



U.S. Department of Energy
Office of Electricity Delivery & Energy Reliability

Electric Distribution



San Ramon, California
May 25-26, 2006

FY06 Annual Program and Peer Review Meeting

Electric Distribution R&D Program Overview

Eric Lightner, Program Manager

U.S. Department of Energy

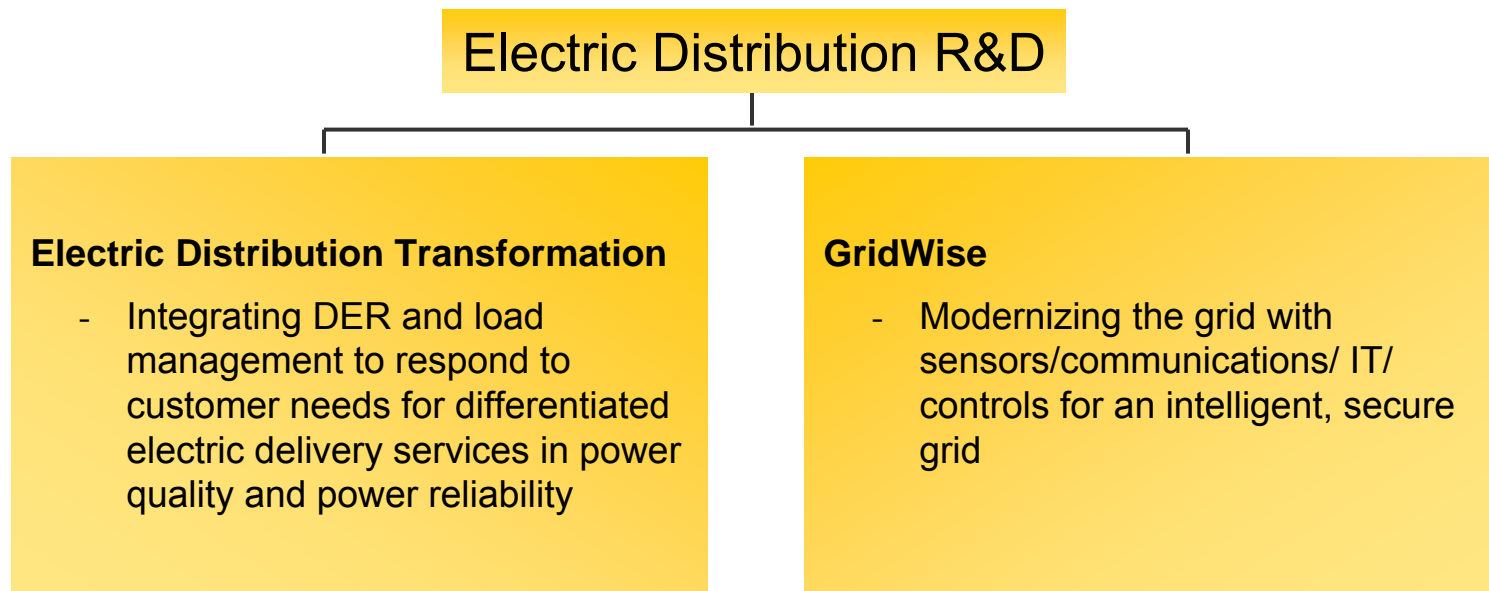
May 25, 2006

Overview

- Mission
- Strategic Direction
- Program Funding
- Program Highlights
 - New project awards
 - Industry award
 - Industry advocacy
 - Public/private partnerships
 - Collaborative R&D
- FY07 Program Planning
- This Annual Program Review
- Program Benefits
- Contact Info

