



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

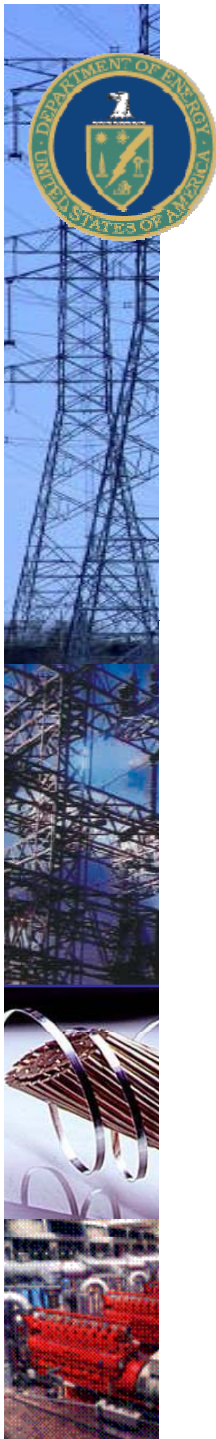
April 29, 2008

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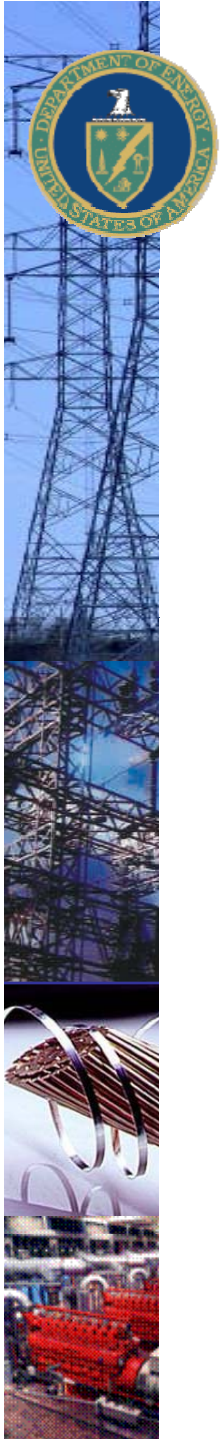
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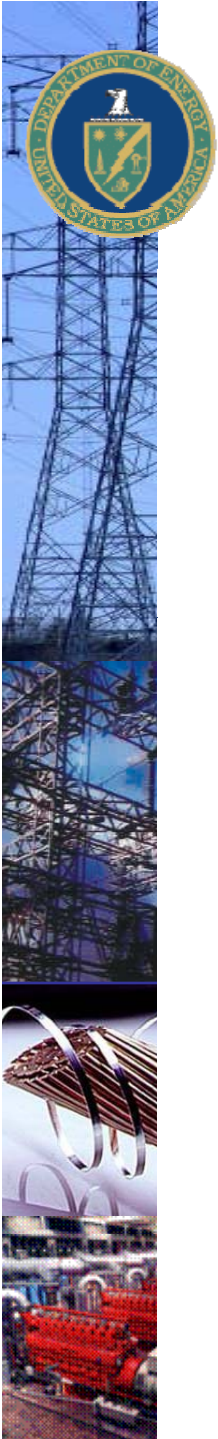
Presentation Outline

- **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

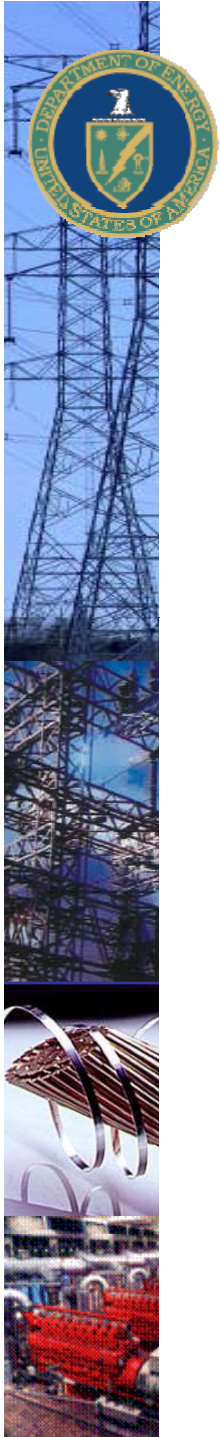
- **Establish a Smart Grid Advisory Committee (Members appointed)**
- **Establish a Smart Grid Task Force (Completed)**
- **Submit to Congress a report concerning the status of Smart Grid system deployments (Due 12/19/2008)**
- **Submit to Congress a study assessing laws and regulations affecting siting 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 1st Q-FY09 following development of RD&D plan)**
- **Establish a Smart Grid regional demonstration initiative showcasing advanced technologies (Planned 1st 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

