

Frequency Performance Payments

AEMO observations from
Non-Financial Operations

24 March 2025



Disclaimer

This presentation includes material outlining AEMO's interpretation of indicative impacts of national energy market (NEM) reforms to energy market systems and processes for energy industry participants, as at 24 March 2025.

The interpretations expressed in this presentation are not binding on AEMO. The interpretation of the impact of NEM reforms may change at any time.

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- AEMO has developed meeting protocols to support compliance with the CCA in working groups and other forums with energy stakeholders. Before attending, participants should confirm the application of the appropriate meeting protocol.
- Please visit: <https://aemo.com.au/en/consultations/industry-forums-and-working-groups>



We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country, and hope that our work can benefit both people and Country.

'Journey of unity: AEMO's Reconciliation Path' by Lani Balzan

AEMO Group is proud to have launched its first Reconciliation Action Plan in May 2024. 'Journey of unity: AEMO's Reconciliation Path' was created by Wiradjuri artist Lani Balzan to visually narrate our ongoing journey towards reconciliation – a collaborative endeavour that honours First Nations cultures, fosters mutual understanding, and paves the way for a brighter, more inclusive future.

Read our
RAP

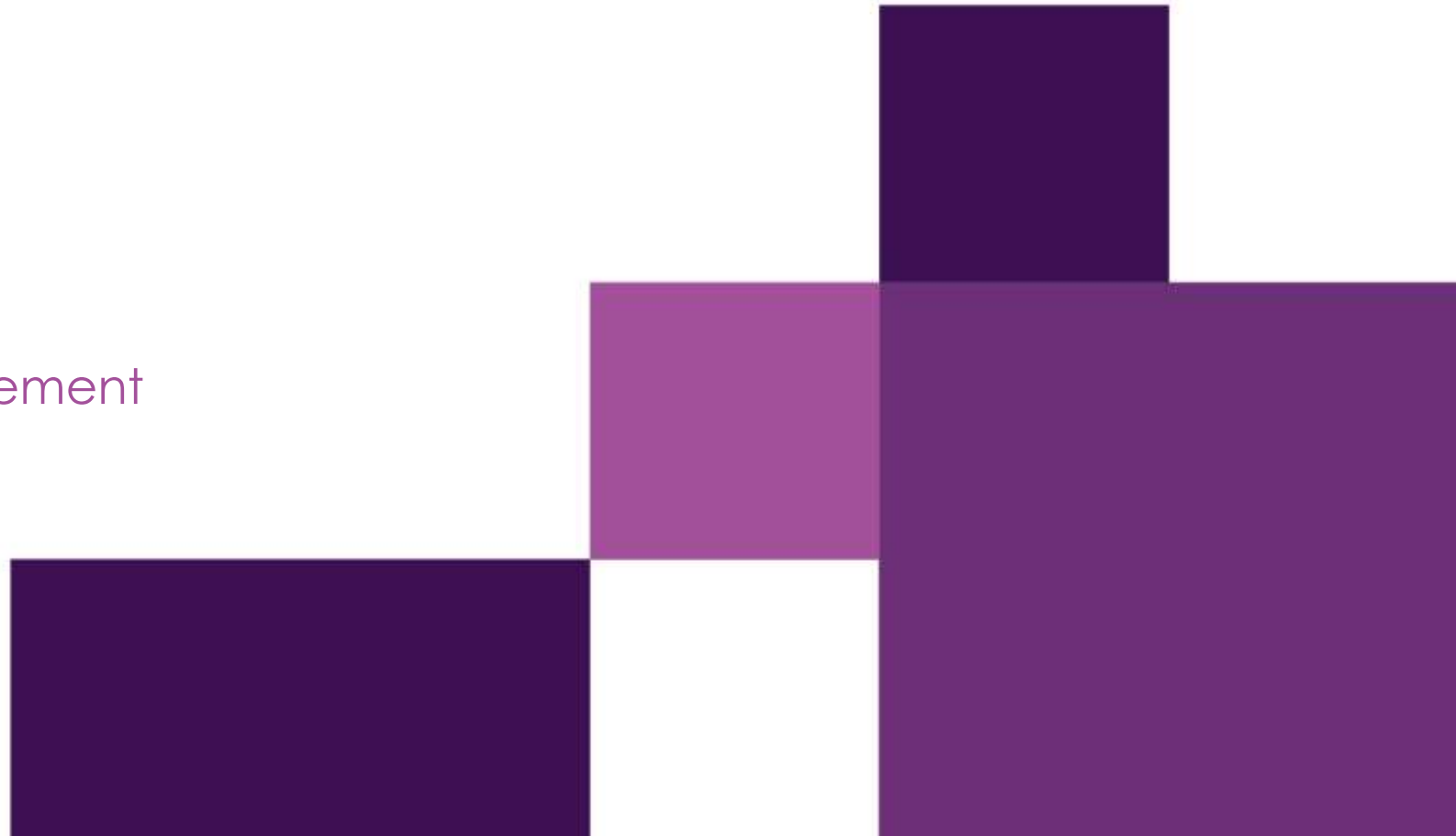




Welcome

Jen Hardman

Principal Advisor, Industry Enablement



FPP – Simple description

In each 5-min NEM trading interval (TI)

AEMO will:



1. Calculate the total value of FPPs by:

- Determining the total extent of *helpful* frequency contributions by individual facilities.
- Pricing those contributions according to the cost of Regulation FCAS in that Trading Interval.



2. Allocate the costs and benefits in one of two ways:

- For scheduled and semi-scheduled generators and customers, who are given dispatch levels by AEMO and provide four-second SCADA data, individual contribution factors are calculated based on the extent (and helpfulness) of any deviation from their dispatch levels.
- For small customers without SCADA (such as households) the ‘residual’ deviation in system frequency is calculated and allocated based on energy consumed.

Session objectives



Overview of high-level observations of **Frequency Performance Payments outcomes** from the Non-Financial Operations period

Q&A

Opportunity for **Q&A** with key experts in attendance

General Housekeeping

1. Please mute your microphone.
2. Use the 'Chat' function to ask any questions or comments.
 - AEMO SMEs are on the call, who will attempt to respond in the chat.
3. Key questions or comments will be addressed verbally in the Q&A section.
4. In attending this meeting, you are expected to:
 - Contribute constructively.
 - Be respectful, both on the call and in the chat.

AGENDA

#	Timing (AEST)	Topic	Presenters
1	11:00am (5 mins)	Arrival and welcome	Jen Hardman
2	11:05am (5 mins)	Summary	Shantha Ranatunga
3	11:10am (30 mins)	Presentation FPP trends – first 3 months of operations Key Dates and Milestones	Shantha Ranatunga
4	11:35am (20 mins)	Questions	All
5		Appendix: Industry Readiness	
6	12:00pm	Close	Jen Hardman

For reference: Under Educational resources [9 October 2024 Recording of Information and Q&A Session](#)

"Please note that this meeting will be recorded by AEMO and published on AEMO's website. By attending the meeting, you consent to AEMO recording the meeting and using the record for this purpose. No other recording of the meeting is permitted"



NFO Results Overview

Shantha Ranatunga
Specialist, Operations



Summary

FPP trends from first 3 months of non-financial operation

- Financial estimates

PFR providers dominate the positive performers

- Thermals and Battery Storage
- Hydro also has positive FPP performance

Total FPP wealth transfer is slightly more than REG costs

- FPP amount is correlated to REG FCAS prices

Observations from non-financial operation

Key Equations

FPP Trading Amount

$$FPP_TA = CF * \frac{P_{Regulation}}{12} * RCR$$

REG Recovery Trading Amounts

$$Used_TA = TSFCAS * U * NCF$$

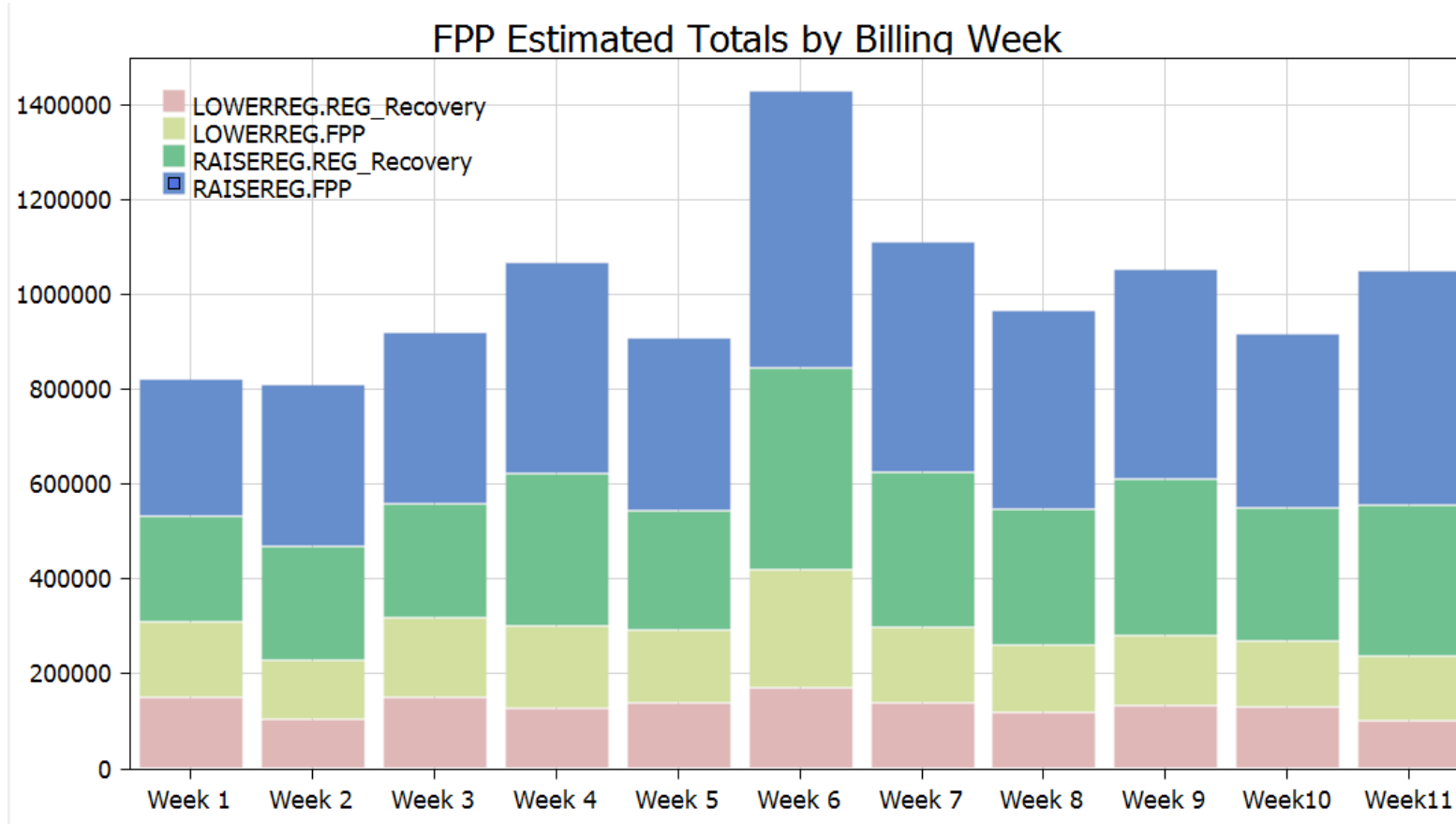
$$Unused_TA = TSFCAS * (1 - U) * DCF$$

Replacement for
the Causer Pays

Where:

