

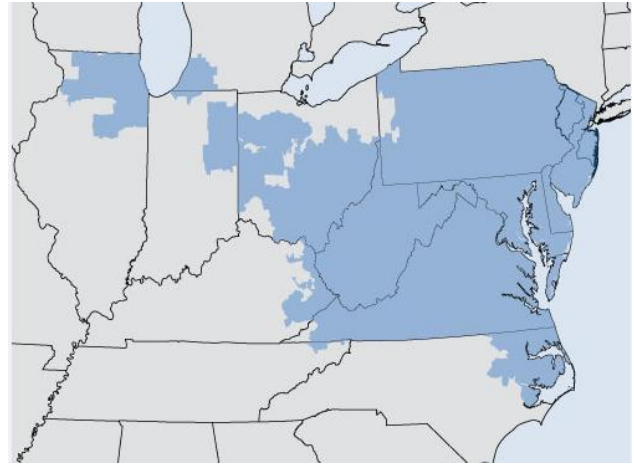


Reliability Pricing Model Demand Response and Energy Efficiency

What is PJM?

As a federally regulated Regional Transmission Organization (RTO), PJM Interconnection (PJM) manages the electric transmission system to ensure reliability, operates wholesale electricity markets and conducts a regional planning process for the expansion of the transmission system for a territory serving 13 states and the District of Columbia.

Since PJM began operating the competitive wholesale electricity market in 1997 it has expanded the number and types of markets available to its members to include: Day-Ahead and Real-Time Energy, Capacity, Financial Transmission Rights and Ancillary Services markets.



What is the capacity market?

Capacity represents the need to have adequate resources to ensure that the demand for electricity can be met at all times. For PJM, that means that a utility or other electricity supplier, load serving entity, is required to have the resources to meet its consumers' demand plus a reserve amount. Electricity suppliers, load serving entities, can meet that requirement by owning and operating generation capacity, by purchasing capacity from others or by obtaining capacity through PJM's capacity market auctions.

PJM operates a capacity market, called the Reliability Pricing Model (RPM). It is designed to ensure that adequate resources are available to meet the demand for electricity at all times. In the RPM, those resources include not only generating stations, but also demand response actions and energy efficiency measures by consumers to reduce their demand for electricity.

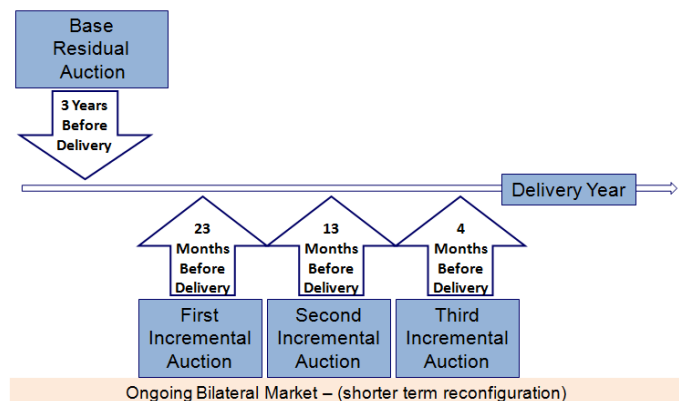
Why is there a separate market for capacity?

PJM must keep the electric grid operating in balance by ensuring there is adequate generation of electricity to satisfy the demand for electricity at every location in the region both now and in the future. PJM's markets for energy and ancillary services help maintain the balance now while the PJM market for capacity aims to keep the system in balance in the future.

Resources, even if they operate infrequently, must receive enough revenue to cover their costs. Payments for capacity provide a revenue stream to maintain and keep current resources operating and to develop new resources. Investors need sufficient long-term price signals to encourage the maintenance and development of generation, transmission and demand-side resources. The RPM, based on making capacity commitments in advance of the energy need, creates a long-term price signal to attract needed investments for reliability in the PJM region.

How is the PJM capacity market operated?

Every year PJM conducts a Base Residual Auction (BRA) for delivery of capacity three years in the future. The BRA is held in May and the delivery year begins 3 years later on June 1st and ends on May 31st of the following year. In addition to the BRA, PJM conducts three Incremental Auctions (IA) in advance of the corresponding delivery year to balance any changes in the load forecast and to allow suppliers of capacity resources to adjust their positions.





Reliability Pricing Model Demand Response and Energy Efficiency

What is demand response?

Demand response, also known as load response, is a consumer's reduction of their demand for electricity in response to dispatch instructions or economic signals.

Some ways a demand response resource may reduce their electric demand are by dimming lights, turning on back-up generation or shutting down an electrical process.

What is energy efficiency?

Energy efficiency measures consist of a consumer installing more efficient devices or implementing more efficient processes/systems that exceed then-current building codes or other relevant standards. An energy efficiency resource must achieve a permanent, continuous reduction in demand for electricity. Energy efficiency measures are fully implemented throughout the delivery year without any requirement of notice, dispatch, or operator intervention.

Some ways an energy efficiency resource may permanently reduce their electric demand are by replacing incandescent lights with compact fluorescent lights or by replacing their heating and cooling systems with a system that is more efficient than the current minimum standards.

What is the difference between a demand response resource and an energy efficiency resource?

