



U.S. Department of Energy

Office of Electricity Delivery and Energy Reliability

*Smart Grid Activities & Technology  
Workshop*

**Eric Lightner**

**Director, Federal Smart Grid Task Force**

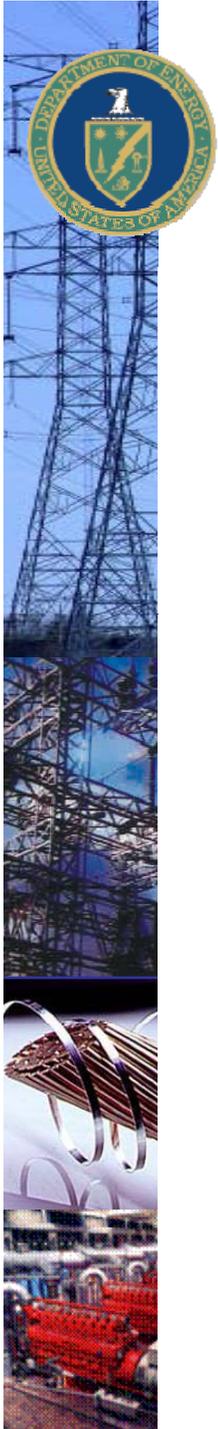
**April 29, 2008**

**DOCKET**

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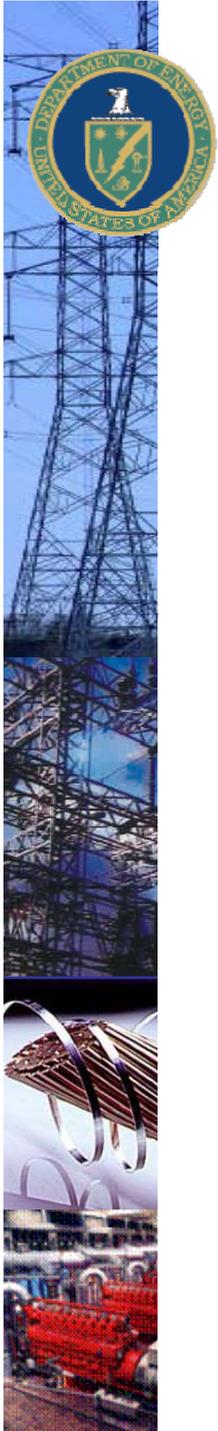
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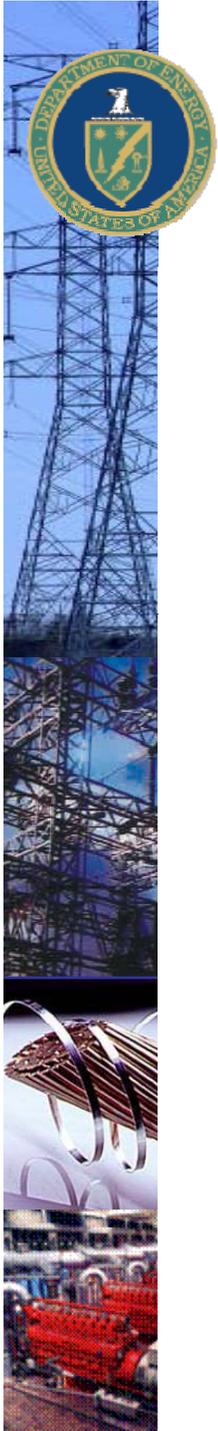
# Presentation Outline

- **OE Requirements on Implementing EISA 2007, Title XIII – Smart Grid**
- **Status Updates on OE Actions**
  - **Federal Smart Grid Task Force**
  - **Defining Smart Grid**
  - **Smart Grid Implementation Workshop**
  - **Reports to Congress**
  - **Interoperability Framework**
  - **Smart Grid Public Awareness**
- **Smart Grid Activities Supporting Strategic Areas Identified in OE R&D Strategic Plan**
- **OE R&D Programs Supporting Achievement of Smart Grid Functions**