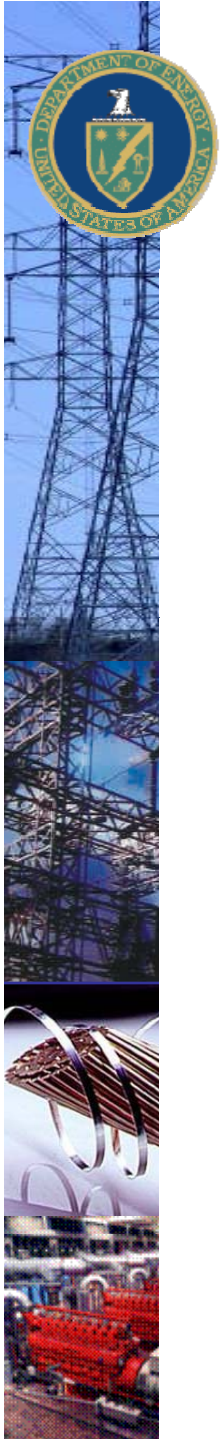
Functions

- 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



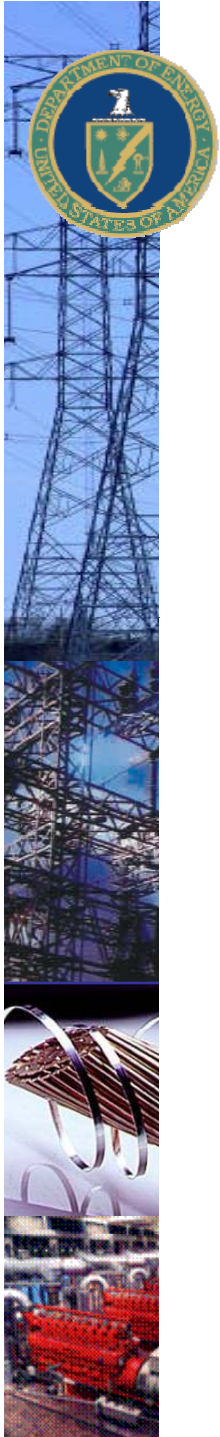
Task Force Composition

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



Defining Smart Grid

Activity	Outcome
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



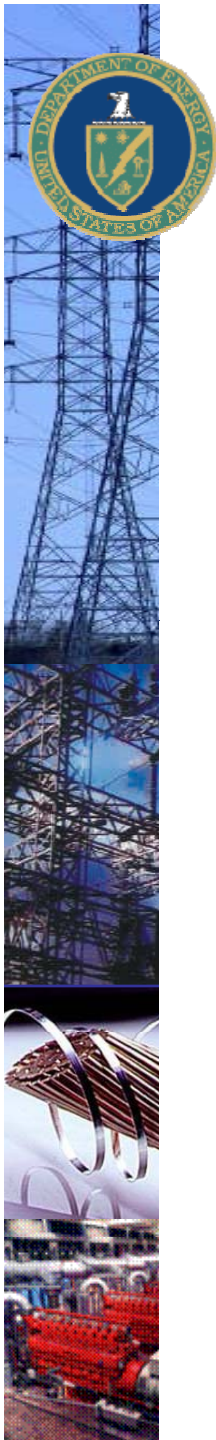
Defining Smart Grid

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:

