose of the new rules	7
2.2	Key elements of the new rules	7
3.	The FPP calculation process	9
3.1	Elements of the calculations	9
4.	FPP external reporting – indicative data structures	12
4.1	FPP reports	12
4.2	Settlements reports	31
4.3	Reports to cease from 8 June 2025	32
5.	Implementation	34
5.1	Indicative timeline	34
5.2	Non-financial operation	35
6.	Further information and engagement opportunities	36
6.1	List of relevant documents	36
6.2	How to stay engaged with the implementation of the FPP reform	36
6.3	Comments on this FPP external data model	37

Tables

Table 1	Key terms and elements of the FPP calculations	9
Table 2	Settlement equations	11
Table 3	Report 1 – FPP unit curated 4 second SCADA data	13
Table 4	Report 2 – FPP regional frequency and frequency measure (4 second)	14
Table 5	Report 3 – FPP unit performance (5 minute)	15
Table 6	Report 4 – FPP unit contribution factor (CF)	16
Table 7	Report 5 – Requirement for Corrective Response (RCR)	18
Table 8	Report 6 – Usage (U)	19
Table 9	Report 7 – FPP unit estimated cost	20



Table 10	Report 8 – Estimated residual cost rate	21
Table 11	Report 9 – Default performance factor	22
Table 12	Report 10 – Pre-dispatch unit estimated cost	24
Table 13	Report 11 – P5min pre-dispatch unit estimated cost	25
Table 14	Report 12 – Pre-dispatch residual estimated cost report	26
Table 15	Report 13 – P5 min residual estimated cost report	27
Table 16	Report 14 – Summary of FCAS requirement	28
Table 17	Report 15 – FPP calculation run	30
Table 18	EMMS Participant Portal Statements and Reconciliation files	31
Table 19	AEMO website and NEMWEB – expected changes	32
Table 20	FPP project milestones	34
Table 21	Relevant documents	36

Figures

Figure 1	Flowchart of the FPP calculation process	11
Figure 2	FPP project timeline	34

1. Introduction

1.1 Background and context

The National Electricity Market (NEM) is experiencing a period of significant change. The progressive replacement of thermal, synchronous generation with variable inverter-connected resources, such as wind, solar and batteries, makes the task of managing the power system securely more complex.

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

- Extend the requirement for all scheduled and semi-scheduled generators to provide automatic primary frequency response, PFR (by removing the sunset clause that would have seen that obligation lapse in June 2023).
- Introduce a new system of incentives and penalties that will see generators and 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 performance values 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.

1.2 Purpose of this document

This document offers stakeholders, especially NEM participants who will be affected by the changes, two resources:

- A succinct distillation of information about FPP, including the reasons for the new arrangements (section 2), key theoretical and operational parameters (section 3) and key dates (section 5).
- Provide a near-final version of the external FPP reporting data model (table structures), including the elements of Causer Pays reporting that will be discontinued (section 4).

Based on dialogue with participants, AEMO intends for this External High Level Design document to help participants understand and plan for system, process and operational changes that will commence with non-financial operation from December 2024 and take full effect from 8 June 2025. In particular, AEMO is providing the external reporting data model at this time, five months ahead of the April 2024 publication of the final technical specification for FPP reporting (DM 5.3.1), to allow participants to begin to plan and progress their own IT change requirements.

It is important to note, however, that the information regarding the FPP reporting data model contained in this document should be treated as subject to change. The final FPP reporting data model will be published in April 2024.



1.3 Document outline

The following sections of this document cover:

- Purpose of the new FPP regime – Summarises the AEMC’s stated rationale for, and intended outcomes from, this reform (section 2)
- The FPP calculation – Explains how the multiple elements of FPP will be derived, used and reported (section 3).
- Reporting data model – Provides the table designs that AEMO will be used to report all data to participants via NEM Reports (section 4).
- Implementation timeline – Provides key milestones, including commentary on key events (section 5).
- Other available information – Lists key documents related to the FPP reform (section 6.1).
- Feedback and engagement – Explains how stakeholders can provide comment on this document and remain engaged with the progress of the FPP reform (section 6.2-3).



2. Primary Frequency Response Incentive Arrangements rule change – purpose and key elements

The changes AEMO is implementing in the FPP reform initiative are the result of the AEMC’s final determination in the Primary Frequency Response Incentives Arrangements rule change.¹

This section summarises the AEMC’s stated purpose for the new PFR incentive arrangements and identifies the key elements of the reform.

2.1 Purpose of the new rules

As the adoption of inverter-based resources continues to increase, 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 AEMC mandated a suite of measures, outlined in section 2.2, below, which would both:

- “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.

2.2 Key elements of the new rules

The AEMC characterised the changes as fitting into three categories:

1. **The extension of mandatory primary frequency response 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 create 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 the aggregate level of frequency response and the total cost of the scheme.²

¹ See <https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements>. Final decision made 8 September 2022.

² AEMC, Primary Frequency Response Incentive arrangements - Final Determination, 8 September 2022, p1.



The focus of this high-level technical design is the implementation of initiatives in the second category. AEMO will use four-second supervisory control and data acquisition (SCADA) system data to measure the impact of each eligible market participant and assign contribution factors (CFs) to apply in each five-minute NEM dispatch interval. These CFs are then used to:

- Calculate outcomes in the two-sided FPP scheme, where penalties for market participants making unhelpful contributions to system frequency equal incentive payments to participants having a helpful impact, in each five-minute interval. This reform creates a new financial flow in NEM ancillary services.
- Allocate the cost of used Regulation FCAS, replacing the current Causer Pays arrangements that assign new CF once every 28 days.

The calculation of CFs is explained in further detail in the next section.

3. The FPP calculation process

This section identifies the factors and values used in the FPP calculation, as well as outlining the process by which AEMO will take measurements, produce input values and calculate final settlement amounts.

3.1 Elements of the calculations

The table below lists the different values that are used in the process, to determine and allocate both FPP and Regulation FCAS recovery. Please note that, to make this document as helpful as possible, the definitions below are more descriptive than those provided in the Glossary of the National Electricity Rules (NER).

Table 1 Key terms and elements of the FPP calculations

Term	Definition
Cost recovery market participant	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.
CF (contribution factor)	A factor calculated in respect of, and applied to, an eligible unit with appropriate metering.
DCF (default contribution factor)	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.
DRCF (default residual contribution factor)	A DCF applied to the residual.
Eligible unit with appropriate metering	A generator or large load that will be assigned individual CFs (because it can provide the necessary data).
FM (frequency measure)	The indicator of a need to raise or lower frequency.
FPP (frequency performance payment)	A trading amount payable by, or to, a Cost Recovery Market Participant, determined in accordance with NER.
NCF (negative contribution factor)	A CF that is less than zero.
NRCF (negative residual contribution factor)	A residual contribution factor that is less than zero.
Performance	Collectively refers to Raise Performance and Lower Performance of all units.
$P_{\text{regulation}}$	The price of Regulation FCAS.
RCF (residual contribution factor)	The contribution factor calculated in respect of, and applied to, the residual.
RCR (requirement for corrective response)	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



Term	Definition
	determined separately for trading amounts for regulating raise services and regulating lower services.
Reference Trajectory	The expected active power output or consumption of an eligible unit with appropriate metering.
Residual	All units without appropriate metering.
Residual Deviation	The aggregate deviation of the Residual.
Residual Performance	The aggregate Performance of the Residual.
SCADA	Supervisory control and data acquisition.
TSFCAS	The total amount of Regulation Raise FCAS or Regulation Lower FCAS in a trading interval.
Usage (U)	The proportion of Regulation FCAS that is deemed to be Used Regulation FCAS,
Unused Regulation FCAS	Regulation FCAS that is deemed to be unused and for which costs are determined in accordance with NER 3.15.6AA(d).
Used Regulation FCAS	Regulation FCAS that is deemed to be Used and for which costs are determined in accordance with NER 3.15.6AA(c).