# OE Requirements on Implementing Title XIII Smart Grid Requirements

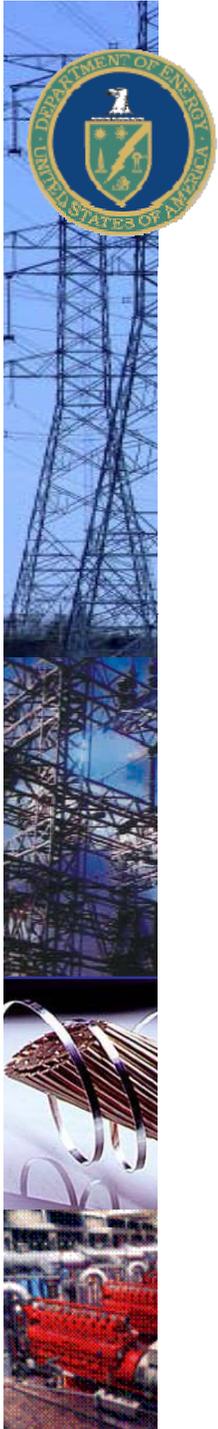
- **Establish a Smart Grid Advisory Committee (Members appointed)**
- **Establish a Smart Grid Task Force (Completed)**
- **Submit to Congress a report concerning the status of Smart Grid system deployments (Due 12/19/2008)**
- **Submit to Congress a study assessing laws and regulations affecting siting of privately owned electricity distribution wires on and across public rights-of-way (Due 12/19/2008)**
- **Carry out a program to research, develop, and demonstrate Smart Grid technologies (Planned 1<sup>st</sup> Q-FY09 following development of RD&D plan)**
- **Establish a Smart Grid regional demonstration initiative showcasing advanced technologies (Planned 1<sup>st</sup> Q-FY09, guided by RD&D plan)**
- **Establish a federal matching funds program (By 12/29/2008)**
- **Submit to Congress a quantitative assessment concerning the security implications of Smart Grid system deployments (Due 6/19/2009)**



# Smart Grid Task Force

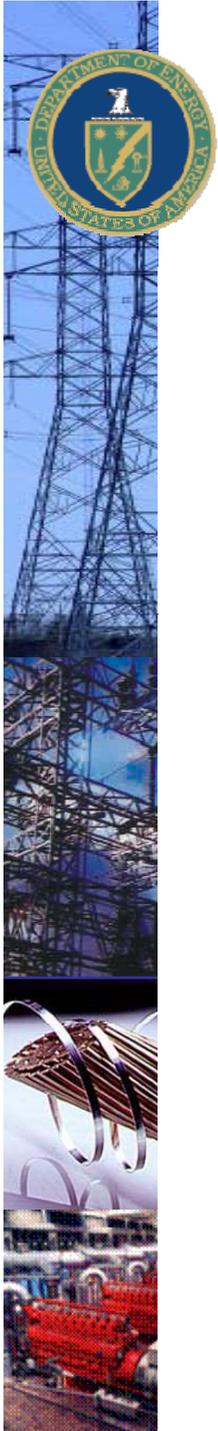
## Functions

- Serves as Federal focal point on all things “smart grid”
- Coordinates and integrates inter-governmental activities
- Oversees report production for submission to Congress
- Oversees development of smart grid RD&D plan
- Guides smart grid regional demonstrations
- Advises on interoperability framework
- Guides establishment of federal matching funds program
- Advises on coordination with States
- Guides outreach and communications to build awareness and educate decision makers
- Collaborates with and supports Electricity Advisory Committee