- CF - Contribution Factor $\{-1 \leq CF \leq 1\}$
- NCF – Negative Contribution Factor $\{-1 \leq NCF \leq 0\}$
- DCF – Default Contribution Factor $\{-1 \leq DCF \leq 0\}$
- $P_{Regulation}$ - Marginal price of the Regulation FCAS Requirement (\$/MW per hr)
- $TSFCAS$ – Recovery amount of the Regulation FCAS requirement (\$)
- RCR - Requirement for Corrective Response (MW)
- U – Usage Factor $\{0 \leq U \leq 1\}$

Billing week totals (2025)

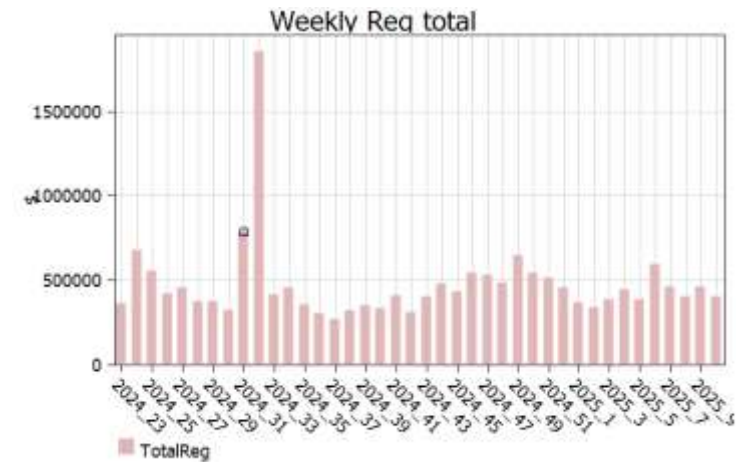


For the first 11 weeks in 2025

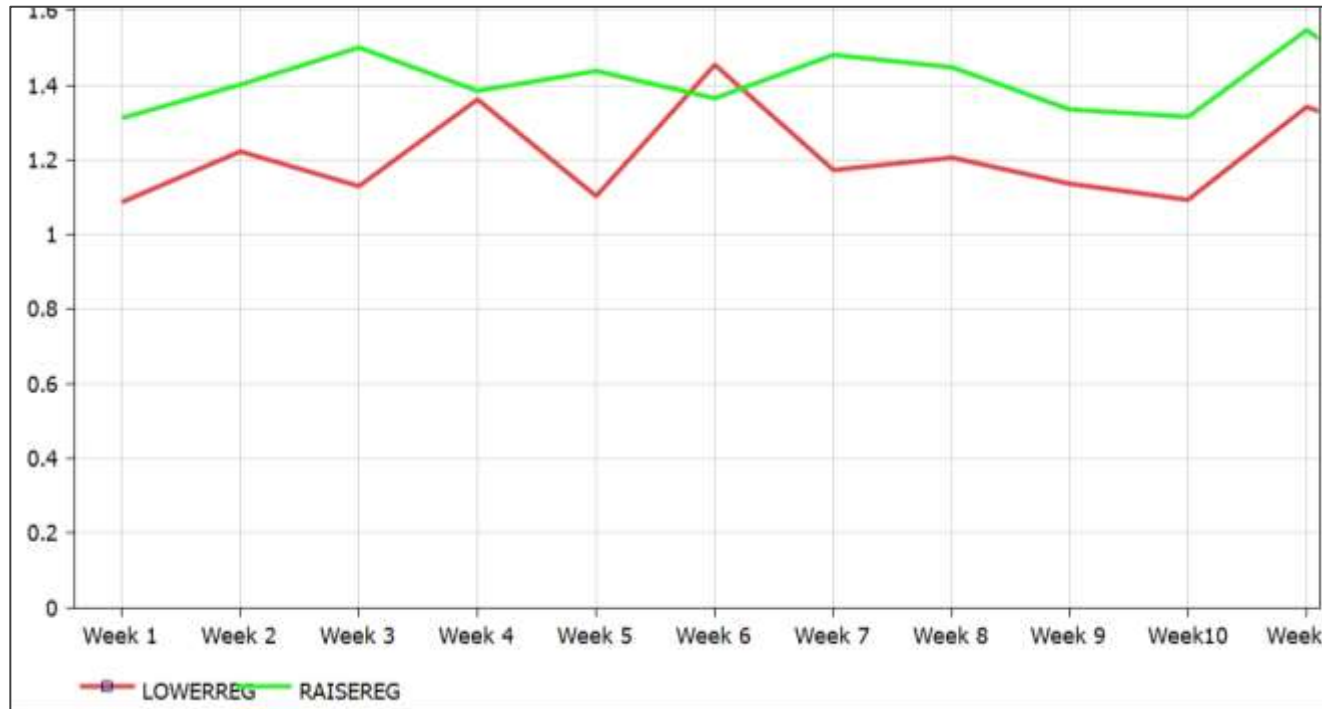
- Total Reg recovery amount (used + unused)
- FPP amount (FPP payment)

FPP net amount is zero, this shows the total transfer.

