



BAL-003-2 Performance Update

&

Manual 12 Primary Frequency Response (PFR) Review

Ross Kelly

Performance Compliance

September 12, 2024

Operating Committee

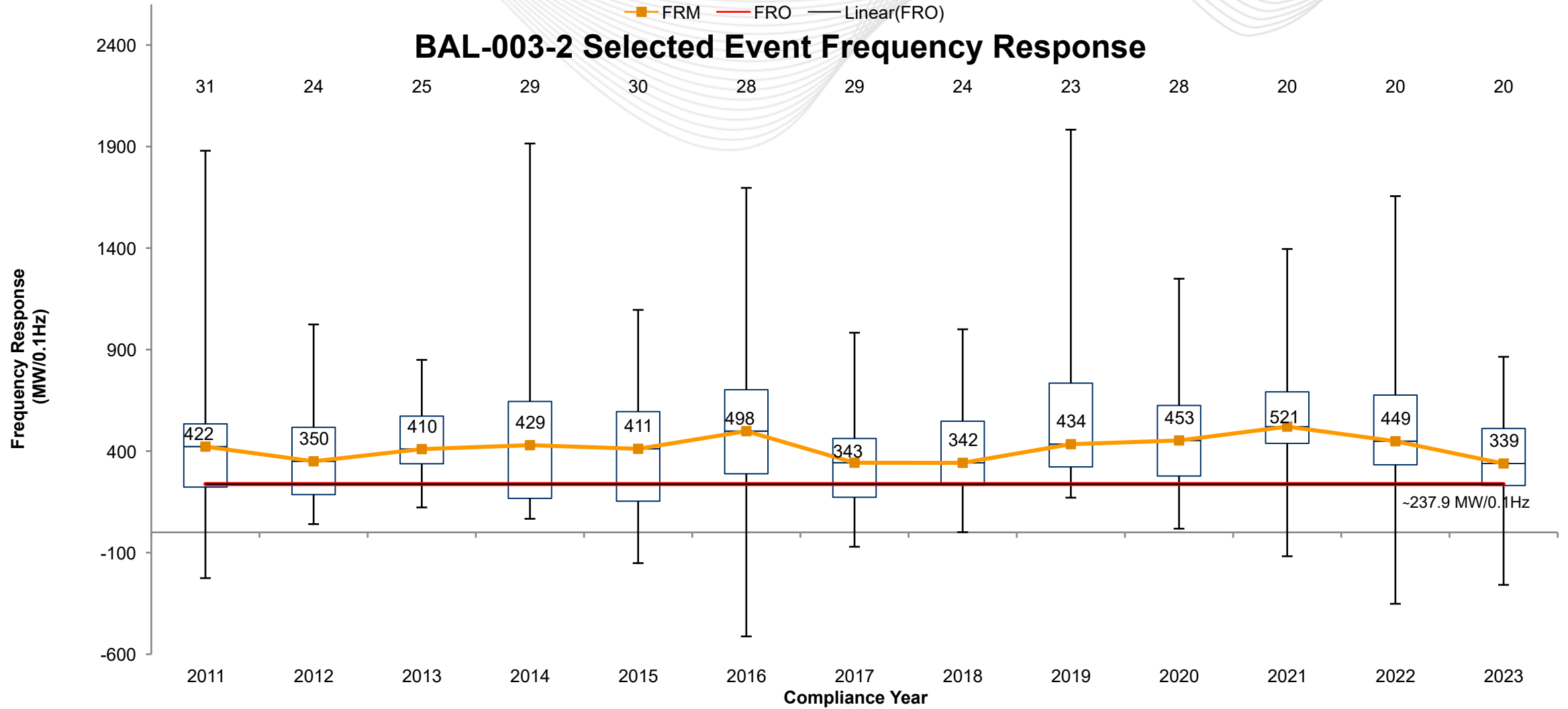
- **Purpose:** To require sufficient Frequency Response from the Balancing Authority (BA) to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value. To provide consistent methods for measuring Frequency Response and determining the Frequency Bias Setting (FBS).
- **Applicability:** PJM is a Balancing Authority. PJM is not a member of Frequency Response Sharing Group (FRSG).
- **Effective Date:** 12/1/2020