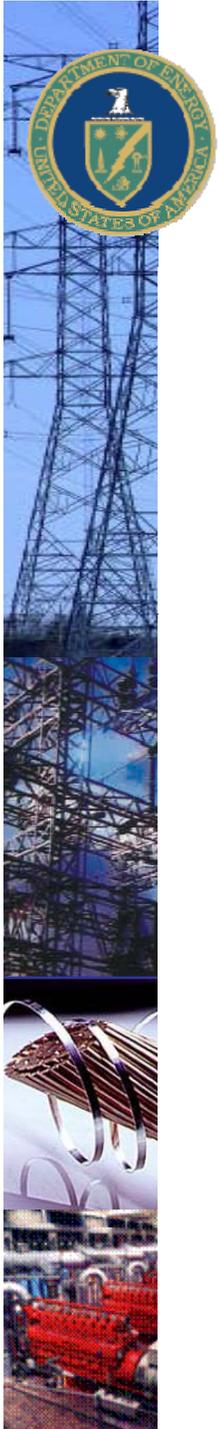
# Task Force Composition

<b>Organization</b>	<b>Members</b>	<b>Roles</b>
<b>OE</b>	Eric Lightner, Director Hank Kenchington Larry Mansueti Philip Overholt	Leadership Cyber Security, State Policy Transmission R&D
<b>EERE</b>	Dan Ton Paul Dickerson	Energy efficiency & renewables
<b>NETL</b>	Steve Bossart	FE/NETL
<b>DHS</b>	Roger McGinnis, Sr. Patrick Murphy	Homeland security
<b>EPA</b>	Stacy Angel	Environmental issues
<b>FERC</b>	David Andrejczak Ray Palmer	Wholesale markets
<b>NIST</b>	William Anderson Jerry FitzPatrick	Interoperability standards
<b>USDA</b>	Georg Shultz Joe Badin	Rural electricity development
<b>DoD</b>	Invited	National security



# Defining Smart Grid

<b>Activity</b>	<b>Outcome</b>
Regional Meetings	Regional meetings were convened by the NETL Modern Grid Strategy team; these stakeholders have created a definition of a smart grid
Smart Grid Implementation Workshop: June 19-20, 2008	Important step in reaching a common understanding of smart grid characteristics, the value created for the electric system, consumers, and society, and to jointly define criteria and metrics for evaluating progress toward implementation



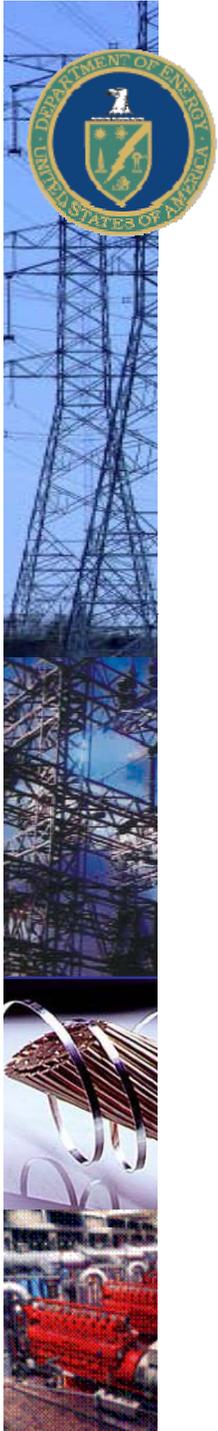
# Defining Smart Grid

Electricity delivery network modernized using latest digital/information technologies to meet key defining functions\*

- Enabling active participation by consumers
- Accommodating all generation and storage options
- Enabling new products, services, and markets
- Optimizing assets and operating efficiently
- Anticipating and responding to system disturbances in a self-healing manner
- Operating resiliently against physical and cyber attack and natural disasters
- Providing the power quality for the range of needs in a digital economy

***The evolution of a smart grid will be one of continuous improvement.***

\* Identified through the NETL Modern Grid Strategy Team efforts



# Smart Grid Implementation Workshop

**Planned for June 19-20, 2008, in DC, with broad stakeholder engagement to reach consensus on and acceptance of:**

- Smart Grid characteristics and values
- Metrics for measuring progress toward a smart grid
- Measurement and verification



