



# BAL-003-2 Performance Update

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# Manual 12 Primary Frequency Response (PFR) Review

Ross Kelly

Performance Compliance

June 6, 2024

Operating Committee

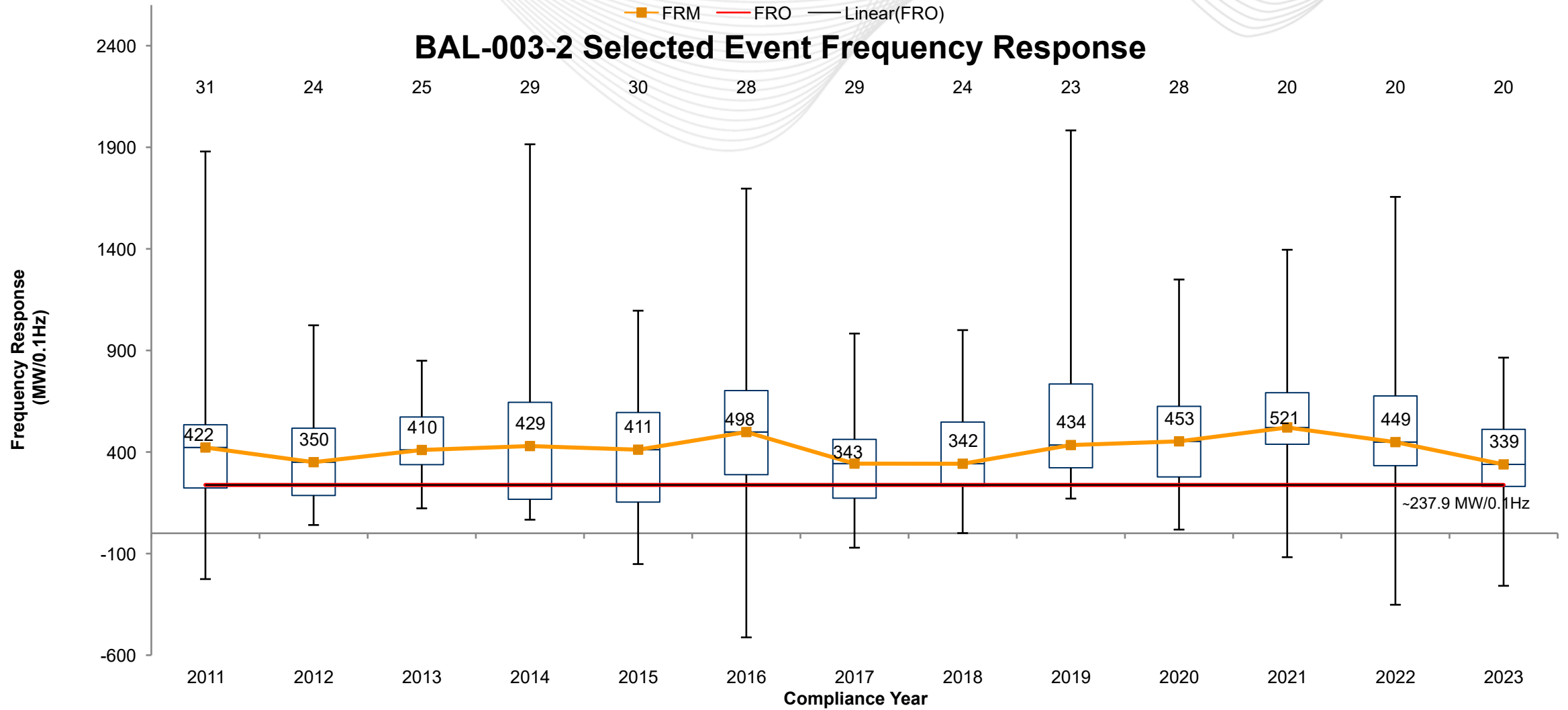
- **Purpose:** To require sufficient Frequency Response from the Balancing Authority (BA) to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value. To provide consistent methods for 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 2023 Frequency Bias Settings and L10 values
  - <https://www.nerc.com/comm/OC/Pages/Resources-Subcommittee.aspx>
- PJM will update Frequency Bias Setting and L10 values in EMS and applicable systems on June 26, 2024.

