

U.S. Department of Energy, Office of Electricity **Grid Resilience through Targeted R&D**

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Advanced Grid R&D

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**Advanced Grid
Research**

OFFICE OF ELECTRICITY
US DEPARTMENT OF ENERGY

Key Trends Driving Electricity System Changes

A changing mix of types and characteristics of electric generations

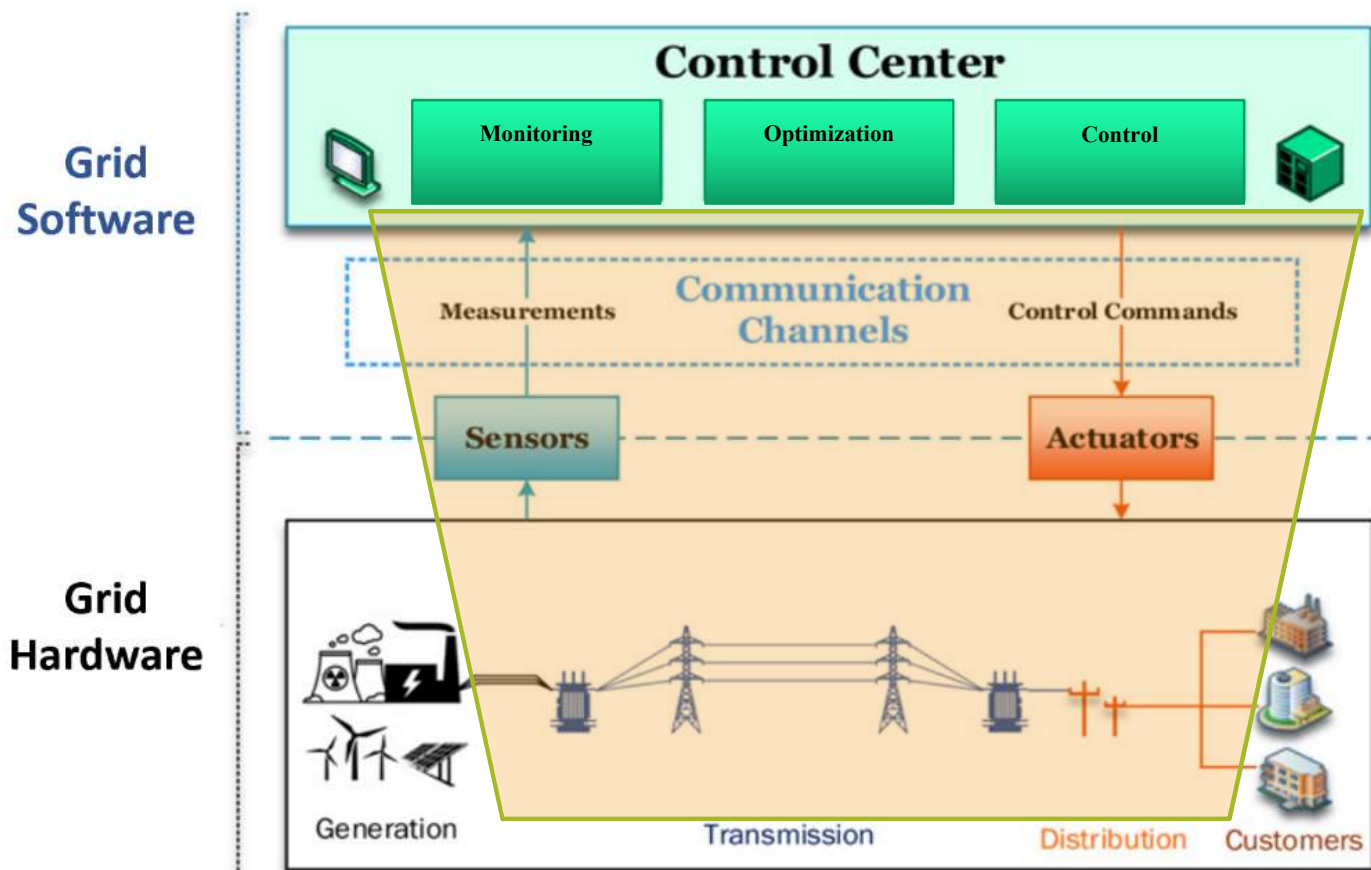
Growing demands for a more resilient and reliable grid

