



Overview & Industry Coordination of EPRI IntelliGrid & Security Research & Smart Grid Demonstrations



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June 7, 2012



IntelliGrid Program

Information & Communication Technologies (ICT) to Enable....

The IntelliGrid Program conducts research, development and demonstrations on the **Information and Communication Technologies (ICT)** that **Enable Smart Grids**

Emphasis on Applying Standards to Accelerate Adoption & Benefits

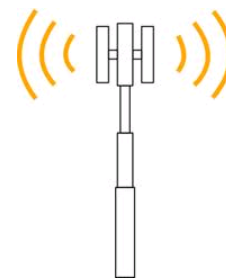
IntelliGrid • Transmission • Distribution • End-Use (AMI/DR)

IntelliGrid^(161c) - ICT for Distribution

Field Area Network Communication Demonstration



- Reliability and performance characteristics the various technology options:



- Private cellular architecture (WiMAX or LTE)
- Public Safety shared spectrum
- Unlicensed (mesh and point-to-point)
- Lightly licensed (e.g. 3.65 GHz)
- “White Spaces”



- Business case, financing, and cost/benefit analysis of network deployment
- Applications: Field Crews, AML, DA, CVR, Substation, Restoration
- EPRI services related to the FAN
 - Planning and estimating network deployment
 - New technology assessment
 - Collaborate: Anticipating 6-12 Utilities

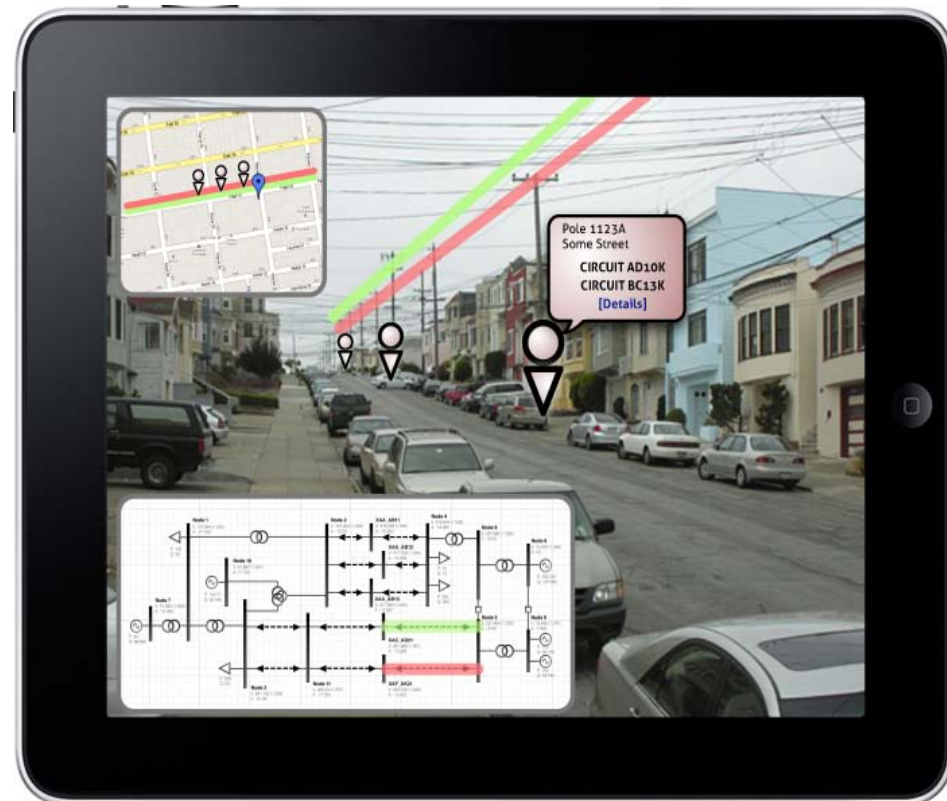


IntelliGrid^(161c) - ICT for Distribution

Field Force Data Visualization (Augmented Reality)