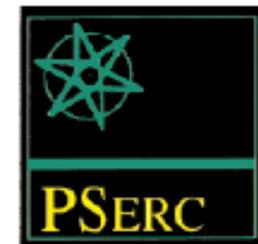
## **Input to:**

- Smart Grid baseline and progress tracking
- Smart Grid RD&D Plan development
- Soliciting and selecting smart grid regional demo activities

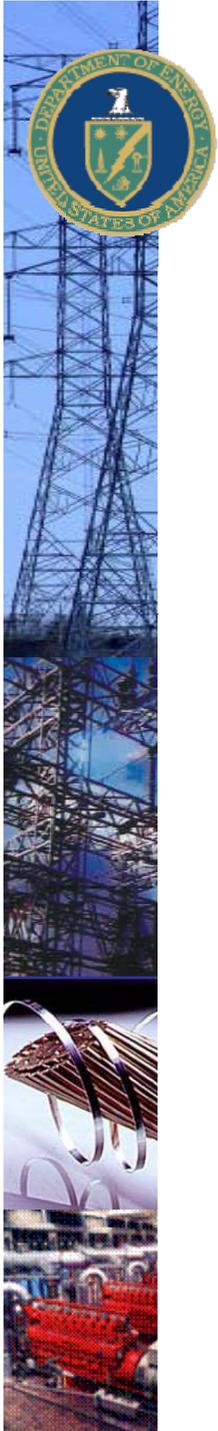
**A Planning Committee comprising a broad representation of smart grid stakeholders is being charged to organize the Workshop.**



# Smart Grid Implementation Planning Committee Organizations



National Laboratories

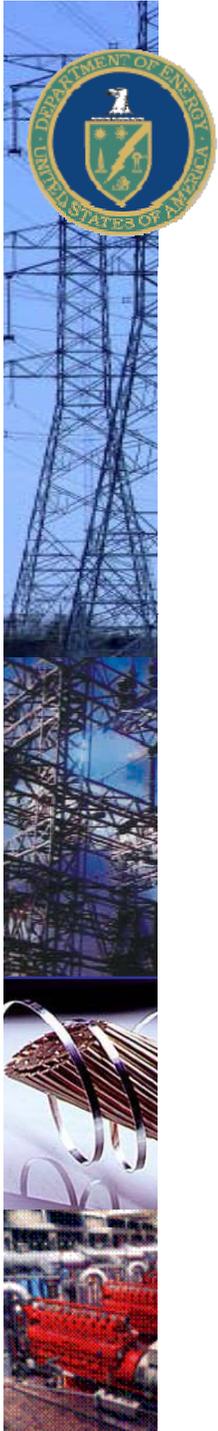


# Reports to Congress: Section 1302 Smart Grid System Report

<b>Requirements</b>	<b>Approach</b>
<ul style="list-style-type: none"><li>- Current status and prospects of smart grid deployment</li><li>- ID of any regulatory or government barriers</li><li>- Recommendations for State/Federal policies or actions (optional)</li><li>- Analysis taking a regional perspective</li></ul>	<ul style="list-style-type: none"><li>- Building on Implementation Workshop findings (data, methodologies, and metrics) to guide smart grid status and projection analyses</li><li>- Combining with the APQC maturity model assessment to conduct on-line surveys and/or interviews to map “now to the future”</li><li>- Working with FERC-NARUC Smart Grid Collaborative to ID regulatory policies and on suggested recommendations</li></ul>

## **Status**

- SOW developed and reviewed by Task Force
- Key milestones identified for on-schedule completion for DOE submittal by 12/19/08
- Lead Contractor: PNNL (incl. subcontract to APQC)