Aging Infrastructure

The emergence of interconnected electricity, information and control systems

Growing supply and demand-side opportunities for customers to participate in electricity systems

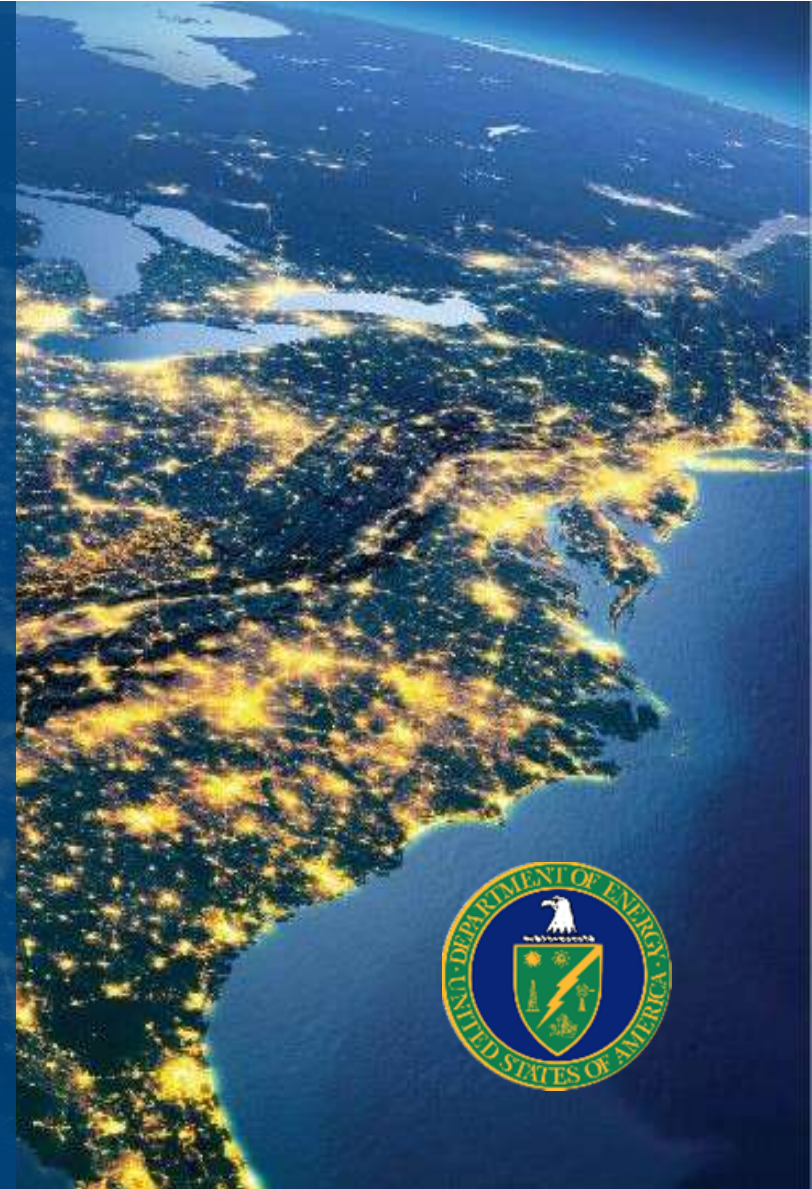
Meeting the Challenges of the Electricity Delivery System



