



Office of Electricity Delivery
and Energy Reliability

ADVANCED DISTRIBUTION MANAGEMENT SYSTEMS

OFFICE OF ELECTRICITY DELIVERY & ENERGY RELIABILITY SMART GRID R&D

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The Office of Electricity Delivery and Energy Reliability (OE) drives electric grid modernization and resiliency in the energy infrastructure. OE leads the Department of Energy's efforts to ensure a resilient, reliable, and flexible electricity system. OE accomplishes this mission through research, partnerships, facilitation, modeling and analytics, and emergency preparedness.

OE's mission aligns with the Department's strategic goals:

Advance foundational science, innovate energy technologies, and inform data-driven policies that enhance U.S. economic growth and job creation, energy security, and environmental quality, with emphasis on implementation of the President's Climate Action Plan to mitigate the risks of and enhance resilience against climate change.

CONVENER: *OE brings together technical and policy expertise, along with a national, system-wide perspective, to facilitate a coordinated strategy to meet emerging energy challenges, and to support a secure and resilient energy system.*

State and Regional Technical Assistance North American SynchroPhasor Initiative (NASPI)
Emergency Response (ESF-12) Technical Workshops / Case Studies State and Local Energy Assurance
Future of the Grid Initiative Federal Smart Grid Task Force Electricity Advisory Committee

RESEARCH SUPPORT: *OE invests in cross-cutting research at national laboratories, universities, and private industry (including small business), and sponsors the transition of results to a broad set of vendors and utilities, moving innovations into useful applications.*

CyberSecurity Operations & Planning Tools Microgrids Smart Grid Demonstrations
Energy Storage Advanced Modeling Smart Grid Investment Grants
Distribution Optimization Outage Management Systems

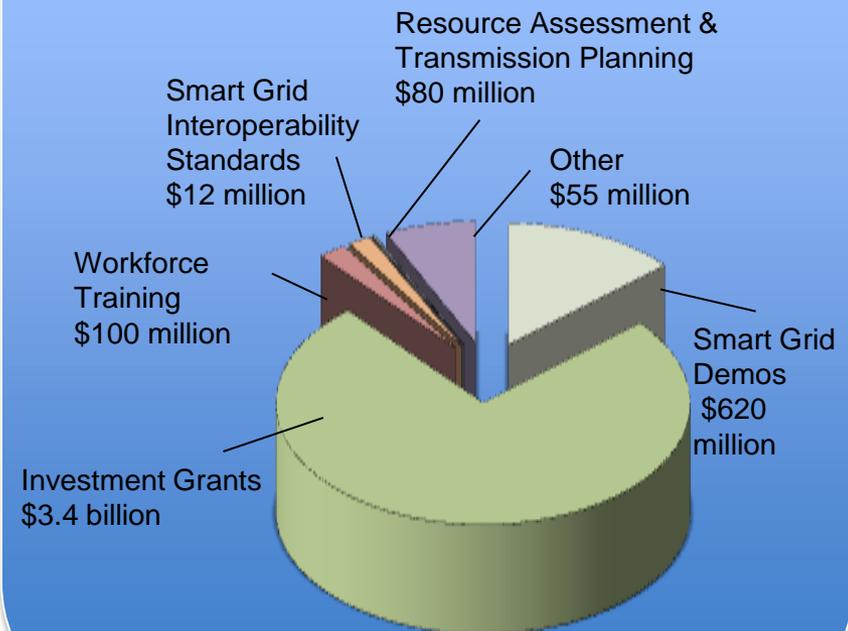
CATALYST: *OE encourages new ideas and business models through competition in prizes and challenges, open source software and data downloads, and voluntary participation in standards development activities.*

Green Button Initiative Smart Grid Interoperability Panel/ NIST
"Apps for Energy" Challenge GridWise Architecture Council
Open Source Software & Toolkits

Leverage deployment of Recovery Act smart grid investments to catalyze and accelerate grid modernization across the U.S.

1. **Deploy smart grid technologies and systems**
2. **Evaluate the performance** to catalyze greater adoption.
3. **Actively engage key stakeholders** to foster peer-to-peer learning
4. **Advance the state-of-the-art in cybersecurity** to ensure smart grid systems are properly protected.
5. **Advance smart grid interoperability and standards.**
6. **Launch new R&D efforts** based on lessons learned and identified remaining challenges

One-time Appropriation \$4.5B of Recovery Act Funds



- **Green Button**
 - Provides electricity customers a method of securely downloading easy-to-understand energy usage information from their utility or electricity supplier
- **Apps for Energy**
 - Encourages the development of applications that help customers make the most of their Green Button Data
- **Regional Peer-to-Peer Workshops**
 - Convened stakeholders to provide a forum to foster productive communication among utilities
- **Voices of Experience**
 - Captured specifics on current deployments in an easy to read format to expand current knowledge base.
- **DataGuard a Voluntary Code of Conduct (VCC) for Smart Grid Data Privacy**
 - Established high level concepts and principles for data privacy that will foster consumer trust and provide a resource for decision makers evaluating privacy practices and policies
- **Power Over Energy Campaign**
 - Launched a multimedia campaign to help inform consumers about how electricity works, their electricity use, and steps they can take to manage and conserve energy:
www.poweroverenergy.org



