Missouri PUC Technical Conference Discussion Points

May 17, 2010

Demand Response in Organized Markets

Basis for demand response participation in organized markets is FERC order 719, which, among other things, requires ISOs/RTOs to…

- accept bids from demand resources, on a basis comparable to any other resources, for ancillary services which the demand resource is technically capable of providing
- permit Aggregators of Retail Customers (ARCs) to bid demand response directly on behalf of retail customers

Order issued October, 2008.

Demand Response in MISO

Order 719 accelerated MISO's efforts to incorporate demand response into their markets, and resulted in a filing that

- created rules defining how demand response could participate in markets for energy, various types of reserves, and voltage regulation
- allowed for the participation of independent aggregators in MISO markets
- defined settlement procedures that minimize the impact of demand response on the host utility

Filing made October, 2009, still pending FERC ruling.

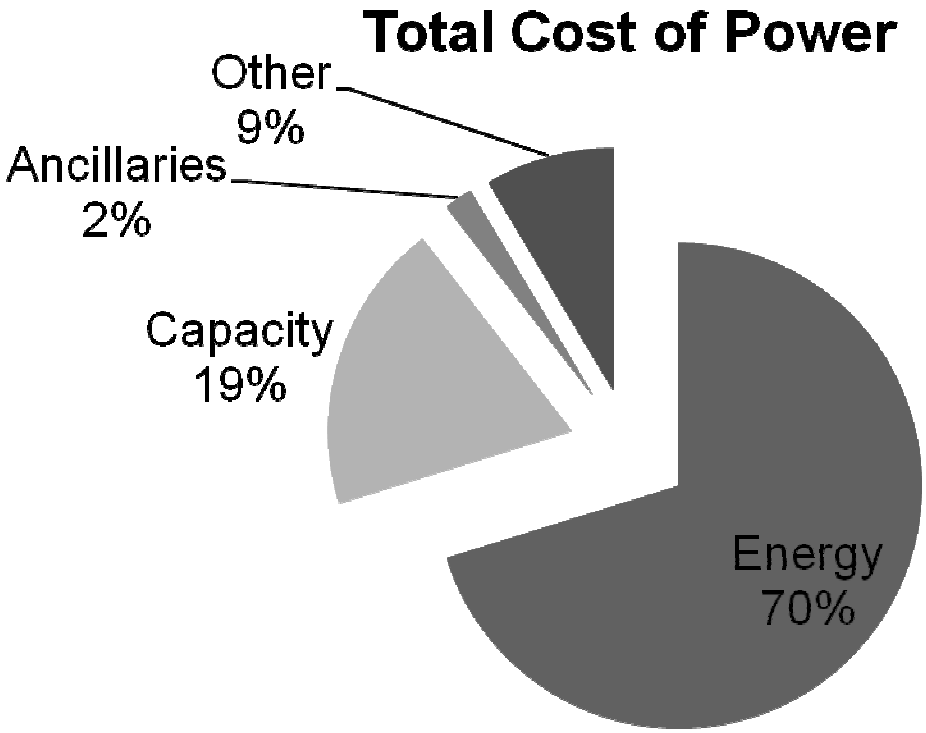
Demand Response Products

Wholesale electric markets trade in well-defined generic products. MISO's DR filing created rules how load reductions can create equivalent products to generation

Product	Generation	Demand Response
Energy	Amount of power injected into the system, as measured by direct metering	Reduction of load, as measured by the difference between a calculated baseline and actual measured load
Capacity	Commitment to be available deliver a specified amount of power	Commitment to curtail load during peak hours and system emergencies
Reserves	Ability to increase output on 10 minutes notice, as measured by direct metering	Ability to reduce demand on 10 minutes notice, measured by the difference in load before and after a call

Wholesale Products

In electricity markets overall, energy is the most important product, followed by capacity, then ancillary services.

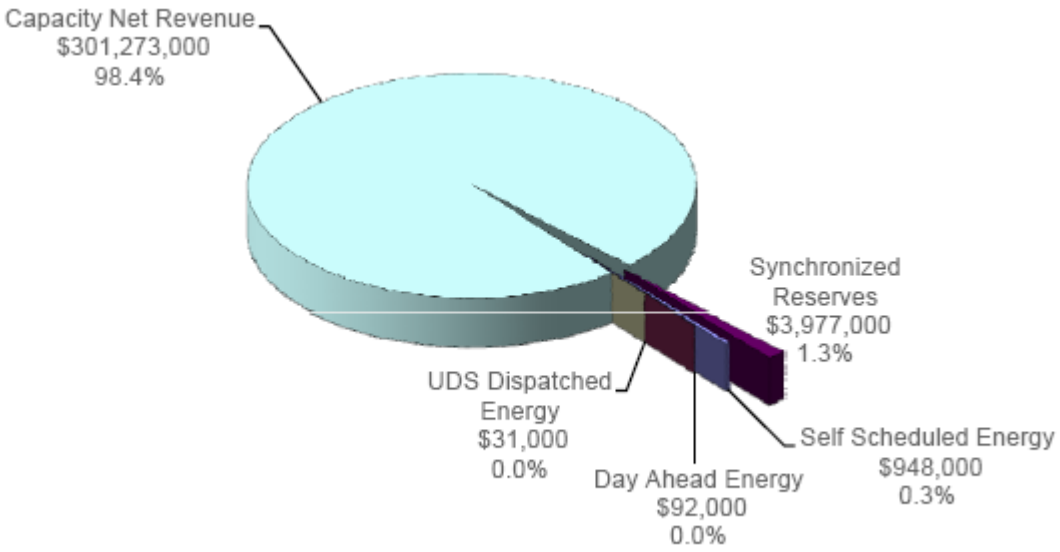


Data is from PJM for 2009. MISO should be similar, with energy's share possibly even higher.

