



PJM Interconnection uses a market mechanism called shortage pricing 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 Ready To Quickly Provide Power to the Grid

Reserves are resources that are not actively supplying the system but are quickly available to provide energy if needed. PJM seeks to have enough synchronized reserves to handle the loss of the largest generating resource 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 resource online), PJM needs additional resources that are able to quickly respond to help alleviate the shortage.

Additional reserves can be provided by:

- Increasing the output of generating resources already supplying energy to the grid
- Bringing additional generating resources online
- Making purchases from other systems or curtailing sales to other systems
- Reducing load by calling on demand response resources to lower their electricity use

### Using Shortage Pricing To Respond to Reserve Shortages

When reserves are short, accurate pricing is important to provide the correct price incentives for resources like generation and demand response to quickly respond.

PJM's current shortage pricing mechanism, which took effect in May 2017, reflects shortage pricing for impacted five-minute intervals where PJM's dispatch application indicates a synchronized and/or primary reserve shortage.

Other elements of this shortage pricing mechanism 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 market for non-synchronized reserves (reserves that are not electrically synchronized to the system but can be brought online within 10 minutes) is available to supplement the Synchronized Reserve Market.

#### Key Facts

- PJM seeks to have enough synchronized reserves to handle the loss of the largest generating resource on the system at the time.
- At times when reserves are short, PJM needs additional resources that are able to quickly respond to help alleviate the shortage.
- Accurate pricing is important to provide the right incentives for resources like generation and demand response to quickly respond when reserves are short.
- PJM's current shortage pricing mechanism went into effect in May 2017.
- PJM's shortage pricing also enables the market clearing price to increase as a shortage becomes more severe to further encourage more resources to respond.





- In addition to generation with costs in excess of \$1,000 per megawatt-hour, emergency demand response, emergency purchases and demand resources with bids in excess of \$1,000 per megawatt-hour can set the price of energy up to \$2,000 per megawatt-hour.
- Market power screening and mitigation remain in effect during shortage conditions.

PJM currently uses a two-step Operating Reserve Demand Curve (ORDC) to establish reserve prices during shortage conditions. The ORDC is a formula that sets a price to serve as a “penalty factor” for being unable to meet the reserve requirement. The first step on the ORDC sets a maximum penalty of \$850 per megawatt-hour of energy. The second step on the ORDC sets a maximum penalty of \$300 per megawatt-hour.

The shortage pricing mechanism also 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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