Combined Reg recovery amount for last 6 months - just below \$0.5Million

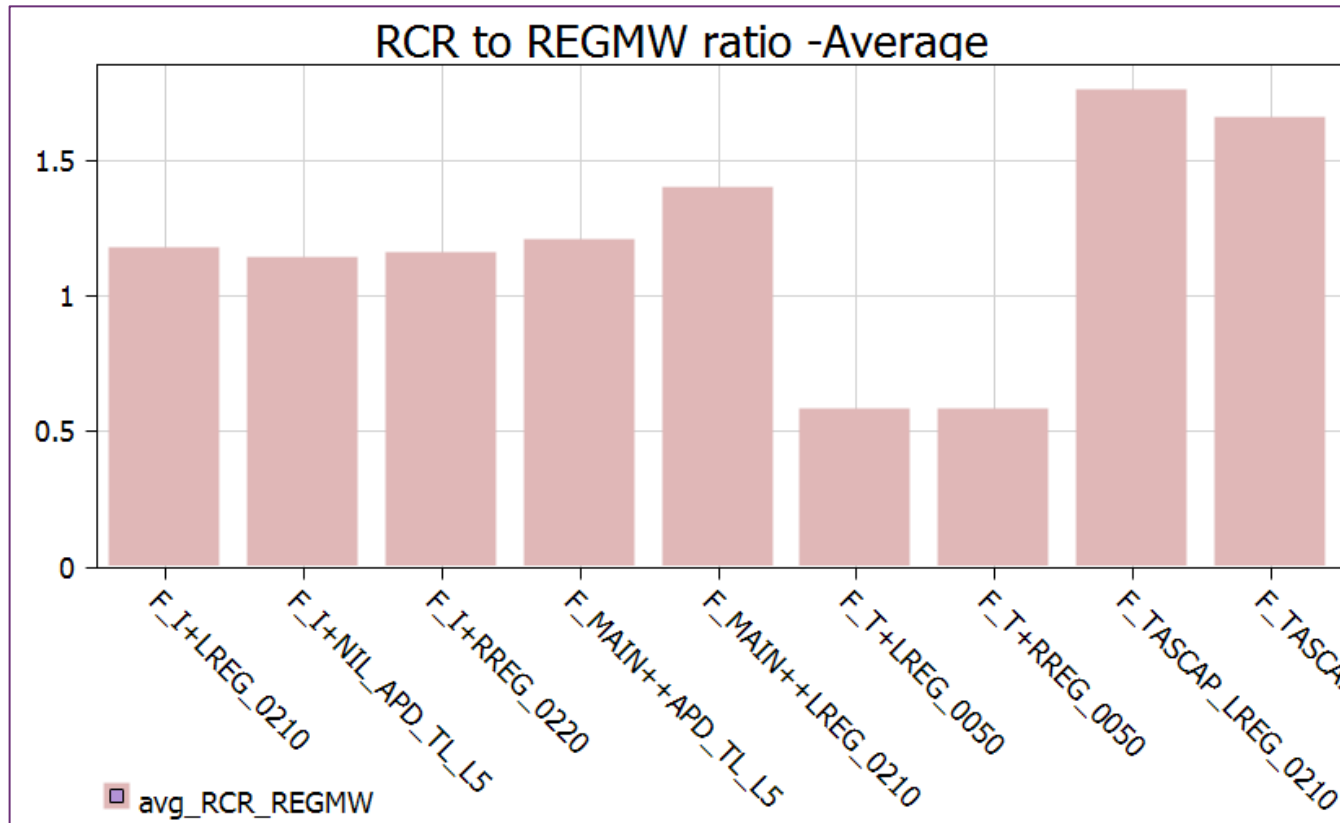


FPP amount vs REG recovery ratio



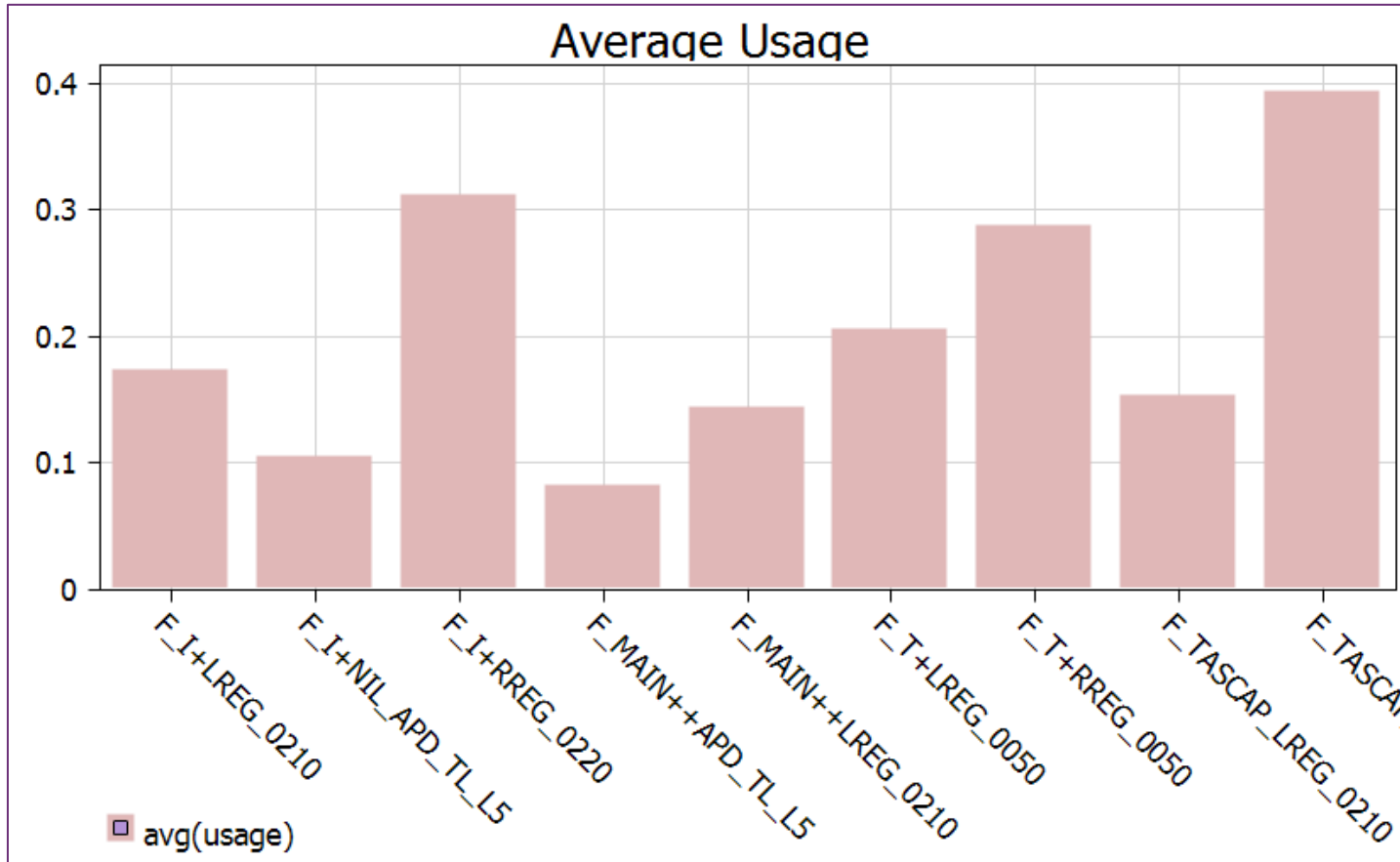
- [Total FPP amount] divided by [Total regulation recovery amount]
- In this sample it is slightly above 1
- Can change, if behaviour changed after transition to financial operation
 - If RCR values change
 - FPP amount is a function of RCR and $P_{\text{Regulation}}$

Ratio of RCR to Regulation MW enabled -Average



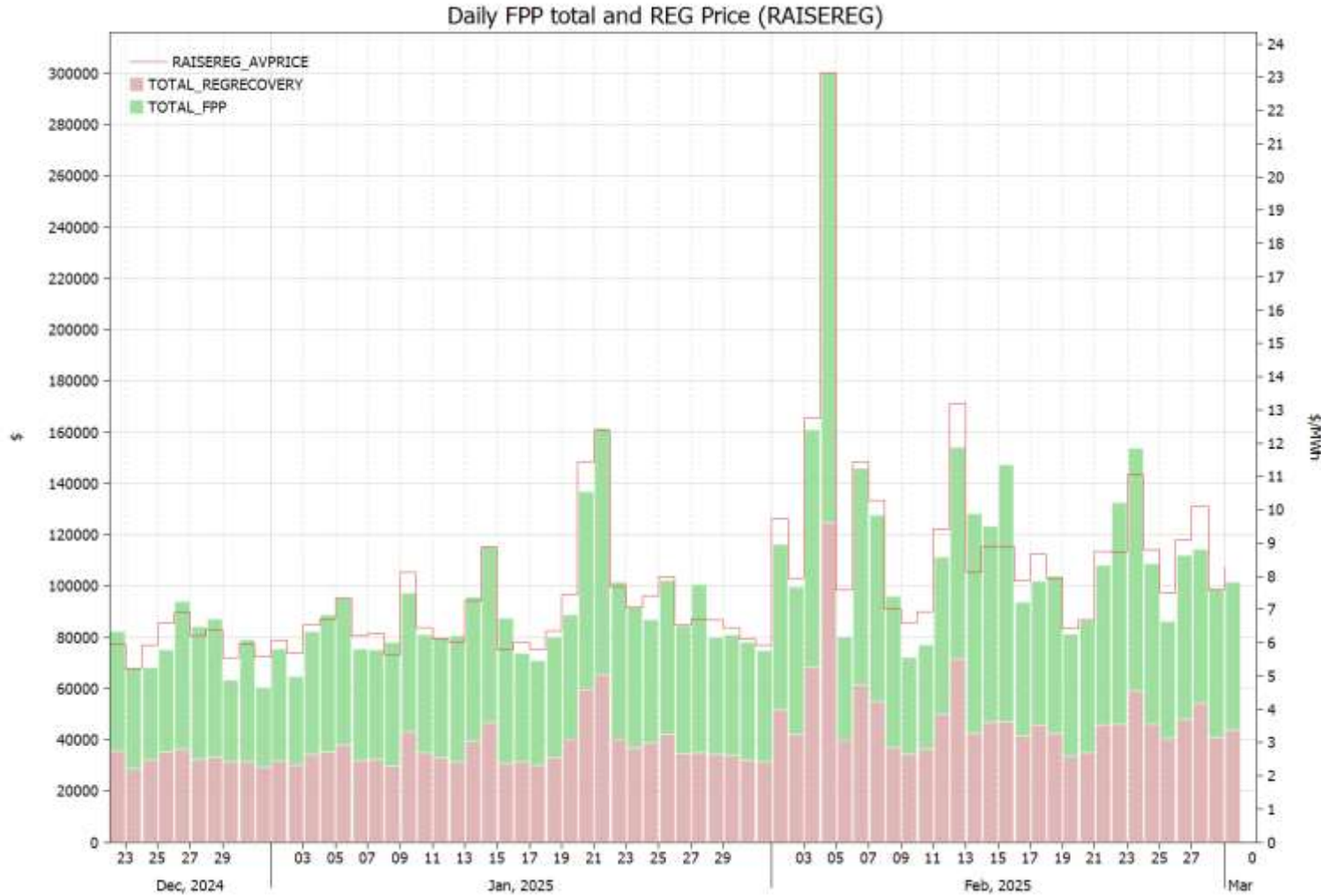
- RCR reflects the total helpful deviations
- Consistently low for Tasmanian local constraints

Average Usage value



- Used REG MW reflects the total helpful deviations from REG enabled units
 - With or without any AGC instructions
- USAGE is the ratio of that to the enabled REG amount
- Expected to be smaller for binding co-optimized 5min Constraints

Daily totals RaiseReg + VWA Price



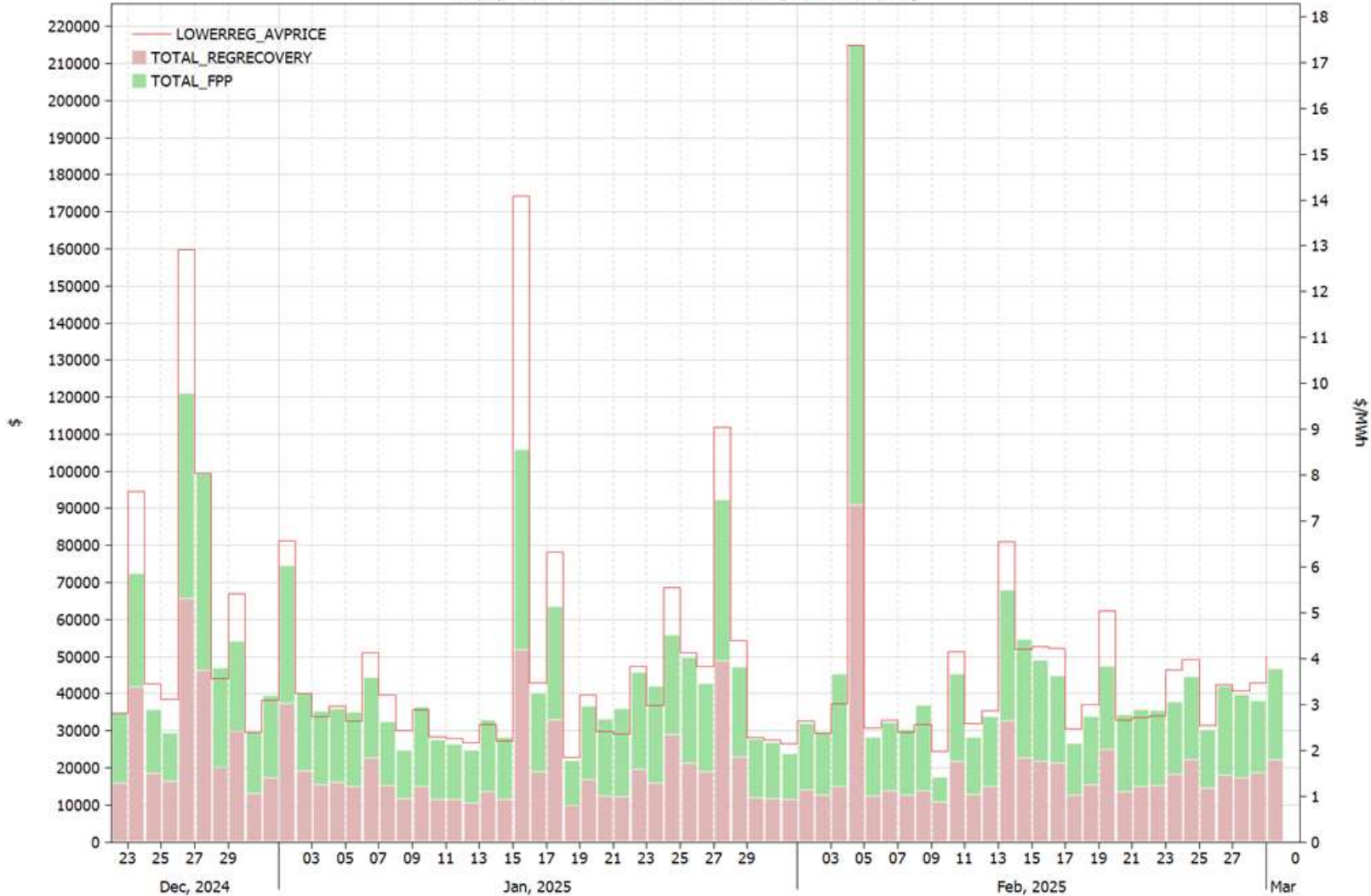
- Daily Volume Weighted Average Regulation FCAS price
- Total Reg recovery amount (used +unused)
- FPP amount (FPP payment)

