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The EPRI Smart Grid Demonstration Initiative is a five-year collaborative research effort focused on design, implementation, and assessment of field demonstrations to address prevalent challenges with **integrating distributed energy resources** in grid and market operations to create a “Virtual Power Plant.” The newsletter provides periodic updates on the project as well as updates on relevant industry news and events. If you have comments about the newsletter, please contact Matt Wakefield at 865-218-8087, mwakefield@epri.com.

PROJECT UPDATE

6th EPRI Smart Grid Demonstration Host Site under Final Review

ESB Networks’ (Ireland) Smart Grid project

ESBs Smart Grid project has been reviewed by the EPRI Technical review team and has undergone a peer review by key industry stakeholders. The final step is presentation at the November EPRI Board of Directors meeting. This project adds another aspect of diversity by integrating together four main focus areas: 1) Large Scale Wind Integration, 2) Customer Behavior Trials and Technology, 3) Electric Vehicles, and 4) Green Distribution Circuits. This project will add additional diversity and strengthens the overall collaboration. The ESB Smart Grid Host Site Project Peer Review presentation can be viewed [here](#).

Host Site Proposal Reminder

EPRI Smart Grid Host Site Selection Process

Start Proposal Review Process No Later Than	Host Site Selection Timeline				Present Qualified Proposal at EPRI BOD Meeting
	2009	2010			
	Q4	Q1	Q2	Q3	
August 21, 2009	[Timeline bar with red vertical line at start and green vertical line at end]				November 18, 2009
January 8, 2010	[Timeline bar with red vertical line at start and green vertical line at end]				April 6, 2010
April 15, 2010	[Timeline bar with red vertical line at start and green vertical line at end]				August 3, 2010

EPRI Smart Grid Demonstration members interested in submitting a proposal must submit it no later than **April 15th, 2010** (Yes, this is also “Tax” day). This will allow us to identify all host site projects by August 2010 to ensure we have time to perform research within the projects by the end of 2012.

October Smart Grid Advisory Meeting Proceedings Available on Smart Grid Resource Center

www.smartgrid.epri.com/advisory_meetings.html

Over 20 presentations and updates were given at the October Smart Grid Advisory meeting that was hosted by PNM Resources in Albuquerque, NM. Topics included an overview of each Host-Site including live demonstrations of integrating OpenDSS with Community Energy Storage in AEP’s South Bend, IN circuits and also demonstrating the import of PNM’s use cases into a UML tool to dynamically merge individual use cases to create a master Activity Diagram and complete list of actors and interactions among systems to support development of an RFP based on requirements. Presentations included external DOE smart grid projects as well as a presentation from New Energy and Industrial Technology Development Organization (NEDO) to give an update on Japanese smart grid activities and much more. All the presentations are publicly available on the [website](#).

EPRI “Resident Researcher” Employee Program - Smart Grid Engineer or Analyst

EPRI has two openings for a Smart Grid Engineer or Analyst in our Knoxville TN office.

The five-year Smart Grid Demonstration Project has created a unique opportunity to expose your new or seasoned engineers or analysts to hands-on smart grid projects focused on integration of Distributed Energy Resources. Location of the position is in Knoxville, TN and duration can be from 1 to 3 years. This opportunity will give your employees broad experiences in real-world smart grid industry activities and help strengthen and prepare your workforce for the future. Please contact Matt Wakefield for more information. (mwakefield@epri.com, 865-218-8087).

Task 1: Analytics (works in progress)

The deliverables from Task 1 can be leveraged by the collaborating utility members of the EPRI Smart Grid Demonstration initiative and applied in their individual smart grid projects. They may serve as resources to be used in each smart grid host-site project.

Subtask 1.1 – Development of Regional Profiles & Subtask 1.2 – Integration Framework

Project Manager: Dr. Angela Chuang

The final report on tasks 1.1 & 1.2 is in the final stages of review for delivery at the end of the year. Dr. Chuang provided a detailed update on these tasks at the October EPRI Smart Grid Advisory Meeting and the presentation is viewable [here](#).