3.2 Description of the FPP process

Broadly, the process undertaken for each five-minute trading interval is as follows.

1. For each eligible unit with appropriate metering (that is, units that will receive an individual CF), compare SCADA measurements with a Reference Trajectory to determine deviations from that trajectory. Calculate Residual Deviations based on the sum of deviations of eligible units with appropriate metering.
2. Determine the FM, which indicates whether there is a need to raise or lower power system frequency.
3. For each eligible unit with appropriate metering and the Residual, calculate Performance based on the FM and the deviations.
4. Calculate CFs for eligible units with appropriate metering and for the Residual.
5. Determine the RCR, which is then multiplied by Regulation FCAS Requirement price to calculate the total amount of FPPs for each Regulation FCAS Requirement.
6. Use the CFs for each Cost Recovery Market Participant to apportion FPPs.
7. Apportion FPPs to eligible units without appropriate metering pro rata, based on their total energy output (or consumption) and RCF.
8. Calculate Usage.
9. Apportion the cost of Used Regulation FCAS to each Cost Recovery Market Participant on the basis of NCFs.
10. Apportion the cost of Unused Regulation FCAS to each Cost Recovery Market Participant using DCFs.

Figure 1, overpage, shows the general workflow of this process, excluding the application of any exceptions.

Figure 1 Flowchart of the FPP calculation process

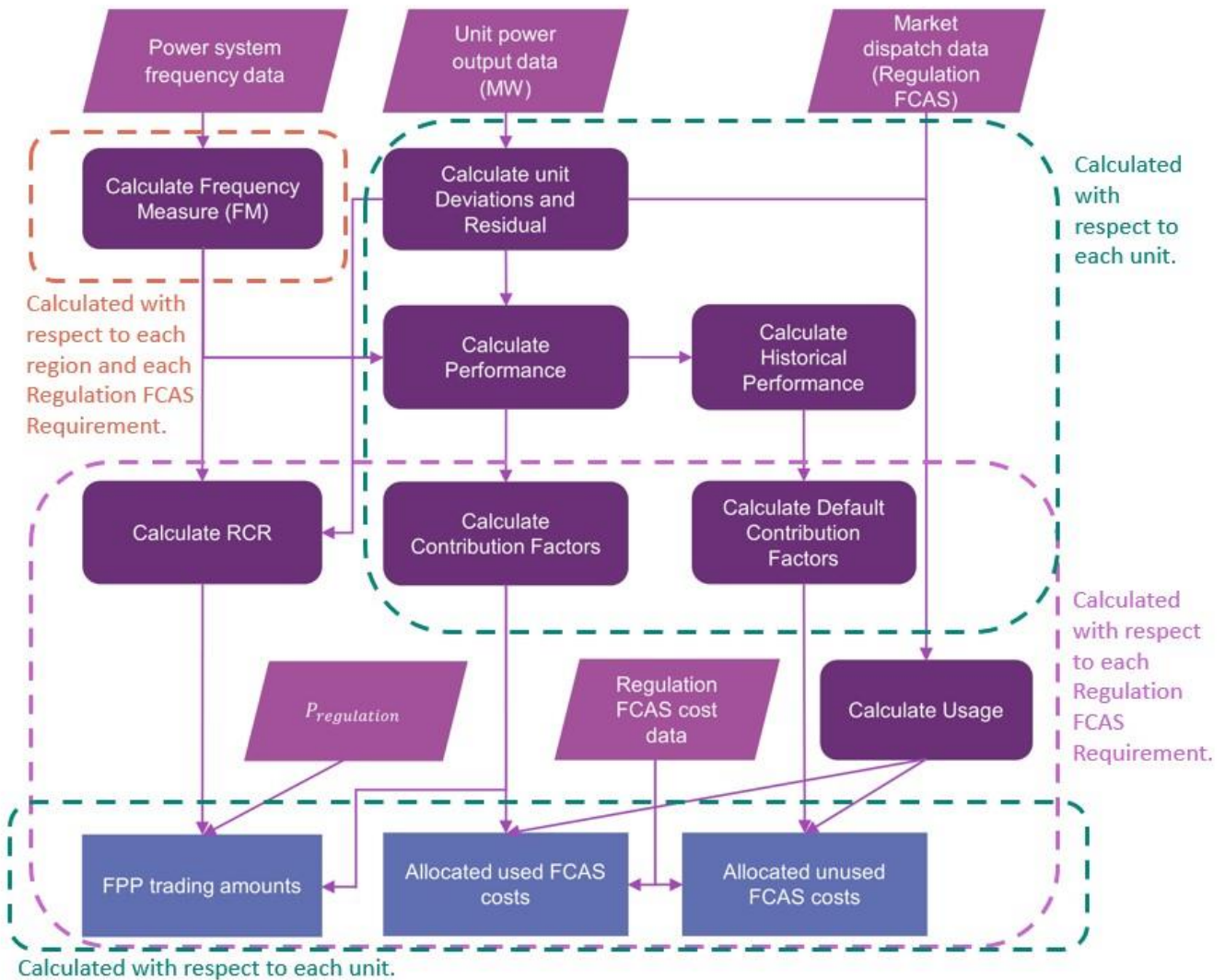


Table 2, below, details the equations that are used to determine the FPPs and the recovery of Regulation FCAS costs.

Table 2 Settlement equations

Trading Amounts	Eligible unit	Residual Deviation
FPPs	$TA = CF \times \frac{P_{regulation}}{12} \times RCR$	$TA = RCF \times \frac{P_{regulation}}{12} \times RCR \times \frac{TE}{ATE}$
Recovery of Used Regulation FCAS	$TA = TSFCAS \times U \times NCF$	$TA = TSFCAS \times U \times NRCF \times \frac{TE}{ATE}$
Recovery of Unused Regulation FCAS	$TA = TSFCAS \times (1 - U) \times DCF$	$TA = TSFCAS \times (1 - U) \times DRCF \times \frac{TE}{ATE}$

4. FPP external reporting – indicative data structures

The following information is provided to participants in good faith, to assist with their own architecture and design processes for the changes required for the FPP rule change on their side. The information and examples here are indicative in nature, and are subject to revision, additions and change before being published formally in the FPP reporting technical specification (5.3.1), which will finalise the data model including column naming, data typing and other information. AEMO plans to publish tech spec 5.3.1 in April 2024.

4.1 FPP reports

This section covers the reports that will be generated by the FPP relating to performance, frequency, contribution factors and financial estimates. It does not include settlements reports.

In reading the following tables, please note that:

- Dates and times will be aligned to the fixed UTC+10 time zone (as per the NER)
- Where dates have a time component these will aim to be represented in 24 hour notation down to the second level of precision (i.e. HH:MM:SS)
- “Private reports” mean that each participant will only have their own data visible to them. These will be delivered via the participant data model (to a separate folder in the participant file share) in AEMO CSV format unless otherwise specified.
- “Public reports” mean that all participants will be able to view all data. These will be delivered via NEMWEB in AEMO CSV format unless otherwise specified. Note that this is a file format change from the existing CSV files published via NEMWEB for Causer Pays.
- “Private until next market day reports” mean that these reports will be private in the current market day but will become “Public reports” the following market day. These will be delivered as per the method outlined above for “private reports” initially, and then the following market day, will be delivered as per the method outlined above for “public reports”.
- For further detail about the FPP calculations, interpretations of the meanings, and key terminology used, please see previous sections of this document, as well as the full details in the procedure document published previously.

- Version numbers in the FPP database are used to distinguish which is the most recent (i.e. highest version number). In some cases (called out in the below table) it is possible to have ex-post activities like recalculations which create new versions of calculation outputs (i.e. in the case of reruns).
- FPP will deliver some “financial estimates” which are provided as indications of the AUD amount based on performance. Settlement calculations and reports will determine the actual AUD amount required for settlement of participants frequency performance payments.
- Pre-dispatch (and P5min) financial estimates are provided as order of magnitude guides based on assumptions, i.e. that all regulation FCAS is unused.

