U.S. DEPARTMENT OF ENERGY

Office of

Electricity Delivery and Energy Reliability

FY 2013 Budget Request

Patricia A. Hoffman, Assistant Secretary

February 13, 2012

The Importance of a Modern Grid

"A smarter, modernized, and expanded grid will be pivotal to the United States' world leadership in a clean energy future...A 21st century clean energy economy demands a 21st century grid."

- *A Policy Framework for the 21st Century Grid* – White House Report, June 2011

"Building this new energy future should be just one part of a broader agenda to repair America's infrastructure … we've got … a power grid that wastes too much energy."

- President Obama – State of the Union, January 2012

Department of Energy Mission and Goals

DOE Mission

The mission of the Department of Energy is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.

Transform our Energy Systems

Goal 1: Catalyze the timely, material, and efficient transformation of the nation's energy system and secure U.S. leadership in clean energy technologies.

The Science and Engineering Enterprise

Goal 2: Maintain a vibrant U.S. effort in science and engineering as a cornerstone of our economic prosperity with clear leadership in strategic areas.

Secure Our Nation

Goal 3: Enhance nuclear security through defense, nonproliferation, and environmental efforts.

Management and Operational Excellence

Goal 4: Establish an operational and adaptable framework that combines the best wisdom of all Department stakeholders to maximize mission success.

Overview of the OE FY 2013 Request

FY 2011 Current	FY 2012 Appropriation	FY 2013 Request
$138.2M	$139.1M	$143.0M

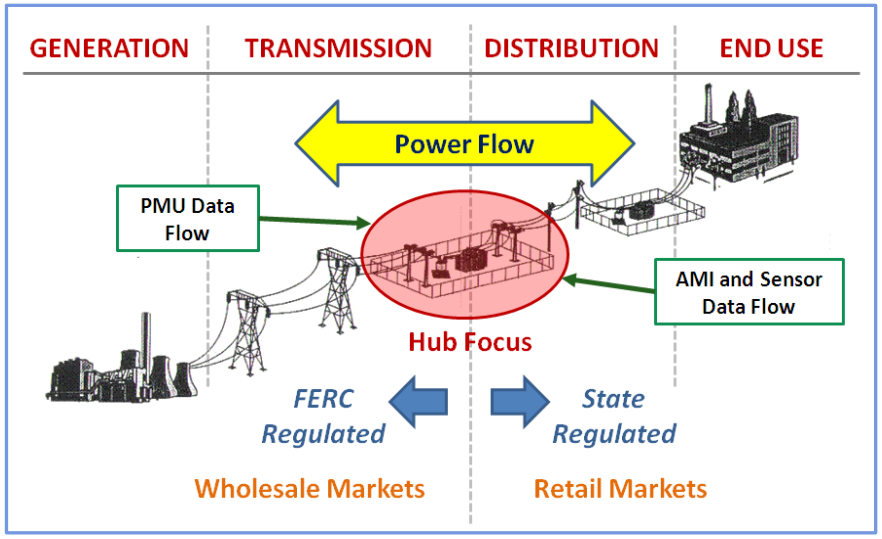
The Office of Electricity Delivery and Energy Reliability (OE) leads national efforts to modernize the electric grid, enhance security and reliability of energy infrastructure, and facilitate recovery from disruptions to the energy supply.

- The FY 2013 budget request emphasizes:
  - Challenging conventional approaches to next-generation grid technologies through the new **Electricity Systems Hub**;
  - Securing energy control systems, devices and data with **Cyber Security** solutions designed for the unique needs of energy delivery systems; and
  - Increasing understanding of grid operations and system interactions through **Advanced Modeling Grid Research**.

Electricity Systems Hub

FY 2013 Request: $20 M

- The new Electricity Systems Hub will focus on the interface between transmission and distribution as the point where power and information flows intersect with markets and regulations.