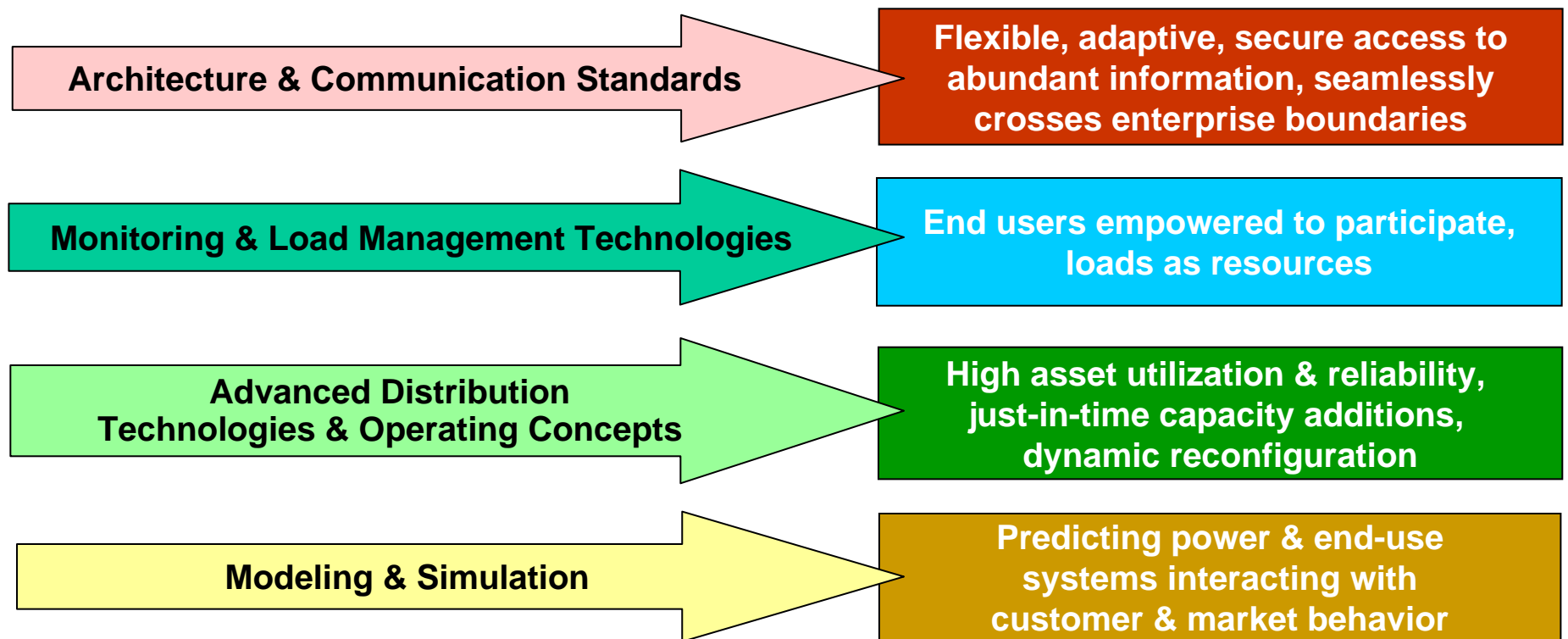
Mission

Modernize distribution grid infrastructure and operations, from distribution substations (69 kV and down) to consumers, with 2-way flow of electricity and information