Average around \$90K per day

- Correlated to the VWA FCAS Price
 - Pregulation is the adjusted marginal price for the constraint

Daily totals LowerReg + VWA Price

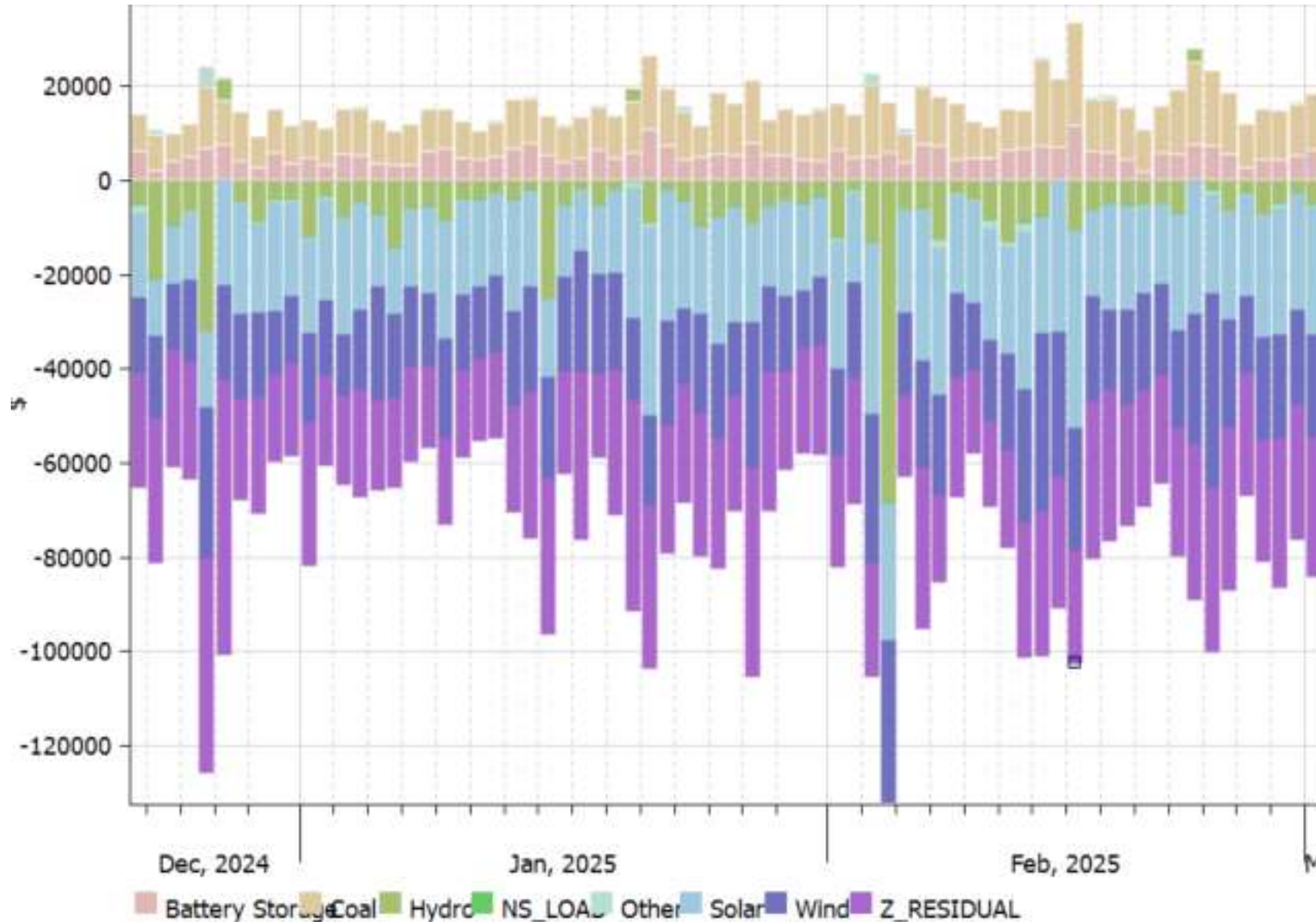
Daily FPP total and REG Price (LOWERREG)



- Daily Volume Weighted Average Lower Regulation FCAS price
- Total LOWERREG recovery amount (used +unused)
- FPP LOWERREG amount (FPP payment)

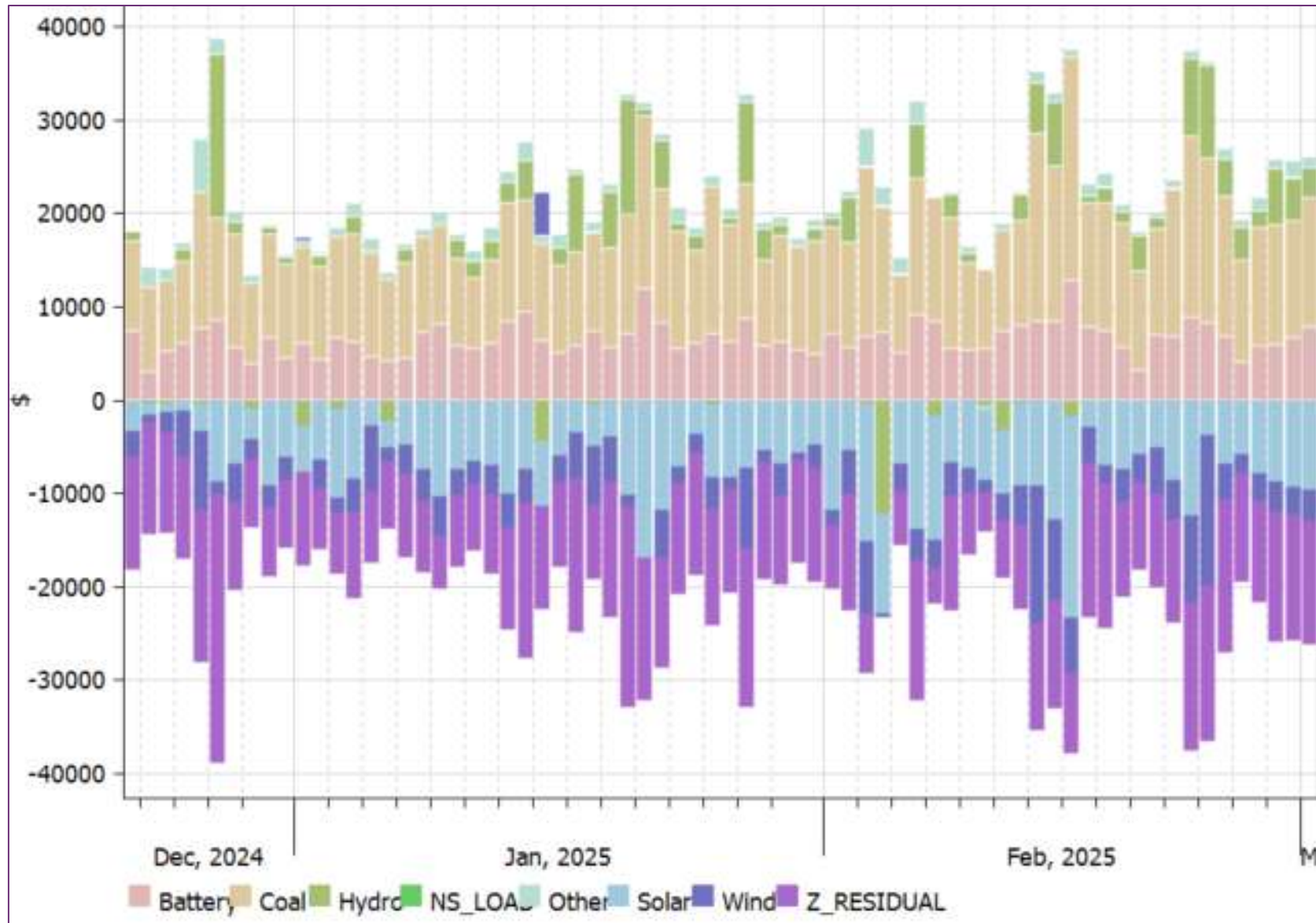
Average around \$30K per day

Estimated Daily Totals by Fuel type



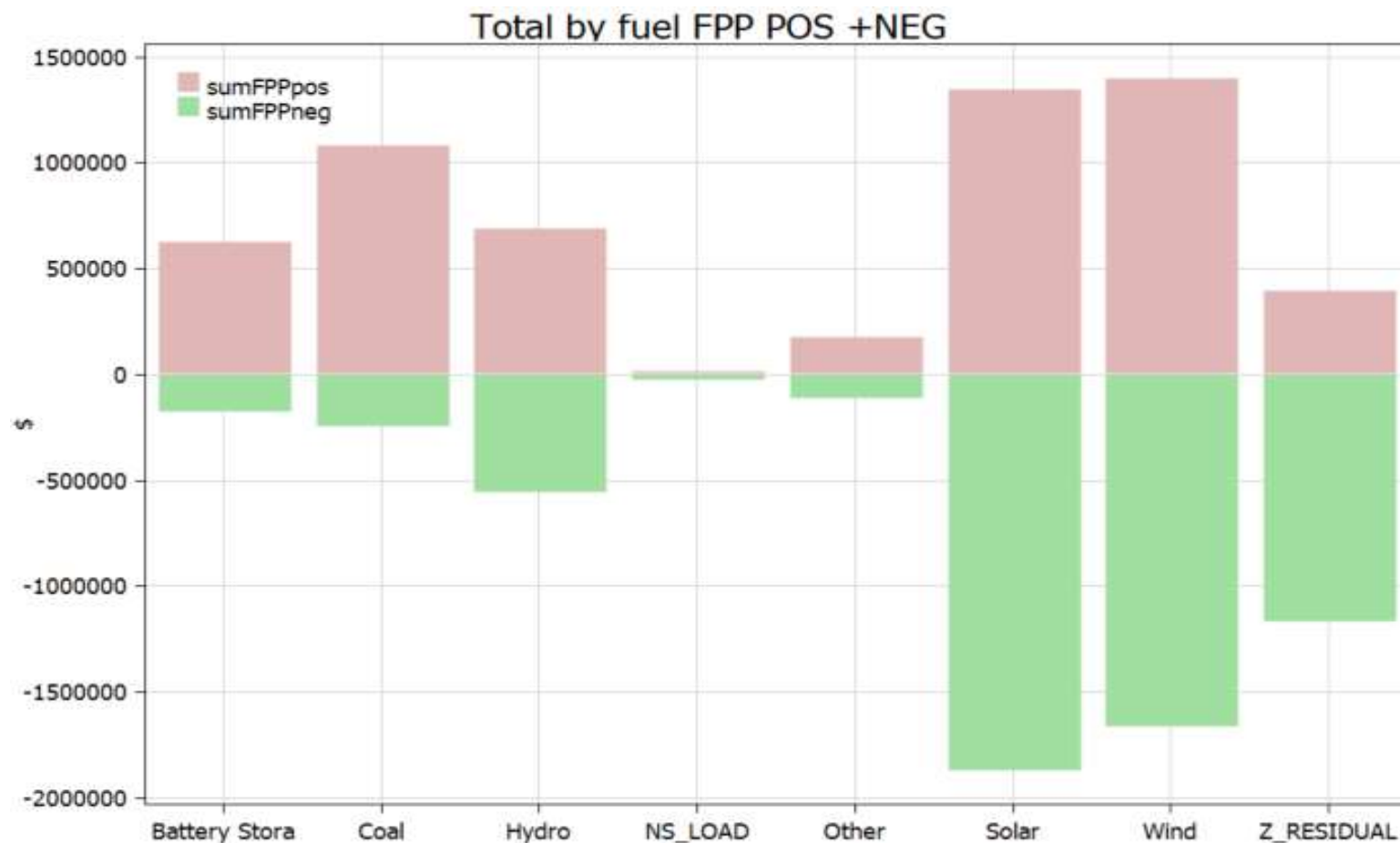
- Estimated Daily Totals
 - Sum of FPP, used recovery and unused Recovery
 - Categories are estimates only
- Battery and Coal consistently net positive.
- Wind, Solar and residual net negative
- Hydro performance skewed due to Tasmania Reg Recovery