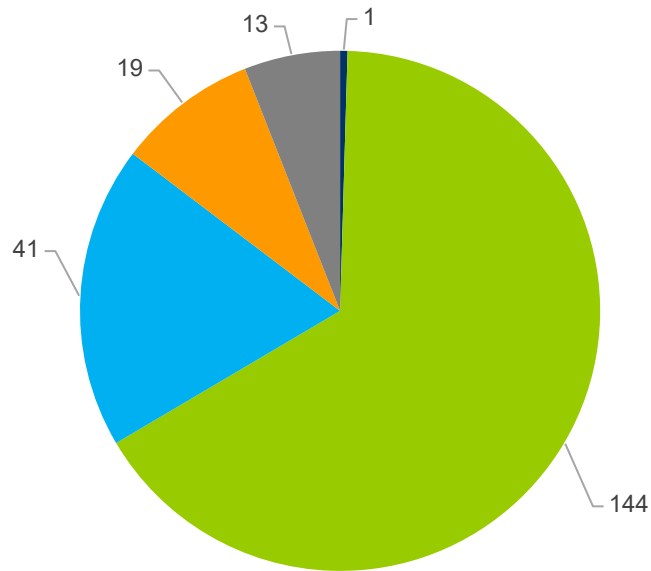
- PJM continues to monitor unit PFR performance using criteria described in PFRSTF and documented in PJM Manual 12.
  - <https://www.pjm.com/library/manual>
- Event Selection
  - Frequency goes outside +/- 40mHz deadband
  - Frequency stays outside +/- 40mHz deadband for 60 continuous seconds
  - Minimum/maximum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

- **Today's review includes:**
  - High Frequency Event
    - 03/05/2024 06:55:47
  - Low Frequency Events
    - 03/16/2024 15:50:17
    - 03/19/2024 12:01:18
    - 03/31/2024 03:25:56
    - 04/07/2024 09:51:01
    - 04/08/2024 18:21:03
    - 04/10/2024 01:01:24
    - 04/13/2024 00:34:20
    - 04/15/2024 16:18:52

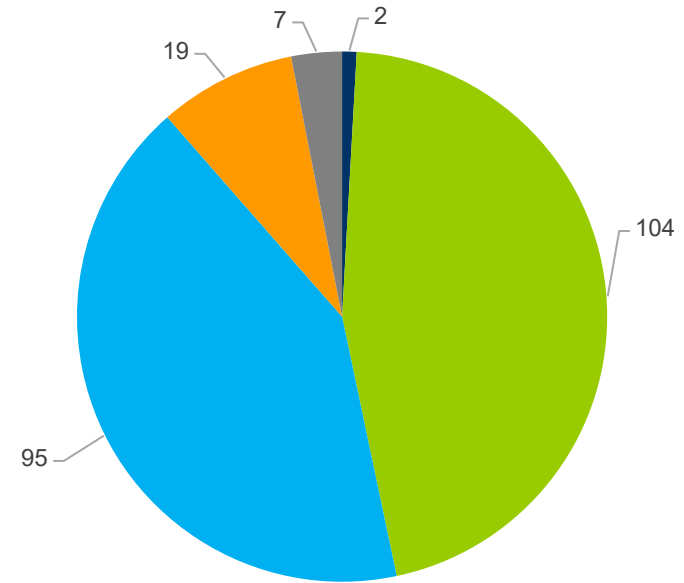
Fuel Type	# of Units evaluated
Coal	177
Hydro	25
Natural Gas	278
Oil	39
Solar	34
Wind	87
Other	7
<b>Total</b>	<b>647</b>