- R1:** Each Frequency Response Sharing Group (FRSG) or Balancing Authority (BA) that is not a member of a FRSG shall achieve an annual Frequency Response Measure (FRM) (as calculated and reported in accordance with Attachment A) that is equal to or more negative than its Frequency Response Obligation (FRO) to ensure that sufficient Frequency Response is provided by each FRSG or BA that is not a member of a FRSG to maintain Interconnection Frequency Response equal to or more negative than the Interconnection Frequency Response Obligation (IFRO).

$$FRO_{BA} = IFRO \times \frac{\text{Annual Gen}_{BA} + \text{Annual Load}_{BA}}{\text{Annual Gen}_{Int} + \text{Annual Load}_{Int}}$$

– 2024 Operating Year (OY) runs from December 2023 until November 2024

- FRO_{PJM} for 2024 OY = $IFRO_{PJM} \times \text{Pro-rate Share}_{PJM}$
 $= (-923 \text{ MW}/0.1\text{Hz}) \times (25.77\%) = -237.9 \text{ MW}/0.1 \text{ Hz}$



- The NERC Resource Subcommittee (RS)
 - Posted 2024 Frequency Bias Settings and L10 values
 - <https://www.nerc.com/comm/OC/Pages/Resources-Subcommittee.aspx>
- PJM updated the Frequency Bias Setting and L10 values in the EMS and applicable systems on June 26, 2024.

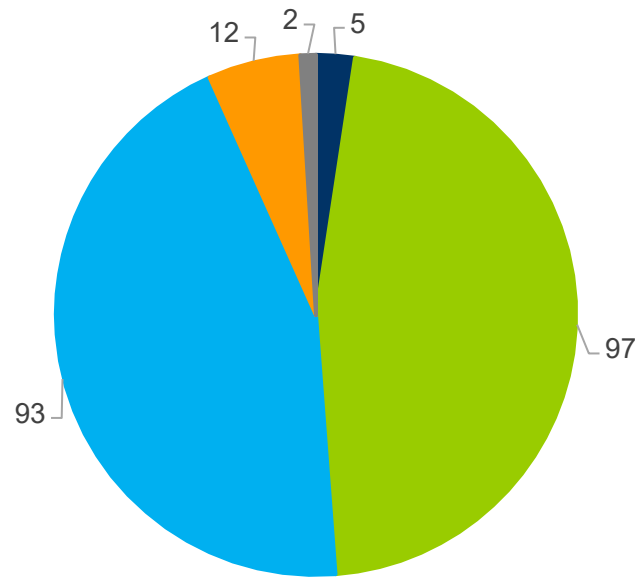
- PJM continues to monitor unit PFR performance using criteria described in PFRSTF and documented in PJM Manual 12.
 - <https://www.pjm.com/library/manual>
- Event Selection
 - Frequency goes outside +/- 40mHz deadband
 - Frequency stays outside +/- 40mHz deadband for 60 continuous seconds
 - Minimum/maximum frequency reaches +/- 53mHz

- **Today's review includes:**
 - Low Frequency Events
 - 06/09/24 23:00:40
 - 07/08/24 11:34:20
 - 07/28/24 17:20:50
 - 07/31/24 12:32:52
 - 08/12/24 17:09:43
 - 08/30/24 21:02:05

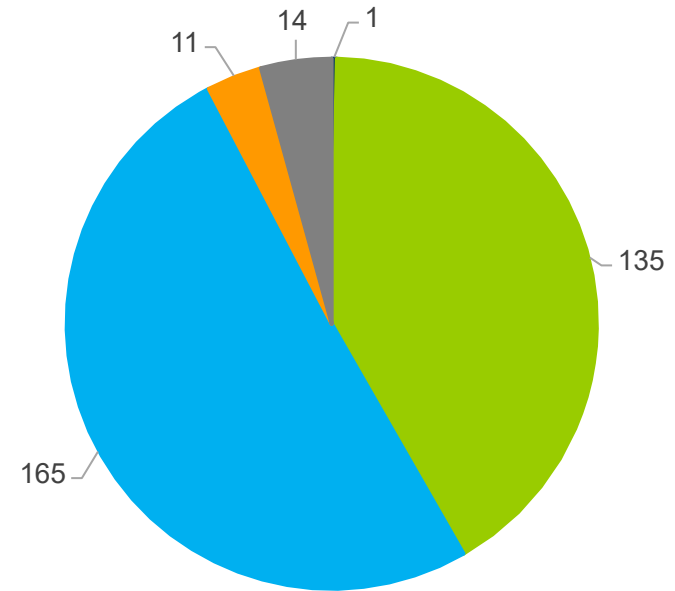
Fuel Type	# of Units evaluated
Coal	177
Hydro	25
Natural Gas	278
Oil	39
Solar	34
Wind	87
Other	7
Total	647

