Performance Assessment for Primary Frequency Response

PFRSTF

December 1, 2017

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Calculation

- Resources expected performance will be calculated with the primary frequency control calculation
  - Frequency below governor deadband

$$MW_{\text{Primary Control}} = \left[\frac{(HZ_{actual} - 60 + DB)}{(60 * Droop - DB)}\right] * (Frequency\,\text{Responsive}\,Capacity) * (-1)$$

  - Frequency above governor deadband

$$MW_{\text{Primary Control}} = \left[\frac{(HZ_{actual} - 60 - DB)}{(60 * Droop - DB)}\right] * (Frequency\,\text{Responsive}\,Capacity) * (-1)$$

  - 36mHz deadband (or less), 5% droop (or less)

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Pass/Fail Assessment

- Threshold will be set to determine Pass/Fail assessment
  - Unit will need to provide 50% of expected response to Pass (in MW)
  - Response measured within 20-52 seconds (alignment with BAL-003-1)
  - Sustain frequency response out to 60 seconds or duration of event
- Pass/Fail assessment due to some data quality
  - 10 second scan rates
  - Data deadband storage in historian
- Assessments will be performed on market units
  - Further breakdown assessments will be available upon request

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When will assessment take place?

- PJM will reserve the right to perform performance assessment between 25-35 times a year
  - This will align with ‘clean’ frequency excursions where frequency went outside the deadband and engaged governors
- Process for non-performance
  - PJM will review first failed PFR assessment with stakeholder to discuss details of failed response
  - Subsequent failed PFR assessment will be referred to IMM/FERC for follow-up
  - No monthly payments for cost of service until demonstrated successful performance

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When we will/will not evaluate a resource to provide PFR

- When we will:
  - Unit is operating between Pmin and Pmax
  - And Unit is online providing energy and has available headroom/footroom
  - And/Or Unit is assigned reserves

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When we will/will not evaluate a resource to provide PFR

- When we will not:
  - Unit is not currently providing real-time energy/reserves
  - Or Unit is not operating between Pmin and Pmax
  - Or Unit has an exception
    - Long-term exception developed through the exception process
    - Short-term exception based on current operating parameters
      - Documented in EDART – max 30 day exception
  - Or Unit is providing regulation

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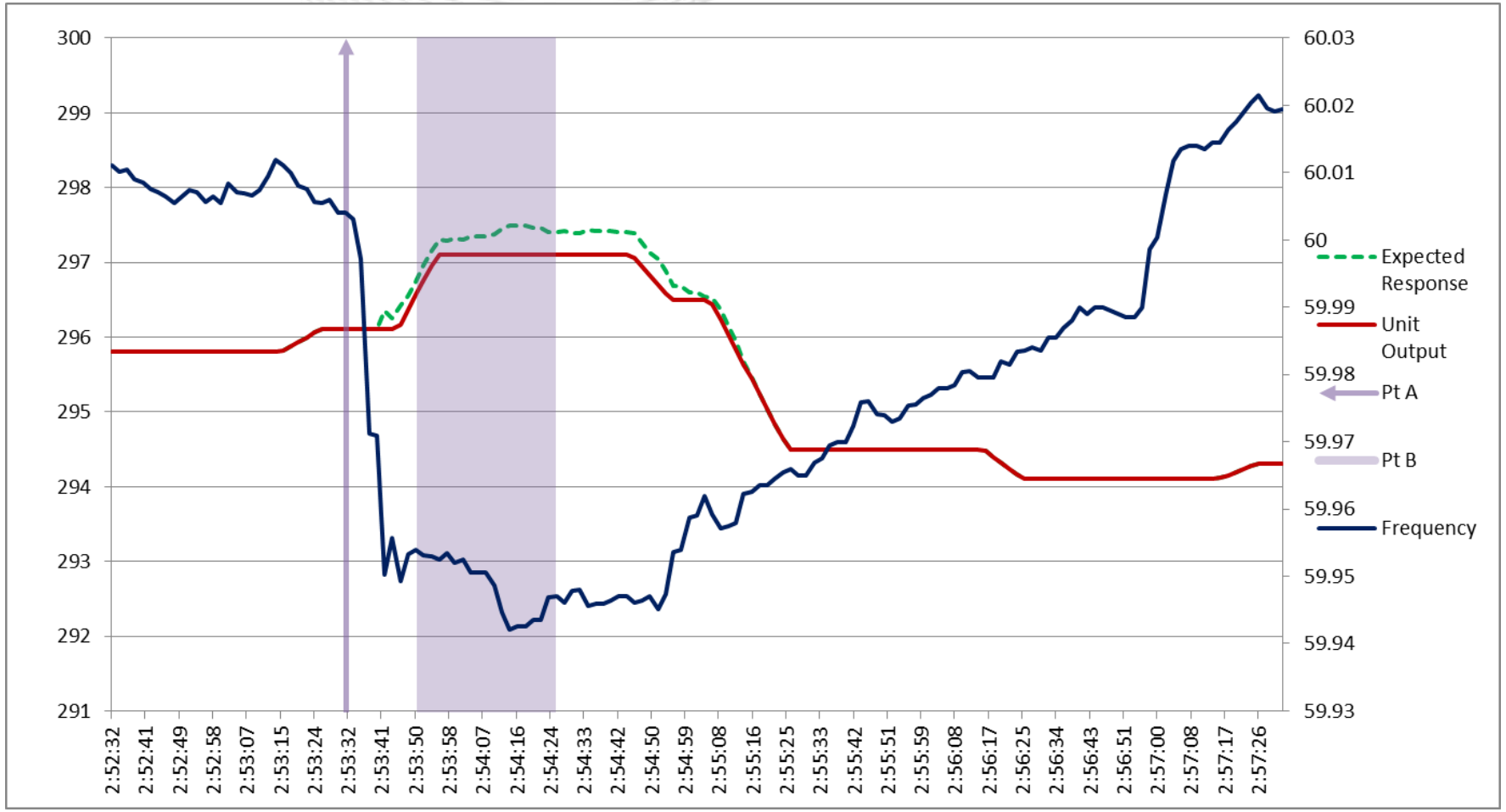
Example of Passed Performance