03/05/2024 06:55:47

03/16/2024 15:50:17



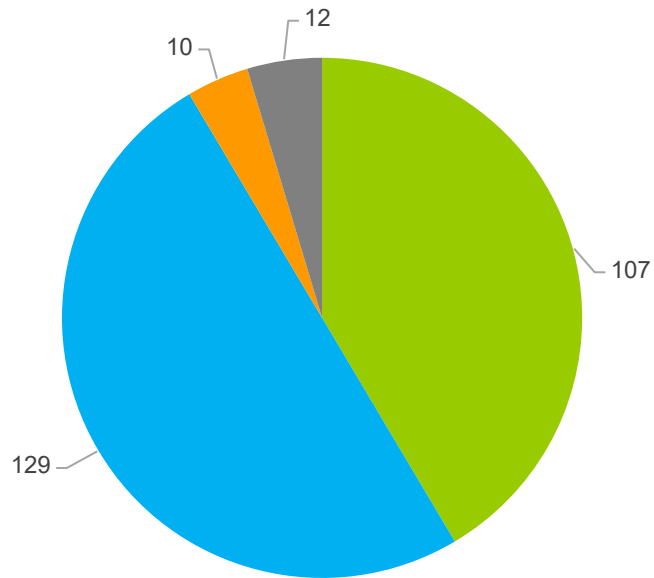
- Further Evalutaion Needed
- No PFR, Response Expected
- No PFR, Response Not Expected
- PFR, Response Expected
- PFR, Response Not Expected



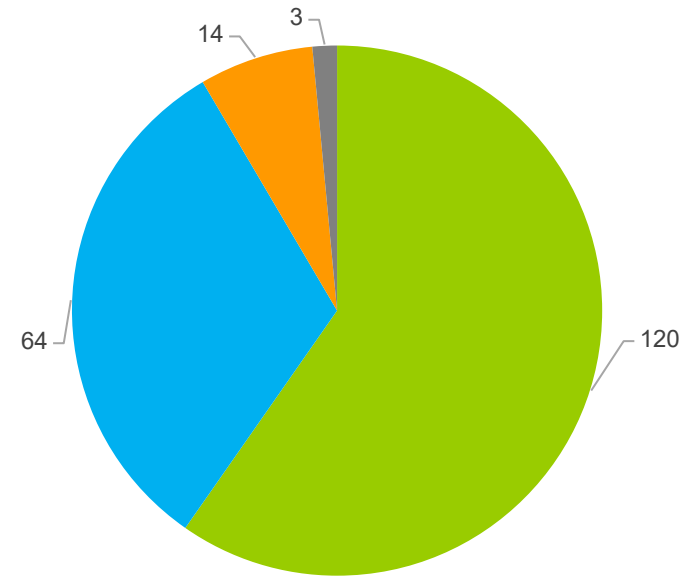


03/19/2024 12:01:18

03/31/2024 03:25:56

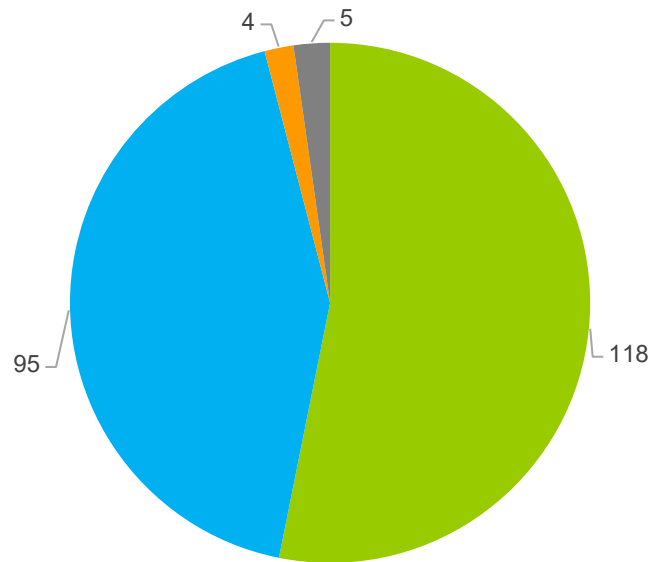


- No PFR, Response Expected
- No PFR, Response Not Expected
- PFR, Response Expected
- PFR, Response Not Expected

