



Demand response is integrated into PJM Interconnection's wholesale electricity markets, providing equivalent treatment for generation and demand resources. Retail customers have the opportunity to participate in PJM's Energy, Capacity, Synchronized Reserve and Regulation markets and receive payments for the demand reductions they make.

PJM is working to broaden the opportunities for demand response to play a significant role in its wholesale electricity markets. PJM believes its demand-response initiatives are valuable because they give retail customers the ability to respond to wholesale prices.

The Federal Energy Regulatory Commission (FERC) initially approved PJM pilot programs in 2002. The FERC called such efforts "a highly useful and beneficial tool to reduce costs and maintain reliability during peak periods when generation supplies may be scarce."

Even though wholesale electricity prices fluctuate hourly, retail consumers generally pay electricity rates that are based on average electricity costs. This means that they don't see the changes in wholesale prices and don't have the opportunity to react to them. Without clear price signals, consumers have no incentive to reduce their usage when wholesale prices are high.

Demand response – enabling consumers to respond to wholesale prices – enhances efficiency by linking the price of electricity and the value consumers place on it. Giving consumers the ability to "see" wholesale prices and react when prices are high can help minimize the impact of price spikes, reduce the need for expensive peaking generating capacity and help hold down energy prices overall.

Other benefits of demand response were pointed out by the FERC in its 2006 "Assessment of Demand Response & Advanced Metering":

"To a degree, generation, transmission, and demand response are substitutes, depending on the location of generation or demand response. As a substitute for generation, demand response can serve as a local peaking resource and thereby assist resource adequacy. As a substitute for transmission and distribution infrastructure, demand response can reduce the need for new transmission or distribution expansion to bring generation to a local area. At minimum, demand response can provide relief for an overloaded transmission system, and can defer the need for infrastructure."

In 2006, PJM received FERC approval to enhance its demand-response activities. These enhancements included:

- Making economic load response a permanent part of the PJM Energy Market.
- Improving the options available to emergency load response participants.
- Enabling demand resources to provide synchronized reserve and regulation service.

Qualified PJM market participants who act as agents, called Curtailment Service Providers (CSPs), work with retail customers who wish to participate in demand response. CSPs aggregate the demand of retail customers, register that demand with PJM, submit the verification of demand reductions for payment by PJM and receive the payment from PJM. The allocation of the payment from PJM to the CSP and the retail customer is a matter of private agreement between them.



**Economic load response** provides an opportunity to reduce electricity consumption and receive a payment when PJM locational marginal prices (LMPs) are high. Participants have the choice of a day-ahead option or a real-time option.

In the day-ahead option, a CSP's customers can offer – in advance of real-time operations – to reduce the amount of electricity they will draw from the PJM system. If the offers are accepted, they will receive payments based on the day-ahead LMPs for the reductions. In the real-time option, a CSP enables customers to reduce their usage voluntarily during times of high prices and receive payments based on real-time LMPs for the reductions.

**Emergency load response** compensates retail customers who reduce their usage during emergency conditions on the PJM system.

The energy-only option compensates retail customers who reduce their usage voluntarily during emergency conditions. Full emergency load response, in contrast, compensates retail customers with both energy and capacity payments provided to CSPs. These customers must reduce load at the direction of PJM during emergency conditions up to a maximum of 10 times during the summer months.

There are 4,620 megawatts (MW) of demand response committed as capacity resources for the annual period beginning June 1, 2008.

PJM added the capability of accepting bids for demand reduction in the Synchronized Reserve Market and the Regulation Market on May 1, 2006. Demand resources must provide metering information at no less than a one-minute scan rate surrounding a call for Synchronized Reserves. CSPs that bid demand reductions into the Regulation Market must meet all of the requirements of regulation service, including the real-time telemetry requirement.

As of year-end 2007, 4,898 sites totaling 2,944 MW were registered to participate in economic load response and 705 sites totaling 2,144 MW were registered to participate in emergency load response. PJM's Load Response eTool provides CSPs, as well as electric distribution companies and load-serving entities, with an online tool for processing the registration of demand resources and demand reduction activity and transactions in the PJM markets.

Demand response demonstrated its value during a heat wave in early August 2006. Reductions in electricity use produced price reductions estimated to be equivalent to \$650 million in payments for energy for the week of the heat wave. On the day PJM reached a new all-time peak, demand reductions lowered the cost of electricity by about \$230 million.

The potential impact of demand response was illustrated in a January 2007 study for the Mid-Atlantic Distributed Resources Initiative (MADRI). The study showed that a modest reduction in energy usage could reduce electricity costs by up to \$182 million annually, based on a three percent demand response providing reductions in energy market prices of \$25 per megawatt-hour.

PJM's goal is to see demand response fully integrated into the retail market. That will happen when a large number of retail electric customers have access to demand-response options. PJM is working with state commissions and other stakeholders to support that goal. This effort includes collaborative groups such as MADRI, which is working to find ways to increase the deployment of time-of-use meters and to integrate distributed generation and demand response into state retail rate designs.

5/6/08

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