Office of Electricity

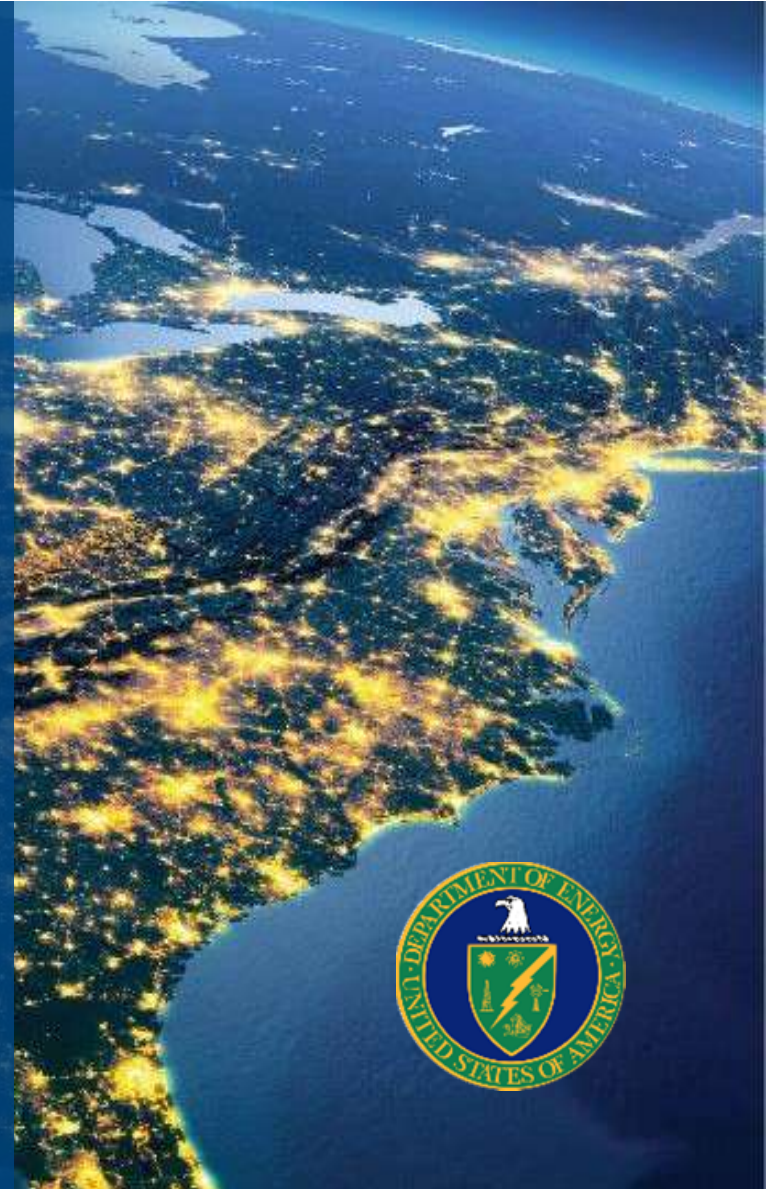
- Provide national leadership to ensure a secure, resilient and reliable energy delivery system.
- Develop technologies to improve the infrastructure that brings electricity into our homes, offices, and factories.
- Support development of the federal and state electricity policies and programs that shape electricity system planning and market operations.
- Drive electric grid modernization and resiliency through research, partnerships, facilitation, and modeling and analytics.

energy.gov/oe

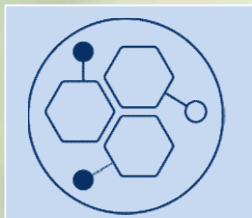


Key Priorities

- **North American Energy Resiliency Model**
 - Develop an integrated North American Energy Resiliency Model to conduct planning and contingency analysis to address vulnerabilities in the North American energy system
- **Megawatt Scale Grid Storage**
 - Develop megawatt scale storage capable of supporting regulation, ramping and energy management for bulk and distribution power systems
- **Revolutionize Sensing Technology Utilization**
 - Pursue the integration of high fidelity, low cost sensing technology for predictive and correlation modeling for electricity
- **Resilient Transmission Assets**
 - Pursue electricity-related policy issues by carrying out statutory and executive requirements, while also providing policy design and analysis expertise to states, regions, and tribes