Subtask 1.3 – Strategies for Integrating Distributed Energy Resources into System Planning and Operations

Project Manager: Matt Wakefield

The draft report for this task is under review for delivery at the end of the year. An update on this deliverable was presented at the June EPRI Smart Grid Advisory Meeting and is viewable [here](#).

Subtask 1.5 – Develop Framework for Economic Assessment

Project Manager: Dr. Bernie Neenan.

The draft report is under review from a broad range of stakeholders with anticipated delivery in January 2010. An update on this task from the October EPRI Smart Grid Advisory meeting is viewable [here](#).

Task 2: Critical Integration Technologies (works in progress)

The deliverables from Task 2 can be leveraged by the collaborating utility members of the EPRI Smart Grid Demonstration initiative for their individual smart grid projects as well as potential resources to be used in each smart grid host-site project.

Subtask 2.1 – Develop Architecture Reference Guide for Distributed Resource Integration.

Project Manager: Matt Wakefield.

This report is in development with the final report scheduled to be delivered in January 2010. Topics of this report will include:

- The function of Architecture in complex systems
- Case studies where inadequate system architecture impacted performance and reliability
- Use cases with functional and non functional requirements in a variety of scenarios involving DER
- Relevant Commercial off the Shelf (COTS) communication technologies
- Architectural considerations in the face of changing requirements and opportunities
- Key disruptive technologies

Subtask 2.2 –DER Information Exchange Model

Project Manager: Joe Hughes

This task is just getting under way and will be coordinated with NIST Standards related activities. Anticipated delivery date is mid-2010.

Subtask 2.4 – Develop Aggregation Methods and Tools

Project Manager: Dr. Angela Chuang

A technical updated on tasks 2.4 findings is being developed for delivery at the end of the year. Dr. Chuang provided an update on this task at the October EPRI Smart Grid Advisory Meeting and the presentation is viewable [here](#).

Subtask 2.5 – Develop DER Controller Requirements

Project Manager: Gale Horst

DR Controller design concepts from several vendors are starting to move toward a controller design that manages DR for the utility by centrally aggregating responses thus relieving utility systems from the responsibility of micro-managing end use loads. A white-paper concept is under final review and anticipated to be delivered by the end of the year.

Subtask 2.6 – Critical Integration Technologies

Several technologies and field trials are being considered. Below are two projects that we will provide updates on at the smart grid advisory meeting. Several other critical technologies are being considered for evaluation and as plans mature, updates will be provided. Any Smart Grid Collaborator that has a critical integration technology that is being evaluated can utilize EPRI for targeted research. This does not need to be part of a host-site project and enables targeted research that not only benefits the individual utility, but the collaborative as well.

- **TVA/Bristol Water Heater Control:** Using Fiber-To-The-Home (FTTH), ZigBee: Analytical study of daily water heater control for permanent peak shifting. An initial report on the technology review is now available for EPRI members at www.epri.com. Search for Report 1020213, “Bristol Tennessee Essential Services (BTES) / Tennessee Valley Authority (TVA) Smart Water Heater Project – Technology Description and Installation Lessons Learned.” An update of the project was presented at the October Smart Grid Advisory meeting and the presentation is available [here](#).

- **PV Integration:** Specification for local communication interface to small-scale solar systems for utility applications. This effort is focused on developing a communication specification for interfacing grid-tie inverters with utilities to further interoperability. Progress continues to be made and a draft specification is under review at a workshop. The workshop follows the [SPI conference](#) in Anaheim, October 30th. Contact Brian Seal for more information (bseal@epri.com, 865-218-8181).

Task 3: Demonstrate Technologies in Actual Applications (Host-Sites/SG Demonstrations)

EPRI Smart Grid Demonstration Host Site Projects

American Electric Power

The EPRI OpenDSS team has loaded data from the first of 8 South Bend, IN AEP circuits to be simulated with community energy storage (CES) into the OpenDSS (Open Distribution System Simulation) software tool. The first use of this tool is to simulate adding CES on the circuit at various selected locations. The tool will simulate various sizes of CES systems and the impact on the circuit. Various utilization triggers and charging schemes are being simulated for the impact. AEP is seeing the value of this exercise as a way to plan the charging and discharging of the storage system for a variety of purposes. The historical circuit data in the simulation tool will help select and verify optimal locations and utilization of the storage units. Utilization simulations include load peak shifting as well as consideration for a quality and reliability resource. At the recent smart grid advisory meeting in Albuquerque, the team offered the first peek at some example simulation outputs from a South Bend Indiana circuit. The simulations compared, for example, using 25kWh, 50kWh, and 75kWh CES units (25kW) looking at various charging and discharging schemes. The presentations from the October Advisory meeting can be accessed [here](#) and [here](#).