06/09/24 23:00:40

07/08/24 11:34:20

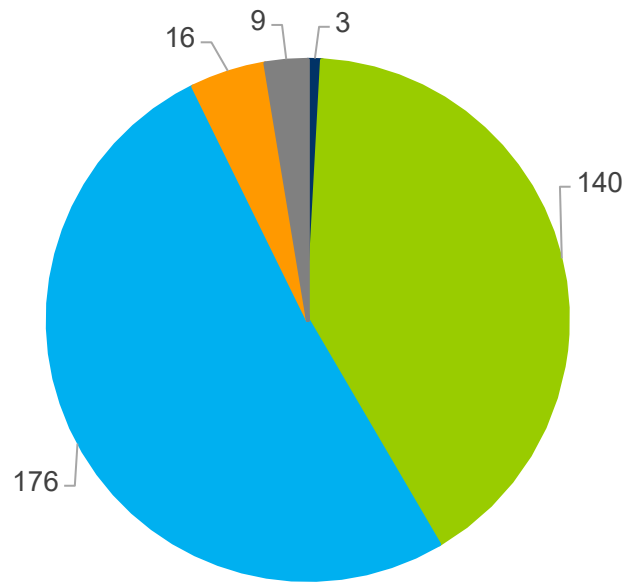


- Further Evaluation Needed
- No PFR Response, Response Expected
- No PFR Response, Response Not Expected
- PFR Response, Response Expected