- Expected MW 1.4MW
- Actual MW 1.1MW
- Performance 78%



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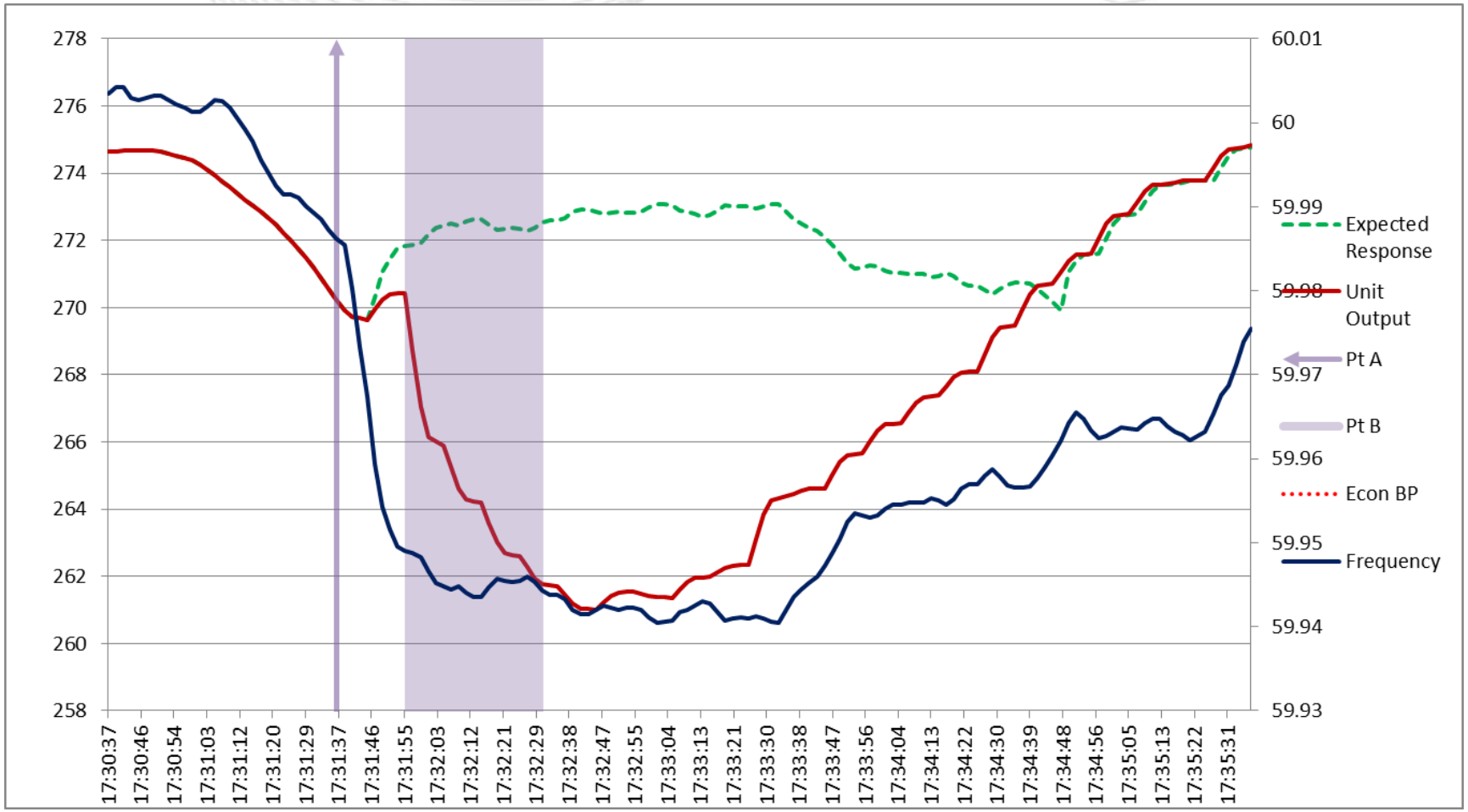
Example of Failed Performance