- The integrated Hub approach will produce creative solutions to address the barriers and challenges associated with this “pinch point” of grid modernization.
- Two to three regional hubs may be pursued to address the unique regional and local issues associated with grid integration.

Cyber Security for Energy Delivery Systems

FY 2013 Request: $30 M

- The cyber threat is becoming increasingly sophisticated and targeted at the energy sector.
- OE's Cyber Security program specifically addresses the unique cyber security needs of energy sector control systems.
- The request supports collaborative research among government, industry and academia to strengthen energy sector cybersecurity capabilities through:
  - High-risk/reward research focused on the unique cybersecurity needs of the energy-sector
  - Research to secure smart grid technologies against cyber attack and protect energy-consumer privacy
  - Research to identify, mitigate and decrease the number of SCADA* vulnerabilities
  - Integrated risk analyses to keep ahead of the evolving threat landscape

** **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition*

Advanced Modeling Grid Research

FY 2013 Request: $10 M

- Advanced Modeling Grid Research develops sophisticated algorithms, models and capabilities to better analyze and predict grid behavior
- The program applies this understanding using real-time electric system data to improve grid planning and operations
- Specifically, the research focuses on:
  - *Accelerating performance* – improving grid resilience by developing dynamic state estimation and contingency analysis at a sub-second level
  - *Enabling predictive capability* – relying on real-time measurements and improved models to more accurately represent the electric system and better predict system behavior, thus reducing margins and equipment redundancies needed to cover uncertainties

Details of the OE FY 2013 Request

	Request Amount (in thousands)
Clean Energy Transmission and Reliability	24,000
Transmission Reliability and Renewables Integration	*14,000*
Advanced Modeling Grid Research	*10,000*
Smart Grid Research and Development	14,400
Electricity Systems Hub	20,000
Energy Storage	15,000
Cyber Security for Energy Delivery Systems	30,000
Subtotal, Research and Development	**103,400**
Permitting, Siting, and Analysis	**6,000**
Infrastructure Security and Energy Restoration	**6,000**
Program Direction	**27,615**
TOTAL, Electricity Delivery and Energy Reliability	**143,015**

OE Programs

Clean Energy Transmission and Reliability ($24.0M)

Transmission Reliability and Renewables Integration ($14.0M)

Supports the development of advanced sensors and tools to give transmission system operators real-time information and improve system operations.

Advanced Modeling Grid Research ($10.0M)

Supports development of sophisticated algorithms, models and capabilities to better analyze and predict grid behavior.

Smart Grid Research and Development ($14.4M)

Supports the development of an efficient, fully integrated “smart” grid through the integration of digital information and communication technologies into the power system.

Electricity Systems Hub ($20.0M)

Addresses the critical issues and barriers associated with integrating, coordinating, and facilitating the numerous changes that are happening on the distribution and transmission systems. By taking a systems-level approach and a “grid-to-edge” perspective, the Hub will focus on near-term and future solutions that will enable the seamless modernization of the electric grid to meet national goals.

OE Programs

Energy Storage ($15.0M)

Supports the development of grid-scale storage technologies to reduce power disturbances, reduce generation need at peak demand, and improve system flexibility to better incorporate renewable resources.

Cyber Security for Energy Delivery Systems ($30.0M)

Addresses vulnerabilities within the Nation's electricity delivery system to reduce the risk of energy disruptions due to cyber attacks, a fundamental need with the growing sophistication of cyber threats.

Permitting, Siting and Analysis ($6.0M)

Provides technical assistance to states and regions on electricity policies and programs that increase access to reliable, affordable and sustainable energy sources, including analysis of emerging system challenges and advanced transmission approaches.

Infrastructure Security and Energy Restoration ($6.0M)

Leads national efforts to enhance the security of the Nation's critical energy infrastructure against threats and hazards and carries out the Department's Energy Sector-Specific Agency responsibilities, protecting the Nation's critical energy infrastructure and key resources.