FPP component only estimates



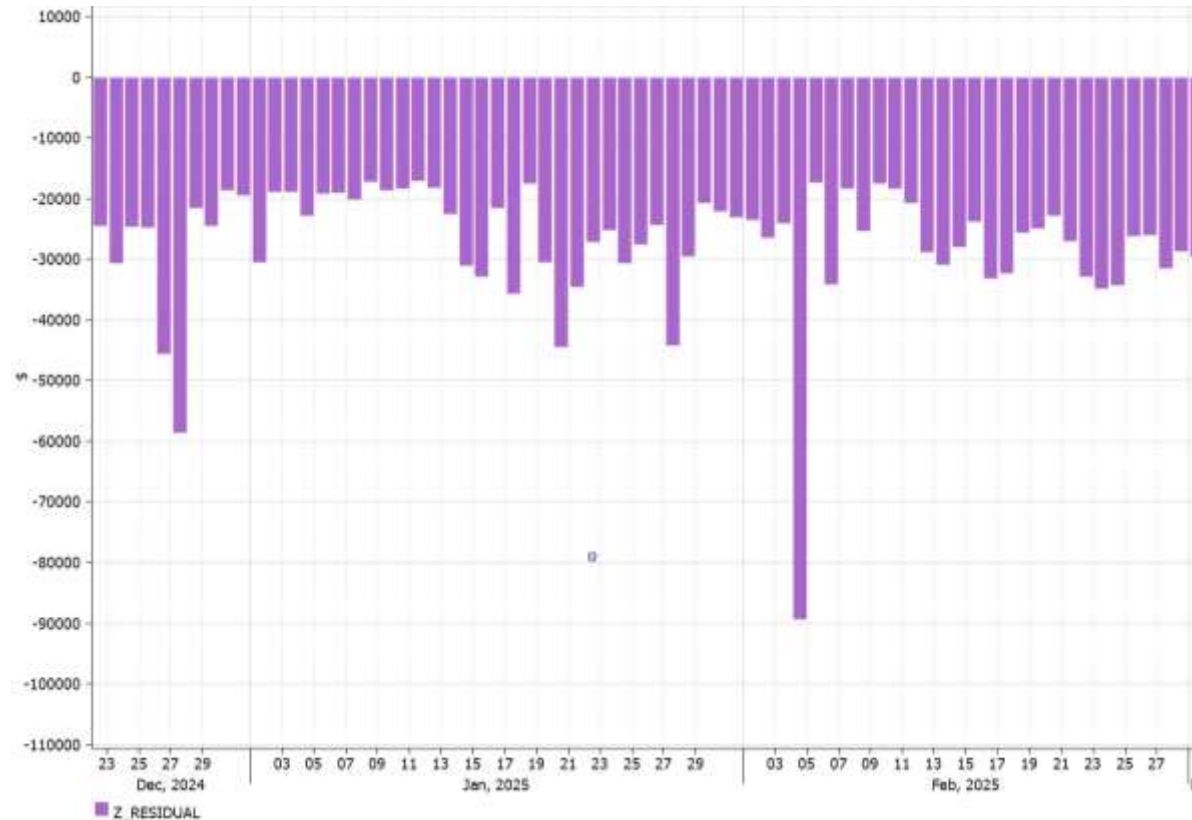
- FPP payment/recovery only
 - No REG recovery
- Symmetrical
 - Payment = recovery
- Battery, Coal consistently positive
- Hydro mostly positive

FPP amount individual totals



- All categories have positives and negatives instances
- Battery, Coal and Hydro net positive amounts
- Wind and Solar's natural deviations may get rewarded when they are helping the frequency.
- Residual is generally negative but may get rewarded occasionally
 - Mainly in Tasmania

Residual recovery and payment

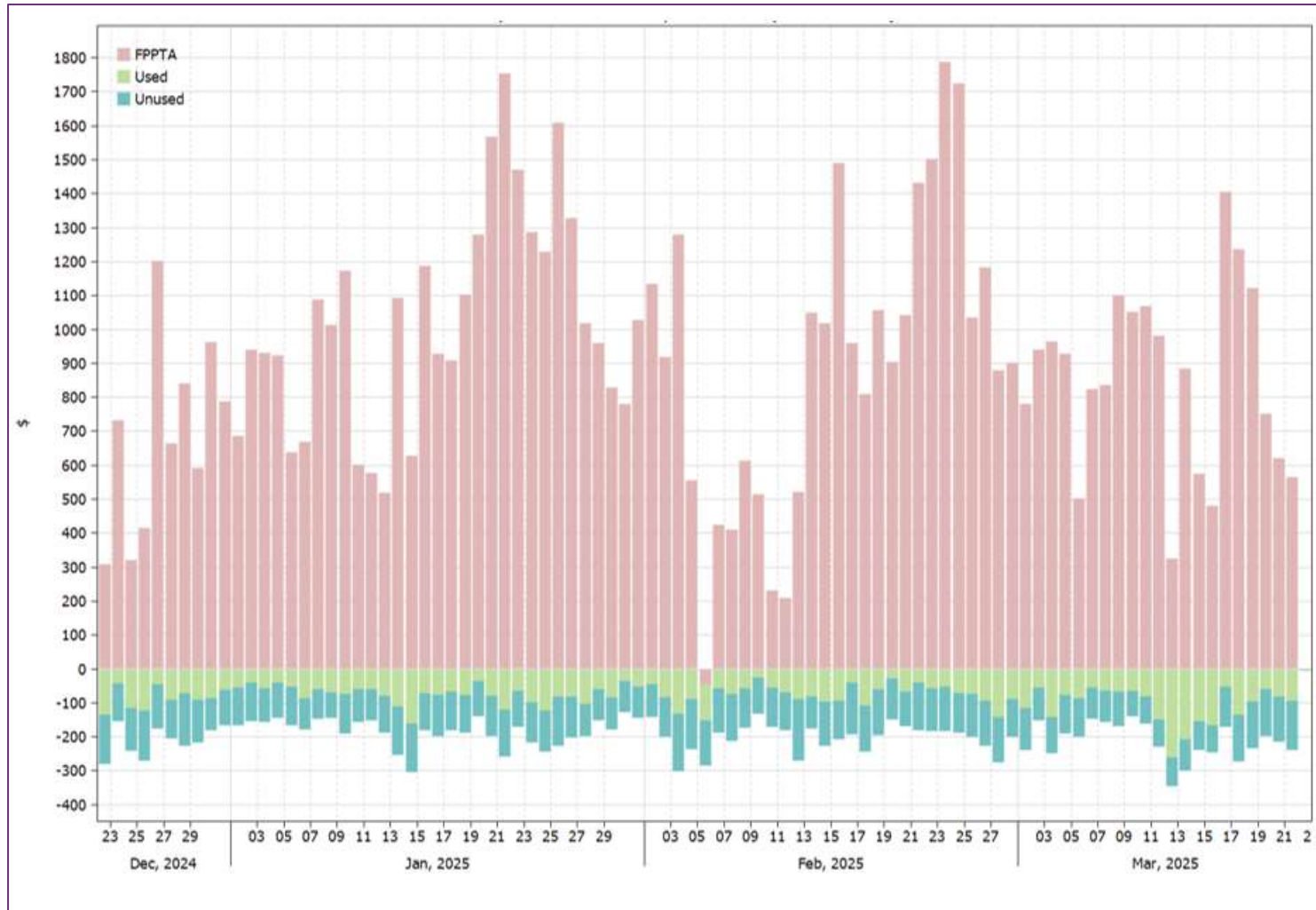


- Daily total residual amounts
- Net value is negative: residual loads generally pay
- However, there are intervals with positive RCF
 - where residual loads get paid