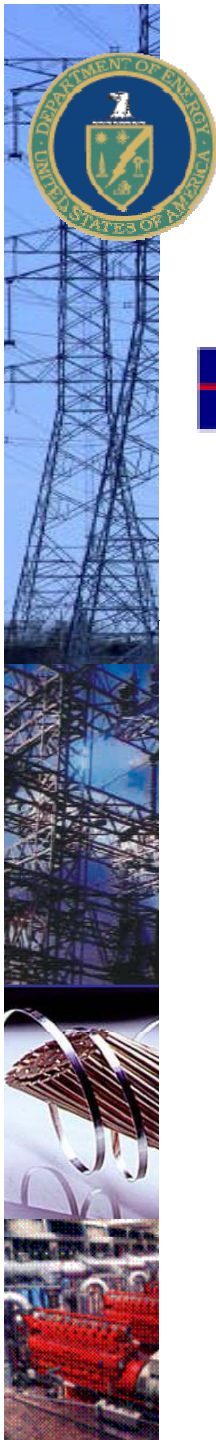
- Smart Grid characteristics and values
- Metrics for measuring progress toward a smart grid
- Measurement and verification



Input to:

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

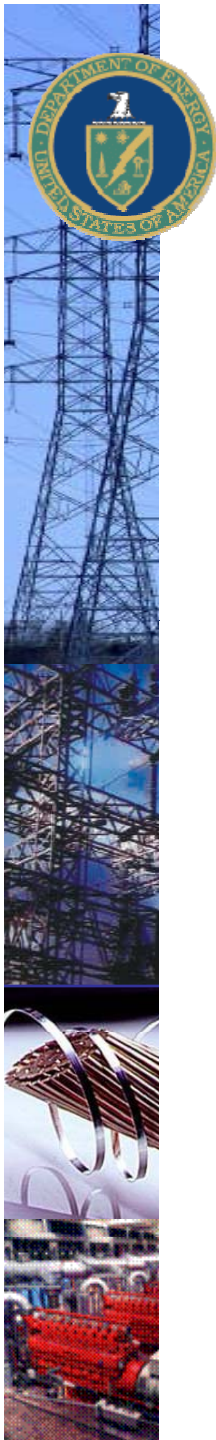
A Planning Committee comprising a broad representation of smart grid stakeholders is being charged to organize the Workshop.



Smart Grid Implementation Planning Committee Organizations



National Laboratories



Reports to Congress:

Section 1302 Smart Grid System Report

Requirements

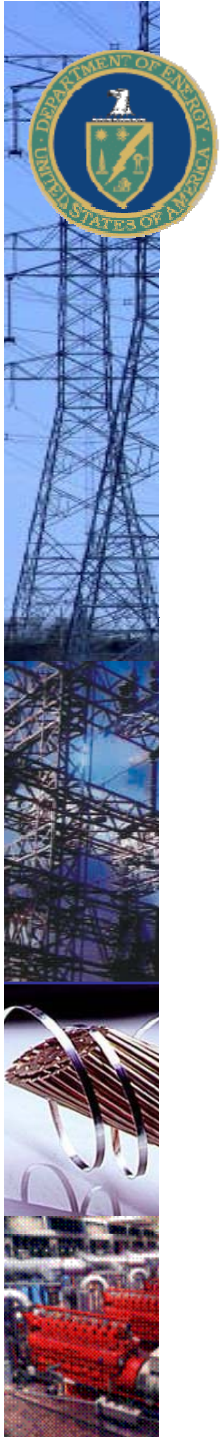
- Current status and prospects of smart grid deployment
- ID of any regulatory or government barriers
- Recommendations for State/Federal policies or actions (optional)
- Analysis taking a regional perspective

Approach

- Building on Implementation Workshop findings (data, methodologies, and metrics) to guide smart grid status and projection analyses
- Combining with the APQC maturity model assessment to conduct on-line surveys and/or interviews to map “now to the future”
- Working with FERC-NARUC Smart Grid Collaborative to ID regulatory policies and on suggested recommendations

Status

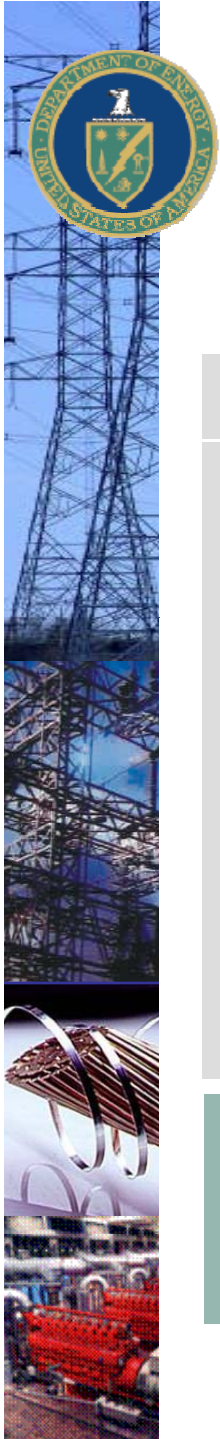
- SOW developed and reviewed by Task Force
- Key milestones identified for on-schedule completion for DOE submittal by 12/19/08
- Lead Contractor: PNNL (incl. subcontract to APQC)