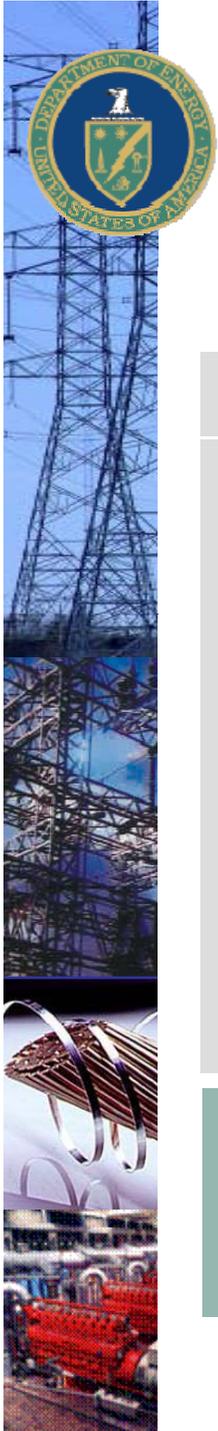


# Reports to Congress:

## Section 1308 Effect of Private Wire Laws on Development of CHP Facilities

<b>Requirements</b>	<b>Approach</b>
<ul style="list-style-type: none"><li>- Evaluate purposes and effect of the laws</li><li>- Determine impact of changing laws and regulations</li><li>- Assess extent of duplication or redundancy due to privately owned wires</li></ul>	<ul style="list-style-type: none"><li>- ID 4-8 key states for study through consultation with NARUC for national representation</li><li>- Convene a Steering Committee with monthly meetings and calls</li><li>- Develop interview questions and guides</li><li>- Conduct 6-10 interviews in each category:<ul style="list-style-type: none"><li>- With vendors/developers</li><li>- With regulators and utilities</li></ul></li><li>- ID alternatives to CHP ownership of wires</li></ul>

<b>Status</b>
<ul style="list-style-type: none"><li>- SOW developed with key Tasks defined</li><li>- On-schedule completion for DOE submittal by 12/19/08</li><li>- Lead Contractor: Navigant Consulting</li></ul>



# Reports to Congress: Section 1309 Security Attributes of Smart Grid Systems

## Requirements

- Assess and determine impact of smart grid deployments on infrastructure security and operations
- Recommend on how smart grid can help in:
  - Reduced vulnerability
  - Restoration
  - Coordinated emergency responses
- Recommend on risk mitigation

## Approach

- Work in coordination with CSS/DHS/FERC/NERC on SOW development

## Status

- In early stages of planning
- Report due 6/19/09



# Smart Grid Interoperability Framework

## NIST having primary responsibility to coordinate development

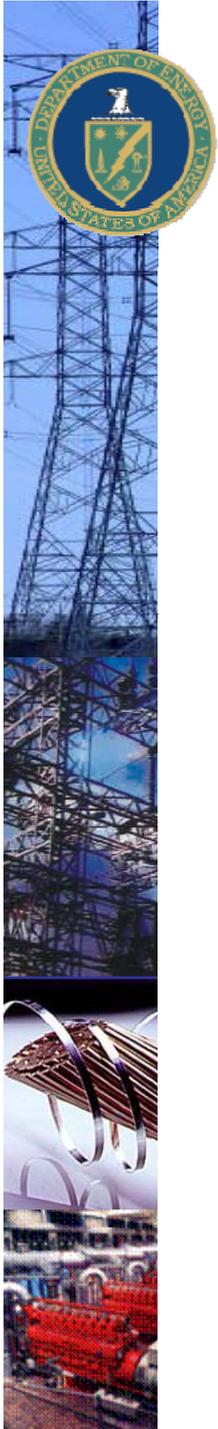
- **Input from**
  - FERC, OE, Smart Grid Task Force, other Federal & State agencies
  - GWAC, IEEE, NERC, NEMA
- **Scope of framework**
  - Flexible to accommodate legacy systems
  - Technology neutral
  - Voluntary uniform standards for appliances and equipment for homes and businesses

## GWAC leading the support

- Held meeting with FERC Commissioner on interoperability
- Participating in the NIST Interop Framework Team meetings
- Providing GWAC developed materials, forum proceedings, and contact to help coordinate development