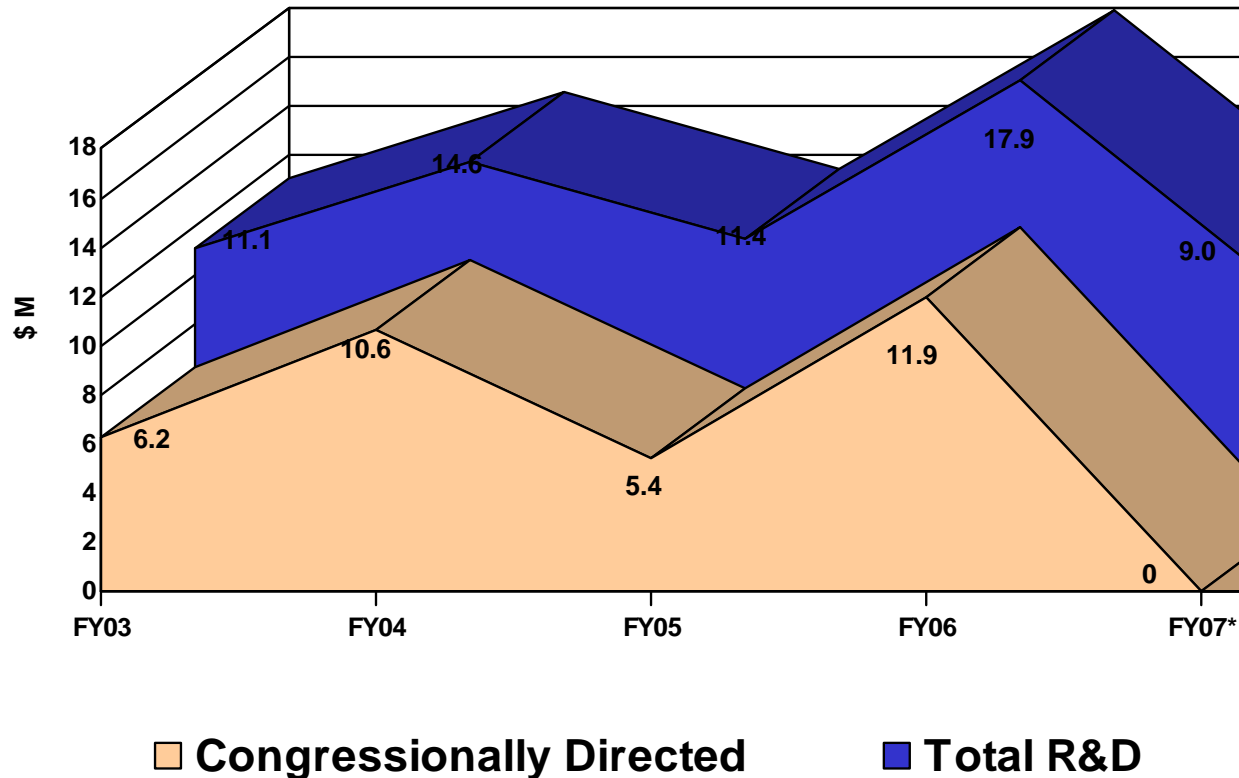


Electric Distribution Strategic Direction

R&D Areas Guided by the Electric Distribution Multi-Year RD³
Technology Roadmap Plan