A demand response resource can reduce its demand for electricity when instructed; this means PJM considers it a "dispatchable resource". A demand response resource can participate in the RPM market for as long as its ability to reduce its demand continues.

A demand response resource must be willing to reduce demand for electricity up to 10 times each year when called for a reduction. In a year without any reduction calls, the demand response resource is required to demonstrate the ability to reduce demand for electricity during a test of reduction capability. Data will be submitted by the demand response resource to prove compliance with reductions from actual calls or reductions from capability tests.

An energy efficiency resource is one that reduced their demand for electricity through an energy efficiency measure that does not require any additional action by the consumer. Energy efficiency resources may participate in the RPM for up to four years.

How can a consumer be considered capacity?

A consumer's ability to reduce its demand for electricity is equivalent to the ability of a generator to increase its electricity output. This helps keep the electric system operating in balance, with supply matching demand at all times, in order to ensure the reliability of the grid.

Can a consumer be considered both a demand response resource and an energy efficiency resource?

A consumer can be considered both a demand response resource and an energy efficiency resource if the consumer implements the two different programs. For example, if a consumer replaced their HVAC system with one more efficient than the current standard they could participate in the RPM as an energy efficiency resource. They might also participate in the RPM as a demand response resource under a separate program in which they curtail their demand for energy by switching to back-up generation when a call for reduction is made.

Can a consumer participate in every auction?

A consumer can currently participate in all the existing RPM auctions as a demand response resource. Beginning in April 2009 an energy efficiency resource may participate in markets for the 2012/13 delivery year and all years thereafter. Following is a table outlining the auctions for which consumers are eligible:

Year	2009		2010				2011				2012 forward	
	BRA	IA	BRA	IA	IA	IA	BRA	IA	IA	IA	BRA	IA
Delivery Year	2012/13	2011/12	2013/14	2010/11	2011/12	2012/13	2014/15	2011/12	2012/13	2013/14	All forward	All forward
Demand Response	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Energy Efficiency	✓		✓			✓	✓		✓	✓	✓	✓



Reliability Pricing Model Demand Response and Energy Efficiency

How does a consumer participate in the capacity market?

In order to participate in the RPM, a consumer will need to either contact a Curtailment Service Provider (CSP) that is a member of PJM or become a member of PJM themselves. A CSP can represent the consumer in PJM's wholesale electricity markets and facilitate the monetary exchange with PJM.

PJM provides training and documentation to its members to help them understand the complexities of participating in the wholesale electricity markets. As a member the CSP or consumer gains the ability to offer to sell their ability to curtail load into PJM's markets.

What if a consumer currently participates in the capacity market as an Interruptible Load for Reliability?

The Interruptible Load for Reliability (ILR) program will exist through the 2011/2012 delivery year. Any consumer that wants to continue to be a capacity resource at PJM will need to participate in the RPM as a demand response resource beginning in the 2012/2013 delivery year. ILR resources and demand response resources are both capacity resources however the timing of the consumer's commitment differs.

Demand response resources commit to being a capacity resource at the time of clearing in an RPM auction. The majority of resources, 97.5%, are contracted by PJM in the Base Residual Auction (BRA) 3 years prior to the delivery year. Clearing in one of the Incremental Auctions is a commitment 23 months, 11 months or 4 months prior to the delivery year. An existing ILR resource that clears in the May 2009 BRA as a demand response resource is obligated to reduce their demand for electricity when called during the 2012/2013 delivery year and will allow an existing ILR resource to maintain their revenue stream from the capacity market without interruption.

What kind of revenue stream can a consumer expect from the capacity market?

The revenue stream will depend on the amount of MWs cleared in a capacity auction and the clearing price of the auction. Although the price will be known after the results are posted, the cash flow occurs during the relevant delivery year. The clearing prices have historically ranged from \$40 to \$240 per MW-day, depending on the delivery year and the location of the resource.

As an illustration, assume that a CSP clears 20 MW in a capacity auction that had a clearing price of \$100/MW-day and that the CSP delivers the 20 MW as contracted. The revenue stream for a year would be 20 MW X \$100/MW-day X 365 days = \$730,000. These revenues would accrue daily during the delivery year and be paid on a monthly basis until the implementation of weekly settlements when the revenues will be paid weekly.

How does the capacity market fit into a state's master plan for energy?

Participation in the PJM capacity market allows a consumer to monetize their ability to reduce demand for electricity and to monetize energy efficiency measures they have implemented. The consumer will not only experience savings from an altered energy consumption pattern but can also receive a revenue stream for helping to increase the reliability of the electric system that serves them. RPM provides a revenue stream to make demand response and energy efficiency viable alternatives in support of state energy master plans.

Where can I find additional information?

The following materials are available to provide additional information about the **RPM** and the **auction clearing process**:

<http://www.pjm.com/markets-and-operations/rpm.aspx>

The following materials are available to provide additional information about **demand response**:

<http://www.pjm.com/markets-and-operations/demand-response.aspx>

All of the **requirements** to offer or commit an energy efficiency resource in the PJM capacity market are detailed in PJM Manual for the PJM Capacity Market (M-18):

<http://www.pjm.com/documents/manuals.aspx>

A **list of CSPs** can be found on the PJM website at:

<http://www.pjm.com/markets-and-operations/demand-response/csps.aspx>