## Interoperability Path Forward





# Communications and Outreach for Public Awareness

## **GridWeek 2007, April 2007 in DC**

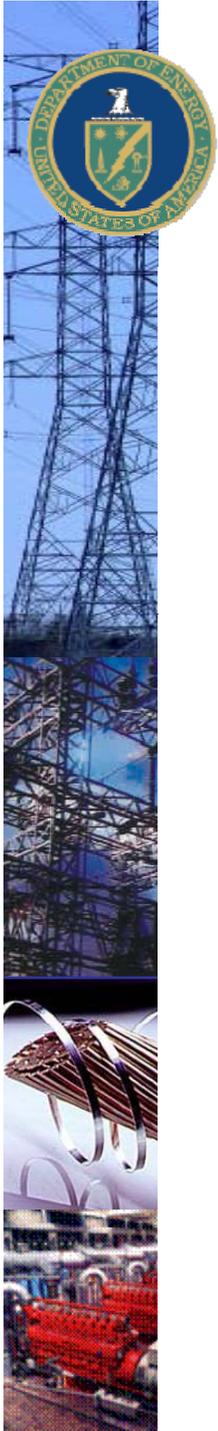
- Aligning and coordinating national agenda on grid modernization
- 634 participants, including federal/state/industry/Lab leaders
- Inaugural event organized and sponsored by OE



[www.gridweek.com](http://www.gridweek.com)

## **GridWeek 2008, September 23-25, 2008 in DC**

- GridWise Alliance and OE as leading sponsors
- Becoming *the* national event on smart grid
  - Enabling energy efficiency
  - Smart Grid in a carbon economy
  - Future of Energy
  - Utility operational efficiencies
  - New business models
  - Interoperability of a Smart Grid
  - Securing the Smart Grid
  - Implementing EISA 2007
  - Smart Grid Success Areas
- More than 800 attendees anticipated by the Organizing Committee



# Publications for Public Awareness

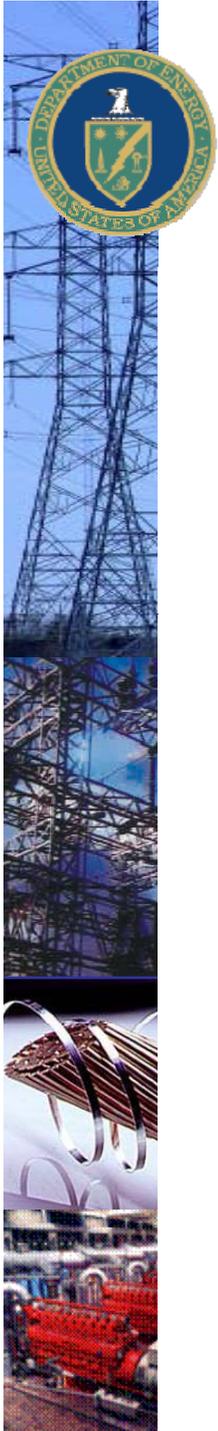
## Smart Grid Guidebook

- An illustrative document on:
  - What is the Smart Grid
  - What is the value
  - Why is it necessary
  - Who are the “key” players
- Target for distribution during GridWeek 2008
- Lead Contractor: Litos Advertising & Design

## Smart Grid Newsletter

[www.smartgridnews.com](http://www.smartgridnews.com)