Source: *2009 State of the Market Report for PJM, Volume I*

Demand Response in Wholesale Markets

However, Demand Response's economic characteristics make it capacity and reserves markets relatively more important:



Data is from PJM for 2009.

Source: *Load Response Activity Report January-December 2009.*

Role of Demand Response

Compared with generation, demand response is very inexpensive to build and very expensive to run. This means that DR is a major resource for capacity and reliability planning, an emerging source of reserves, and not important at all in energy markets. This suggests several policy priorities:

- Ensure that resource planning takes full advantage of demand resources
- Allow participation in all ancillary services markets
- Don't obsess about *de minimis* aspects of energy markets

Capacity Markets

MISO does not have an organized capacity market. Since capacity is currently the main source of value from demand response, this creates a barrier to realizing the full benefits of DR. Possible options around this problem are:

- Continue with the current model, where DR capacity is provided to utilities through bilateral contracts
- Require assessment of DR in utility reliability plans
- Allow or require demand response to compete with new peaking generation on a cost basis
- Allow aggregators to provide DR to utilities on comparable terms to current interruptible tariffs
- Mandate utilities procure some amount of DR.

Role of ARCs

Aggregators of Retail Customers work within this framework. ARCs will typically play the following roles:

- Identify and recruit end-users who are technically able to participate in DR markets
- Install necessary metering and controls
- Offer customer's DR into wholesale markets
- Dispatch curtailments as instructed by ISO/RTO
- Perform measurement, verification and settlement
- Receive ISO/RTO payments
- Pay end-users

Interaction of ARCs with Utilities

FERC order 719 mandated that ISOs/RTOs allow ARCs to function independently of the host utility. MISO rules draw on lessons learned in other ISOs, and have number of features to ensure peaceful coexistence

- ARC and Load Serving roles completely separate
- No need for LSEs to be operationally aware of DR; MISO dispatches it when it is the economic resource
- Energy provided by Demand Response is “reconstituted” to ensure minimal impact on LSE energy settlements
- LSE review of registrations ensures no double-counting
- MFRR construct gives regulators control over effects on nonparticipants

Reconstitution in Brief

Reconstitution is adding energy provided by demand response back into a LSE's metered demand. This ensures that settlements balance and protects the LSE.

Example: An LSE predicts 100MW of load, and purchases 100MW on the day-ahead market. As the market clears, 2MW of this is provided by DR. Without reconstitution, the LSE would have 98MW of load. Instead, the 2MW is added-back, giving 100MW of load for settlement purposes.

- Prevents LSE from selling 2MW of energy that isn't there in the real-time markets
- Protects LSE from real-time deviation charges
- Properly allocates costs of the DR.

The Marginal Foregone Retail Rate

The need for the MFRR arises from the need to offset wholesale supply with retail billing.

For example, take a utility with 100MW of load. When this is met through generation, the utility pays for 100MW of generation, bills for 100MW of retail use, and everything balances.

But, if 1MW of this is met through DR, the utility now still has to pay for 100MW of wholesale supply (99MW of generation and 1MW of DR). But, their retail consumption has dropped to 99MW. If this is not accounted for, costs for 1MW of supply are not recovered. This is known as the “Missing Money Problem”

Marginal Foregone Retail Rate

There has been much debate about the proper compensation for energy provided by demand response. With the MFRR construct, MISO has given rate makers a tool to implement their own policies.

- Setting the MFRR to zero amounts to a subsidy for DR
- Setting the MFRR to the energy portion of the retail rate makes it cost-neutral for non-participants
- Setting the MFRR higher than this restricts demand response to peak hours

Effects on System Reliability and Prices

In this model, demand resources are treated as a source of supply, comparable with a merchant generation plant.

- Provided that measurement and verification protocols are sufficiently rigorous, DR makes an identical contribution to reliability as a generator
- DR only clears the market if it is displacing a more expensive resource, so demand response can only lower wholesale prices
- Independent aggregators have no recourse to rate recovery and impose no costs on the host utility or nonparticipants

Conclusions and Recommendations

MISO's demand response rules draw on lessons learned over several years of DR in other ISOs. The rules are well-crafted to allow ARCs to represent end-users in the energy and ancillary services markets without any undesired side effects.

- Beyond setting the MFRR, there is little need for rulemaking around ARCs in Missouri, at least for the commercial and industrial rate classes.
- Main regulatory challenge/opportunity is finding ways to integrate demand response into resource planning and capacity markets.