Status Quo and RMISTF review
Substitution Curves and Effective MWs

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Status Quo – Benefits Factor

- Defined in PJM Manual 11 Section 3.2.7.6

- Translates a RegD MWs into RegA MWs or Effective MWs. Reflects the rate of substitution between resources following the different regulation signals

- Benefits Factor curve was originally designed with Order 755 implementation, with input from KEMA study on impact of fast responding resources
  - Updated in 2015 out of PJM’s regulation performance issues stakeholder process
• Effective MW is calculated as the product of Performance Adjusted MW on the X-axis * Benefits Factor value on the Y-axis
  – Does not fully account for area under the curve
  – Less computational burden
• Identified by PJM and IMM as not fully accounting for RegD MWs and a design flaw in RMISTF
RMISTF – Rate of Technical Substitution (RTS) Curve

- Represents a defined engineering relationship for a desired operational control for RegA and RegD resources
  - Developed based on PJM analysis and signal definition
  - Optimized commitment of RegA and RegD least-cost solution
- Proposed curves changed seasonally and on/off ramp
RTS Curve – definition process

Define Engineering Relationship → Identify Desired ACE Control → Determine RegA - RegD 'MW Pairs' of Equivalent Control → Derive the MRTS Curve to Determine Rate of Technical Substitution → Optimize Commitment of RegA and RegD to Least-Cost Solution

Analysis performed and Isoquants developed for level of ACE control

Plot the MW pairs of RegA and RegD

Take the derivative of the RegA - RegD solution curve to define the RTS Curve
• Effective MW is calculated as area under the curve
  – Full valuation of the rate of substitution
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