Con Edison

The Con Edison use cases being developed represent the "concept of operations" from the Con Edison 3G System of the Future project. Use cases will include concepts for dispatch of customer load controllers, thermal aging calculations for transformers, intentional islanding on 460V network, and network protector sensing and protecting from back-feeding. A new use case is being considered relative to utilizing Distributed Energy Resources to respond to a distribution issue. These use cases will enfold into a demand response command center and a distribution control center as the Con Edison host site demonstration project proceeds. The Con Edison presentation from the October Advisory meeting can be accessed [here](#).

FirstEnergy

FirstEnergy (JCP&L host site) has selected seven use case scenarios regarding operations business requirements and two use case scenarios covering market business requirements. This set of use cases will detail the smart grid deployments at JCP&L. The operations set covers visualization of the DER resources, emergency grid conditions, system alarms, and utilizing DER in load planning and scheduling. In the market business requirements, DER resources are utilized in RTO/ISO programs and emergency support. These items will be further detailed as the project continues and additional knowledge is gained. The FirstEnergy presentation from the October Advisory meeting can be accessed [here](#).

PNM Resources

The use case development is complete. The team is assembling a list of existing technology at PNM and identifying applications that fulfill the role of "actor" in the use case development. A gap analysis of the applications, devices and interfaces will follow. Also to follow are workshops to identify functional requirements with the goal of issuing RFPs. The PNM presentation from the October Advisory meeting can be accessed [here](#) and [here](#) that demonstrated integrating use cases into a model that represents a powerful tool to evaluate the integration of use cases to more easily support requirements of large, integrated systems. This tool is related to the NIST Knowledge Base development.

Electricité de France (EDF)

The scope of work as an EPRI host site is being finalized to solidify the project plan and responsibilities. EDF's work will revolve around developing models, tools, and standards for DER integration as well as economic analysis that will compare models and tools developed in the United States with those used in Europe. The EDF presentation from the October Advisory meeting can be accessed [here](#).

Task 4: Technology Transfer Activities

Subtask 4.2 – Industry Coordination

Project Manager: Stephanie Hamilton

Two reports are under development to document external smart grid projects including the DOE Renewable and Distributed System Integration (RDSI) projects and a number of International Smart Grid Projects. This activity will align goals of external projects with EPRI's 6 critical elements. Relationship building along with documentation of these activities will support a broader range of collaboration activities to identify opportunities to coordinate similar research and leverage lessons learned with projects that are outside of EPRI's smart grid demonstration membership team. These reports are expected to be released in January, 2010.

Subtask 4.3 – Standards Development

EPRI IntelliGrid Team

This effort is currently utilizing, participating in and monitoring the NIST Roadmap Effort and translating the results into suggested action plans for our utility members. The action plan will also include suggested roles in supporting organizations to the NIST Roadmap including Standards Development Organizations and User Groups.

Smart Grid Strategic Intelligence Report

The Smart Grid Strategic Intelligence Report provides an overview of key smart grid conferences and events attended by EPRI staff, utility members and key stakeholders. As key events are attended, highlights are documented and shared with our smart grid members in this periodic report. If you would like to contribute to this report, please contact Stephanie Hamilton (shamilton@epri.com, 307-460-3226). The first Smart Grid Strategic Intelligence Report is now available on EPRI's website. The Product ID is 1020214.

