



GRID
MODERNIZATION
LABORATORY
CONSORTIUM
U.S. Department of Energy

Delivering a Power Grid for the 21st Century

The United States power system is a strategic investment for our nation, and new paradigms for designing, operating and securing our grid are critical for our national economic and security goals. To meet this challenge, the U.S. Department of Energy established the Grid Modernization Initiative. Through this Initiative, DOE is working with public and private stakeholders to develop the concepts, tools, and technologies needed to measure, analyze, predict, protect, and control the grid of the future.

In support of this Initiative, the DOE launched the **Grid Modernization Laboratory Consortium** to engage the national laboratories working on DOE grid programs to frame a new integrated approach for planning and delivering innovations and thought leadership in support of grid modernization. This new, crosscutting approach ensures that DOE research and development investments and capabilities are fully coordinated to enable a modern U.S. power system.

Led by scientists and engineers from across the DOE national labs, the technical teams are aligned with **six technical thrust areas**:

- **sensing and measurements**
- **devices and integrated systems**
- **system operations, power flow, and control**
- **design and planning tools**
- **security and resilience**
- **institutional support.**



QUADRENNIAL ENERGY REVIEW:
ENERGY TRANSMISSION, STORAGE,
AND DISTRIBUTION INFRASTRUCTURE

Apr-17-2015

Released in April 2015, the Quadrennial Energy Review (QER) highlighted fundamental challenges and new opportunities for transforming the grid to meet new demands of U.S. energy and economic priorities of the 21st century. The QER recommended focused investment in Grid Modernization research and development as a national imperative.

IMPACT

By 2025, grid modernization is expected to help industry substantially improve the performance and security of the U.S. electric system by delivering the following grid qualities:

- Improved reliability for customers
- Enhanced resilience against all hazards
- Continued affordability in the face of change
- Enhanced environmental performance delivering a clean supply of electricity
- Fundamental security of the delivery of the nation's electricity needs

THE CHALLENGE

For the next several decades, the Grid Modernization Laboratory Consortium will coordinate grid modernization activities to address the following challenges:

- increasing the grid's digital capacity
- enabling two-way power flow for distributed generation (renewables)
- improving security and resilience to all hazards—cyber, physical and other risks
- developing tools and control paradigms that leverage the capabilities of new digital grid technologies to deliver improved reliability and economic productivity.

STAKEHOLDER INVOLVEMENT AND OUTREACH

Modernization of the U.S. electric grid entails dramatic transformations, with close collaboration required across industry, states, federal agencies, regulators and numerous other stakeholders. In addition to leading the lab-to-lab technical teams to best leverage intellectual and scientific assets, the labs also play a key role in engaging regional stakeholders in new concepts.

For example, the labs are providing institutional support to states, local communities, tribes, and others to develop new regulations needed to unleash the potential of the modern grid. The labs will also engage in the development and implementation of regional and local demonstrations, co-funded by industry, to accelerate the rate of impact of the new innovations emerging from the DOE Grid Modernization efforts.

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MULTI-YEAR PROGRAM PLAN

Consortium members developed a draft multi-year program plan (MYPP) that outlines an integrated approach to grid research funding, stewarded primarily across three DOE offices:

- Electricity Delivery and Energy Reliability (DOE-OE)
- Energy Efficiency and Renewable Energy (DOE-EERE)
- Energy Policy and Systems Analysis (DOE-EPSCA).

Other DOE grid programs, such as Fossil Energy, Advanced Research Projects Agency-Energy and the Office of Science, are also engaged. The MYPP defines an agenda to accelerate the impact of the DOE innovations on the nation's infrastructure, including partnerships with industry and states to launch emerging concepts.

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