

March 6, 2012



**Office of Electricity
Delivery & Energy
Reliability**



ARRA Smart Grid Analysis and Outreach Efforts

Joe Paladino

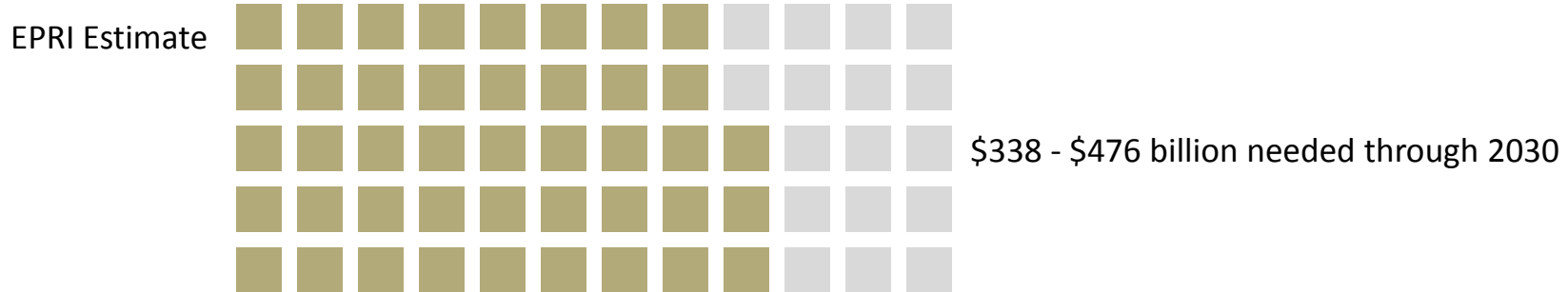
Briefing to Electricity Advisory Committee



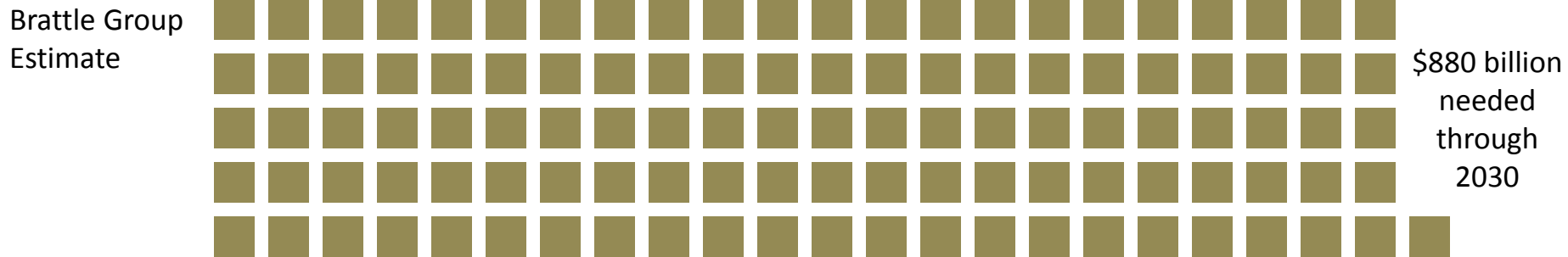
Scope and Challenges

“Speed of Value”
Lessons-Learned
Best Practices

SGIG Spending  \$7.9 billion with cost share to be spent through 2015



EPRI. Estimating the costs and benefits of the smart grid: A preliminary estimate of the investment requirements and the resultant benefits of a fully functioning smart grid. EPRI, Palo Alto, CA; 2011.








Chupka, M.W. Earle, R., Fox-Penner, P., Hledik, R. Transforming America’s power industry: The investment challenge 2010 – 2030. Edison Electric Institute, Washington D.C.; 2008.



