

# **Demand Response In Midwest ISO Markets: Barriers to Comparable Treatment**

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## Midwest Market Philosophy

The Midwest ISO strives to have an open wholesale energy market where Market Participants can buy or sell energy in fair, efficient and non-discriminatory markets, while providing a reliable grid operation.

- Markets work best when there is vigorous participation by both buyers (demand response) and sellers
  - Demand response enhances long-term system adequacy
  - Demand response can address real-time reliability issues
  - Demand response can mitigate peak prices and price volatility
  - Demand response can limit supplier market power

## Midwest Market Philosophy

Existing and planned Midwest ISO market structures seek to provide opportunities for demand to participate on the same basis as supply side resources, i.e.,

- Ability to make consumption decisions based on the value of energy consumed compared to the prevailing market price
  - In a time frame consistent with those consumption decisions
- Ability to offer and fully monetize the value of flexibility that can be offered to dynamically balance market supply and demand

## Demand Response in Midwest ISO Markets (today)

- Energy Markets
  - Price sensitive demand bids in the Day-Ahead market
  - Demand Response Resources in both DA/RT markets
- Ancillary Services Requirements
  - Reliability response demand bids – response required only under power system contingencies
- Resource Adequacy Construct
  - Allow demand response to qualify as ‘capacity credits’: Load Modifying Resources
- Planning Process
  - Integrate demand response into resource planning
- Emergency Procedures
  - Emergency Protocols to support reliability utilise demand response in EEA2, steps 1 & 3

## Existing Opportunities for Demand Participation in the Day-Ahead Market

### Day-Ahead Market: demand participation design elements

- Fixed Demand Bid – Load Serving Entities (LSEs) indicated amount to be purchased, regardless of price (~85% of market demand on a daily basis)
- Price Responsive Demand (PRD) – Load Serving Entities (LSEs) submit PRD bids, either “physical” or “virtual,” to manage price risk (~15% of market demand on a daily basis)
- Demand Response Resources (DRRs) – Treated in all respects like generation; DRRs are evaluated and cleared based on offer components, including start, notification and minimum run times
  - Value in submitting a DRR offer instead of a PRD bid is the Midwest ISO will respect such DRR operator characteristics, which may reflect, for example, physical limitations associated with starting and stopping industrial processes

## Existing Opportunities for Demand Participation in the Real-Time Market

### **Real-Time Market:** demand participation design elements

- Price Responsive Demand (PRD) – LSEs cannot submit PRD bids in this market but instead manage their exposure to volatile prices by responding to Real-Time clearing prices
- Demand Response Resources (DRRs) – DRRs can be dispatched based on economics, in the same manner as a supply-side resource
  - Including ability to participate in 5-minute balancing market

## Existing Opportunities: Demand Participation in Resource Adequacy

### **Resource Adequacy:** demand participation design elements

- The Midwest ISO's Module E includes the ability of demand response to count in fulfillment of capacity requirements
- Currently, demand resources qualifying as planning resources in the Midwest ISO are around 8,200 MW
- RAR construct filed at FERC on 28 December 2007 and conditionally accepted on 26 March 2008 created a platform to ensure continued participation of demand resources

## Existing Opportunities for Demand Participation: Emergency Demand Response

### **Emergency Procedures:** demand participation design element

- Emergency demand response provided almost 3,000 MW of relief on 1 August 2006 and between 300 – 500 MW MW in February 2007.
  - Avoided need to dispatch generation resources into their operating reserves
  - Avoided administrative pricing rules that require default generation offers of \$1000



## Existing Opportunities for Demand Participation: Emergency Demand Response

Emergency Demand Response Initiative – filed 31 December 2007 and conditionally accepted on 22 April 2008

- Provide categories of demand response in an EEA2 situation
  - To establish curtailment priorities
  - To reflect varying costs
  - To allow the Midwest ISO to create merit order offer stacks by location and priority status
- Provide compensation of demand response in an EEA2 situation
  - As compared to DA Schedules
  - Higher of RT LMP or emergency demand response offers
    - Offers initially part of registration process

## Demand Response Initiatives – demand response in resource planning

### Planning Process:

- ISOs/RTOs conduct long-term reliability planning to determine the need for and coordinate new investment in generation and transmission in each region.
- Midwest ISO through its MTEP process has committed more than \$3b for new transmission investment.
- In the most recent MTEP planning study, the Midwest ISO has begun the process to allow demand resources to compete against generation or transmission in its reliability studies

