



Price responsive demand is the ability of consumers to control their energy expenditures by changing their electricity use in response to wholesale electricity prices. To assist the development of price responsive demand, PJM Interconnection has created business rules that support the deployment of the advanced metering infrastructure and retail rate approaches needed to enable consumers, including residential and small commercial customers, to receive and act on wholesale electricity prices in real time.

Demand response – the ability of consumers to be compensated for reducing their electricity use or changing their use patterns in response to power system needs or hourly electricity costs – has grown dramatically in PJM’s wholesale electricity markets in recent years.

A broader approach to demand response, called price responsive demand, or PRD, is being implemented to expand even more the role of demand resources in PJM.

Most consumers today pay for electricity based on fixed prices for each kilowatt-hour of usage. These prices don’t change during the day, the month or the year. However, the wholesale price of the electricity that suppliers buy to serve these consumers changes by the hour.

If consumers used less electricity during hours when the wholesale price is high, then the cost of serving them would go down for suppliers – and the savings could be passed to consumers through lower electricity bills. The electricity use reductions also would ease stress on the power supply system, especially during critical periods of high demand and emergency operations.

Price responsive demand, an important aspect of the Smart Grid, requires:

- The widespread deployment of advanced meters to retail customers.

- The introduction of dynamic retail rates that are linked to wholesale electricity prices.

Intelligent, two-way meters record electricity usage hourly rather than monthly and receive price signals that enable consumers to respond to dynamic retail prices that are triggered by wholesale market prices in real time. A number of PJM-member utilities have announced plans for large-scale advanced meter installations, and state regulatory authorities have authorized the installation of more than 12 million smart meters across PJM by 2022.

In the future, these smart meters will be able to communicate price information to “smart” appliances programmed to automatically change their operation based on the electricity price. Home automation technology will make it convenient for consumers to respond to wholesale electricity prices.

“Dynamic retail rates” means that electric rates are linked to wholesale electricity prices and vary by time of use. These variable rates will enable consumers to benefit when they adjust their usage in response to wholesale prices.

A simple example illustrates the benefits. Suppose that both spouses work outside the home, their house has an advanced meter and the electricity rates they pay are based on the time of use. The couple could set the thermostat to allow the temperature in the house to rise slightly – instead of running the air conditioning – when electricity prices are high on hot summer afternoons, saving them money.



Reducing use during times of high demand will help to avoid the need for, and significant costs of, additional generating capacity. In addition, the usage reductions may help lower electricity prices in the wholesale market.

Price responsive demand differs from PJM's existing demand response opportunities, through which large customers can receive payments in PJM's markets for reducing their energy use. In these activities, an end-use customer typically participates through a curtailment service provider, a PJM member specializing in demand response.

In price responsive demand, in contrast, consumers will not be paid directly for reductions, but rather will save money on their bills by cutting or shifting their electricity use.

PRD represents an additional option for demand to participate in PJM's wholesale markets. However, it will not be treated as a supply resource, like the demand response that participates in PJM's Reliability Pricing Model capacity market. Instead, it will be treated as a predictable change in the amount of electricity used, not as additional generation.

The voluntary participation of PRD providers in PJM's markets will enhance grid operations and reliability and provide a closer link between the wholesale and retail electricity markets.

By producing a predictable change in electricity use – a reduction when prices rise, an increase when prices drop – PRD will enable PJM dispatchers to manage the electric system more efficiently and give them another tool in their real-time reliability operations.

PJM's market rules for PRD enable participants meeting the eligibility requirements to voluntarily commit a demand reduction in the markets. The

requirements for utilities or other PRD providers committing reductions include:

- Demand served under a dynamic retail rate structure that changes hourly and reflects locational wholesale prices in some form.
- Advanced metering capable of automatically responding to prices and of recording electricity consumption hourly.
- Supervisory control that ensures that the committed demand reduction can be accomplished if it does not happen automatically in a grid emergency.
- Penalties for PRD providers that fail to meet commitments during emergencies.

Price responsive demand commitments will be factored into PJM's calculations of its load forecast and the resources needed to ensure reliability in its capacity market. Utilities and other entities committing demand reductions will reduce their capacity obligations and payments as a result, which will benefit consumers.

PRD does not replace PJM's existing demand response opportunities. Instead, it expands demand response beyond its current role as a supply resource in the markets by capturing the benefits of predictable reductions in demand for the power system and consumers.

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