Tables 3-17, below, provide details about the 15 different reports AEMO intends to provide to participants regarding FPP measurements and calculations (i.e., excluding settlements reports).

Table 3 Report 1 – FPP unit curated 4 second SCADA data

Report details	Report type and frequency
<p>This report will deliver the curated 4 second SCADA data for each FPP unit.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the curated SCADA data (DD/MM/YYYY HH:MM:SS) • FPP Unit ID (registered DUID/TNI) • Measured MW (4 second SCADA measurement in MW) • Scheduled MW (reference trajectory value from FPP calculation process) • Unit Deviation (output of the FPP calculation process) • Version (FPP run number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report will only include units that are ‘eligible’ and ‘included’ in the FPP assessment process. For further details please see the Frequency Contribution Factors Procedure. • This report is planned to be sent on closure of trading interval and completion of FPP calculation. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. • This report will not be impacted by FPP ex-post activities. 	<p>Private report until next market day</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>

Sample report					
Date and Time	FPP Unit ID (registered DUID/ TNI)	MEASURED_MW	SCHEDULED_MW	DEVIATION	Version
18/07/2021 11:00:04	DUID1	46.7000008	44.64845333	2.05154747	1
18/07/2021 11:00:04	DUID2	6.19999981	3.97044	2.22955981	1
18/07/2021 11:00:04	DUID3	86.5999985	86.68404	-0.0840415	1
18/07/2021 11:00:04	DUID4	-0.30000001	0	-0.30000001	1
18/07/2021 11:00:04	DUID5	57.7999992	57.50032	0.2996792	1
18/07/2021 11:00:04	DUID6	0	0	0	1
18/07/2021 11:00:04	DUID7	45	45	0	1
18/07/2021 11:00:04	DUID8	110.800003	116.8633867	-6.06338367	1
18/07/2021 11:00:04	DUID9	217.699997	233.2209333	-15.52093633	1
18/07/2021 11:00:04	DUID10	0	0	0	1
18/07/2021 11:00:04	DUID11	0	0	0	1
18/07/2021 11:00:04	DUID12	0	0	0	1

Table 4 Report 2 – FPP regional frequency and frequency measure (4 second)

Report details	Report type and frequency
<p>This report will deliver the curated 4 second frequency and frequency measurement data for each region.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the curated frequency measurement (DD/MM/YYYY HH:MM:SS) • Region ID • Frequency (4 second frequency in Hz for that region) • Calculated frequency measure for that region from FPP database • Version (FPP run number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report is planned to be sent on closure of trading interval and completion of FPP calculation. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. • This report will not be impacted by FPP ex-post activities. 	<p>Public report</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>

Sample report				
Date and Time	Region ID	Frequency	Frequency Measure	Version
14/08/2023 00:05:00	TAS1	49.997	-0.01238	1
14/08/2023 00:05:00	QLD1	49.964	0.015442	1
14/08/2023 00:05:00	NSW1	49.964	0.014613	1
14/08/2023 00:05:00	VIC1	49.987	0.006758	1
14/08/2023 00:05:00	SA1	49.993	0.006007	1
14/08/2023 00:05:04	TAS1	49.973	-0.00363	1
14/08/2023 00:05:04	QLD1	49.977	0.017122	1
14/08/2023 00:05:04	NSW1	49.978	0.016255	1
14/08/2023 00:05:04	VIC1	49.963	0.013479	1
14/08/2023 00:05:04	SA1	49.965	0.01245	1

Table 5 Report 3 – FPP unit performance (5 minute)

Report details	Report type and frequency
<p>This report will deliver the calculated performance value for each 5 minute trading interval for each FPP unit.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • FPP Unit ID (registered DUID/ TNI) • Raised performance value (calculated by FPP for that trading interval taken from FPP database) • Raise type category (this column shows if this value is live or default value appointment) • Lower performance value (calculated by FPP for that trading interval taken from FPP database) • Lower type category (this column shows if this value is live or default value appointment) • Version (FPP run number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report will only include units that are 'eligible' and 'included' in the FPP assessment process. • This report will show 'residual' value as separate unit in the report rows. • This report is planned to be sent on closure of trading interval and completion of FPP calculation. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. • This report will be impacted by FPP ex-post activities. 	<p>Private report until next market day</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>

- Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number.
- This report will include the corresponding line item in the next publication with related version number.

Sample report

Date and Time	UNITID	RAISE PERFORMANCE	RAISE TYPE	LOWER PERFORMANCE	LOWER TYPE	Version
20/07/2021 05:10:00	DUID1	0.987454049	Calculated	-1.55283307	Calculated	1
20/07/2021 05:10:00	DUID2	0.931273066	Calculated	-1.179920501	Calculated	1
20/07/2021 05:10:00	DUID3	0.036994371	Calculated	0.198326279	Calculated	1
20/07/2021 05:10:00	DUID4	-0.013881323	Calculated	0.629090684	Calculated	1
20/07/2021 05:15:00	DUID1	0.955413109	Calculated	2.465176627	Calculated	1
20/07/2021 05:15:00	DUID2	0.627712095	Calculated	1.920370063	Calculated	1
20/07/2021 05:15:00	DUID3	0.065198878	Calculated	-0.092088541	Calculated	1
20/07/2021 05:15:00	DUID4	0.098092458	Calculated	-0.418729356	Calculated	1
20/07/2021 05:15:00	Residual	0.009245827	Calculated	-0.472935572	Calculated	1
20/07/2021 05:15:00	DUID1	0.065198878	Calculated	-0.02	Default	2

Table 6 Report 4 – FPP unit contribution factor (CF)

Report details	Report type and frequency
<p>This report will deliver the calculated contribution factor value for each 5 minute trading interval for each constraint and FPP unit.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) 	<p>Private report until next market day</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>

- FPP Unit ID (registered DUID/ TNI)
- Contribution Factor (the calculated contribution factor for the FPP unit and constraint ID for that trading interval) – for further details please see the procedure document.
- Version (FPP run number from the FPP database)

Business rules

- This report will only include units that are ‘eligible’ and ‘included’ in the FPP assessment process.
- This report will show ‘residual’ value as separate unit in the report rows.
- This report is planned to be sent on closure of trading interval and completion of FPP calculation.
- If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval.
- This report will be impacted by FPP ex-post activities.
- Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number.
- This report will include the corresponding line item in the next publication with related version number.

Sample report

Date and Time	CONSTRAINTID	BIDTYPE	FPP UNITID	Contribution Factor	Version
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	DUID1	-0.0347	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID1	-0.0337	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	DUID1	0.0302	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID1	0.0302	1
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	DUID1	-0.0337	1
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	DUID2	0.0006	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	DUID2	-0.0004	1
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	DUID2	0.0006	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID2	-0.0004	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID2	0.0006	1
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	DUID3	-0.0049	1
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	DUID3	-0.0051	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	DUID3	-0.0049	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID3	-0.0049	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID3	-0.0049	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID1	0.03	2
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID2	-0.0005	2
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID3	-0.0049	2

Table 7 Report 5 – Requirement for Corrective Response (RCR)

