

# Demand Response in Midwest ISO Markets

Michael Robinson



21 October 2009

# 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 and voluntary participation by both buyers (demand response) and sellers
  - Demand response can reduce the need for new generating capacity
  - 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 a comparable basis as supply side resources.
  - Ability to make consumption decisions based on the value of energy consumed relative compared to the prevailing market price
  - 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

The Midwest ISO currently has no demand side 'programs'

- 'Programs' as used in some jurisdictions typically refer to temporary initiatives to promote a certain activity or action
- 'Programs' also may provide side payments for participation; these side payments are funded by charges socialised across all MPs
- The Midwest ISO approach has been to provide market mechanisms that provide opportunities and incentives for full demand participation
  - States in the Midwest ISO footprint have demand programs

# Demand Response in Midwest ISO Markets (today)

- Energy and Ancillary Services Markets:
  - Price sensitive demand bids in the Day-Ahead market
  - Demand Response Resources in both Day-Ahead and Real-Time energy & operating reserve markets.
  - Reliability response demand offers – response required only under power system contingencies or for provision of regulation service.
- Emergency Procedures:
  - Emergency Protocols to support reliability by utilising emergency demand response in EEA2, steps 1, 2 & 3.
- Resource Adequacy Construct:
  - Allow demand response to qualify as ‘capacity credits’: Load Modifying Resources.
    - Energy Efficiency qualifies
- Planning Process:
  - Integrate demand response into resource planning.

# Existing Opportunities for Demand Participation in the Day-Ahead Energy & Operating Reserves 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, availability offers
  - 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 Energy & Operating Reserves Market

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

- Price Responsive Demand (PRD) – LSEs cannot submit PRD bids in this market yet 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
  - Availability offers

# Existing Opportunities for Demand Participation: Load Settlement Zone Definition

**Definition of load zones: 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.
- If broader pricing zones were established across multiple LSEs
  - This would serve to mute the price signal these MPs face, and therefore, inhibit demand response.
- Locational pricing and time-differentiated pricing

# 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

# 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

# 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 effective on 01 June 2009 creates a platform to ensure continued participation of demand resources

# Demand Response – 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 – 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
  - State jurisdictional authority
- Understand the value of demand response across wholesale and retail markets
- Next meeting: tbd

# Midwest ISO Potential Barriers to Participation

- General
  - Business Practices Manuals, guides
- Market Participation Structure and Registration
  - Definitions, ARCs
- Bidding, Clearing and Notification
  - Separate offers, regulation offers, forecasting
- Modeling and Communications
  - Link to LSE
- Measurement and Verification
  - Vagueness, metering requirements
- Financial Settlements
  - Admin charges, compensation

# Aggregator of Retail Customers (ARCs)

The core elements of the Tariff provisions filed on 2 October 2009:

- A Market Participant that is an ARC has been defined in Module A.
- Under the General Provisions of Module C, a new section defines the role and responsibilities of an ARC, the registration requirements, the modeling requirements, the relationship between the ARC and LSE, the assets it can represent, and the certification requirements to ensure participation is not precluded by the relevant electric retail regulatory authority.
- The metering requirements have changed, allowing hourly metering measurements for energy provision and five-minute metering measurements for contingency reserve provision. Regulation reserve requirements with respect to metering remain unchanged.
- The one-to-one relationship between the Host Load Zone and the DRR asset has been relaxed.
- The forecasting requirements (Load Zone Dispatch Interval Demand Forecast) have been eliminated and replaced with M&V protocols, adopting the framework and guidelines adopted by NAESB.
- As part of the registration process, an ARC can offer demand response either on behalf of only one retail customer or multiple retail customers and an individual customer may serve as an ARC on behalf of itself and others.
- The Midwest ISO will require the ARC to be a Market Participant like other demand response participants.

# Aggregator of Retail Customers (ARCs)

The core elements of the Tariff provisions filed:

- Because ARCs will offer and schedule DRR-Type I and DRR-Type II assets already included in the Tariff:
  - The ARC's demand response offer will meet the same requirements as a demand response offer from any other Market Participant.
  - Demand response offers from an ARC will be treated no differently than the demand response offers from other Market Participants (the unit dispatch software will not be able to distinguish the difference in market participant type).
  - The ARC bidder has only an opportunity to offer demand response in the Midwest ISO markets and does not have a guarantee that its offer will be selected.
- Except for circumstances where the laws and regulations of the relevant retail regulatory authority do not permit a retail customer to participate, there is no prohibition on who may be an ARC.
- The Midwest ISO registration process will specify registration requirements, including credit conditions, and certification by the ARC that participation is not precluded by the relevant electric retail regulatory authority. Single aggregated offers consisting of sets of individual demand response resources from a single area, reasonably defined, will be required by the Midwest ISO, limited to within an LBA area. The Midwest ISO will place appropriate restrictions on any customer's participation in an ARC-aggregated demand response offer to avoid counting the same demand response resource more than once.

# Price Responsive Demand (PRD)

The core elements of the design that need to be considered:

- OMS, states and other retail regulatory authorities must act.
- Registration & validation issues
- RTP must consider PRD in its unit dispatch system, to avoid over-procurement
- Module E qualification (resource adequacy)?
- Impact LOLE and reserve margin analysis?
- Settlement issues?

# Questions/comments?

Contact:

Michael Robinson

[mrobinson@midwestiso.org](mailto:mrobinson@midwestiso.org)

317.249.5741