

Driving Grid Resilience

Office of Electricity - Advanced Grid R&D

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Office of Electricity

The Office of Electricity (OE) provides national leadership to ensure that the Nation's energy delivery system is secure, resilient and reliable. OE works to develop new technologies to improve the infrastructure that brings electricity into our homes, offices, and factories, and the federal and state electricity policies and programs that shape electricity system planning and market operations.

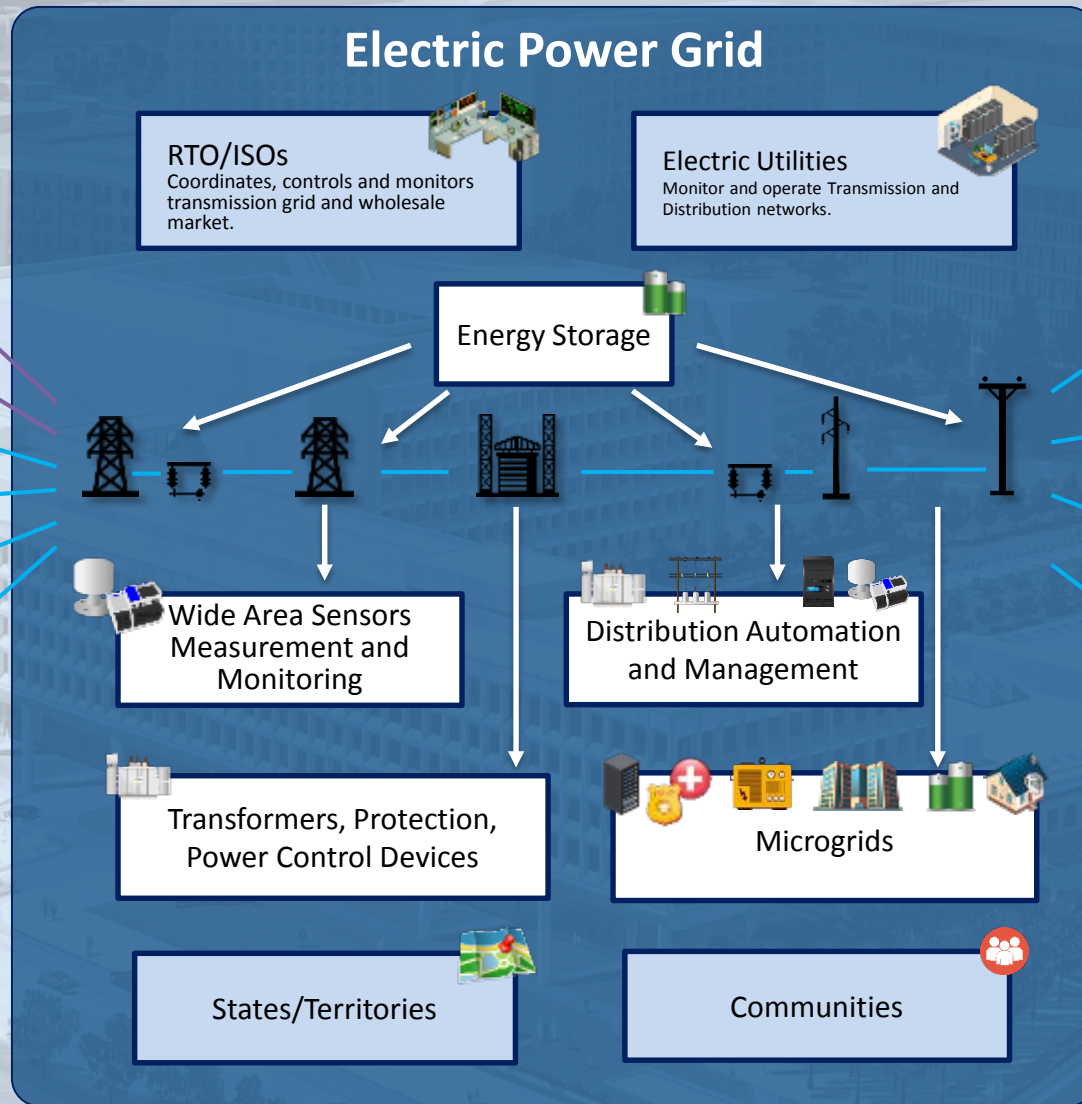
OUR MISSION

OE drives electric grid modernization and resiliency in the energy infrastructure.

OE leads the Department of Energy's efforts to ensure a resilient, reliable, and flexible electricity system. OE accomplishes this mission through research, partnerships, facilitation, and modeling and analytics.



OE's Advanced Grid R&D Portfolio



Integrated Technical Thrusts

Technology Innovation

Design and Planning

- Create grid planning tools that integrate transmission and distribution system dynamics over a variety of time and spatial scales

System Operations, Power Flow, and Control

- Design & test technologies that enhance/enable the capability to control and coordinate millions of assets for grid operations through EMS/DMS

Sensing and Measurements

- Explore integrating advanced sensors, communications, visualization and analytics to enable 100% observability

Devices and Integrated Systems

- Evaluate and develop new devices and components for improved reliability/resilience

Security and Resilience

- Develop resilient and advanced security (cyber and physical) solutions and real-time incident response capabilities for emerging technologies and systems

Institutional Support

- Enable regulators & utility/grid operators to make more informed decisions & reduce risks on key issues that influence the future electric grid/power sector

Advanced Grid R&D Programs At-A-Glance

Grid Controls and Communications	<i>Transmission Reliability and Resilience</i>	Synchrophasors		Advanced Grid Modeling	
	<i>Resilient Distribution Systems</i>	Advanced Distribution Systems	Advanced Microgrids	Dynamic Controls and Communications	High-Fidelity & Low-Cost Sensors
Grid Systems and Components	<i>Transformer Resilience and Advanced Components</i>	Advanced Power Grid Components			
	<i>Energy Storage Systems</i>	Energy Storage			

Five Priorities for OE Going Forward

North American Energy Systems Resiliency Model

Operational Strategy for Cyber and Physical Threats

Megawatt-Scale Grid Storage

Revolutionize Sensing Technology Utilization

Puerto Rico and US Virgin Islands Resiliency Efforts

Advanced Synchrophasor Program



North American SynchroPhasor Initiative

- Realize promise of synchrophasor technology
- Facilitate intelligent deployment of synchrophasors



Advanced Application Development

- Automatic switchable network for reliable early warning for informed remedial reaction
- Reliability monitoring and NERC compliance tools
- Oscillation behavior



Reliability and Models

- Research, develop, and implement electricity infrastructure and market simulations



Equipment Standards

- Data quality
- Device calibration (NIST)