



The Public Utilities  
Commission of Ohio

*Ohio's One-Stop Utility Resource*

# **Integrating Price Responsive Demand into Regional Power Markets and System Operations**

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# Overview

- Integrating Price Responsive Demand (PRD) into RTO Markets & System Operations
  - Characteristics of PRD
  - Necessity of RTO Coordination
  - Reliability Benefits of PRD
  - How to Integrate PRD & Ensure Reliability

The views expressed herein are my own and should not be regarded as an opinion regarding the merits of any pending cases.



## Price Responsive Demand Characteristics

- The Predictable Response to Changes in Wholesale Prices by Consumers on Dynamic or Time-Differentiated Retail Pricing
  - Examples: Critical Peak, Critical Peak Rebate & Real-Time Pricing
- Expansion Depends Upon Significant AMI Investment
- Mass Market PRD will Not be Offered and Dispatched as a Resource



# Necessity of RTO Coordination

- Regional Planning and Resource Adequacy
  - Current Forecasting Techniques
    - Do Not Consider Price Responsive Demand
    - Based on Data from Periods without Dynamic Retail Pricing
  - Use of Current Forecasting Would Result in Carrying Capacity & Planning Reserves for Demand that Would not be Present at Higher Spot Prices
    - Eliminates Opportunity to Achieve Capacity Savings – Often the Single Largest Cost Savings in a Business Case for AMI
    - Added Capacity Keeps Spot Prices Too Low to Evoke Significant Demand Response
- RTO System Operations
  - In Short-term Forecasts & Dispatch, Price Response provides Opportunity to Reduce Congestion Costs & Avoid Use of Emergency Operating Procedures



## Reliability Benefits of PRD

- Beneficial Feedback: Demand Spike or Outage Increases Spot Prices, Causing an Offsetting Demand Reduction
  - Improves Predictability of Demand & Power Flows for Operations
  - Facilitates Integration of Intermittent Resources
  - Enhances Reliability for any Given Level of Reserves
- Performance of Mass Market PRD Statistically Less Variable than Large Customer Demand Response or Generation
- AMI Can Provide Targeted, Rapid & Verifiable Load Reductions in Emergencies
- AMI Allows Access to More Load Data, Providing an Opportunity to Reduce Forecast Uncertainty



## How to Integrate PRD & Ensure Reliability

### Key Elements:

- Use Transparent Forecast Demand Response Curve based on Statistically Predictable Relationship Between Price & Demand
- Scarcity Pricing Reform: Operating Reserve Demand Curve based on the Value of Reserves to Consumers
- Resource Adequacy: Price Responsive Loads must have Capacity based on their Firm Demand after accounting for PRD & should have the Option to Hold Additional Capacity
- Capacity Emergency Procedures: Non-discriminatory Curtailment based on relative Capacity Deficiency