Performance Based Regulation:
Year One Analysis for FERC

Regulation Performance Senior Task Force
October 11, 2013
Overview

• Background
• Impact on:
  – System Control/Operations
  – Markets
  – Settlements
• Next Steps
… PJM proposes to submit to the Commission a report in this docket containing the status of PJM’s regulation market one year from the effective date of the Tariff and Operating Agreement revisions proposed herein (i.e., October 12, 2013). The reports would contain information such as the health of the regulation market and the degree to which the penetration of fast-following regulation resources has approached or exceeded the point at which the benefits of fast-following resources are reduced compared to traditional resources. The report would also address the specifics as to operational challenges that have arisen as a result of implementation of this order.

--PJM Compliance Filing January 25, 2013
PBR Impacts on System Control

• Regulation Requirement –
  - 1.0% - 0.78% Coincident with go-live
  - 0.78% - 0.74% November 2012
  - 0.74% - 0.70% December 2012

• Impact of Fast Moving Resources – 19 RegD resources (11 generators, 8 DR)

• Regulation Performance

www.pjm.com
CPS1 is a statistical measure of Area Control Error (ACE) variability and its relationship to frequency error.

Balancing Authority ACE Limit (BAAL) measures how the RTO maintains interconnection frequency within a predefined frequency profile under both normal and abnormal conditions.
Impacts on Markets

• Two part Offer and Clearing
  – Capability for Reserving Regulating MWs
  – Performance for Movement of Regulating MWs

• Effective MW’s – Performance and Benefit

• Pricing
  – Intra Hour- LOC
  – 5 minute Mileage
Points on the line indicate the high (2.9), average (2.6) and low (0.7) Marginal Benefits factor since October 1, 2012.
Average Regulation Market Clearing Prices

- Average RMCP
- Average RMCCP
- Average RMPCP
Capability, Performance and Lost Opportunity Credits in Millions $ October 2013 Through Present
(Includes August and September estimates)
Miles RegA vs Reg D
October 2013 - August 2013

Mileage RegA
Mileage RegD
Linear (Mileage RegA)
Linear (Mileage RegD)
Impact on Settlements

- Two part Compensation
  - Capability Credit
  - Performance Credit

- Mileage Ratio vs. Marginal Benefits Factor
  - Mileage Ratio = \text{Miles by Signal Type (RegA or RegD)}
  - RegA Miles by Signal Type
Hourly Marginal Benefits Factor versus Hourly Mileage Ratio
October 2012 through August 2013

Statistics MBF Mileage Ratio
Average 2.63 3.11
Standard Deviation 0.20 1.87
High MBF w/ coincident Mileage Ratio (Nov 6, 2012) 2.90 4.32
Low MBF w/ coincident Mileage Ratio (Aug 13, 2013) 0.68 4.46
High Mileage Ratio w/ coincident MBF (Jul 14, 2013) 2.40 94.20
Low Mileage Ratio w/ coincident MBF (Jul 1, 2013) 2.89 0.31
### Re-settlement Estimation

<table>
<thead>
<tr>
<th>Scenario</th>
<th>RMPCP</th>
<th>LOCC</th>
<th>Net from Base Case (includes LOC)</th>
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<tbody>
<tr>
<td>Gen Base Case</td>
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- Multiplier either Marginal Benefits Factor (MBF) or Mileage Ratio is applied only to the Regulation Performance Credit Credit.
- RMPCP does not change.
- Lost Opportunity Cost Credit is evaluated against the new compensation.
- RMCCP and the Capability cost credit does not change based on FERC’s July 2013 Order.
Path Forward

• Final Order October 2, 2013 – Rehearing accepted and granted

• RPSTF Meeting October 18th 10-12 at CTC or teleconference to discuss Re-Settlement

• Re-settlement – two parts
  – Bill going forward
  – Resettlement period