Technology Deployment

SGIG/SGDP Areas of Smart Grid Technology Deployment

Customer Systems	Advance Metering Infrastructure	Electric Distribution Systems	Electric Transmission Systems	Equipment Manufacturing
				
<ul style="list-style-type: none"> • Displays • Portals • Energy management • Direct load controls 	<ul style="list-style-type: none"> • Smart meters • Data management • Back office integration 	<ul style="list-style-type: none"> • Switches • Feeder optimization • Equipment monitoring • Energy Storage 	<ul style="list-style-type: none"> • Wide area monitoring and visualization • Synchrophasor Technology • Energy Storage 	<ul style="list-style-type: none"> • Energy devices • Software • Appliances



Benefits from Smart Grid Technology

Applications

Load reductions from AMI and customer systems

- Time-based rates
- Information from web portals, IHDs, PCTs
- Automated load control (also w/o AMI)

Operational efficiency from AMI

- Remote service connection
- Automated meter reading
- Outage detection and restoration

Remote or automated voltage optimization for distribution circuits

- Reactive power compensation
- Peak demand reduction
- Conservation voltage reduction

Automated feeder switching for outage restoration within distribution circuits

Equipment health monitoring

Synchrophasor technology for transmission system operations

- Real-time and off-line analysis

Benefits

• Capital expenditure deferrals or reductions; improved asset utilization

• Energy use reductions

• Reliability improvements

• O&M cost savings

- Lower costs to consumers and society
- Lower emissions

PLUS

- Enhanced system flexibility to accommodate variable and distributed generation, energy storage, electric vehicles, and demand response



Products

Analysis Approach:

- DOE/EPRI Report on Methodology for Cost-Benefit Analysis
- Guidebooks
- DOE Computational Tool
- Grid-Lab-D
- Documentation of analysis methods → business case analysis

Reporting SGIG/SGDP Results:

- SGIG Progress Report
- SGIG Build/Impact Metric Reports (twice annually), plus
 - Technology Configurations Report
 - Annual update to NASPI's RAPIR Report
- Consumer Behavior Studies:
 - Interim and Final CBS Reports
 - Cross-Study Reports
- SGDP Technology Performance Reports (interim and final)
 - Energy Storage Meta-Analysis

Joint OE/EIA Efforts:

- Legislative/Regulatory Policies and Case Studies Report
- Updated Forms 861 and 441 (to measure SG deployment progress)



Outreach Strategy

- 1. Get products on smartgrid.gov (use listserve)**
- 2. Engage with industry groups and regulators (EEI, EPRI, NRECA, APPA, NASPI, consumer advocates, NARUC, PUCs)**
 - Analysis approach
 - Sharing results
- 3. Webinars to communicate findings to targeted audiences, e.g.,**
 - Results of consumer behavior studies to SG Working Group (PUCs)
 - Discussion of SG applications/impacts, e.g., Volt/VAR optimization focus
- 4. Peer-to-Peer Exchange, e.g.,**
 - Consumer Behavior Studies →
 - Industry conferences on demand response
 - Annual DOE/NARUC Electricity Forum
 - AMI and Distribution System Automation →
 - Distributech, IEEE conferences, industry group conferences
 - Transmission System (synchrophasors) → NASPI
- 5. Technical Assistance (e.g., to public utility regulators)**



SmartGrid.gov/Recovery Act: Data, Information, Analysis, and Case Studies

What is the Smart Grid?

Recovery Act Smart Grid Programs

Federal Smart Grid Initiatives

Smart Grid Information Clearinghouse



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OVERVIEW OF PROGRAMS

PROJECT INFORMATION

DEPLOYMENT STATUS

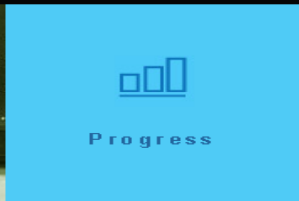
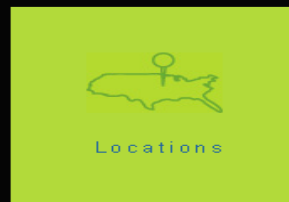
PROGRAM IMPACTS

CONSUMER BEHAVIOR

RECIPIENT REPORTING

DATA. ANALYSIS. IMPACTS.

Recovery Act Smart Grid programs are electric grid modernization initiatives funded through the American Recovery and Reinvestment Act of 2009.



