

## Building a Modern Grid

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Mercer County Community College, the Conference Center at Mercer

1200 Old Trenton Road, West Windsor, NJ

Sources: <https://www.nrdc.org/sites/default/files/powering-future-grid-reliability-fs.pdf>

<https://www.mjbradley.com/reports/powering-future-renewable-energy-grid-reliability>

- Our grid has evolved from a centralized system into one that is more like a web. This evolution has been influenced by the transition from centralized energy resources like huge coal fired power plants to distributed energy resources like wind farms and solar energy. Running it smoothly requires new and advanced lines as well as increased coordination among generators, transmission and distribution system grid managers, and consumers.
- Understanding grid dynamics is essential to future electricity growth, use forecasting and energy projecting. “**Load shape**” is the pattern of electricity demand governed by the seasons, time of day, infrastructure failures, security issues, weather emergencies, and climate change—all conditions that have the potential to stress the perfect balance between supply and demand necessary at all times to deliver power and avoid blackouts.
  - From this information, **demand response programs and public education initiatives** should encourage non-peak load time use. To explain, peak loads happen when everyone uses power at the same time, such as waking up in the morning to shower, cook breakfast, or do a load of laundry. This same process happens in the evening when people come home from work, cook dinner, turn on the television, and do housework. With the influence of electric vehicles growing in society, charging and other power-intensive activities should be encouraged during non-peak hours, like overnight, to reduce grid stress and keep energy costs low by preventing “peakers” from coming online.
- Infrastructure investment and improvement is also essential to maintain a reliable grid, it is important to continue strengthening the system of wires, transformers, and substations that move power around the country.