Sample participant level observations

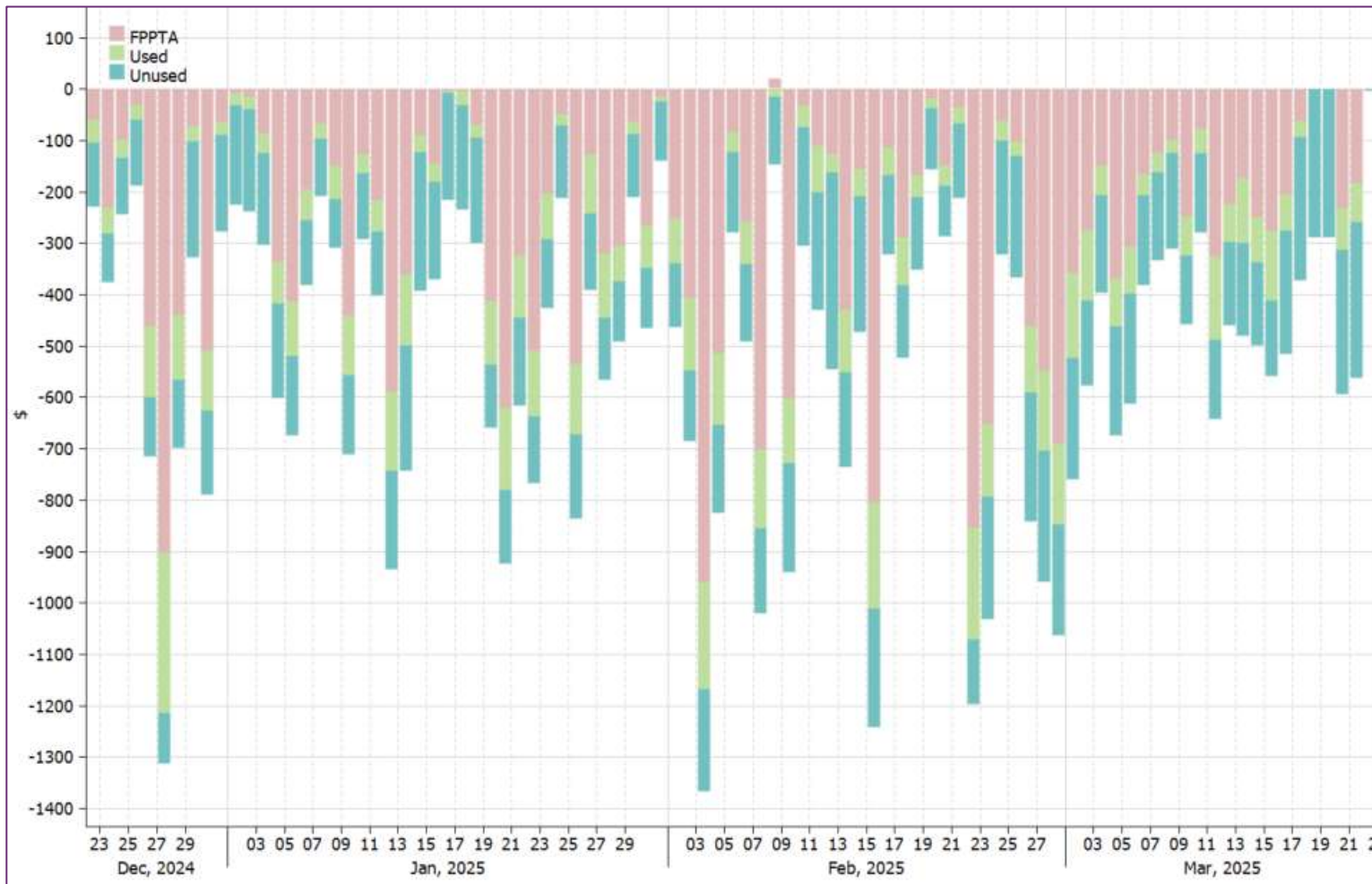
Shantha Ranatunga

Daily Totals for a participant 1



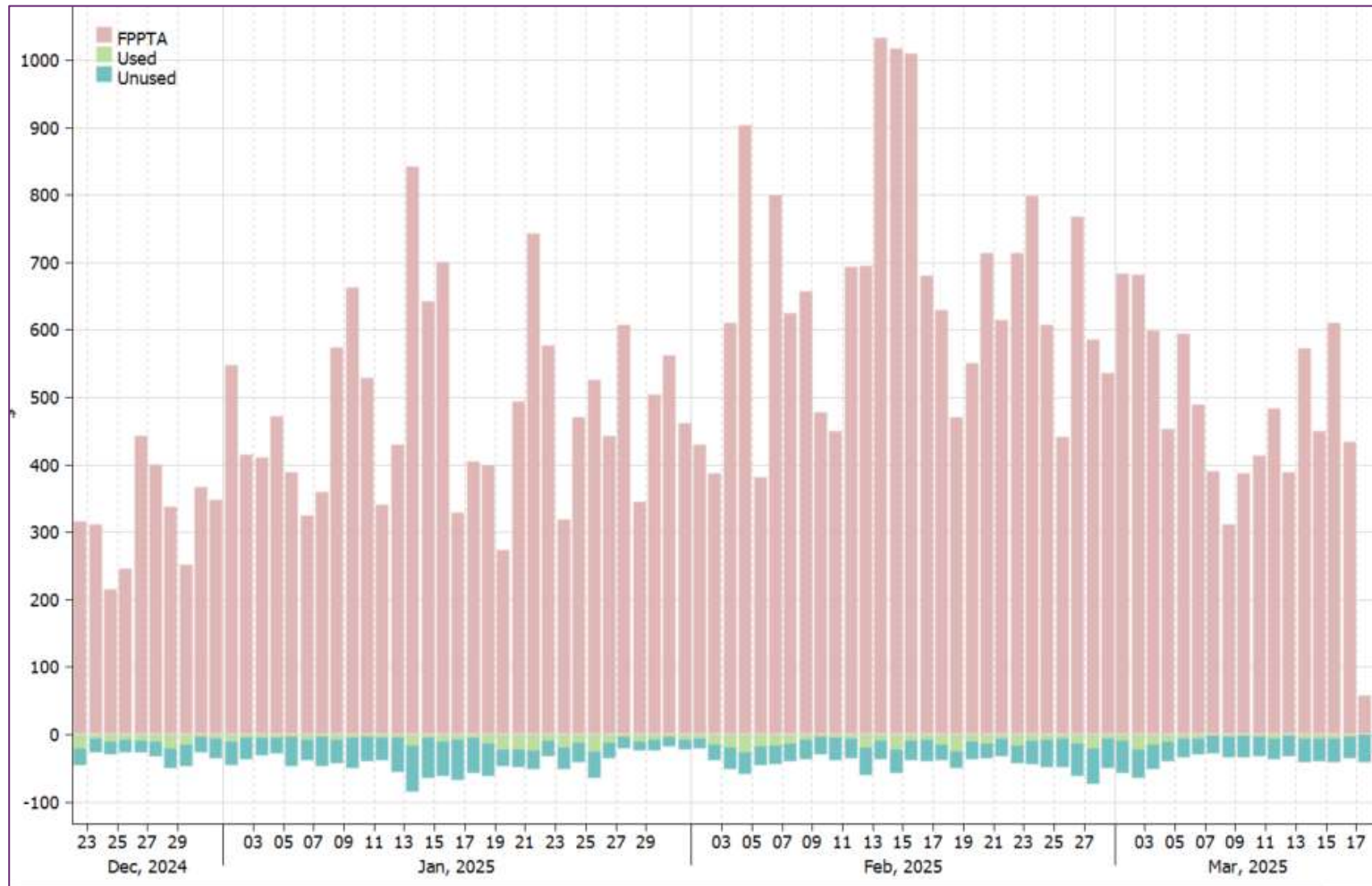
- Positive: AEMO pays the participant
- Factor based TA amount only (does not include residual TA, if any)
- One portfolio with a Coal station
 - Provider of PFR
- FPP daily totals are generally positive.
- Smaller contribution to REG recovery
 - In some cases, less than the causer pay amount (more analysis required)

Daily Totals for a participant 2



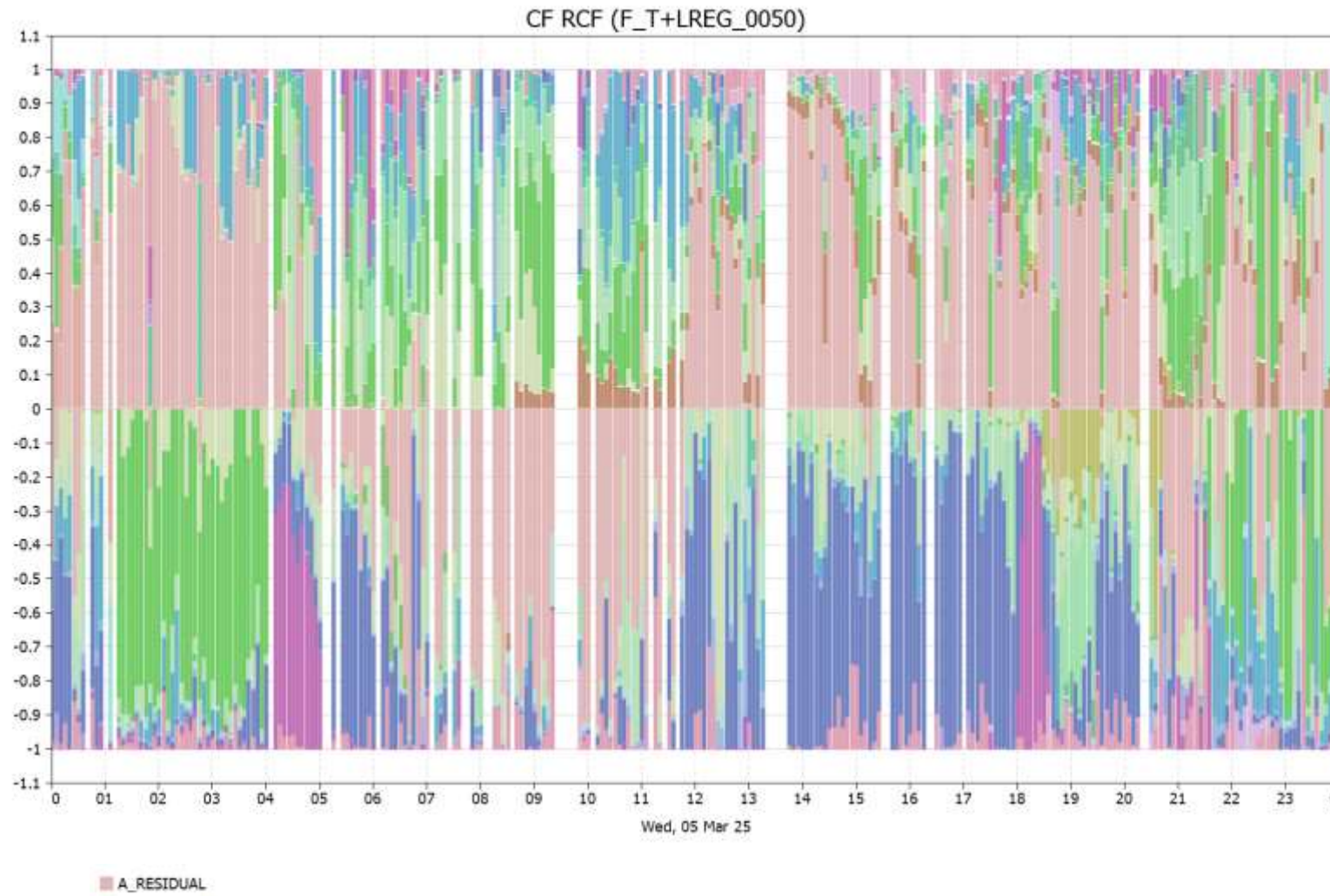
- Portfolio with a Solar farm
 - Does not provide PFR
- For this unit generally negative totals