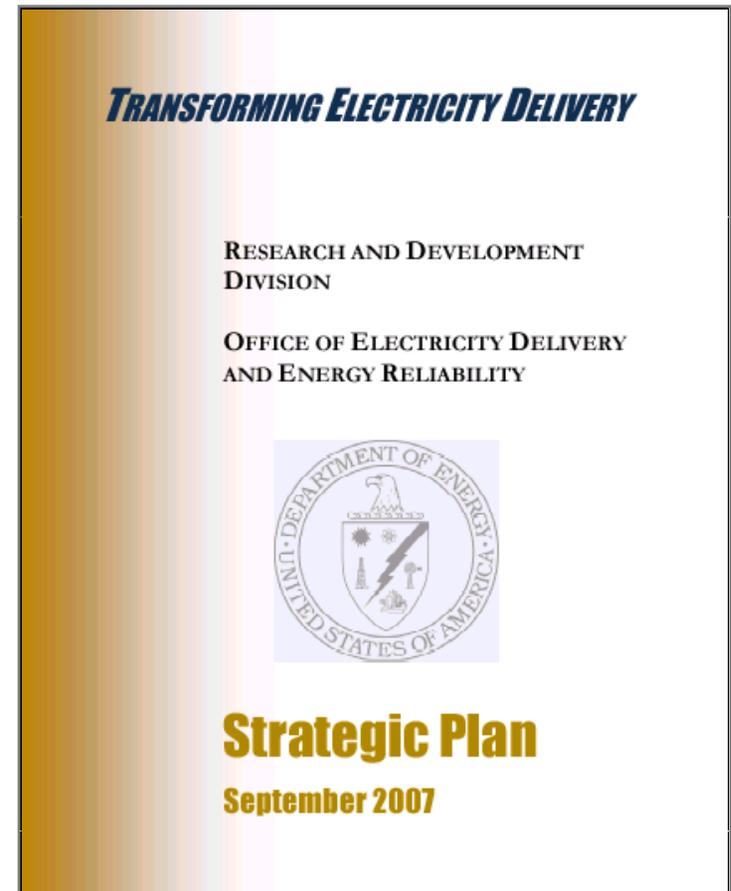
- Monthly on-line publications covering news, trends, research and marketplace information relevant to grid automation

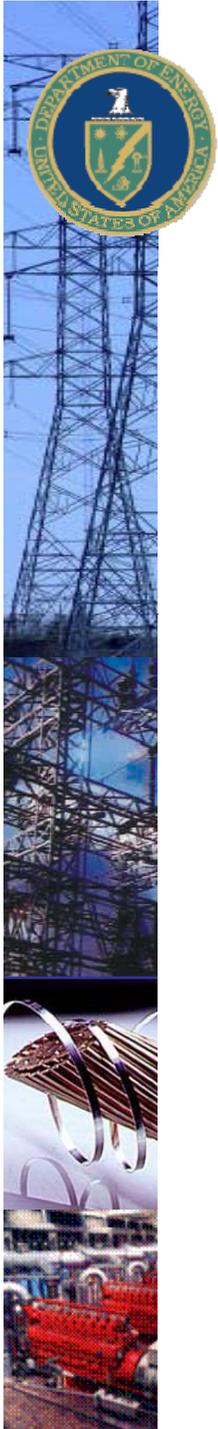


# Smart Grid Activities Supporting Implementation of OE R&D Strategic Plan

## Four Strategic Opportunity Areas identified in the Plan

- ✓ Smart Grid
  - Defining smart grid as a unifying theme to connect generation, consumption, and anything in between
  - Smart grid guidebook and demonstrations
- ✓ Climate Change
  - Metrics for energy efficiency gains and energy use reduction from smart grid implementation
  - Awards from FY07 solicitation on RDSI
- ✓ Modeling & Analysis
- ✓ R&D Partnerships





# OE R&D Programs Support Achieving Smart Grid Characteristics

- **Operational (system, energy) efficiency**
  - Wire development, cables, other advanced grid components
  - Distribution/substation automation
- **Self-healing and resilience from attacks**
  - Real-time monitoring, advanced algorithm development
  - Situational awareness tool
  - Advance control systems (security / interoperability)
- **Improved power quality and faster grid operations**
  - Storage technologies
  - High-voltage power electronics (switches)
  - HTS fault current limiters
- **Asset optimization, generation diversity, consumer empowerment, enabling services**
  - Integration of renewable and distributed systems
  - CBM, plug-in hybrids, microgrids, demand response