



Shortage pricing is the mechanism PJM Interconnection implemented in 2012 to accurately price energy and reserves when reserves are short. Prices that reflect the true state of the system approaching and during reserve shortages can enhance system reliability by attracting resources to respond to the shortage.

Reserves are resources that are not supplying the system but are quickly available to provide energy if needed. PJM seeks to have enough reserves to handle the loss of the largest generating unit on the system at the time. Reserves are considered short if PJM does not have enough to meet its established requirements.

At times when reserves are short (i.e., less than the largest generating unit on line), accurate pricing is important to provide the correct price incentives for resources like generation and demand response to respond to help alleviate the shortage.

Additional reserves can be provided by increasing the output of generating units already supplying energy to the grid; bringing additional generating resources online; making purchases from other systems or curtailing sales to other systems; and reducing load by calling on demand response resources to lower their electricity use.

PJM's shortage pricing mechanism created a new market to price primary reserves. Primary reserves are offline resources that can be activated within 10 minutes.

Other elements of the shortage pricing mechanism, which took effect in October 2012, include:

- Energy and reserves are priced jointly in real time every five minutes to improve their price consistency and ensure that a shortage of reserves is reflected in energy prices.
- During a reserve shortage, a demand curve establishes prices for reserves.

- A new market for non-synchronized reserve (reserves that are not electrically synchronized to the system but can be brought online within 10 minutes) was implemented to supplement the existing Synchronized Reserve Market.
- Emergency demand response, emergency generation and purchases, and demand resources with bids in excess of \$1,000 per megawatt-hour can set the price of energy.
- Market power screening and mitigation remain in effect during shortage conditions.

A price cap totaling \$2,700 per megawatt-hour for energy during a reserve shortage was phased in between 2012 and 2015, including a \$1,700 per MWh cap for reserves alone. The price of primary and synchronized reserves will reflect shortages when either an actual shortage exists or a voltage reduction or a manual load dump emergency action is implemented.

The shortage pricing mechanism enables the market clearing price to increase as a reserve shortage becomes more severe. If emergency resources are no longer available and electricity demand exceeds the capacity that is available to provide energy and meet the required reserves, PJM will use the reserves to supply customers with electricity to meet their demand. This increases the clearing prices of both energy and reserves.

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