Reports to Congress:

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

Requirements	Approach
<ul style="list-style-type: none">- Evaluate purposes and effect of the laws- Determine impact of changing laws and regulations- Assess extent of duplication or redundancy due to privately owned wires	<ul style="list-style-type: none">- ID 4-8 key states for study through consultation with NARUC for national representation- Convene a Steering Committee with monthly meetings and calls- Develop interview questions and guides- Conduct 6-10 interviews in each category:<ul style="list-style-type: none">- With vendors/developers- With regulators and utilities- ID alternatives to CHP ownership of wires
Status <ul style="list-style-type: none">- SOW developed with key Tasks defined- On-schedule completion for DOE submittal by 12/19/08- Lead Contractor: Navigant Consulting	



Reports to Congress:

Section 1309 Security Attributes of Smart Grid Systems

Requirements

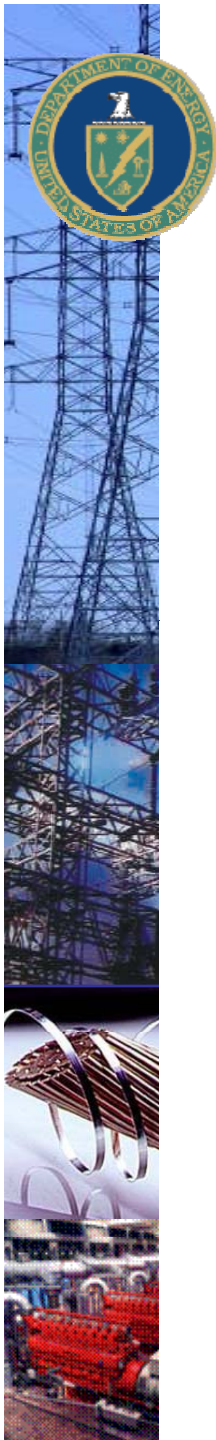
- Assess and determine impact of smart grid deployments on infrastructure security and operations
- Recommend on how smart grid can help in:
 - Reduced vulnerability
 - Restoration
 - Coordinated emergency responses
- Recommend on risk mitigation

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

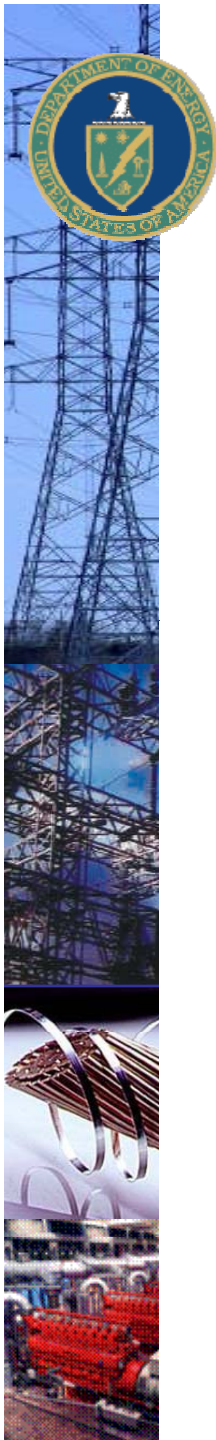
- **Input from**
 - FERC, OE, Smart Grid Task Force, other Federal & State agencies
 - GWAC, IEEE, NERC, NEMA
- **Scope of framework**
 - Flexible to accommodate legacy systems
 - Technology neutral
 - Voluntary uniform standards for appliances and equipment for homes and businesses