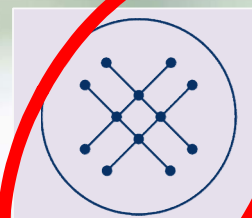
Advanced Grid R&D Portfolio At-A-Glance



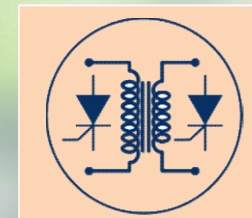
**Advanced Grid
Modeling and
NAERM**



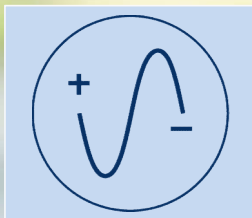
**Transmission
Sensors**



Microgrids



**Advanced Power
Grid Components**



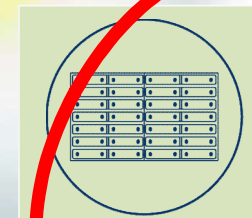
**Transmission
Reliability**



**Advanced
Distribution Systems**



**Dynamic Controls
& Communications**



**Energy Storage
Systems**

UI-ASSIST Approach supports OE Mission and Portfolio

OE Portfolio

- Develop modeling capability to assess the national energy infrastructure
- Define and demonstrate the value and benefits energy storage can provide
- Utilize microgrids in applications to demonstrate a variety of benefits
- Deploy sensors to provide visibility; real time status; and diagnosis, prediction, and mitigation of system disruption
- Demonstrate function and value of transactive energy
- Advance the adoption of grid systems, components, and materials that will increase resilience and reliability and protect access to energy threats
- Support development of policies that shape electricity system planning and markets
- Build human capital needs to support and advance R&D innovation

UI-ASSIST Themes

- Distribution System Modeling & Benchmark System Development
- Energy Storage Modeling and Optimization
- Microgrid and Active Distribution System
- Cyber Security and Infrastructure
- DSO Functions/Energy Management
- DSO – Market and Regulatory Issues
- Lab Testing and Validation
- Field Demonstration
- Impact Analysis and Policy Recommendations
- Workforce Development

U.S. – India Strategic Energy Partnership

In 2018, U.S. and Indian leaders announced the Strategic Energy Partnership (SEP) as a foundation for cooperation. The aim of this Partnership is to enhance cooperation on energy security, expand energy and innovation linkages across our respective energy sectors, bolster our strategic alignment, and facilitate increased industry and stakeholder engagement.

There are four pillars supporting this Partnership

- Power & Energy Efficiency**
- Oil & Gas**
- Renewable Energy & Sustainable Growth**
- Coal**

U.S.-India Strategic Energy Partnership issues Joint Statement

- Last week U.S. Secretary of Energy Brouillette and Indian Minister of Petroleum and Natural Gas and Steel Pradhan co-chaired a virtual ministerial meeting of the U.S.-India Strategic Energy Partnership (SEP) to review progress, highlight major accomplishments, and prioritize new areas for cooperation.
- During this meeting a presentation was given by Prof. Sharma, Secretary, Department of Science and Technology on the progress of the UI-ASSIST program which gave it great prominence.
- In the Joint Statement issued by the US-India following the ministerial meeting
 - The two countries are also leading joint research and development (R&D) through the U.S.-India Partnership to Advance Clean Energy-Research (PACE-R) on smart grids and energy storage to increase resilience and reliability of the electric grid.

Secretary Brouillette Addresses U.S.-India SEP Ministerial



After seeing today's presentations, I'm delighted by how we're pursuing these opportunities under the SEP.

We're collaborating on renewable energy, nuclear energy, and energy efficiency. We're striving to enhance flexible operations of coal power plants and to strengthen and modernize our energy infrastructure, ensuring a more resilient electric grid. We're forging ahead on research and development involving smart grids and energy storage to make our clean energy more reliable, and on carbon capture utilization and storage to make our reliable energy cleaner. We're seeking to meet tomorrow's challenges by encouraging more women to enter the energy sector and by advocating for more women in leadership positions.

Additional Support

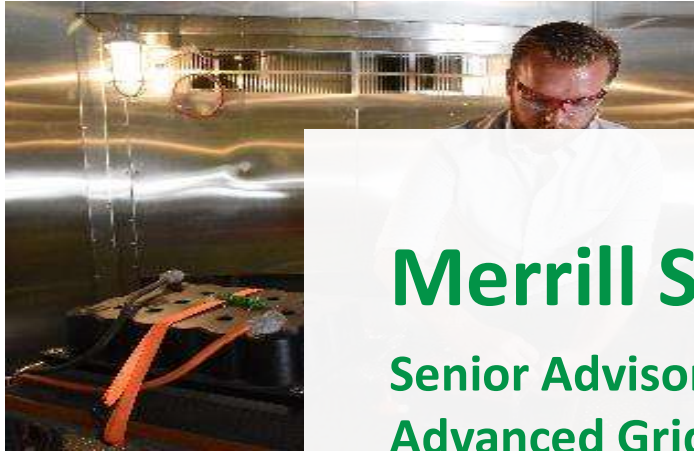
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