Report details	Report type and frequency																																								
<p>This report will deliver the calculated RCR for each constraint and bid type for each 5 minute trading interval.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) • RCR (the calculated requirement for corrective response from FPP database) • Version (FPP Run number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report is planned to be sent on closure of trading interval and completion of FPP calculation. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. • This report will be impacted by FPP ex-post activities. • Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number. • This report will include the corresponding line item in the next publication with related version number. <p>Sample report</p> <table border="1" data-bbox="203 954 1167 1235"> <thead> <tr> <th>Date and time</th> <th>CONSTRAINTID</th> <th>BIDTYPE</th> <th>RCR</th> <th>Version</th> </tr> </thead> <tbody> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+LREG_0210</td> <td>LOWERREG</td> <td>237.7863</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+NIL_APD_TL_L5</td> <td>LOWERREG</td> <td>237.7863</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+NIL_MG_R5</td> <td>RAISEREG</td> <td>211.7725</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+RREG_0220</td> <td>RAISEREG</td> <td>0</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_MAIN++APD_TL_L5</td> <td>LOWERREG</td> <td>231.4095</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_T+NIL_WF_TG_R5</td> <td>RAISEREG</td> <td>22.2552</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+NIL_MG_R5</td> <td>RAISEREG</td> <td>200</td> <td>2</td> </tr> </tbody> </table>	Date and time	CONSTRAINTID	BIDTYPE	RCR	Version	20/07/2021 5:10:00	F_I+LREG_0210	LOWERREG	237.7863	1	20/07/2021 5:10:00	F_I+NIL_APD_TL_L5	LOWERREG	237.7863	1	20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	211.7725	1	20/07/2021 5:10:00	F_I+RREG_0220	RAISEREG	0	1	20/07/2021 5:10:00	F_MAIN++APD_TL_L5	LOWERREG	231.4095	1	20/07/2021 5:10:00	F_T+NIL_WF_TG_R5	RAISEREG	22.2552	1	20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	200	2	<p>Public report</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>
Date and time	CONSTRAINTID	BIDTYPE	RCR	Version																																					
20/07/2021 5:10:00	F_I+LREG_0210	LOWERREG	237.7863	1																																					
20/07/2021 5:10:00	F_I+NIL_APD_TL_L5	LOWERREG	237.7863	1																																					
20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	211.7725	1																																					
20/07/2021 5:10:00	F_I+RREG_0220	RAISEREG	0	1																																					
20/07/2021 5:10:00	F_MAIN++APD_TL_L5	LOWERREG	231.4095	1																																					
20/07/2021 5:10:00	F_T+NIL_WF_TG_R5	RAISEREG	22.2552	1																																					
20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	200	2																																					

Table 8 Report 6 – Usage (U)

Report details	Report type and frequency																																																								
<p>This report will deliver the calculated usage for each constraint and bid type for each 5 minute trading interval.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) • Enabled MW value (quantity of regulation FCAS that was enabled in MW) • Used MW value (quantity of regulation FCAS that was calculated to be used in MW) • Usage (calculation of the proportion of regulation FCAS that was calculated to be used) • Version (FPP run number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report is planned to be sent on closure of trading interval and completion of FPP calculation. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. • This report will be impacted by FPP ex-post activities. • Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number. • This report will include the corresponding line item in the next publication with related version number. <p>Sample report</p> <table border="1" data-bbox="203 1023 1529 1300"> <thead> <tr> <th>Date and Time</th> <th>CONSTRAINTID</th> <th>BIDTYPE</th> <th>ENABLEDMW</th> <th>USEDMW</th> <th>USAGE</th> <th>Version</th> </tr> </thead> <tbody> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+LREG_0210</td> <td>LOWERREG</td> <td>180.0353</td> <td>65.9286</td> <td>0.3662</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+NIL_APD_TL_L5</td> <td>LOWERREG</td> <td>180.0353</td> <td>65.9286</td> <td>0.3662</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+NIL_MG_R5</td> <td>RAISEREG</td> <td>141</td> <td>55.305</td> <td>0.3922</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+RREG_0220</td> <td>RAISEREG</td> <td>141</td> <td>55.305</td> <td>0.3922</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_MAIN++APD_TL_L5</td> <td>LOWERREG</td> <td>134</td> <td>62.654</td> <td>0.4676</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_T+NIL_WF_TG_R5</td> <td>RAISEREG</td> <td>3.9626</td> <td>2.1646</td> <td>0.5463</td> <td>1</td> </tr> <tr> <td>20/07/2021 5:10:00</td> <td>F_I+NIL_MG_R5</td> <td>RAISEREG</td> <td>141</td> <td>53</td> <td>0.375887</td> <td>2</td> </tr> </tbody> </table>	Date and Time	CONSTRAINTID	BIDTYPE	ENABLEDMW	USEDMW	USAGE	Version	20/07/2021 5:10:00	F_I+LREG_0210	LOWERREG	180.0353	65.9286	0.3662	1	20/07/2021 5:10:00	F_I+NIL_APD_TL_L5	LOWERREG	180.0353	65.9286	0.3662	1	20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	141	55.305	0.3922	1	20/07/2021 5:10:00	F_I+RREG_0220	RAISEREG	141	55.305	0.3922	1	20/07/2021 5:10:00	F_MAIN++APD_TL_L5	LOWERREG	134	62.654	0.4676	1	20/07/2021 5:10:00	F_T+NIL_WF_TG_R5	RAISEREG	3.9626	2.1646	0.5463	1	20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	141	53	0.375887	2	<p>Public report</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>
Date and Time	CONSTRAINTID	BIDTYPE	ENABLEDMW	USEDMW	USAGE	Version																																																			
20/07/2021 5:10:00	F_I+LREG_0210	LOWERREG	180.0353	65.9286	0.3662	1																																																			
20/07/2021 5:10:00	F_I+NIL_APD_TL_L5	LOWERREG	180.0353	65.9286	0.3662	1																																																			
20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	141	55.305	0.3922	1																																																			
20/07/2021 5:10:00	F_I+RREG_0220	RAISEREG	141	55.305	0.3922	1																																																			
20/07/2021 5:10:00	F_MAIN++APD_TL_L5	LOWERREG	134	62.654	0.4676	1																																																			
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20/07/2021 5:10:00	F_I+NIL_MG_R5	RAISEREG	141	53	0.375887	2																																																			

Table 9 Report 7 – FPP unit estimated cost

Report details	Report type and frequency
<p>This report will deliver the estimated cost for each FPP unit for each constraint and bid type for each 5 minute trading interval.</p> <p>Please note that these are financial estimates only and are calculations provided indicatively only. Settlement calculations and reports will determine the actual AUD amount required for settlement of participants frequency performance payments.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) • FPP Unit ID (registered DUID/ TNI) • FPP in AUD (the financial estimate of frequency performance payment calculated with the formula: $FPP = CF \times (P_regulation / 12) \times RCR$, the value will be in AUD). This value can be either positive (credit) or negative (debit) • Used recovery FCAS in AUD (the financial estimate of the recovery of used FCAS calculated with the formula: $Used\ Recovery\ FCAS = TSFCAS \times U \times NCF$, the value will be in AUD). This value will be either 0 (nil), or a negative value (debit) only. • Unused recovery FCAS in AUD (the financial estimate of the recovery of unused FCAS calculated with the formula: $Unused\ Recover\ FCAS = TSFCAS \times (1 - U) \times DCF$, the value will be in AUD). This value will be either 0 (nil), or a negative value (debit) only. • Version (FPP number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report is planned to be sent on closure of trading interval and completion of FPP calculation. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. • This report will be impacted by FPP ex-post activities. • Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number. • This report will include the corresponding line item in the next publication with related version number. 	<p>Private report (these financial estimate reports will not be made public)</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes)</p>

Sample report							
Date and time	CONSTRAINTID	BIDTYPE	UNITID	FPP	USEDFCAS	UNUSEDFCAS	Version
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	DUID1	-3.47	-5	-1	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID1	-3.37	-6	-1	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	DUID1	3.02	0	-1	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID1	3.02	0	-1	1
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	DUID1	-3.37	-2	-0.3	1
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	DUID2	0.06	0	-1	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	DUID2	-0.04	-3	-1	1
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	DUID2	0.06	0	-0.5	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID2	-0.04	-10	-1	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID2	0.06	0	0	1
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	DUID3	-0.49	-2	-1	1
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	DUID3	-0.51	-7	-1	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	DUID3	-0.49	-6	-1	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	DUID3	-1	-5	-1	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID3	-0.49	-4	-1	1