- **Enterprise Information Sharing for Smart Distribution Operations**
 - Tracks and reports on CIM progress
- **Field Force Data Visualization of Operational Data**
 - Provide an inexpensive alternative to mobile workforce applications by leveraging CIM
- **GIS Data Quality Improvement**
 - Tools for completing and correcting GIS data critical for the Smart Grid



IntelliGrid (161D) - ICT for End-Use (AMI & DR)

Leads to New DR Standards ANSI/CEA 2045



- NIST assigned to Consumer Electronics Association (**CEA 2045 Standard**)
- A standard modular communication interface for residential demand response
- One communication module works with all end devices
- One end device works with all communication systems
- Customer installable, no truck rolls
- Flexible, evolvable, providing customer choice



IntelliGrid ^(161D) - ICT for End-Use (AMI & DR)

Automated Demand Response & Ancillary Services Demo

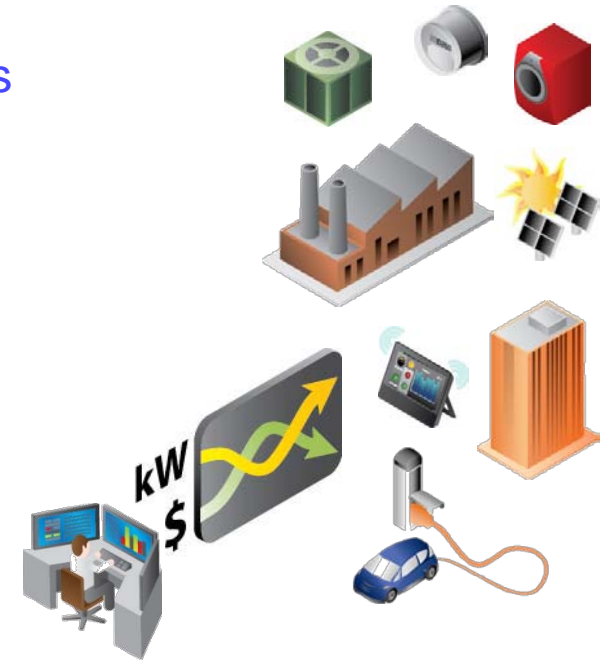


Objectives and Scope

- Advance Standards for Demand Response (DR) and Ancillary Services (Fast DR) thru [Utility Demonstrations](#)
- Address Research Questions
 - Quality of service, Reliability, Security, Privacy, Scalability, etc.

Value

- Increase Adoption of Commercialized Products & Enable Innovation
- Develop Utility Migration Strategy for [OpenADR](#) Implementation
- **Coordination:** LBNL, NIST, OpenADR Alliance, etc.
- **Collaboration:** Anticipating 10-20 Utilities



Advance Standards for Automated DR & Ancillary Services

EPRI Cyber Security Program NESCO/NESCOR Partnership



Industry

Asset Owners

Government

NERC

Trade Orgs

Vendors

- **EnergySec** = National Electric Sector Cybersecurity Organization (NESCO)
- **EPRI** = National Electric Sector Cybersecurity Organization Resource (NESCOR)



National Electric Sector Cybersecurity Organization Resource (NESCOR)



Deliverables for 2011:

- Smart Energy Profile 1.x Summary and Analysis
- AMI Penetration Test Plans
- Failure Analysis Scenarios and Impacts

2012 Activities:

- Mapping of cyber security standards (i.e. NISTIR 7628)
- Cyber security posture (Failure Scenarios, Metrics etc.)
- Detailed penetration test procedures for WAMPAC systems (Wide Area Monitoring Protection & Control)

Value:

- Provide tools for utilities to configure, assess, and test the cyber security of electric systems