[See all case studies >](#)

FEATURED REPORTS



Household Response to Pricing

Report examines results of survey on customer behavior to feedback pricing for demand response.



FERC National Action Plan for Demand Response

As part of the Energy Independence and Security Act of 2007, the Federal Energy

PROGRAM NEWS



September 20, 2011

Glendale, California Smart Meter Program

August 18, 2011

NYISO Unveils \$74 Million Smart Grid Initiative, Breaks Ground on New Power Control Center



SmartGrid.gov/Recovery Act: Data, Information, Analysis, and Case Studies

What is the Smart Grid? Recovery Act Smart Grid Programs Federal Smart Grid Initiatives Smart Grid Information Clearinghouse

SMARTGRID.GOV RECOVERY ACT SMART GRID PROGRAMS

Overview of Programs, Studies and Activities

The American Recovery and Reinvestment Act of 2009 (ARRA) authorized the U.S. Department of Energy (DOE) to fund smart grid programs. The Recovery Act authorized DOE to fund smart grid programs to modernize the electric power grid and to improve the efficiency of energy delivery and use. The Recovery Act also authorized DOE to fund smart grid programs to improve the reliability and security of the electric power system.

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Project Information

The American Recovery and Reinvestment Act of 2009 authorized funding for smart grid programs across the United States. This section contains information, resources and data for smart grid projects. Click on a location on the map to view a list of projects, or use the search feature to find a project.

Map of the United States showing project locations.

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Deployment Status

The U.S. Department of Energy (DOE) is pleased to report on the progress of smart grid programs funded by the Recovery Act. This section provides information on the status of smart grid programs across the United States. The Recovery Act authorized DOE to fund smart grid programs to modernize the electric power grid and to improve the efficiency of energy delivery and use. The Recovery Act also authorized DOE to fund smart grid programs to improve the reliability and security of the electric power system.

Smart Grid Investment Grant Asset Investments

Total Investments as of February 14, 2011

Category	Investment (\$)
Smart Grid Investment Grant	\$1,000,000,000
Advanced Metering Infrastructure and Customer System Investments	\$1,000,000,000
Transmission System Investments	\$1,000,000,000

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DATA ANALYSIS IMPACTS

Recovery Act Smart Grid programs are electric grid modernization initiatives funded through the American Recovery and Reinvestment Act of 2009.

Programs Case Studies Impacts

FEATURED REPORTS

- Venue and Benefits Reporting Plan: Illustrative Sample for Integrated and/or Crosscutting Smart Grid
- Guidance for ARRA Smart Grid Program Venue and Benefits: CO2 Emissions and Pollutants Emissions
- Guidance document on report CO2
- Discussion of Data for Smart Grid Metrics and Benefits: Storage System Performance Supplement
- Presentation
- Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide

PROGRAM NEWS

- September 20, 2011: Glendale, California Smart Meter Program
- August 18, 2011: NYSO Unveils \$74 Million Smart Grid Initiative, Breaks Ground on New Power Control Center
- August 1, 2011: Vermont Electric Cooperative Wins POWER magazine's first Smart Grid Award
- May 28, 2011: Leeburg Approaches \$1 Million in Savings From Creative Electric Conservation

Overview of Programs, Project Information, Deployment Status, Program Impacts, Consumer Behavior, Recipient Reporting

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Program Impacts

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Smart Grid Demonstration Projects

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Consumer Behavior Studies

The Consumer Behavior Studies are an opportunity to advance the electricity industry's understanding of consumer behavior through the application of advanced, opinion-researched methods.

Study Objectives

Study Schedule

Study Name	Study Objectives	Study Schedule	Study Status	Study Contact
Smart Grid Consumer Behavior Study	Advanced Metering Infrastructure (AMI) and Smart Grid Demonstration (SGD) asset reporting data and identifying Smart Grid Initiative (SGI) project impacts on consumer behavior	October 2011 - Smart Grid Demonstration (SGD)	Open	DOE
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Recipient Reporting

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Smart Grid Data Hub

Instructions

For program participants only. How to use our new and improved data reporting website.

Data Hub

Federated Reporting gov

Wyers

SPRIS