Table 10 Report 8 – Estimated residual cost rate

Report details	Report type and frequency
<p>This report will deliver the estimated residual cost rate for each constraint and bid type for each 5 minute trading interval.</p> <p>Please note that these are financial estimates only and are calculations provided indicatively only. Settlement calculations and reports will determine the actual AUD amount required for settlement of participants frequency performance payments.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) 	<p>Public report</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes).</p>

- FPP in AUD/MWh (the financial estimate of frequency performance payment calculated with the formula: $FPP = CF \times (P_{\text{regulation}} / 12) \times RCR$, the value will be in AUD/MWh). This value can be either positive (credit) or negative (debit)
- Used recovery FCAS in AUD/MWh (the financial estimate of the recovery of used FCAS calculated with the formula: $\text{Used Recovery FCAS} = \text{TSFCAS} \times U \times \text{NRCF} / \text{ATE}$, the value will be in AUD/MWh). This value will be either 0 (nil), or a negative value (debit) only.
- Unused recovery FCAS in AUD/MWh (the financial estimate of the recovery of unused FCAS calculated with the formula: $\text{Unused Recover FCAS} = \text{TSFCAS} \times (1 - U) \times \text{DRCF} / \text{ATE}$, the value will be in AUD/MWh). This value will be either 0 (nil), or a negative value (debit) only.
- Version (FPP run number from the FPP database)

Business rules

- ATE is the sum of total absolute MW of eligible units without SCADA.
- This report is planned to be sent on closure of trading interval and completion of FPP calculation.
- If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval.
- This report will be impacted by FPP ex-post activities.
- Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number.
- This report will include the corresponding line item in the next publication with related version number.

Sample report

Date and Time	CONSTRAINTID	BIDTYPE	FPP Payment	USEDFCAS	UNUSEDFCAS	Version
20/07/2021 05:10:00	F_I+LREG_0210	LOWERREG	-0.33	-3	-3.2	1
20/07/2021 05:10:00	F_I+NIL_APD_TL_L5	LOWERREG	2.3	-0.3	0	1
20/07/2021 05:10:00	F_I+NIL_MG_R5	RAISEREG	-0.6	-3	-2	1
20/07/2021 05:10:00	F_I+RREG_0220	RAISEREG	-1	0.1	-5	1
20/07/2021 05:10:00	F_MAIN++APD_TL_L5	LOWERREG	-5	-3	-1.5	1
20/07/2021 05:10:00	F_T+NIL_WF_TG_R5	RAISEREG	1	-3	-5	1

Table 11 Report 9 – Default performance factor

Report details	Report type and frequency
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This report will deliver the default performance factors calculated based on a historical period and effective for a billing period (aligned to the settlement week).

Entities to be displayed as columns

- Effective period from date and time (DD/MM/YYYY HH:MM:SS) and to date and time (DD/MM/YYYY HH:MM:SS). This is the billing period over which these default performance factors will be effective. This will align to the settlement week.
- Calculated from date and time (DD/MM/YYYY HH:MM:SS) and to date and time (DD/MM/YYYY HH:MM:SS). This is the time range within which the historical performance is used as an input into the default performance factor.
- FPP Unit ID (registered DUID/ TNI) and residual deviation per region
- Default raise performance (calculated default performance factor calculated from the historical performance period)
- Default lower performance (calculated default performance factor calculated from the historical performance period)
- Substitute raise performance (calculated substitute performance factor calculated from the historical performance period)
- Substitute lower performance (calculated substitute performance factor calculated from the historical performance period)
- Version (FPP run number from the FPP database)

Business rules

- This report is planned to be published weekly as per rule, 5 days before billing period.
- This report will include national public holidays in the billing period and will be reflected in the report.
- This report will not be impacted by FPP ex-post activities.

Sample report

Whole week, minimum 100 intervals

EffectiveFromDateTime	EffectiveToDateTime	CalculateFromDateTime	CalculatedToDateTime	UNITID (All FPP units / Residual deviation per region)	DEFAULT_RAISE_PERFORMANCE	DEFAULT_LOWER_PERFORMANCE	SUBSTITUTE_RAISE_PERFORMANCE	SUBSTITUTE_LOWER_PERFORMANCE	Version
17/09/2023 00:00:00	24/09/2023 00:00:00	27/08/2023 00:00:00	03/09/2023 00:00:00	DUID1	0	-1.55283307	0	-1.55283307	1
17/09/2023 00:00:00	24/09/2023 00:00:00	27/08/2023 00:00:00	03/09/2023 00:00:00	DUID2	0	-1.1799205	0	-1.1799205	1
17/09/2023 00:00:00	24/09/2023 00:00:00	27/08/2023 00:00:00	03/09/2023 00:00:00	DUID3	0	0	0	0	1

Public report

Published weekly as per rules, 5 days before billing period.

17/09/2023 00:00:00	24/09/2023 00:00:00	27/08/202 3 00:00:00	03/09/2023 00:00:00	DUID4	-0.01388132	0	-0.01388132	0	1
24/09/2023 00:00:00	01/10/2023 00:00:00	03/09/202 3 00:00:00	10/09/2023 00:00:00	DUID1	0	0	0	0	1
24/09/2023 00:00:00	01/10/2023 00:00:00	03/09/202 3 00:00:00	10/09/2023 00:00:00	DUID2	-0.6277121	-1.92037006	-0.6277121	-1.92037006	1
24/09/2023 00:00:00	01/10/2023 00:00:00	03/09/202 3 00:00:00	10/09/2023 00:00:00	DUID3	0	-0.09208854	0	-0.09208854	1
24/09/2023 00:00:00	01/10/2023 00:00:00	03/09/202 3 00:00:00	10/09/2023 00:00:00	DUID4	0	-0.41872936	0	-0.41872936	1
24/09/2023 00:00:00	01/10/2023 00:00:00	03/09/202 3 00:00:00	10/09/2023 00:00:00	RES_NSW1	-110.627712	-10.6277121	-90.6277121	-9.6277121	1

Table 12 Report 10 – Pre-dispatch unit estimated cost

Report details	Report type and frequency
<p>This report will deliver the estimated unit cost based on pre-dispatch. These are very high-level estimates (i.e. assuming that all is unused FCAS), and will be provided for each constraint and bid type for each 5 minute trading interval.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the pre-dispatch run (DD/MM/YYYY HH:MM:SS) • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) • FPP Unit ID (registered DUID/ TNI) • Unused recovery FCAS in AUD (the financial estimate of the recovery of unused FCAS calculated from with the formula Unused Recovery FCAS = TSFCAS × DCF, the value will be in AUD). This value will be either 0 (nil), or a negative value (debit) only. • Version (version number from the FPP database) <p>Business rules</p> <ul style="list-style-type: none"> • This report is planned to be published every half hour after a pre-dispatch run. • If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. 	<p>Private report (these financial estimate reports will not be made public)</p> <p>Frequency: At the completion of pre-dispatch runs for a closed trading interval (i.e. every 30 minutes for pre-dispatch).</p>

- This report will not be impacted by FPP ex-post activities.