EPRI Smart Grid Demonstration Initiative

Leveraging Today's Technology to Advance the Industry

- Deploying the Virtual Power Plant
- Demonstrate Integration and Interoperability
- Leverage information & Communication Technologies
- Integration of Multiple Types of Distributed Energy Resources (DER):



Distributed Generation



Renewable Generation

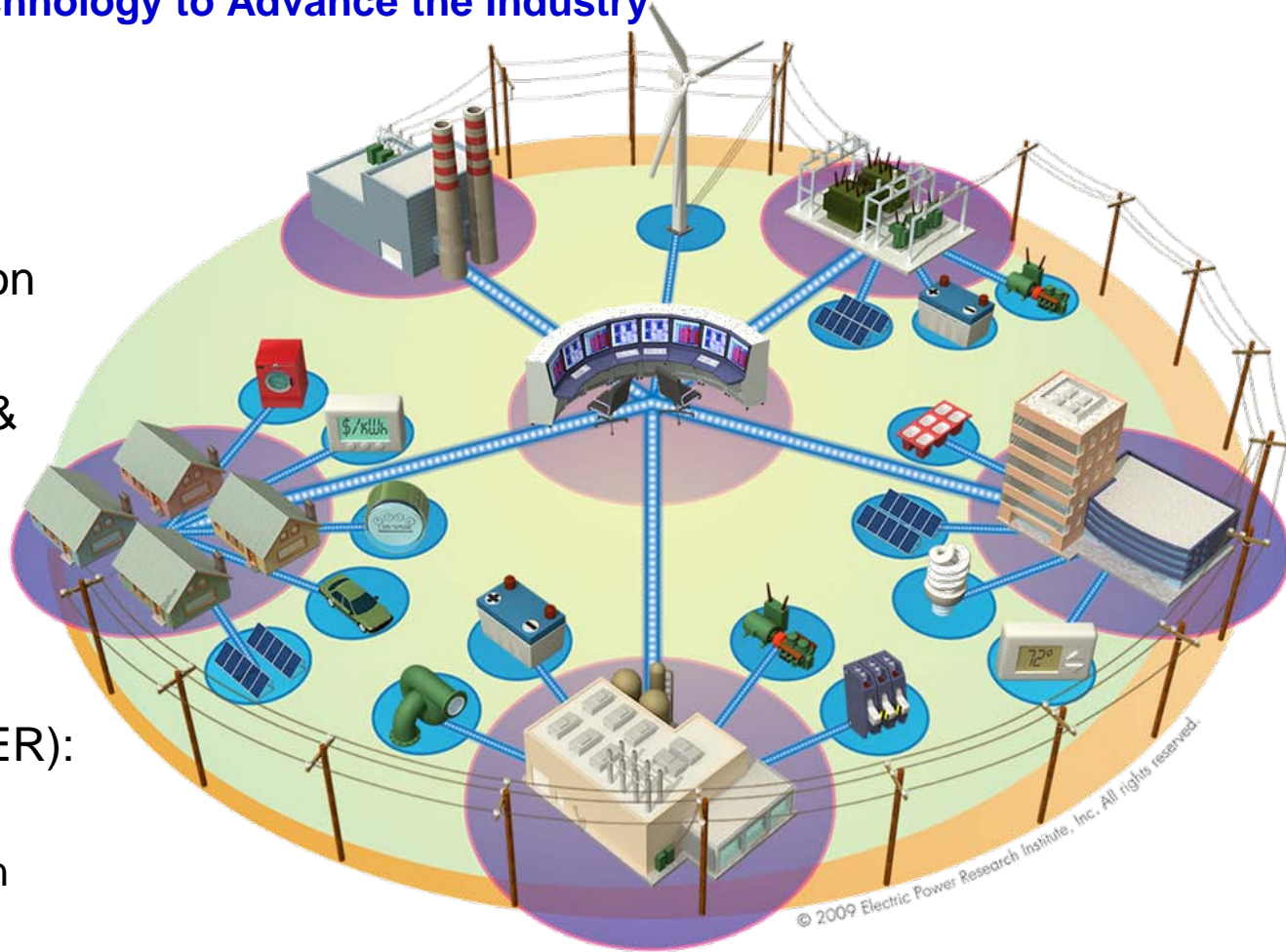


Storage



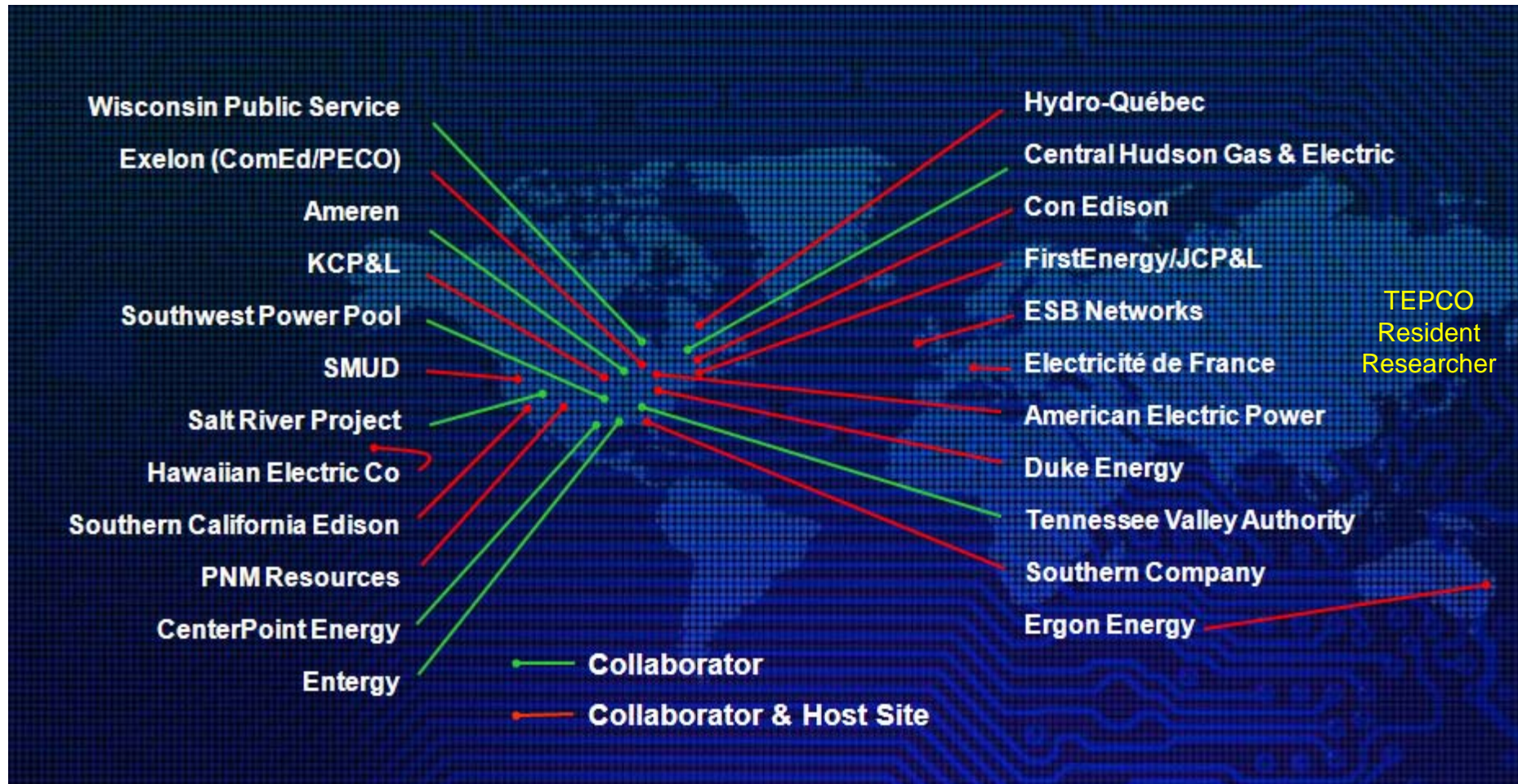
Demand Response

 Multiple Levels of Integration - Interoperability



EPRI Smart Grid Demonstration Projects


23 Utilities, 15 Large Scale Demonstrations



Cost-Benefit Analysis – Goal, Maximize Learning Guiding Documents

- **Maximize *learning* from Smart Grid projects by**
 - Where, how, and why technologies perform as they do
 - Promoting transferability of results
- **For *learning* to be maximized:**
 - Methodologies must be credible