Daily Totals for a participant 3



- Portfolio with a BESS
 - Strong provider of PFR and 1sec FCAS services
- Consistently positive FPP trading amount

Contribution factor spread for a constraint



- Contribution Factor stacked bar graph
- Each bar represents a DUID or Residual
- Null CF when const not binding
- Tasmanian LOWERREG Constraint for 05 March 2025
 - Residual contribution factor (RCF) is positive significant portion of time
 - Under investigation

Summary of findings

FPP calculation results: published from Mid-December 2024

- Tools operating as expected, minor technical issues related to data publication being addressed
- Some feedback (and clarification requests) received from the industry

Observed results generally align with the intentions of the PFR incentives reform

- Known PFR providers have positive FPP financial estimates

Tasmanian residual's average RCF is lower than others

- Most probably due to interactions between different frequency control systems
- AEMO is conducting further investigations

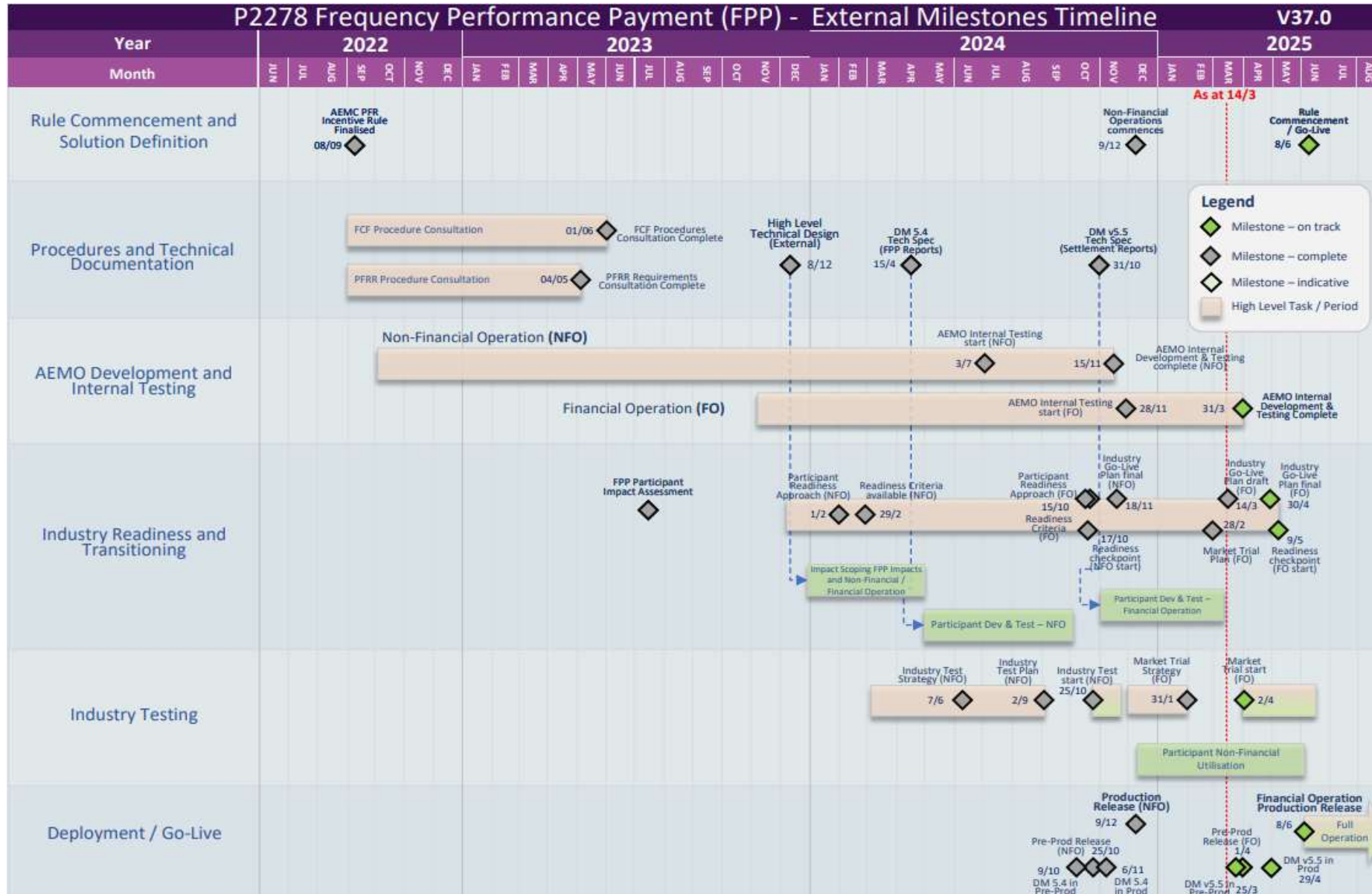
Further Resources

- [AEMO | Frequency Performance Payments project](#)
- [Overview of the FPP reform factsheet](#)
 - [FPP calculations and participant outcomes factsheet](#)
- [Video explainers](#)
 - Eight video explainers on different aspects of the FPP system are published on the [FPP project page](#) on AEMO's website (scroll to bottom of page).
- [FPP FAQ Document](#)
 - Quick reference resource addressing key questions relating to FPP system and FPP reform
- [FPP Factor Calculation Document](#)
 - Supplementary to the FAQ Document and explains FPP concepts in greater detail

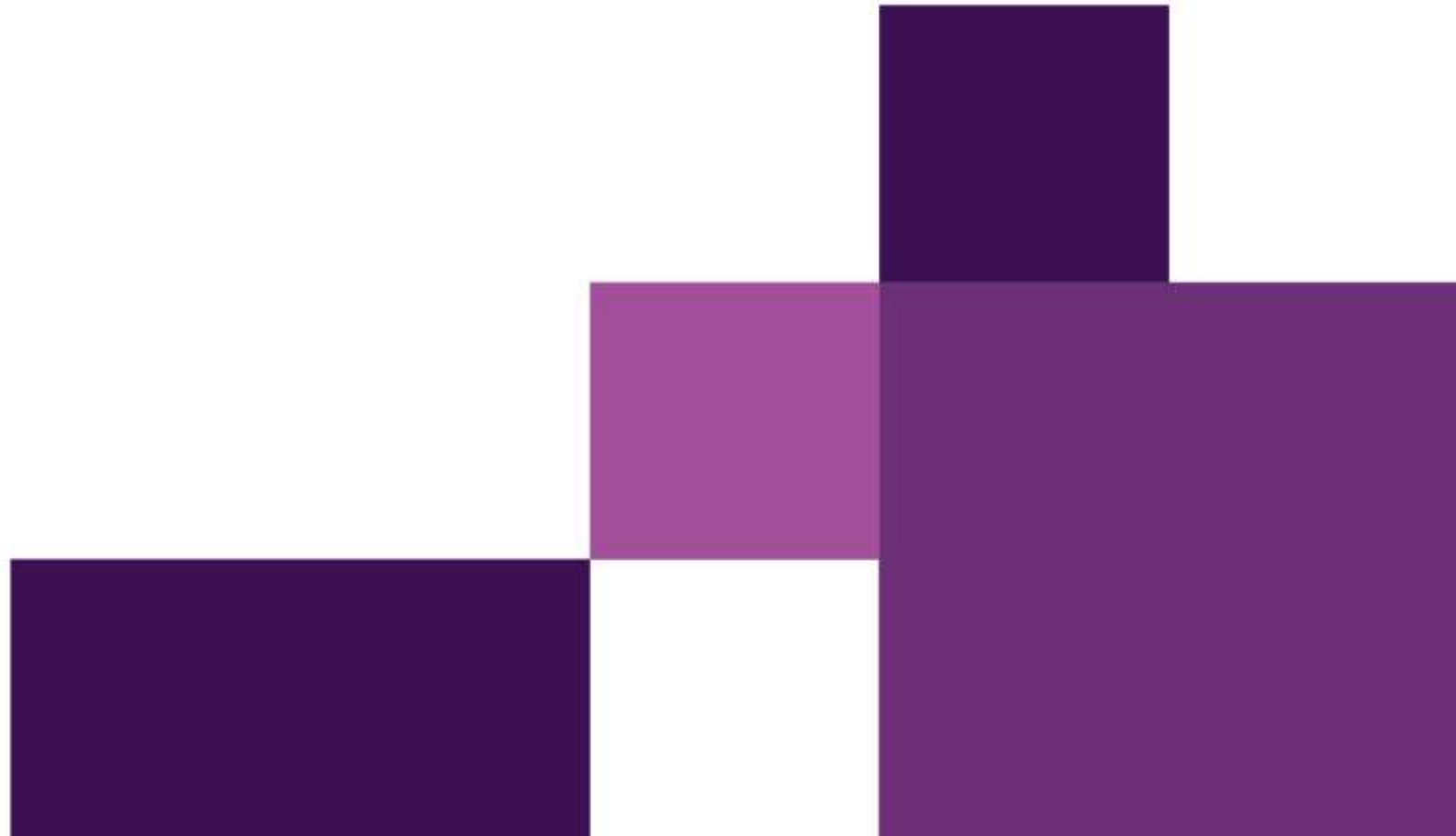
FPP Key Dates

- [Draft FPP FO Go Live Plan](#) published 14 March. Industry feedback due **11 April 2025** via NEMReform@aemo.com.au.
- AEMO has not yet received a ruling from the ATO regarding the GST treatment of FPPs. However, AEMO is making preparations to start the market trial with GST being applied to FPPs.
- AEMO [expedited consultation](#) on updates to the Frequency Contribution Factors Procedure (FCFP):
 - Draft report and proposed procedure change published 21 February 2025.
 - AEMO did not receive any feedback that the process should not be expedited. Submissions to the draft procedure have now closed.
 - Final report will be published 1 April 2025
- Financial Go Live / Rule Commencement – 8 June 2025.