Sample report

Date and time	INTERVAL_DATETIME	CONSTRAINTID	BIDTYPE	UNITID (all fpp units fppdatabase)	UNUSEDFCAS (TSFCAS × DCF)
20/07/2021 05:00:00	20/07/2021 05:30:00	F_MAIN++APD_TL_L5	LOWERREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+RREG_0220	RAISEREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_MG_R5	RAISEREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+LREG_0210	LOWERREG	DUID1	-0.3
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+LREG_0210	LOWERREG	DUID2	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+RREG_0220	RAISEREG	DUID2	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_MAIN++APD_TL_L5	LOWERREG	DUID2	-0.5
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_MG_R5	RAISEREG	DUID2	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID2	0
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+LREG_0210	LOWERREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_MAIN++APD_TL_L5	LOWERREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+RREG_0220	RAISEREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_MG_R5	RAISEREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 06:00:00	F_MAIN++APD_TL_L5	LOWERREG	DUID1	-2

Table 13 Report 11 – P5min pre-dispatch unit estimated cost

Report details	Report type and frequency
<p>This report will deliver the estimated unit cost based on P5min runs. These are very high-level estimates (i.e. assuming that all is unused FCAS), and will be provided for each constraint and bid type for each 5 minute trading interval.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> • Date and time of the pre-dispatch run (DD/MM/YYYY HH:MM:SS) • Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) • ConstraintID (binding constraint ID from FCAS data used in FPP calculations) • Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations) • FPP Unit ID (registered DUID/ TNI) 	<p>Private report (these financial estimate reports will not be made public)</p> <p>Frequency: At the completion P5min dispatch runs for a closed trading interval (i.e. every 5 minutes for P5min dispatch).</p>

- Unused recovery FCAS in AUD (the financial estimate of the recovery of unused FCAS calculated from with the formula Unused Recovery FCAS = TSFCAS × DCF, the value will be in AUD). This value will be either 0 (nil), or a negative value (debit) only.

Business rules

- This report is planned to be published every 5 minutes after a P5min dispatch run.
- If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval.
- This report will not be impacted by FPP ex-post activities.

Sample report

Date and time	INTERVAL_DATETIME	CONSTRAINTID	BIDTYPE	UNITID (all fpp units fppdatabase)	UNUSEDFCAS (TSFCAS × DCF)
20/07/2021 05:00:00	20/07/2021 05:30:00	F_MAIN++APD_TL_L5	LOWERREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+RREG_0220	RAISEREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_MG_R5	RAISEREG	DUID1	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+LREG_0210	LOWERREG	DUID1	-0.3
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+LREG_0210	LOWERREG	DUID2	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+RREG_0220	RAISEREG	DUID2	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_MAIN++APD_TL_L5	LOWERREG	DUID2	-0.5
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_MG_R5	RAISEREG	DUID2	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID2	0
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+LREG_0210	LOWERREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_MAIN++APD_TL_L5	LOWERREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+RREG_0220	RAISEREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_MG_R5	RAISEREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 05:30:00	F_I+NIL_APD_TL_L5	LOWERREG	DUID3	-1
20/07/2021 05:00:00	20/07/2021 06:00:00	F_MAIN++APD_TL_L5	LOWERREG	DUID1	-2

Table 14 Report 12 – Pre-dispatch residual estimated cost report

Report details	Report type and frequency
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This report will deliver the estimated residual cost based on pre-dispatch and P5min runs. These are very high-level estimates (i.e. assuming that all is unused FCAS), and will be provided for each constraint and bid type for each 5 minute trading interval.

Entities to be displayed as columns

- Date and time of the pre-dispatch run (DD/MM/YYYY HH:MM:SS)
- Date and time of the trading interval (DD/MM/YYYY HH:MM:SS)
- ConstraintID (binding constraint ID from FCAS data used in FPP calculations)
- Bidtype (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations)
- Unused recovery FCAS in AUD (the financial estimate of the recovery of unused FCAS calculated from with the formula: Unused Recovery FCAS = TSFCAS × DRCF / ATE, the value will be in AUD/MWh). This value will either be either 0 or negative. ATE is the sum of total absolute MW of eligible units without SCADA. In Pre-Dispatch time system will use sum of regional demand as a proxy.

Business rules

- This report is planned to be published every half hour after a pre-dispatch run.
- If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval.
- This report will not be impacted by FPP ex-post activities.

Sample report

Date and time	INTERVAL_DATETIME	CONSTRAINTID	BIDTYPE	UNUSEDFCAS
20/07/2021 5:00	20/07/2021 5:30	F_I+LREG_0210	LOWERREG	-3.2
20/07/2021 5:00	20/07/2021 5:30	F_I+NIL_APD_TL_L5	LOWERREG	0
20/07/2021 5:00	20/07/2021 5:30	F_I+NIL_MG_R5	RAISEREG	-2
20/07/2021 5:00	20/07/2021 5:30	F_I+RREG_0220	RAISEREG	-5
20/07/2021 5:00	20/07/2021 5:30	F_MAIN++APD_TL_L5	LOWERREG	-1.5
20/07/2021 5:00	20/07/2021 5:30	F_T+NIL_WF_TG_R5	RAISEREG	-5

Public report

Frequency: At the completion of pre-dispatch runs for a closed trading interval (i.e. every 30 minutes for pre-dispatch).

Table 15 Report 13 – P5 min residual estimated cost report

Report details	Report type and frequency
----------------	---------------------------

This report will deliver the estimated residual cost based on P5min runs. These are very high-level estimates (i.e. assuming that all FCAS is unused), and will be provided for each constraint and bid type for each 5 minute trading interval.

Entities to be displayed as columns

- Date and time of the pre-dispatch run (DD/MM/YYYY HH:MM:SS)
- Date and time of the trading interval (DD/MM/YYYY HH:MM:SS)
- ConstraintID (binding constraint ID from FCAS data used in FPP calculations)
- Bid type (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations)
- Unused recovery FCAS in AUD (the financial estimate of the recovery of unused FCAS calculated from with the formula: Unused Recovery FCAS = TSFCAS × DRCF / ATE, the value will be in AUD/MWh). This value will either be either 0 or negative. ATE is the sum of total absolute MW of eligible units without SCADA. In Pre-Dispatch time system will use sum of regional demand as a proxy.

Business rules

- This report is planned to be published every 5 minutes after a P5min dispatch run.
- If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval.
- This report will not be impacted by FPP ex-post activities.

Sample report

Date and time	INTERVAL_DATETIME	CONSTRAINTID	BIDTYPE	UNUSEDFCAS
20/07/2021 5:00	20/07/2021 5:30	F_I+LREG_0210	LOWERREG	-3.2
20/07/2021 5:00	20/07/2021 5:30	F_I+NIL_APD_TL_L5	LOWERREG	0
20/07/2021 5:00	20/07/2021 5:30	F_I+NIL_MG_R5	RAISEREG	-2
20/07/2021 5:00	20/07/2021 5:30	F_I+RREG_0220	RAISEREG	-5
20/07/2021 5:00	20/07/2021 5:30	F_MAIN++APD_TL_L5	LOWERREG	-1.5
20/07/2021 5:00	20/07/2021 5:30	F_T+NIL_WF_TG_R5	RAISEREG	-5

Public report

Frequency: At the completion of P5min dispatch runs for a closed trading interval (i.e. every 5 minutes for P5min dispatch).

Table 16 Report 14 – Summary of FCAS requirement

Report details	Report type and frequency
----------------	---------------------------

This report will deliver a summary of FCAS requirements as used by the FPP calculation.

Entities to be displayed as columns

- Date and time of the trading interval (DD/MM/YYYY HH:MM:SS)
- ConstraintID (binding constraint ID from FCAS data used in FPP calculations)
- Bid type (the bid type saved in relation to constraint ID from FCAS data used in FPP calculations)
- Relevant regions (the relevant regions for the constraint from FCAS data)
- MW enabled for FPP calculation (from FPP database)
- Marginal cost (from FCAS data used for FPP calculations)
- Pregulation AUD/ MWh (From FCAS data used for FPP calculations)
- TSFCAS: FCAS recovery amount related to the constraint.
- TFPP: Total amount of FPP related to the constraint.
- RCR MW (the calculated requirement for corrective response from FPP database)
- Usage (calculation of the proportion of regulation FCAS that was calculated to be used)

Business rules

- This report is planned to be sent on closure of trading interval and completion of FPP calculation.
- If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval.
- This report will be impacted by FPP ex-post activities.
- Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number.
- This report will include the corresponding line item in the next publication with related version number.