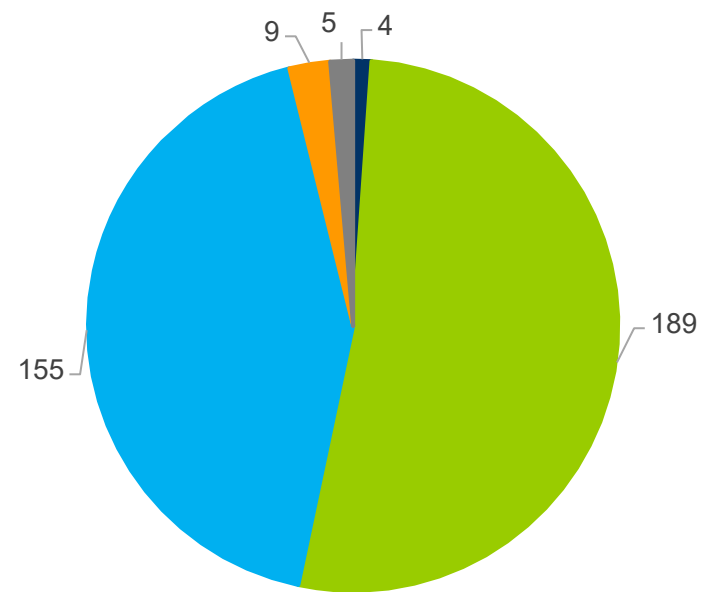


07/28/24 17:20:50

07/31/24 12:32:52

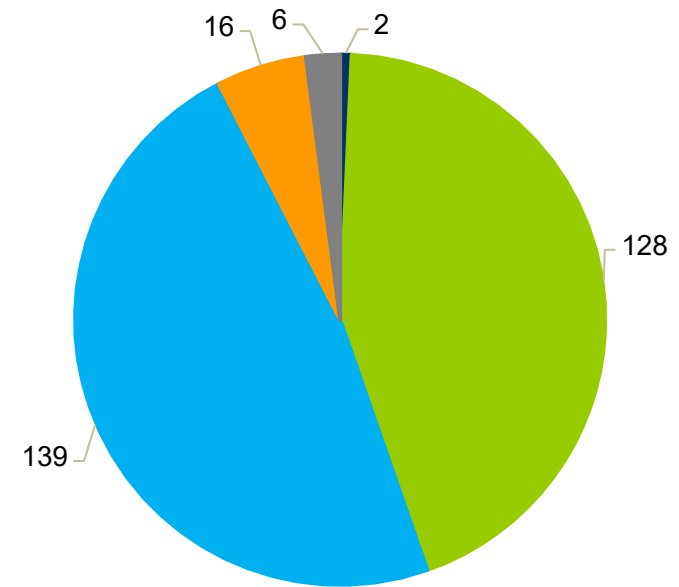
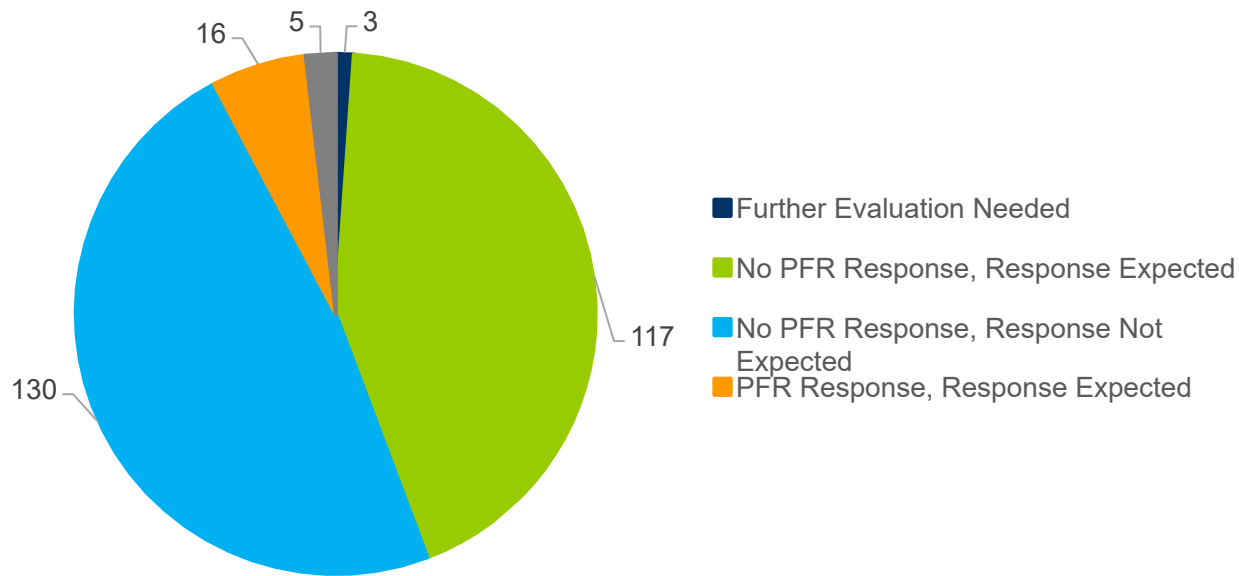


- Further Evaluation Needed
- No PFR Response, Response Expected
- No PFR Response, Response Not Expected
- PFR Response, Response Expected
- PFR Response, Response Not Expected