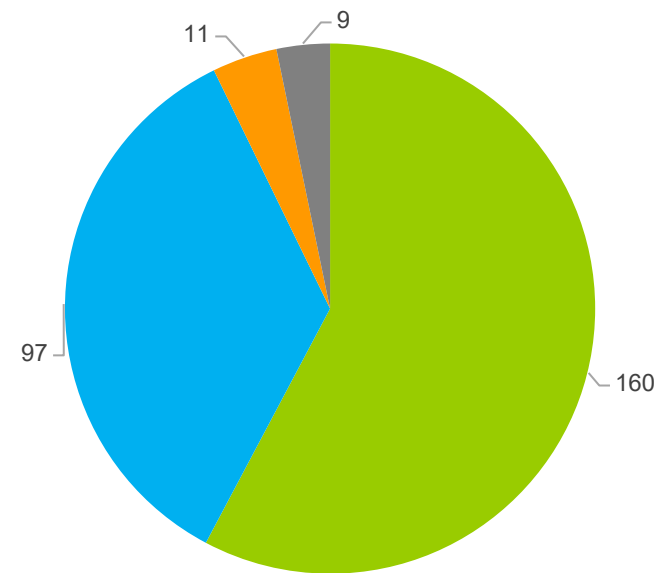


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04/08/2024 18:21:03

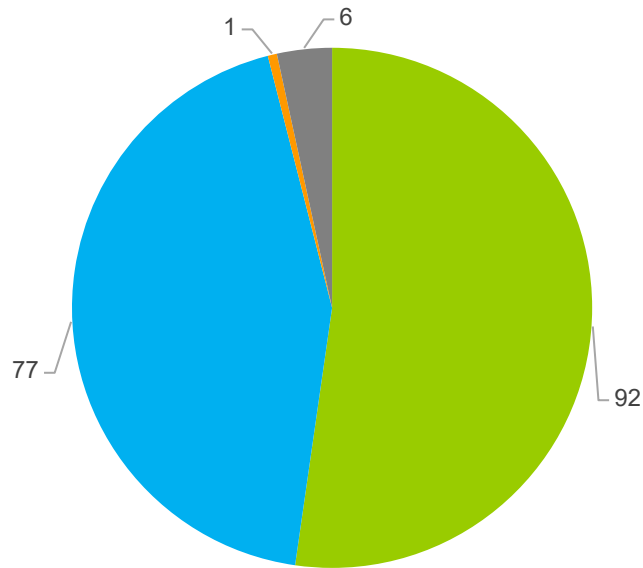


- No PFR, Response Expected
- No PFR, Response Not Expected
- PFR, Response Expected
- PFR, Response Not Expected