Electric Distribution R&D Funding Profiles

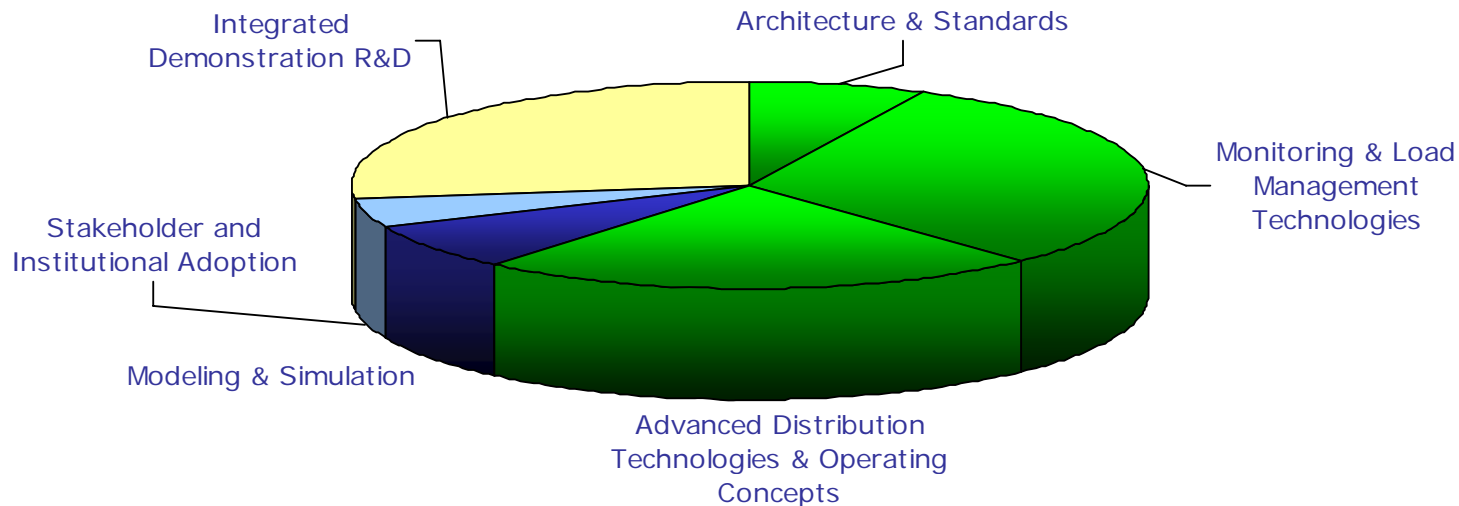


***\$9.0M Electric Distribution R&D FY07 budget request included in "Visualization and Controls" budget item.**

FY06 Funding Allocations, by Program Area

Total Budget in FY06: \$17.9M, including:

- \$6.0M discretionary funds
- \$11.9M Congressionally directed activities



New Project Awards in FY06

- **7 projects awarded from the FY05 Electric Distribution/GridWorks solicitation**
 - Advanced Distribution Operations/Automation
 - ❖ Advanced Integration of DER into the Utility Distribution System, DTE Energy
 - ❖ Development of an Integrated Distribution Management System (IDMS), Southern Company Services, Inc.
 - ❖ 3G System of the Future: Advanced Distribution Operation with DER Integration, Infotility
 - Fault Locating, Prediction, and Protection
 - ❖ Advanced Protection Methods Implemented on SCE's Circuit of the Future, Southern California Edison
 - ❖ Development and Demonstration of Advanced Monitoring Systems for Fault Location, Analysis, and Prediction, EPRI Solutions
 - Microgrid
 - ❖ Microgrid Design, Development and Demonstration, GE Global Research
 - ❖ Value and Technology Assessments to Enhance the Business Case for the CERTS Microgrid, University of Wisconsin, Madison

New Project Awards in FY06

- 4 SBIR Phase-I Projects awarded in April 2006
 - Standard Data Exchanges for Distribution, EnerNex Corporation
 - ❖ Open-source data translation software modules to allow different utility software systems to work together
 - Standard Data Exchanges for Distribution, Williams-Pyro, Inc.
 - ❖ A web-based system to allow T&D centers to translate electrical data from one proprietary software format into another
 - Distribution System State Estimation, EnerNex Corporation
 - ❖ A new software product for analyzing large data sets for load modeling and forecasting
 - State Estimation for Modern Electric Distribution Systems, Techno-Sciences, Inc.
 - ❖ Computational tools for reliable, real-time utility management

Additional info at <http://www.science.doe.gov/sbir/newweb/awards.htm>

Industry Award Received in FY06

Exelon's DC-IN-A-BOX™ - A GridApp™ Core Project

A self-contained, fully compartmental, electrically isolated 10 MVA substation, featuring:

- Smaller footprint
- No barbed-wire fences
- Underground cables in/out
- No exposed energized parts
- About 2/3 the initial cost of a traditional DC

Scalable



Design

- Easier siting
- Higher safety/security
- Less maintenance
- \$20-40M annual savings projected

Traditional



New

*2005 Utility Automation & Engineering T&D Project of the Year Award;
5 additional utilities interested in implementation*

Program Receiving Industry Advocacy

GridWise Architectural Council – a broad-based, neutral industry council

Develop and promote GridWise principles of interaction and interoperability standards

Ron Ambrosio

Manager, IBM T.J. Watson Research Center

Jay Britton

Principal Architect, AREVA-T&D Corporation

David Cohen

Acting CEO and CTO, Infotility

Rik Drummond, Council Chair

CEO & Chief Scientist, Drummond Group Inc.

Albert Esser*

CTO, VP Technology, Emerson Network Power

Erich Gunther

CTO, EnerNex Corporation

Stephanie Hamilton

DER Manager, Southern California Edison (SCE)

Larsh Johnson

President, CTO, eMeter Corporation

Jack McGowan

President, Energy Control Inc.