 - Apply Scientific Method
 - Results must be verifiable by others
- **“Methodological Approach” (ID 1020342)**
 - Jointly funded by DOE and EPRI
 - Provides framework for estimating benefits & costs
- **CBA Guidebook Vol. 1, Measuring Impacts (ID 1021423)**
 - Manual for practical application with step by step instruction
 - Guidance for documenting the project & approach to perform a CBA





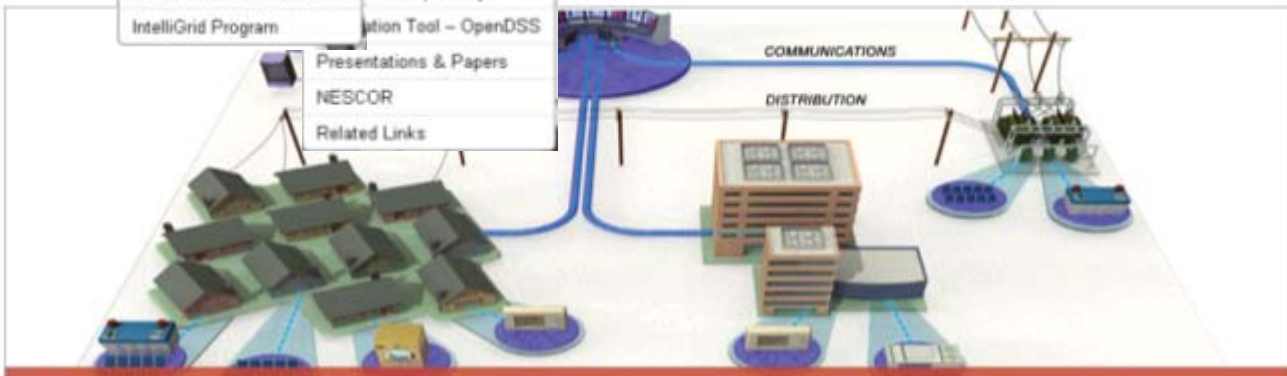
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PNM Smart Grid Demonstration [MORE >>](#)

A Smart Grid is one that incorporates information and communications technology into every aspect of electricity generation, delivery and consumption in order to minimize environmental impact, enhance markets, improve reliability and service, and reduce costs and improve efficiency.


Newsletters


Smart Grid Advisory Update

November 2011  (1.28 MB)

August 2011  (560 KB)

IntelliGrid Advisory Update


September 2011  (336 KB)


June 2011  (183 KB)


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Smart Grid in the News

RecentArchive


[EPRI Developing Electric Industry Applications](#)  - February 02, 2012

[EPRI to develop transmission line insulator inspection robot](#)  - February 02, 2012

[If Power Lines Fall, Why Don't They Go Underground?](#)  - February 01, 2012

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Upcoming Events

[Modular Communication Interface – Interoperability Workshop](#) 

Nov 28 - Nov 30, 2011
Groveport, Ohio

[Open ADR Kick-Off Meeting](#)

Apr 3-4, 2012
Knoxville, Tennessee

[Smart Grid Demonstration Advisory Meeting](#)

Mar 6-8, 2012
Houston, Texas

Together...Shaping the Future of Electricity

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