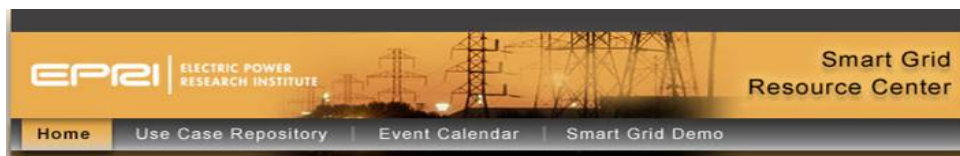
Member Deliverables Available for Download (www.epri.com)

- Product ID 1018945: Smart Grid Distributed Energy Resources (DER) Project Assessment
- Product ID 1018926: EPRI Pre-Workshop Proceedings: Active Distribution System Management for Integration of Distributed
- Product ID 1019584: Summary of potential use cases for Distributed Solar (PV) Integration
- Product ID 1020187: PNM Smart Grid Demonstration Host-Site Project Description
- Product ID 1020188: American Electric Power (AEP) Smart Grid Demonstration Host-Site Project Description
- Product ID 1020189: FirstEnergy Smart Grid Demonstration Host-Site Project Description
- Product ID 1020190: Con Edison Smart Grid Demonstration Host-Site Project Description
- Product ID 1020191: Electricité de France (EDF) Smart Grid Demonstration Host-Site Project Description
- Product ID 1020213: BTES/TVA Smart Water Heater Technology & Lessons Learned
- Product ID 1020214: Strategic Intelligence Update – Smart Grid Conferences and Events
- The Following Project Overviews are publicly available [here](#):
 - Product ID 1020225: Smart Grid Demonstration Overview
 - Product ID 1020226: AEP Smart Grid Demonstration Host-Site Overview
 - Product ID 1020227: Con Edison Smart Grid Demonstration Host-Site Overview
 - Product ID 1020228: Electricité de France (EDF) Smart Grid Demonstration Host-Site Overview
 - Product ID 1020229: FirstEnergy Smart Grid Demonstration Host-Site Overview
 - Product ID 1020230: PNM Smart Grid Demonstration Host-Site Overview

Visit the EPRI Smart Grid Resource Center & Use Case Repository for Public Updates

www.smartgrid.epri.com

The EPRI Smart Grid Resource Center is a public smart grid collaborative resource. The scope of this resource will be expanded over the duration of the project and we plan to coordinate with the DOE Smart Grid Clearinghouse effort to avoid duplication of efforts



KEY EPRI SMART GRID DATES

PV Integration Workshop

See **Subtask 2.6** for more information

When/Where: October 30th, 2009, Anaheim, CA

Contact Brian Seal (bseal@epri.com, 865-218-8181) for more information

This workshop will review the draft communication specification for interfacing grid-tie inverters with utilities. The meeting is occurring today following the [SPI conference](#) in Anaheim, CA.

OpenDSS Workshop

When/Where: November 2nd & 3rd, 2009, Knoxville, TN. On-site (limited attendance) and via webcast (unlimited attendance).

Contact Lisa Wolfenbarger (lwolfenbarger@epri.com, 865-218-8026) for more information

OpenDSS is the Open Source version of the EPRI Distribution System Simulator (DSS) software available on [SourceForge](#). This power system analysis software is used for research and assessment of a wide variety of distribution applications. This workshop is designed to provide concrete example cases that can be used to illustrate a variety of different applications. These case studies will be based on actual distribution system models from the various EPRI programs. They will illustrate the important issues that must be evaluated for each of the types of studies and provide an example of how they are being evaluated using the OpenDSS software. Case studies will include:

- Distribution Loss Studies
- Modeling Distribution Automation and Distribution Controls (Volt/Var Example)
- Integration of Plug-In Hybrid Electric Vehicles
- Evaluation of PV and other renewables integration with the distribution system
- Energy Storage Integration – e.g. AEP's Community Energy Storage (CES)
- Distributed Energy Resource Integration with the Smart Grid
- Using OpenDSS for Harmonic Analysis
- CIM Interface for OpenDSS

Grid-Interop – Smart Grid Demonstration Panel Sessions

When/Where: November 17-19, 2009, Denver, CO

The [Grid-Interop](#) Forum enlists industry involvement in defining actionable steps needed to facilitate the interoperation of the growing number of automation systems that manage the nation's electric system. EPRI will be facilitating [two panel sessions](#) that will provide an overview of both EPRI and DOE Renewable and Distributed System Integration (RDSI) smart grid projects. In addition, Joe Hughes will be chairing the session on Data Communications at Grid-Interop.