- Expected MW 2.73MW
- Actual MW -7.158MW
- Performance -362%



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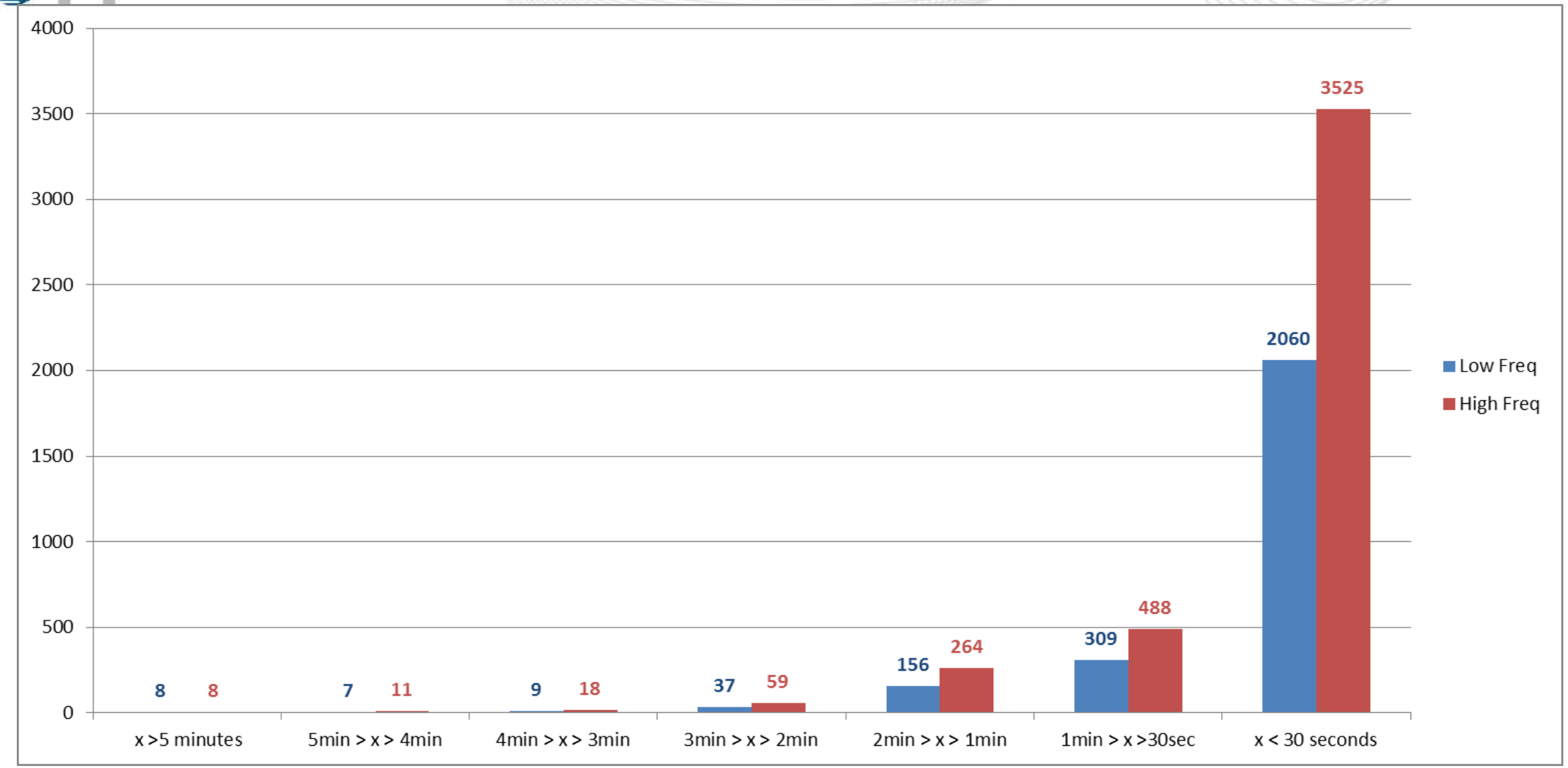
Frequency Profile Nov 2016 – Oct 2017



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