# Regulation Market Pricing Issue

Adam Keech

Executive Director, Market Operations

Markets and Reliability Committee

August 23, 2018

- Performance Based Regulation became effective October 1, 2012 and compensated resources based on:
  - Benefits Factor (BF)
  - Mileage
  - Performance Score (PS)

- OC Special Sessions – Regulation Performance Impacts
  - Revised Benefits Factor curve and floored the RegD BF at 1 during excursion hours (Dec 2015)

- Regulation Market Issues Senior Task Force
  - Modified the regulation signal in January 2017 and subsequently removed the BF floor in August 2018 based on operational analysis
  - MRC endorsed the joint PJM/IMM package to use Marginal Rate of Technical Substitution (MRTS) instead of the BF in June 2017
    - Submitted a 205 filing that was rejected by FERC and the solution was never implemented

- Regulation resources are cleared in ASO 1 hour before the operating hour
  - Priced in LPC every 5 minutes

- Self-Scheduled and $0 offers are cleared first, then remaining resources are cleared up to requirement in economic order

- RegD Benefits Factor ranges between 2.9 and 0.001

- RegA Benefits Factor = 1

- Performance score below 40% will not clear
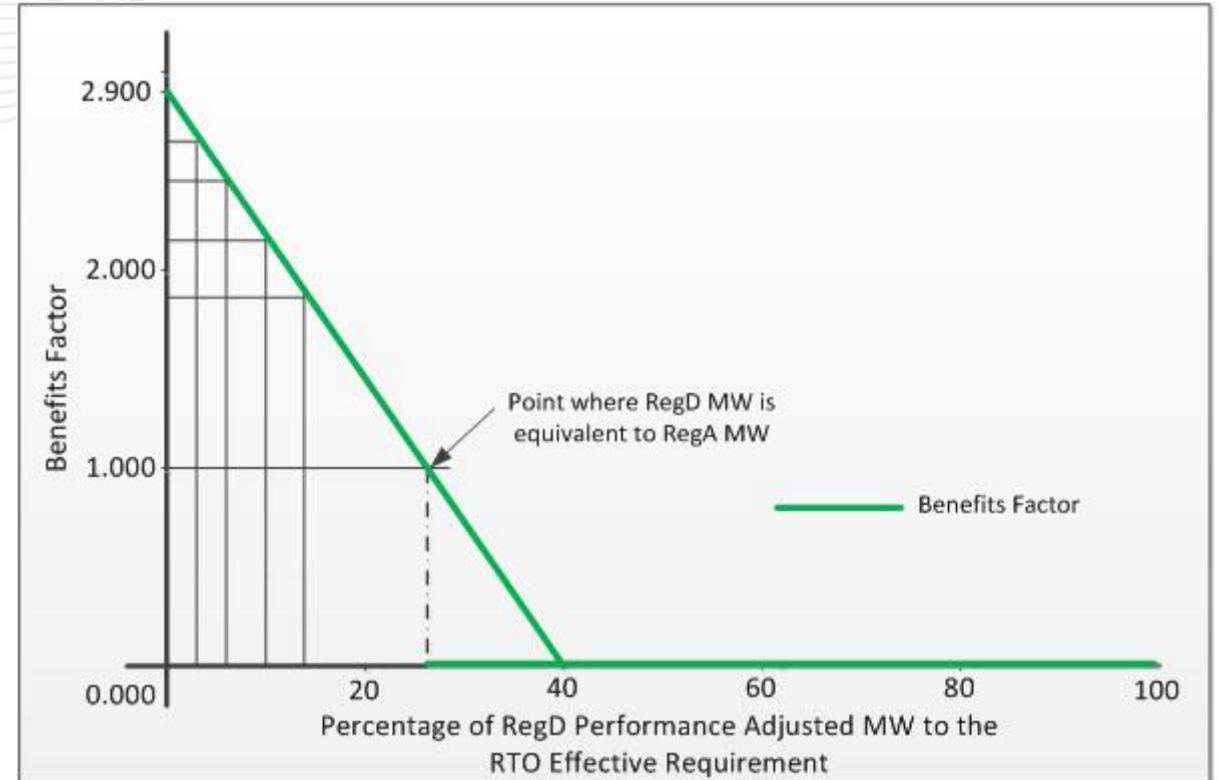
$$RMCP = \text{Adj. Capability Offer} + \frac{Capability\ Offer}{Benefits\ Factor\ *\ Performance\ Score}$$

$$\text{Adj. Performance Offer} + \frac{Performance\ Offer\ *\ Mileage}{Benefits\ Factor\ *\ Performance\ Score}$$

$$\text{Adj. LOC} \quad \frac{LMP\ -\ Marginal\ Cost}{Benefits\ Factor\ *\ Performance\ Score}$$

Any offer or LOC will increase drastically if the BF or PS are very low values

$$RMCP = \frac{Capability\ Offer}{Benefits\ Factor\ *Performance\ Score} = \frac{\$0/MWh}{0.001*0.80} = \$0/MWh$$

$$\frac{Performance\ Offer*Mileage}{Benefits\ Factor\ *Performance\ Score} = \frac{\$0/MWh\ *34.14}{0.001*0.80} = \$0/MWh$$

$$\frac{LMP-Marginal\ Cost}{Benefits\ Factor\ *Performance\ Score} = \frac{\$15/MWh-\$10/MWh}{0.001*0.80} = \frac{\$5/MWh}{0.0008} = \$6,250/MWh$$

Even with a $0 offer, a difference of $5 in LOC can create a $6,250 Clearing Price

- All calculations are being done consistent with market rules
- RMISTF proposal would have addressed some settlement implications of this proposal <u>but not the actual price spikes</u>

- PJM plans to bring a Problem Statement and Issue Charge and a proposed solution to the September MRC for a first read and ask for a vote at the October MRC
  - Floor BF in market clearing at .1 instead of 0
  - Minor updates will required in M-11 and/or M-12

- Between May 1, 2018 and August 6, 2018 there were 105 intervals where the regulation market clearing price was above $500/MWh
  - 43 of these hours had marginal benefits factors < .1 and they have been as low as 0.000076 (>13,000 MW of RegD to provide 1 MW of RegA)
  - Posted/settled prices have exceeded $7,000 for a 5-minute interval
  - The calculation is not bounded

- PJM proposes to set a low limit on the BF of .1 in the market clearing
- The proposed solution would limit the ratio to 10 MW of RegD to provide 1 MW of RegA
- This would have impacted only 2.5% of all hours in the last year