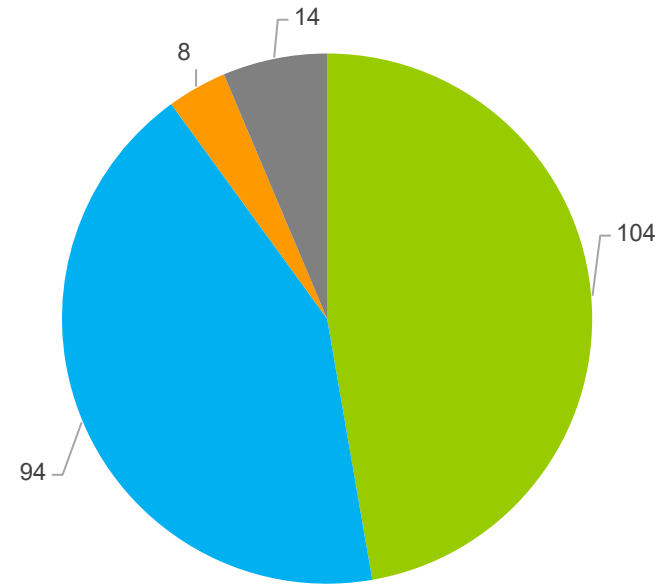


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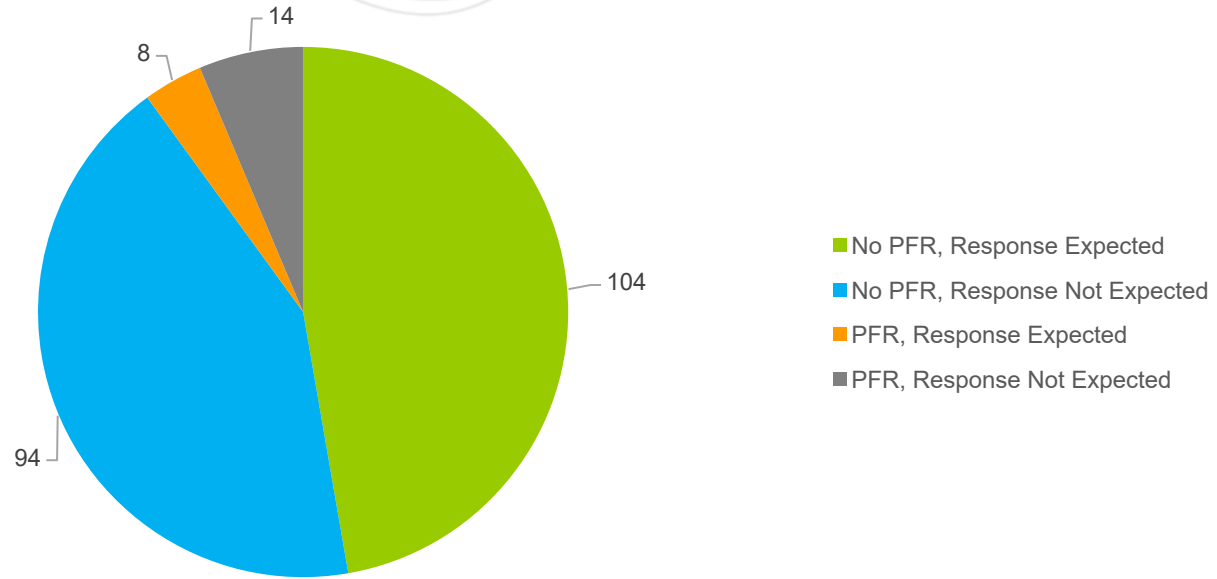
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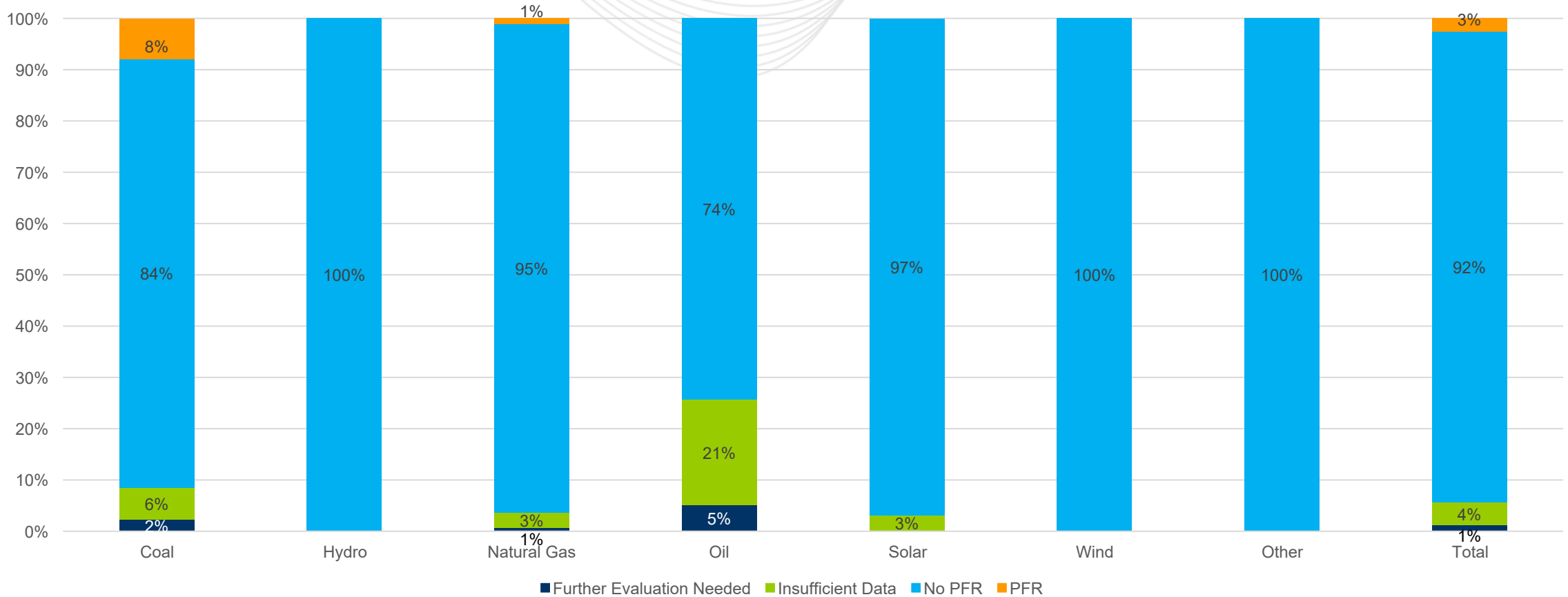
- No PFR, Response Expected
- No PFR, Response Not Expected
- PFR, Response Expected
- PFR, Response Not Expected