Sample report

Date and time of trading interval	CONSTR INTID	BIDTYPE	Version No	Relevant Regions	MW_EN ABLED FPPcal culation	MARGIN ALCOST \$/Mw per hr	P_REGU LATION \$/Mw per hr	TSFCAS \$ (adjusted cost)	TFPP\$	RCR from FPP	U from FPP
20/07/2021 5:10	F_I+LREG_0210	LOWER REG	1	NSW1, QLD1, SA1, TAS1, VIC1	218.9175	0.5	0.5	109	137		
20/07/2021 5:10	F_I+NIL_APD_TL_L5	LOWER REG	1	NSW1, QLD1, SA1, TAS1, VIC1	218.9175	0.6	0.3	131	164		
20/07/2021 5:10	F_I+NIL_MG_R5	RAISE REG	1	NSW1, QLD1, SA1, TAS1, VIC1	210	0.3	0.4	63	79		

Public report

Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes).

20/07/2021 5:10	F_I+RREG _0220	RAISE REG	1	NSW1, QLD1, SA1, TAS1, VIC1	210	1	1	210	263		
20/07/2021 5:10	F_MAIN++ APD_TL_L5	LOWER REG	1	NSW1, QLD1, SA1, VIC1	191.0757	2.5	2.3	478	597		
20/07/2021 5:10	F_T+NIL_ WF_TG_R5	RAISE REG	1	TAS1	46.6662	1	1	47	58		

Table 17 Report 15 – FPP calculation run

Report details	Report type and frequency												
<p>FPP run case solution showcases the 5-minute FPP calculation engine success failure outcome saved in FPP database.</p> <p>Entities to be displayed as columns</p> <ul style="list-style-type: none"> FPP Run Date and Time (DD/MM/YYYY, HH:MM:SS) FPP Run Number <Integer> Date and time of the trading interval (DD/MM/YYYY HH:MM:SS) Region ID Run status <Completed >; <In progress>; <Failure> <p>Business rules for this report</p> <ul style="list-style-type: none"> This report will need to capture FPP calculation engine success failure outcome at region level and this information will be used by AEMO to trigger Market notices. This report is planned to be sent on closure of trading interval and completion of FPP calculation. If there is an event that requires a 30 min wait for any data to be received, system will publish report with new set of data for the same trading interval. Whenever there is an ex-post activity the system will publish report with new set of data for the same trading interval with an incremented version number. This report will include the corresponding line item in the next publication with related FPP run number. <p>Sample report</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">FPP Run Date and Time</th> <th style="width: 10%;">FPP Run number</th> <th style="width: 20%;">Date and time of Trading Interval</th> <th style="width: 10%;">Region ID</th> <th style="width: 10%;">Run status</th> <th style="width: 25%;">Description</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	FPP Run Date and Time	FPP Run number	Date and time of Trading Interval	Region ID	Run status	Description							<p>Public report</p> <p>Frequency: At the completion of FPP calculation for a closed trading interval (i.e. every 5 minutes).</p>
FPP Run Date and Time	FPP Run number	Date and time of Trading Interval	Region ID	Run status	Description								

20/07/2021 5:15	1	20/07/2021 5:10	TAS1	Completed	Successful Run
21/07/2021 5:20	1	20/07/2021 5:15	TAS1	Completed	Successful Run
22/07/2021 5:25	2	21/07/2021 5:20	TAS1	Completed	Successful Run
23/07/2021 5:30	1	22/07/2021 5:25	TAS1	Failure	Run Failure
24/07/2021 5:35	1	23/07/2021 5:30	TAS1	Completed	Successful Run
24/07/2021 5:55	1	24/07/2021 5:35	TAS1	In progress	Run not completed

4.2 Settlements reports

This section provides a high-level, indicative settlement table/report changes that will be made to accommodate the FPP rule requirements. remain subject to future revision, additions and change before being published formally in the FPP Settlements technical specification (DM 5.4), on 22 Sept 2024.

Table 18 EMMS Participant Portal Statements and Reconciliation files

Report Type	Comments
PDF Settlement Statement	No change
Settlement report (SR) - TXT	Addition of FPP reconciliation summary by willing week for payment and recovery, i.e. Eligible/Residual as well as used and unused totals.
Confidential settlements	Update to include eligible and residual payment/recovery reconciliation for used and unused calculations on a daily/5min interval level
Confidential Billing	Aggregation of changes made to confidential settlements report by billing week
Public Settlements	Limited change, update of FPP summary of service type recovery amounts on market level
Public billing	No change
SET Ancillary Summary	Update to include eligible and residual payment/recovery reconciliation for used and unused calculations on 5min interval level
SET FCAS Payment	Update to include eligible and residual payment reconciliation on 5min interval level
SET FCAS Recovery	Update to include eligible and residual recovery reconciliation for used and unused calculations on 5min interval level

Report Type	Comments
SET_FCAS_REGULATION_TRK	May be deprecated and replaced with new contribution factors table – current table decommissioned post go-live
BILLINGASPAYMENTS	Aggregate of SET_FCAS_PAYMENT table changes by billing week
BILLINGASRECOVERY	Aggregate of SET_FCAS_RECVOERY table changes by billing week

Table 19 AEMO website and NEMWEB – expected changes

Report Type	Expected change
AEMO Website: <ul style="list-style-type: none"> AS Payment summary file AS Recovery summary file 	Additional eligible and residual payment and recovery columns
NEMWEB: <ul style="list-style-type: none"> Public settlements report 	No change

For further information, see:

- NEMWEB: <http://nemweb.com.au/Reports/Current/>
- DATA MODEL: http://nemweb.com.au/Reports/Current/MMSDataModelReport/Electricity/MMS%20Data%20Model%20Report_files/MMS_297.htm#1

4.3 Reports to cease from 8 June 2025

After the FPP rule change becomes effective on 8th June 2025, there will be a number of existing Causer Pays related reports / data models that will be decommissioned and will cease to provide data. Some examples of these types of Causer Pays reports that will be decommissioned include (but are not limited to):

- CAUSER_PAYS
- CAUSER_PAYS_SCADA

- CAUSER_PAYS_ELEMENTS
- CAUSERPAYS_INPUT (MPF)

Likewise, after the rule change, the Causer Pays related data will no longer be populated in certain columns of certain published tables. Some examples of these include (but are not limited to):

- MPF related columns in the DISPATCH_FCAS_REQ, PREDISPATCH_FCAS_REQ, P5MIN_FCAS_REQUIREMENT tables will be populated with nulls after the FPP rule change.

5. Implementation

5.1 Indicative timeline

The implementation timeline for the FPP reform is shown in Figure 2 and Table 6, below.

