



PJM Interconnection manages the electric grid to ensure an adequate supply of electricity around the clock and operates the system to prevent disruption.

One of PJM's main jobs is to maintain the reliability of the bulk electric system. There are two significant aspects of grid reliability: adequacy and security.

### Adequacy: Having Enough Resources

For the electric grid, adequacy addresses whether there are enough electric generators and other resources available to meet customer demand. This also includes backup generators (called reserves) and the flexibility to reduce customer usage, if necessary (called demand response). These elements help system operators balance supply and demand. The ability to continuously balance supply and demand is key to operating an electric grid that consumers can rely on.

#### ***Always On: During the Peaks***

The electric grid is designed to meet the demand for electricity when it is highest, which is called a “peak.”

Peaks usually occur during extreme weather conditions, such as the hottest days of summer, when people use air conditioning most, or the coldest days of winter, when people use the most heat.

PJM must balance supply and demand, not just during peaks, but throughout the year – including the spring and fall when temperatures are generally moderate and electricity usage is low.

#### ***Never Off: Expecting the Unexpected***

When temperatures are moderate, many generators take themselves out of service for scheduled maintenance. However, the region still could be hit by an unexpected hot or cold spell. PJM needs to ensure that there are always enough resources available to meet an unexpected spike in usage.

#### **Key Points**

- **Reliability** is about keeping the power flowing and the lights on.
- **Adequacy** is ensuring that there are enough electric resources available to meet consumer demand.
- **Capacity** can include generation, energy efficiency and demand-response resources.
- **Security** is operating the grid to anticipate risks and minimize any loss of service or equipment failure.
- **Resilience** is about planning for, operating through and recovering from a major disruption.

#### ***Ensuring Power Gets Where It's Needed***

Adequacy also refers to the expectation that the high-voltage transmission system will be able to transport the electricity needed to meet customer demand reliably in the future anywhere on the system. PJM uses its Regional Transmission Expansion Plan to identify future adequacy requirements for new resources over a 15-year planning horizon.

#### ***A Commitment to Meet Demand***

PJM is required to meet the reliability standards set by the North American Electric Reliability Corp. (NERC). In addition, PJM maintains the Reliability Assurance Agreement, one of the governing documents on which the organization is built. It is signed by all of the PJM members that sell electricity to end-use customers. It requires that each organization secure, either through PJM's capacity market or through their purchasing efforts, enough electric-generating resources to cover the customer demand that it serves (also called load).



Organizations must also secure an additional amount (also called reserve margin) to prepare for an unexpected spike in demand or failure of a generator. This is similar to how a person planning a home improvement project may budget extra money for additional supplies or labor “just in case.”

PJM controls these resources so that operators can call on them if they are needed to meet the demands on the system.

### ***Securing Resources for the Long Term***

PJM uses a capacity market (called the Reliability Pricing Model or RPM) to prepare for the future.

PJM’s capacity market was created to secure enough power supplies three years before they’re needed to

ensure that sufficient supply will be available in the future to meet peak demand.

Each year, PJM holds a competitive auction to obtain commitments for these future power supplies at the lowest cost. “Capacity” is the commitment of resources to deliver electricity or reduce demand, as needed, particularly in an emergency.

This pledge to make resources available when they’re needed gives consumers the assurance of reliable power in the future. In return, generation developers and owners receive a dependable flow of income to help maintain their existing equipment, attract investment in new resources and to support the development of new technologies and sources of electricity.

## **Security: Operating the Grid to Prevent Failure**

The second aspect of reliability, security, involves operating the electric power system to anticipate the possibility of the failure of key elements of the system and guarding against disruption.

Electric system operators monitor the electric system around the clock as electricity usage rises and falls and conditions evolve. They respond to unexpected events that occur on the system, and they look ahead to prevent instability that could spread and cause cascading outages, potentially affecting millions of consumers.

### ***Anticipating Instability***

Security involves making preemptive adjustments to the system so that it is prepared for the possibility of sudden, unexpected disruptions or the failure of a major element such as a power plant, transmission line or high-voltage transformer.

Operators have the responsibility and authority to make adjustments in real time to protect the system.

### ***Preparing for Disturbances***

Security also involves being prepared to withstand disturbances caused by physical or cyberattacks. If a disruption or equipment failure occurs, system operators seek to minimize and limit the impact to customers.

### ***Planning for Recovery***

Because of extreme weather events and ever-present cybersecurity risks, PJM and its members recognize that there are threats to reliability that can’t be fully anticipated or prevented. As a result, PJM also focuses on resilience – the ability to plan for, operate through and recover from a major electrical system disruption.

*Date: 4/10/19*

2750 Monroe Blvd.  
Audubon, PA 19403  
866.400.8980  
610.666.8980