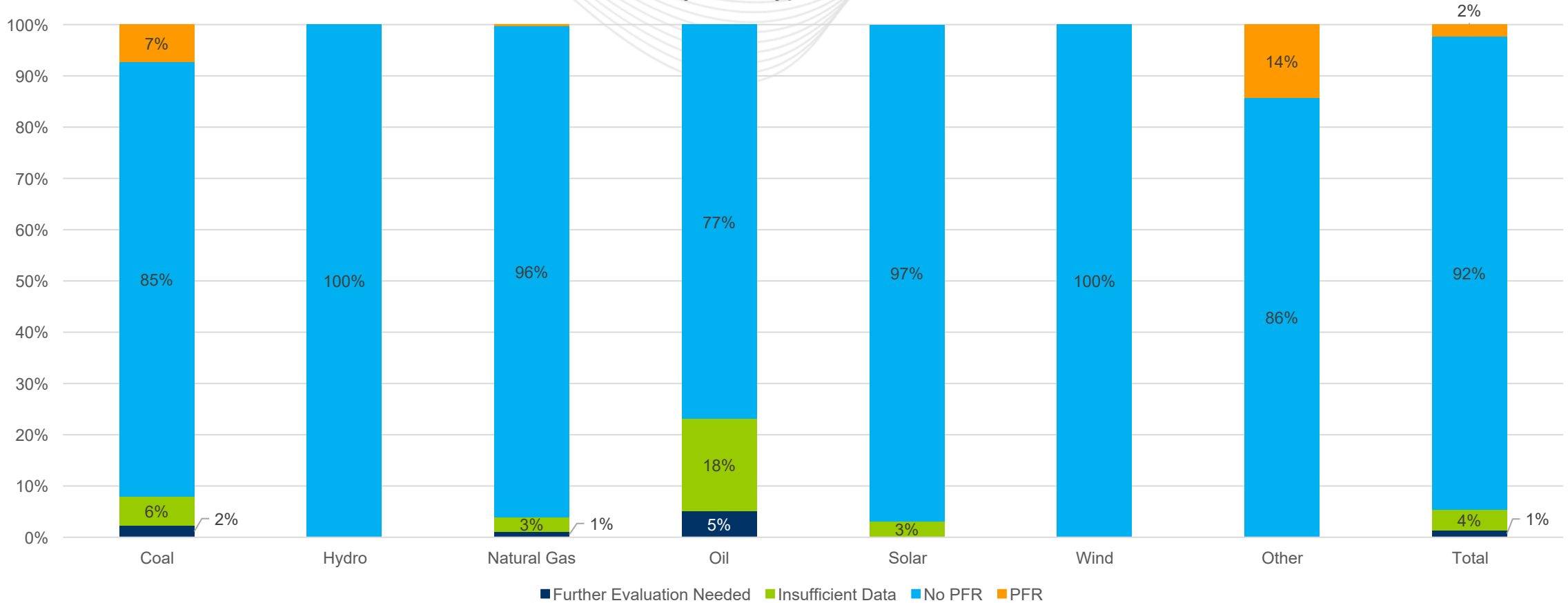


08/12/24 17:09:43

08/30/24 21:02:05



M-12 PFR by Fuel Type For Units > 50 MW



Presenter/SME:
Ross Kelly

Ross.Kelly@pjm.com

SME:
Ilyana Dropkin

Ilyana.Dropkin@pjm.com

Frequency Response

FrequencyResponse@pjm.com



Member Hotline

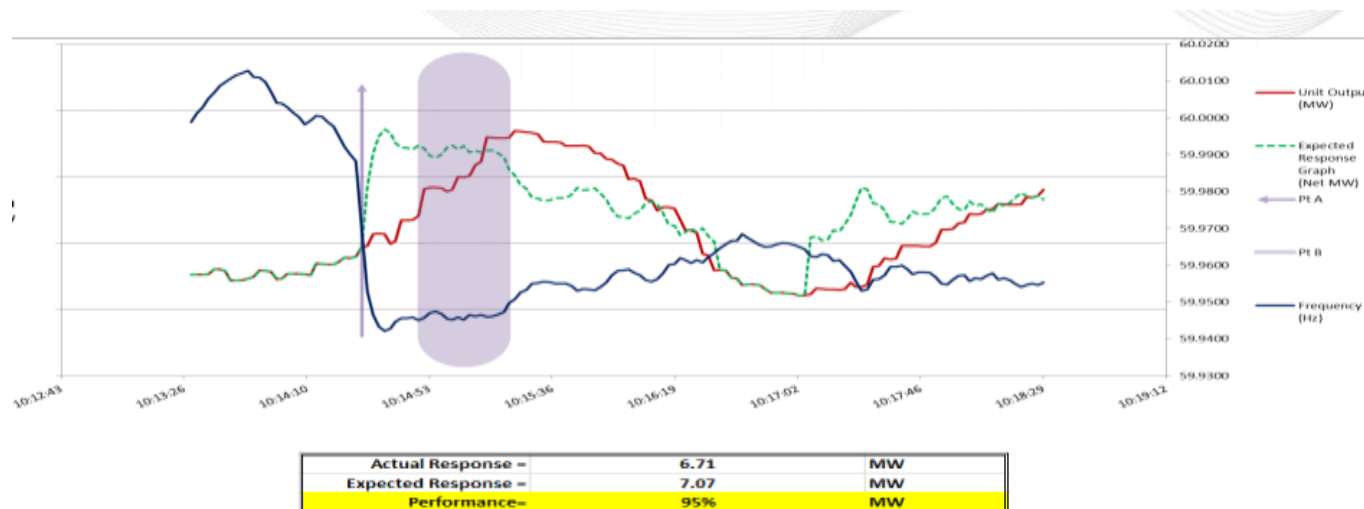
(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Appendix

- Interactive tool for members to use to assist with understanding unit performance
 - <https://www.pjm.com/-/media/committees-groups/task-forces/pfrstf/20181127/20181127-fr-performance-events.ashx>



**PROTECT THE
POWER GRID
THINK BEFORE
YOU CLICK!**



Be alert to
malicious
phishing emails.

Report suspicious email activity to PJM.
(610) 666-2244 / it_ops_ctr_shift@pjm.com