Lynne Kiesling

Director, CAER, Northwestern University

Wade Troxell*

Associate Professor, Colorado State University

Eric Wong*

Manager, Bus Dev & Govt' Relations, Cummins Inc.

Don Watkins

Manager, Operating & Scheduling Practices, BPA

**Transitioning into emeritus status after serving a 2-year term; new members being nominated*

Program Building Industry Partnerships

Continued to sponsor, support, or coordinate with public/private partnerships



GridWise™ Alliance

- Provides a forum where companies in the energy sector can work cooperatively on a common set of issues
- Provides technology solutions to support the DOE vision of a transformed electric system

<http://www.gridwise.org/>



Advanced Grid Applications Consortium

- A utility consortium dedicated to transition best technologies/practices into broad use
- Fast track development of high-impact technologies through β -testing phase

<http://www.gridapp.org/>



NEETRAC Cable Diagnostic Focused Initiative

- 21 members (utilities, manufacturers, and diagnostic service providers) join DOE for diagnostic solutions for underground cables

<http://www.neetrac.gatech.edu/>

Collaborative R&D Planning and Coordination

Leverage all available R&D resources to achieve common objectives



California Energy Commission's
Public Interest Research Program
collaborating with Electric
Distribution Program in:

- Joint portfolio assessments
- Microgrid roadmapping and development
- Interconnection system integration testing
- Mutual participation in respective program reviews

<http://www.energy.ca.gov/pier/>



Leading Collaborative R&D to
Architect the Future Power Grid

- An EPRI consortium
- Collaboration and coordination in areas of
 - Architecture
 - Communication standards
 - Project Advisory Group
 - Review panel participation

<http://www.epri.com/IntelliGrid/>

FY07 Program Planning

Program being reorganized to be responsive to EPACT 2005 Sections 921-925

- Advanced energy delivery technologies
- Advanced grid reliability and efficiency technologies
- Technologies contributing to significant load reductions
- Advanced metering, load management, and control technologies
- Technologies to enhance existing grid components
- Integration of distributed power systems including combined heat and power
- Advanced grid design, operations, and planning tools
- Technology transfer and education

FY07 Program Planning

Ready for implementation of the Five-Year Program Plan for 2008 to 2012

- Plan being developed and ready to be submitted to the Congress in August 2006; inputs from stakeholders received before, during, and after the February 2006 stakeholder workshop in Tallahassee
- Distributed Systems Integration, with defined Focus Areas:
 - Integrated demonstration R&D
 - Advanced operating concepts
 - Load monitoring and load management
 - Modeling and analysis
 - Technology transfer and education

Annual Peer and Program Reviews

FY06 Review Meeting

- 1.5 day and 19 projects being reviewed
- 5 peer reviewers
 - Dan Pearson, PG&E
 - Mark Rawson, CEC PIER
 - Prof. Peter Sauer, Univ. of Illinois at Urbana-Champaign
 - Alison Silverstein, Regulatory/Policy Consultant
 - Don Von Dollen, EPRI IntelliGrid
- Review feedback sent to individual PIs by June 30
 - Continuation of planned scope
 - Modification of planned scope
 - Corrective actions
 - Termination
- Performance-based review to improve DOE program management performance

Program Benefits

- **Primary Benefits to Customers**

- Reduced price spikes, via peak load reduction flattening price vs. load curve
- Empowerment in demand management

- **Primary Benefits to Utilities**

- Deferral or avoidance of new infrastructure investments in generation, transmission, and distribution
- Reduced transmission and distribution losses

- **Overarching Benefits to Support OE's Mission**

- Improved (differentiated services for) power quality and reliability
- Improved grid resilience and responsiveness to outages

Contact Information

Eric M. Lightner

Program Manager, Electric Distribution/GridWise
Office of Electricity Delivery and Energy Reliability

Department of Energy

(202) 586-8130

eric.lightner@hq.doe.gov

For more Office/Program information please see,

OE

<http://www.electricity.doe.gov>

Electric Distribution R&D

<http://www.electricdistribution.ctc.com>

Distributed Energy

<http://www.eere.energy.gov/de/>