04/15/2024 16:18:52



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



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Member Hotline

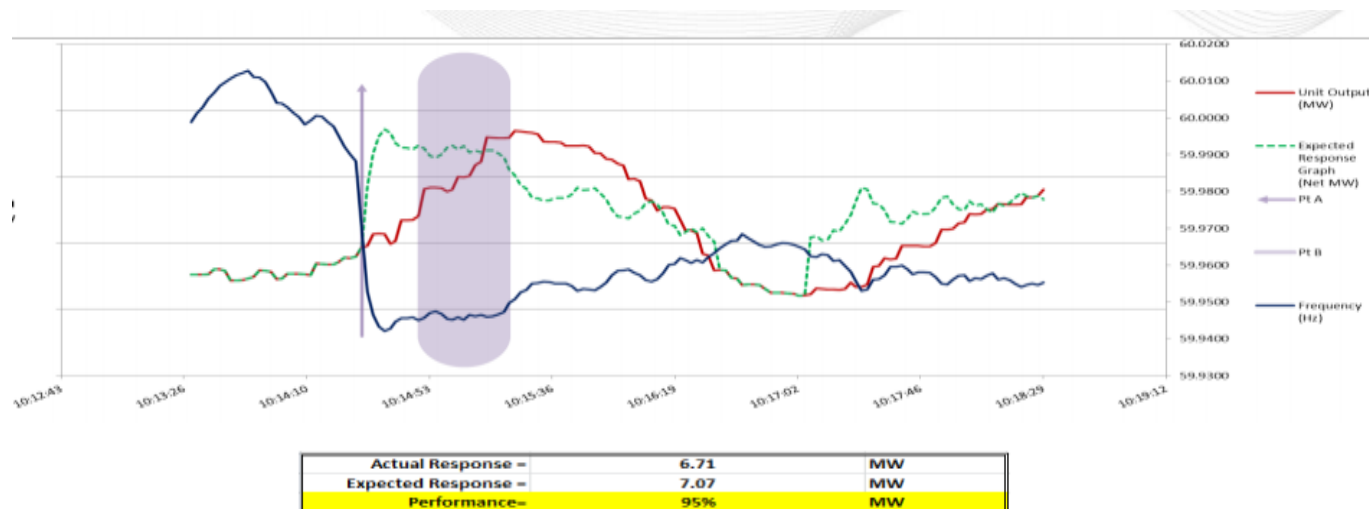
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# Appendix

- 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](mailto:it_ops_ctr_shift@pjm.com)