Figure 2 FPP project timeline

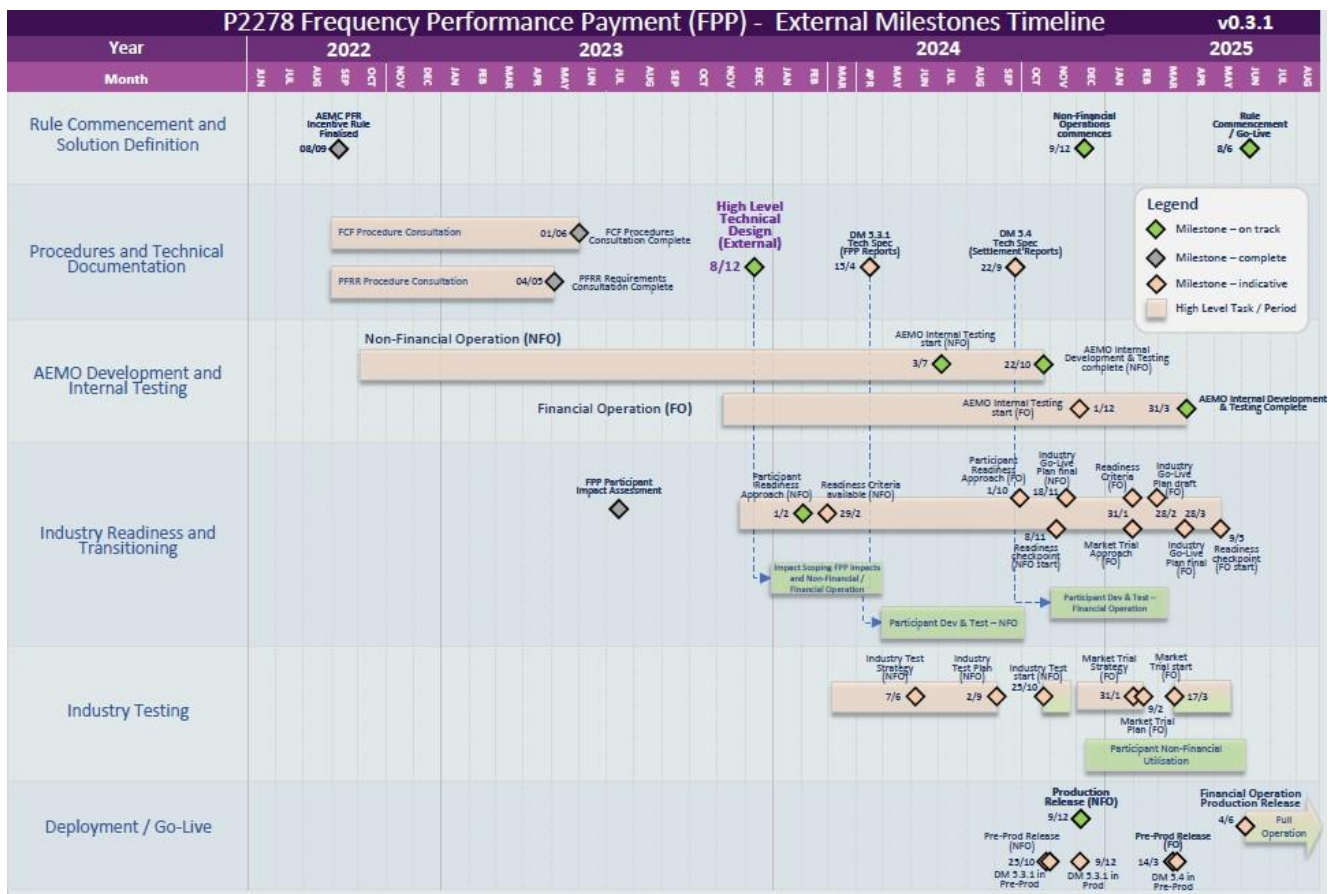


Table 20 FPP project milestones

Milestone	Date
High Level Technical Design (External)	8-Dec-2023
Participant Readiness Approach (including development support requirements) published	1-Feb-2024
Readiness Criteria available (NFO)	29-Feb-2024
Data Model 5.3.1 Tech Spec (FPP Reports)	15-Apr-2024
Industry Test Strategy (NFO) published	7-Jun-2024
AEMO Internal Testing commenced (NFO)	3-Jul-2024
Industry Test Plan published (NFO)	2-Sep-2024
Data Model 5.4 Tech Spec (Settlement Reports)	22-Sep-2024

Milestone	Date
Participant Readiness Approach complete (Financial Operation)	1-Oct-2024
Industry Development finish (NFO)	1-Oct-2024
Readiness Checkpoint - Industry Test start (NFO)	15-Oct-2024
AEMO Internal Development & Testing complete (NFO)	22-Oct-2024
Pre-Production Release (NFO)	25-Oct-2024
Data Model 5.3.1 available in Pre-Prod	25-Oct-2024
Industry Test start (NFO)	25-Oct-2024
Industry Go-Live Plan published - draft (NFO)	4-Nov-2024
Readiness Checkpoint - Go-Live (NFO)	8-Nov-2024
Industry Go-Live Plan published - final (NFO)	18-Nov-2024
Industry Test finish (NFO)	22-Nov-2024
AEMO Internal Testing commences (FO)	28-Nov-2024
Data Model 5.3.1 available in Prod	9-Dec-2024
Production Release (NFO)	28-Nov-2024
Non-Financial Operations commences	9-Dec-2024
Market Trial Strategy published (Financial Operation)	31-Jan-2025
Readiness Criteria available (Financial Operation)	31-Jan-2025
Industry Go-Live Plan published - draft (Financial Operation)	28-Feb-2025
Readiness Checkpoint - Market Trial start (Financial Operation)	28-Feb-2025
Industry Development Finish (Financial Operation)	15-Mar-2025
Data Model 5.4 available in Pre-Prod	15-Mar-2025
Pre-Production Release (Financial Operation)	14-Mar-2025
Market Trial start (Financial Operation)	17-March-2025
Industry Go-Live Plan published - final (Financial Operation)	28-March-2025
AEMO Internal Development & Testing complete (Financial Operation)	31-Mar-2025
Readiness Checkpoint - Financial Operation	9-May-2025
Market Trial finish (Financial Operation)	20-May-2025
Production Release (Financial Operation)	4-Jun-2025
FFP Project Go-Live / Rule Commencement	8-Jun-2025

5.2 Non-financial operation

As shown in Table 20, above, AEMO is planning for six-month non-financial operation period, from December 2024. It is important to note that this follows, and is different from, system testing. AEMO will have all FPP systems in production before the commencement of non-financial operation and recommends that participants do likewise.

During the non-financial operation period, the FPP calculations will be completed and data reported to participants, but settlement of these amounts will not be undertaken. Non-financial operation will allow participants to observe what their outcomes would be under the new FPP regime, without the actual financial consequences. This information will give participants the option to start to respond (or plan to respond) to the new financial incentives that the FPP scheme will send.

6. Further information and engagement opportunities

6.1 List of relevant documents

The table below lists relevant documents that provide further information about how the FPP system will run and how data will be communicated.

Table 21 Relevant documents

Reference	Title	Location
N.A.	Frequency Contribution Factors Procedure	https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/frequency-contribution-factors-procedure/final-documents/final-frequency-contribution-factors-procedure.pdf?la=en
160-0392	Efficient Dispatch and Localised Recovery of Regulation Services Business Specification	https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/ancillary_services/0160-0049-pdf.pdf
N.A.	Power System Data Communication Standard	https://aemo.com.au/-/media/files/electricity/nem/network_connections/transmission-and-distribution/aemo-standard-for-power-system-data-communications.pdf
N.A.	Frequency Contribution Factor Tuning Parameters and Input Sources	https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services/frequency-contribution-factors
N.A.	Guide to Ancillary Services in the National Electricity Market	https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/ancillary_services/guide-to-ancillary-services-in-the-national-electricity-market.pdf
N.A.	MMS Data Model Reports	https://visualisations.aemo.com.au/aemo/di-help/Content/Data_Model/MMS_Data_Model.htm

6.2 How to stay engaged with the implementation of the FPP reform

6.2.1 Online resources

AEMO is implementing FPP as part of the NEM Reform Program. Information about the NEM Reform Program can be found at: <https://aemo.com.au/initiatives/major-programs/nem-reform-program>

The FPP Project page can be found at: <https://aemo.com.au/initiatives/major-programs/frequency-performance-payments-project>. This page includes links to all consultation materials and other resources developed as part of the FPP implementation process.

The NEM Reform Program also publishes a bi-monthly newsletter. Stakeholders can register to receive that newsletter at: <https://aemo.us10.list-manage.com/subscribe?u=eae433173c2b1acb87c5b07d1&id=9c87409bb5>.

6.2.2 Regular forums

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

To join the invite list for any of the above forums, email NEMReform@aemo.com.au.

6.3 Comments on this FPP external data model

AEMO is not calling for written submissions on this document by a specified deadline. However, if market participants or other stakeholders believe there are elements of the FPP external reporting data model that require amendment, AEMO would welcome receiving such comments (including why changes are required).

The AEMO FPP team can be contacted at any time via FPPconsultation@aemo.com.au.

The NEM Reform Program can also be contacted via NEMReform@aemo.com.au.