EPRI Smart Grid Demonstration Meeting - March 2010

When/Where: March 2-4, 2010, Hosted by American Electric Power in Columbus, OH

This meeting is a joint EPRI IntelliGrid / Smart Grid Demonstration Meeting. Invitations will be coming shortly.

EPRI Smart Grid Demonstration Meeting - June 2010

When/Where: June 9 & 10, 2010 (Tentative), Hosted by Electricité de France, Location in France TBD, but it is intended to be scheduled just following [CIRED 2010](#) in Lyon, France on June 7 & 8.

KEY INDUSTRY DATES

Industry Smart Grid Related Events are Listed on EPRI's Smart Grid Resource Center

www.smartgrid.epri.com/calendar.html

Want to add an Event? Send event name, date, location and web site link to Matt Wakefield (mwakefield@epri.com)

INDUSTRY NEWS

Smart Grid Industry News

Please share your smart grid story and we will post it in this newsletter

President Obama Announces \$3.4 Billion Investment to Spur Transition to Smart Energy Grid

U.S. Department of Energy, October 27, 2009

<http://www.energy.gov/news2009/8216.htm>

Standards News

NIST Smart Grid Interoperability Standards Project

NIST is the main resource for monitoring and tracking Smart Grid Related Standards in North America. Several activities are underway along with a number of reports. The "[NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0](#)" has nearly 80 smart grid standards identified and under review.

<http://www.nist.gov/smartgrid/>

Technology Trends

First White Spaces Network Brings Broadband Internet to Rural America over Unused TV Broadcast Airwaves

Reuters, October 21, 2009

<http://www.reuters.com/article/pressRelease/idUS161146+21-Oct-2009+BW20091021>

Freescale Makes Smart Metering Easier with Advanced Meter Reference Design Built on Optimized

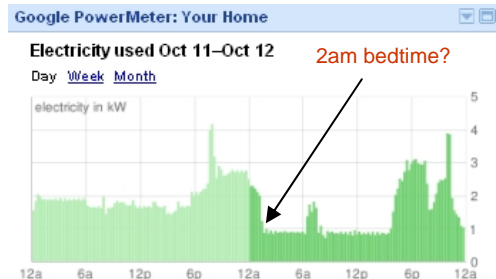
Microcontroller Technology

BusinessWire, October 05, 2009

http://www.businesswire.com/portal/site/google/?ndmViewId=news_view&newsId=20091005006543&newsLang=en

Wakefield Home Demonstration

I wanted to let the members of our smart grid demonstration know that I am running my own little personal smart grid demonstration. I purchased and installed the TED 5000, coincidentally the same week that [Google announced the TED 5000 as their first device partner](#). I acknowledge that every home owner isn't a geek and interested in this type of technology, but for those of us who are, this is a very interesting development demonstrating what the free market can develop to empower consumers independent of electricity suppliers by leveraging emerging technologies. The installation took about 20 minutes and configuring it to work with Google PowerMeter took a couple minutes since I already have an iGoogle account. I've been able to inventory my house loads by individually turning them on and off while monitoring live data with 2-second updates (that's equivalent to SCADA data rates) and discovered my old "beer frig" in the garage is an energy hog and by replacing it, the energy savings will pay for the new one in about 3 years. But wait, there's more. The first day of our smart grid advisory meeting in Albuquerque, I was able to remotely see my home's energy consumption via the Internet on the Google PowerMeter (TED had been installed for 2 days at this time). Wasn't I surprised to see that as I was showing the audience my house load that on early Monday morning, load didn't drop to the normal base-load level until about 2am. This energy monitor was able to educate me that my teenage kids, that were home alone that weekend, were up way past their bedtime on a school night - this tool has more value than I thought. If you think it's valuable to the team that I provide periodic updates on this, let me know (although my kids may not like it). -Matt Wakefield



Together...Shaping the Future of Electricity®

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