## Demand Response Initiatives – demand response in ancillary services markets

### **Ancillary Services:** objective of Ancillary Services Markets

- Ancillary Services Markets will help provide transparent economic signals to govern the provision of these services
- Ancillary Services Markets will reconcile operating practices with market incentives so that Market Participants are compensated for providing reliability
- Ancillary Services Markets reduce need for operators to maintain reliability through out-of-merit actions
- Correctly pricing Energy and Ancillary Services under shortage conditions is important for any resource adequacy construct

## Demand Response Initiatives – demand response in ancillary services markets

### Demand Response Resources (DRR)

- **Type I** - Capable of supplying *a specific quantity* of Energy to the market through physical load interruption.
  - Modeled as a Resource CPNode and linked to a Host Load Zone CPNode
  - Only has 2 outputs: Zero MW or Targeted Demand Reduction Amount
  - Can be Committed for either Energy or cleared for Contingency Reserves
    - Dispatchable for Contingency Reserve Deployment
    - Not Dispatchable for Energy
  
- **Type II** - Capable of supplying *dispatchable* Energy to the market through behind-the-meter generation or controllable load.
  - Combination of Controllable Load and / or behind the meter generation
  - Modeled as a Load CPNode and a Resource CPNode
  - Must submit baseline Load forecast in 5 minute intervals for Host Load Zone and Offer for DRR
  - Can be Committed and Dispatched similar to Generation Resources

## Stakeholder Effort to Address Demand Participation Opportunities in Midwest ISO Markets

The Midwest ISO works with its stakeholders through the Demand Response Working Group (DRWG) to develop suitable demand response market design elements for its wholesale markets

- Monthly meetings
- Well attended & vigorous participation
- Addressed current state of demand response in the Midwest ISO markets and opportunities to increase demand participation
- Example: Report and analysis on use of emergency demand response during EEA2 events in August 2006 and February 2007
  - Deliverable: Compensation for Emergency Demand Response
- Coordinates with parallel effort by Organization of MISO States (OMS)

## Stakeholder Effort to Address Demand Participation Opportunities in Midwest ISO Markets

The Organization of MISO States (OMS) has established the Midwest Demand Response Initiative (MWDRI) to support Midwest ISO efforts

- MWDRI had its initial meeting on February 9, 2007
- Complementary to DRWG efforts
- Create effective, robust demand response initiatives at the retail level
  - End-use customers do demand response
- Understand the value of demand response across wholesale and retail markets

## Barriers to Full Demand Participation in Midwest ISO Markets

- Technical issues
  - PRD in Real-Time Energy Markets: how to send dispatch signals to demand participants in the balancing market while meeting all NERC reliability standards?
    - e.g., systems to allow “dispatch” of dispersed demand response.
  - How to incorporate the appropriate price elastic demand curve in the unit dispatch software; how to adjust the load forecasts for demand elasticity?
- Operator acceptance
  - Concern over the performance of demand resources in reliably operating the grid.
  - This concern should be overcome through experience which our AS market design should achieve through time.

## Barriers to Full Demand Participation in Midwest ISO Markets

- Market design
  - Should the RTO conduct pilot programs and/or promote demand response through side payments?
- Regulatory
  - Those making consumption decisions do not recognize (or pay) value of energy consumed
    - e.g., the missing link between wholesale prices and retail rates
    - Retail rate designs are set by state regulators



## Barriers to Full Demand Participation in Midwest ISO Markets

- Locational marginal pricing – for generators and load?
  - LMP reflects the marginal cost of dispatch, varying by time & location, for generation.
  - LMP provides the appropriate price signal for those generators participating in the dispatch.
  - What about the correct pricing for loads?

Load zones establish pricing points upon which the LSE will be charged.

- LSEs in the Midwest ISO voluntarily define their load zones based on the actual metered withdrawal points of their customers.
- What if multiple LSEs receive the same price in a load zone? Some will receive an LMP charge higher than the cost to serve their location; others will receive an LMP charge lower than the cost to serve. This serves to mute the price signal these MPs face, and therefore, inhibit demand response.

# Proposed End State for Demand Response in Midwest ISO Markets

- Energy Markets
  - Price sensitive demand bids in both DA/RT markets, DRRs in both markets, ISO projects LMPs for price transparency & discovery
  - Pricing fully reflects value of energy, whether marginal resource is a supply or demand resource
- Ancillary Services Markets
  - Reliability response demand bids – response required only under power system contingencies
- Resource Adequacy Construct
  - Allow demand response to qualify as ‘capacity credits’
- Planning Process
  - Fully integrate demand response into resource planning
- Emergency Procedures
  - Provide more rigorous Emergency Protocols to enhance reliability and promote demand response