Objective

Compile industry insights and lessons learned in the utility's own words

Topics

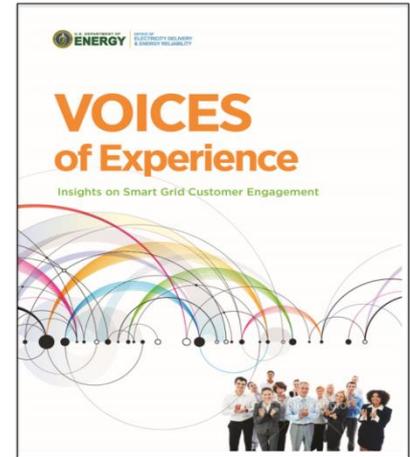
- Smart Grid Customer Engagement
- Advanced Distribution Management Systems

Approach and Expected Outcomes

- Directed by leadership team of industry experts
- Work group members participated in topic focused discussion groups
- Developed a *“Voices of Experience”* report
- Not a roadmap

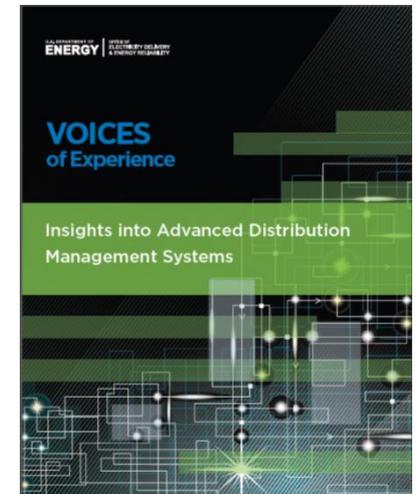
Benefits

- Leverage experience from leading utilities to facilitate grid modernization across the U.S.
- Provide an understanding of current technology, it's benefits, limitations, and future needs
- Capture specifics on current deployments



Download at:

www.smartgrid.gov/voices



Download at:

www.smartgrid.gov/ADMS

More than 40 people representing over 30 utilities/organizations participated.

- San Diego Gas & Electric
- CenterPoint Energy
- Austin Energy
- Duke Energy
- Kansas City Power & Light
- Electric Power Research Institute
- First Energy
- GridWise Alliance
- American Public Power Association
- National Rural Electric Cooperative Association
- Pacific Gas & Electric
- Sacramento Municipal Utility District
- Snohomish County Public Utility District

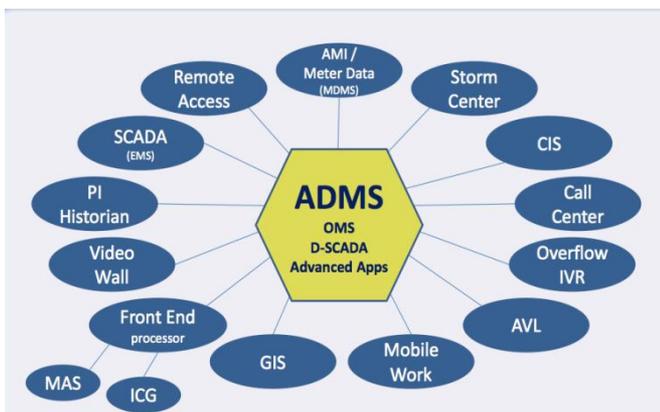
“An advanced distribution management system (ADMS) is the software platform that supports the full suite of distribution management and optimization. It includes functions that automate outage restoration and optimize the performance of the distribution grid.” —*Gartner IT Glossary*

Drivers of ADMS Investments

- Resilience
- Renewables
- Replacement
- Regulation

6 things you Should Know

- Strategic decision championed at the highest level
- Fundamentally changes how a utility operates
- Requires a dedicated, cross-functional team
- Business case requires new thinking: Include soft savings, such as cost avoidance and increased customer satisfaction
- Vendors are a strategic partner
- Integration is difficult



Source: Austin Energy

Today's DMS

- Stand alone modules for various functions.
- Interface capabilities between modules may require costly and lengthy custom solutions.

Future Advanced DMS

- Open source architecture to enable the needed step change in capability to integrate and manage all assets and functions across the utility enterprise regardless of vendor or technology.

Research is Needed

- **ADMS test bed:** Provide a platform to model and test ADMS products with a utility infrastructure. Utilize test bed along with numerous test cases under various operating environments in a real-time setting.
- **Open source platform:** Provide a vendor agnostic interconnection layer so that various DMS systems, their peripheral systems, and other applications can be more effectively interconnected.
- **Next generation applications:** Develop new control strategies and protection schemes to improve the ability to address intermittency, manage bidirectional power flows, improve restoration capability, accommodate market mechanisms, etc.