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

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

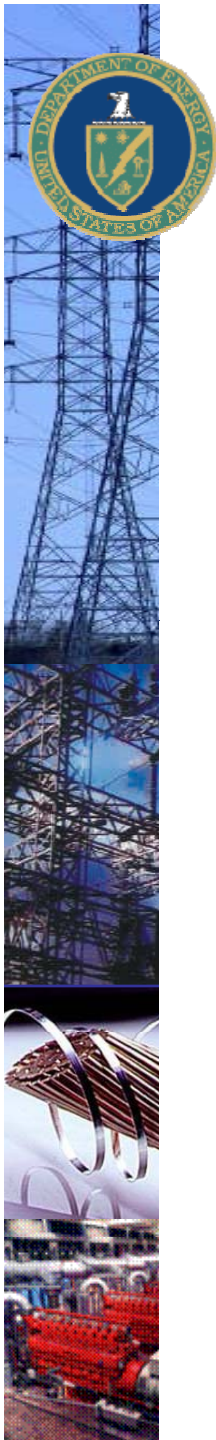
- An illustrative document on:
 - What is the Smart Grid
 - What is the value
 - Why is it necessary
 - Who are the “key” players
- Target for distribution during GridWeek 2008
- Lead Contractor: Litos Advertising & Design

Smart Grid Newsletter

www.smartgridnews.com

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

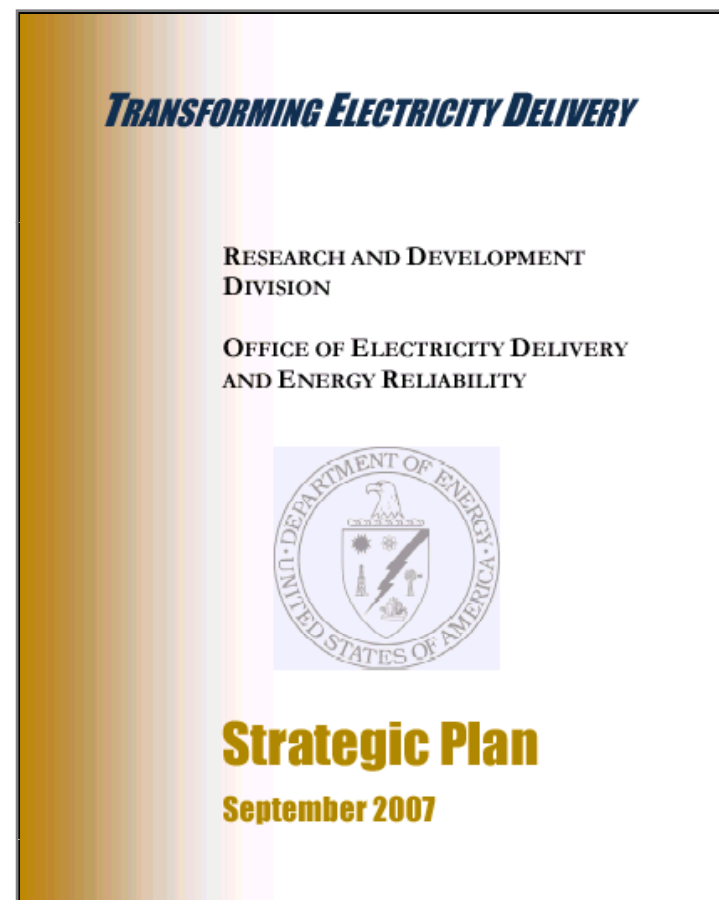


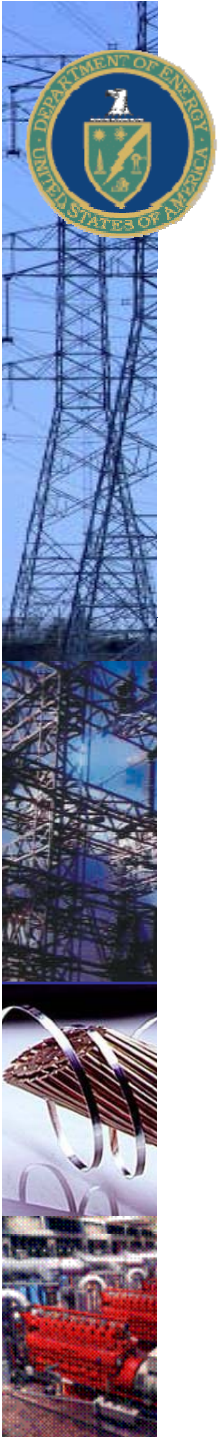


Smart Grid Activities Supporting Implementation of OE R&D Strategic Plan

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