



Office of Electricity Delivery & Energy Reliability

Driving Grid Modernization to Help Ensure a Secure, Resilient, Reliable, and Flexible Electricity System

Electricity empowers Americans: It makes the lights turn on, the computer work, the heat come on along with many other basic comforts we have come to expect. In fact, the nation's economy, security, and health and safety of our citizens depend on the reliable delivery of electricity.

The Department of Energy's (DOE's), Office of Electricity Delivery and Energy Reliability (OE) is working closely with its private and public partners to strengthen, transform, and improve energy infrastructure to ensure access to reliable, secure, and flexible sources of energy.

Through research, partnerships, facilitation, modeling and analytics, and emergency preparedness, OE is driving national efforts to modernize the electricity delivery system, enhance the security and reliability of America's energy infrastructure, and facilitate recovery from disruptions to the energy supply.

Strengthening the Electricity Ecosystem

The electrical grid is more than just generation and transmission infrastructure. It is an ecosystem of asset owners, manufacturers, service providers, and government officials at Federal, state, and local levels, all working together to run one of the most complex yet reliable electrical grids in the world.

Together, we are developing the methods, strategies, and tools needed to help protect the nation's critical energy infrastructure, including the electric power grid, from disruptions caused by natural and manmade events, such as severe weather, physical attacks, and cyberattacks.

Together, we are moving the nation closer to the grid of the future – a platform that delivers reliable and affordable electricity to American consumers where they want it, when they want it, and how they want it.

Improving Lives

OE strives to improve American lives in several ways:

- **Research and Development:** OE works to accelerate discovery and innovation across the electricity ecosystem, fostering the new tools and technologies of tomorrow's grid.
- **Cybersecurity:** One of OE's top priorities is to make the power grid and oil and natural gas infrastructure safer and more resilient to cyber threats.
- **National Security:** OE leads efforts to protect and improve the resiliency of the energy ecosystem against all hazards. This includes the security and reliability of large power transformers, a critical component of the power grid.
- **Emergency Response:** OE also leads DOE's efforts to prepare for, respond to, and recover from hurricanes and floods and other events that might turn out the lights.
- **Transmission Permitting:** OE fosters and encourages the development of reliable and affordable energy infrastructure such as power lines.



Making a Lasting Impact in Electricity Security, Reliability, and Resiliency

The electric grid is becoming more secure, reliable, flexible, and efficient. Below are just a few of OE's accomplishments in this area which have touched businesses and consumers across the nation.

Cyber and National Security	Since 2010, OE has invested more than \$210 million in cybersecurity research, development and demonstration projects that are led by industry, universities and DOE national labs. These critical investments have supported the development of more than 35 new tools and technologies now being used to advance the resilience of the Nation's energy delivery systems.
Emergency Response	OE developed EAGLE-I, the first-ever technology to track and share real-time information on power and natural gas infrastructure during energy emergencies. The Environment for Analysis of Geo-Located Energy Information system delivers timely, accurate, and actionable information about the status and potential impacts of energy sector disruptions. During Hurricane Sandy in 2012, EAGLE-I was used to produce regular reports that allowed senior leadership and responders to make informed decisions that could mitigate Sandy's human and economic impacts. EAGLE-I's expanding capabilities focus on the integration and geospatial overlay of hazards across the energy ecosystem.
R&D Program Management	OE successfully managed an investment of \$4.5 billion in grid modernization that was matched by private funding to reach a total of about \$9.5 billion. Of the \$4.5 billion, \$3.4 billion was used to help industry accelerate the deployment of advanced technologies that are now keeping the lights on more reliably, efficiently and cost effectively. This investment accelerated most recipients' grid modernization investment plans by 2-10 years in their estimation, thereby adding greatly to the nation's electrical infrastructure.
Transmission Permitting	In September 2016, the Energy Department announced a final rule for the Integrated Interagency Pre-Application (IIP) Process for electric grid transmission. This rule is intended to encourage early engagement with stakeholders on electric grid transmission projects and increase the efficiency of grid modernization efforts. Improving the process can save time and result in more successful projects. The Presidential Permits issued in 2016 for the Lake Erie Connector, New England Clean Power Link, and Great Northern transmission lines are examples of how the IPP's collaborative principles are working.

Grid Modernization Initiative

Most of OE's efforts today are being conducted through DOE's Grid Modernization Initiative (GMI). Through the GMI's Grid Modernization Laboratory Consortium (GMLC), up to \$220 million will support critical R&D at DOE's National Labs and partners in a number of key grid modernization areas.

While much progress has been made, much more work is needed. OE will continue to play a major role in addressing the immediate and long-term challenges to America's energy security, while sustaining applied research into the technologies and policies needed for the grid of the future.