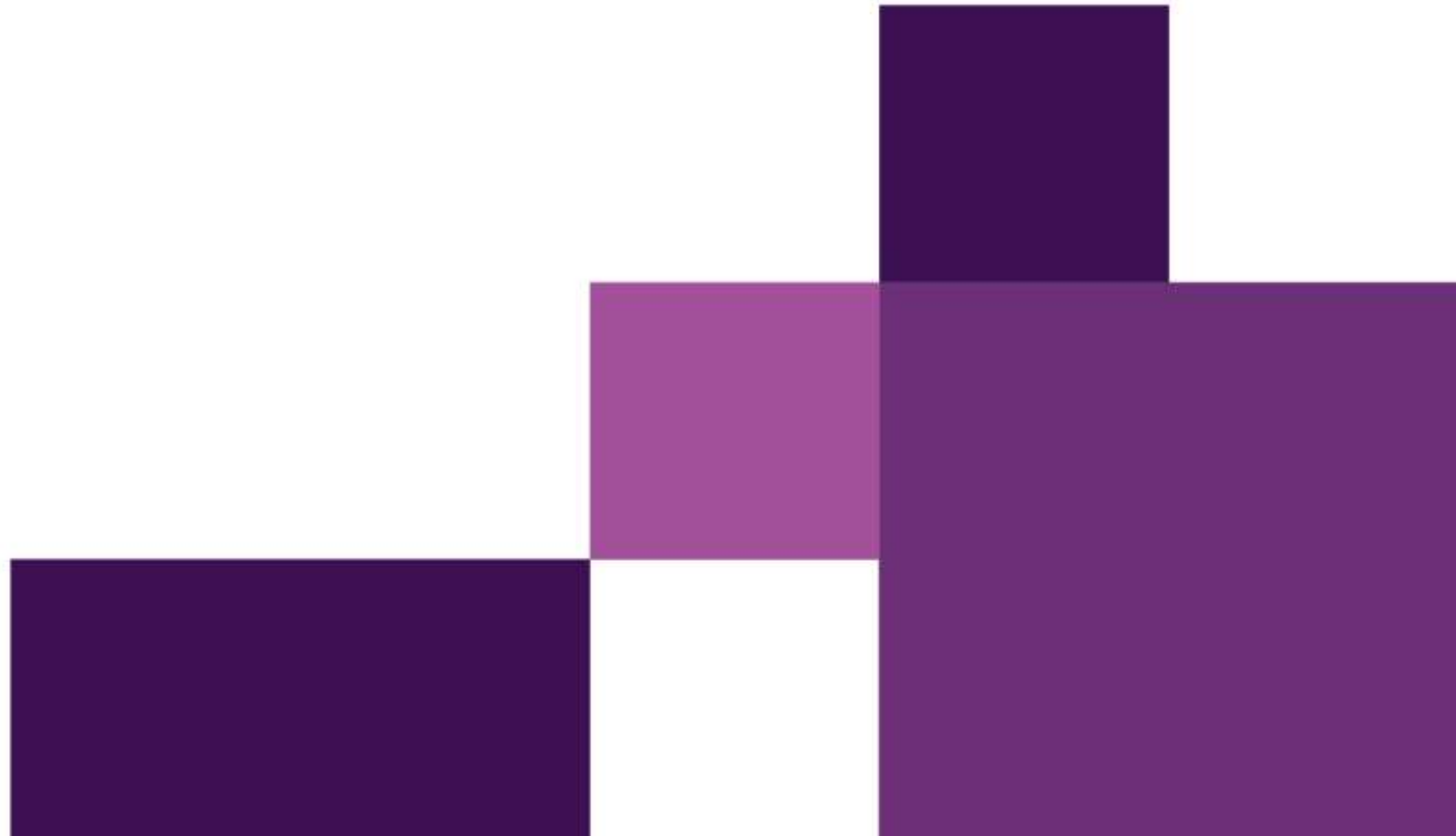
Frequency Performance Payments (FPP) Milestones Timeline



Questions



Appendix



Industry readiness

For noting

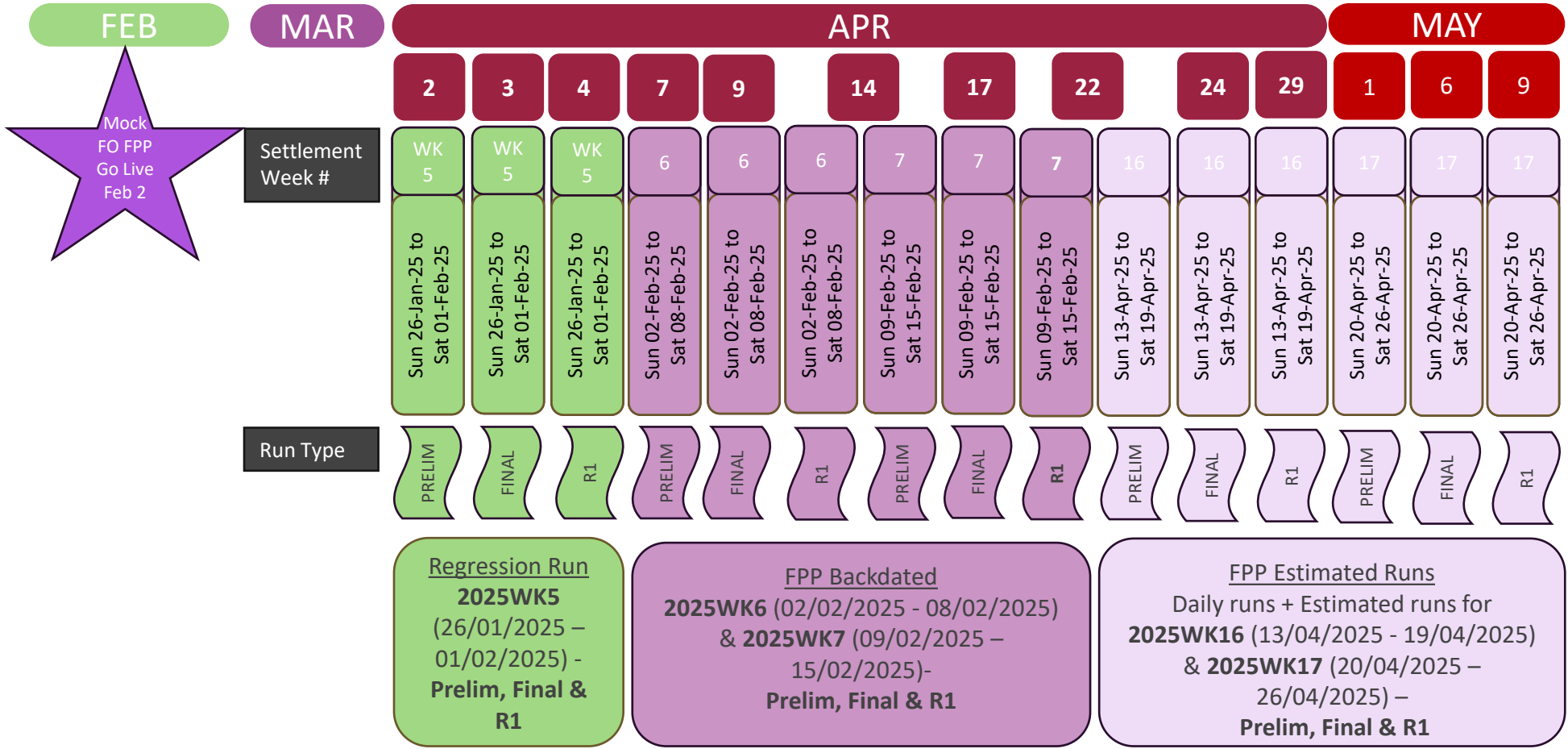


FPP-FO Market Trial update

FPP-FO Market Trial Planning

- [Market Trial Strategy](#) published on 31 January
- [Market Trial Plan](#) published 28 Feb. Feedback and questions on the plan can be directed to NEMReform@aemo.com.au by 21 March.
- Q&A sessions have been scheduled, commencing 31 March. Contact NEMReform@aemo.com.au to have members of your organisation added to this meeting series.
- Participants are asked to register for the market trial, so that Practitest access and training can be arranged. Registration link is here: [FPP \(FO\) Market Trial Registration](#). Practitest Training to be held on 19 March and 26 March.
- Settlements schedule has been released to ITWG members for feedback. Further feedback can be directed to NEMReform@aemo.com.au by 21 March.
- Structure of the Market Trial (outlined on the following slide):
 - Backdated regression run (without FPP): Prelim, Final & R1 for week 5.
 - Runs with FPP Backdated: Prelim, Final & R1 for weeks 6 and 7.
 - FPP Forward Date: Daily runs (estimates), Final & R1 for weeks 16 and 17.

FPP Market Trial Schedule



Mock
FO FPP
Go Live
Feb 2

FPP-FO Check point – 3 Months prior to rule commencement



- AEMO has conducted initiative readiness checkpoint as at 12 March.
- Intention is to provide industry with assessment of progress against the agreed go-live criteria
 - Considerations for implementation planning
 - Readiness for commencement and execution of Market trial in planned timeframes.

3-month readiness & go-live checkpoint

INITIATIVE	<p>FPP-FO Sun 08 Jun 2025 Rule Commencement</p> <ul style="list-style-type: none"> FPP arrangements replacing 'causer pays' arrangements FPP Units performance and 5-min Contribution Factor calculations used to allocate recovery of Reg FCAS costs and penalties 	<p>Summary status: On- track</p> <p>Overall on track against schedule, noting:</p> <ul style="list-style-type: none"> In the absence of ATO GST ruling, AEMO will proceed to include GST in financial settlements
	<p>GO-LIVE CRITERIA</p>	<p>ASSESSMENT / COMMENTS</p>
AEMO	<p>NEM Rules/Procedures:</p>	<p>NEM Rules/Procedures:</p> <ul style="list-style-type: none"> AEMC amendment to FPP rule, as requested by AEMO, finalised 13 March 2025 Binding private ruling from ATO re GST treatment of FPPs – no decision received to date. AEMO will proceed on the basis that GST will be included in FPP financial settlements. Frequency Contributions Factor Procedure non-material changes - on track for 1 April 2025. No risk to FPP go-live.
	<p>AEMO solution tested in-line with requirements for:</p> <ul style="list-style-type: none"> Settlements and billing based on FPP calculations. DM v5.5 and NEM FPP Settlement Reports 	<p>Solution readiness summary:</p> <ul style="list-style-type: none"> FPP Settlements solution and NEM Reports on track for Market Trial and June go-live Certification of FPP solution and Settlements in progress with expected completion prior to 8 June
	<p>AEMO business:</p> <ul style="list-style-type: none"> Ready to operate new FPP arrangements 	<p>Business readiness summary</p> <ul style="list-style-type: none"> Preparations proceeding to schedule for business to support post go-live.
INDUSTRY	<ul style="list-style-type: none"> Individual Participant readiness activity is not a pre-requisite for go-live. However, Participants may wish to make system/process changes to reconcile AEMO payments/penalties in accordance with rule commencement. 	<ul style="list-style-type: none"> Introduction of Financial Operations is based on AEMO using the standard approach for settlements and reporting. There is no dependent participant preparatory activity identified that would inhibit rule commencement as scheduled.
CONTINGENCY	<p>Contingency approaches developed and contingency actions proposed</p>	<p>Agreed contingencies being monitored, no trigger points exceeded with confirmations required in line with May go-live checkpoint</p>



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