Smart Grid Demo Advisory Team Meeting, San Diego, CA

February 3rd, 2009
Welcome!

Agenda

• 1:00 – 1:15: Welcome & Introductions
• 1:15 – 1:45: Con Edison Host-Site Overview/Update (Frank Doherty)
• 1:45 – 2:15: FirstEnergy Host-Site Overview/Update (Joe Waligorski)
• 2:15 – 2:45: PNM Resources Host-Site Overview/Update (Steve Willard)
• 2:45 – 2:55: Break
• 2:55 – 3:15: Deliverables Update (Matt Wakefield / Brian Green)
• 3:15 – 4:00: Regional Profiles Update (Angela Chuang)
• 4:00 – 4:45: Arch. Ref. Design Update (Steve Thiel / Charles Vincent)
• 4:45 – 5:00: Break
• 5:00 – 5:50: Round Table – Member Smart Grid Projects / Activities
• 5:50 – 6:00: Wrap Up
## Host Sites Overview

<table>
<thead>
<tr>
<th>Resources</th>
<th>Consolidated Edison</th>
<th>FirstEnergy</th>
<th>PNM Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distributed Generation Demand Response Wind Plant</td>
<td>HVAC (Res., C&amp;I) DR Electric Storage Thermal Storage</td>
<td>Solar PV (residential &amp; System) Storage &amp; DR</td>
</tr>
<tr>
<td>Integration</td>
<td>End-to-end (Customer owned DG, DR provider, Con Edison, NYISO)</td>
<td>Real Time T&amp;D Ops &amp; Planning PJM</td>
<td>HAN, SCADA, System Ops &amp; Planning</td>
</tr>
<tr>
<td>Diversity</td>
<td>Dense Urban Environment Customer Owned Resources</td>
<td>Smart Grid w/Out use of AMI system Master Controller Concept</td>
<td>Large deployment of Residential PV. Optimization Incl. Volt &amp; Freq control</td>
</tr>
<tr>
<td>Business Case</td>
<td>Increase Reliability Reduce Peak Demand</td>
<td>Grid efficiency and reliability at local level</td>
<td>15% peak load reduction at feeder</td>
</tr>
<tr>
<td>Furthers Industry</td>
<td>Interoperability of Distributed Energy Resources (DER)</td>
<td>Local delivery system Integration of DER</td>
<td>Technologies &amp; Standards for Renewable Integration</td>
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</tbody>
</table>

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Break (Resume promptly at 2:55 PM)
From Analysis to Action

Over the next 25-30 years, significant CO₂ reductions could be achieved through the aggressive development and deployment of a full portfolio of technologies.

* Source: EPRI Publication 1016905, The Green Grid Savings and GHG reduction Enabled by a Smart Grid
EPRI Smart Grid Demonstrations

• Several regional demonstrations
  – Multiple Levels of Integration
  – Multiple Types of Distributed Energy Resources

• Leverages Information & Communication Technologies
## SG Demo Update

### Current Smart Grid Demo Collaborators

<table>
<thead>
<tr>
<th>AEP**</th>
<th>Entergy</th>
<th>Southern</th>
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<tbody>
<tr>
<td>Ameren</td>
<td>FirstEnergy*</td>
<td>Southwest Power Pool</td>
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<td>Central Hudson G&amp;E</td>
<td>Great Plains Energy (KCPL)</td>
<td>SRP</td>
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<tr>
<td>Con Edison*</td>
<td>PNM Resources*</td>
<td>TVA</td>
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<td>Duke</td>
<td>PSEG</td>
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* Current Host-Site
** Actively working on development of Host-Site proposal

Still a fair amount of activity / Interest from Additional utilities to join collaborative
# Host Site Selections (1-2 Selections Per Cycle)

## Typical Host-Site Selection Cycle

<table>
<thead>
<tr>
<th>ID</th>
<th>Host Site Selection Dates</th>
<th>Q1 09</th>
<th>Q2 09</th>
<th>Q3 09</th>
<th>Q4 09</th>
<th>Q1 10</th>
<th>Q2 10</th>
<th>Q3 10</th>
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<tr>
<td>1</td>
<td>April 15, 2009</td>
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<td>2</td>
<td>August 4, 2009</td>
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<td>3</td>
<td>November 18, 2009</td>
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<td>April 6, 2010</td>
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<td>5</td>
<td>August 3, 2010</td>
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### Typical Host-Site Selection Cycle

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<thead>
<tr>
<th></th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
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<tr>
<td>Utility Drafts Proposal</td>
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<td>EPRI Technical Review</td>
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<td>Peer Review</td>
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<td>Present to BOD</td>
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**Start all Field Deployments no later than Mid-2011 to have at least 1 year of Deployment with sufficient time for field assessment**
Task 1 – Analytics

<table>
<thead>
<tr>
<th>ID</th>
<th>Task 1: Analytics on Integrations Approaches &amp; Impact of DR</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tr>
<td>1</td>
<td>1.1 Develop Regional Profiles</td>
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<td>2</td>
<td>1.2 Develop Integration Framework</td>
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<td>3</td>
<td>1.3 Identify &amp; Evaluate Analytical Tools</td>
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<td>4</td>
<td>1.4 Develop and Evaluate Approaches for CO2 impact</td>
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<td>5</td>
<td>1.5 Develop Framework for Economic Assessments</td>
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<td>6</td>
<td>1.6 Develop Scope and Mapping of SG Projects</td>
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- Task 1.1 & 1.2 Regional Profiles
- Task 1.5 Framework For Economic Assessment
  - Coordinating with DOE & a number of world class economists
    - Team Established, working meetings begin in February
    - Managed by Bernie Neenan
- Task 1.6 Scope & Mapping of SG Projects
  - [Smart Grid Project Mapping Draft](#)
Task 2 – Critical Integration Technologies

- Task 2.1 – Architecture Reference Design
  - Foundation for future work

- Task 2.6 – Lab Trials of Critical Integration Technologies
  - “Mini Projects” - Opportunities for utilities with smaller projects that don’t meet all the requirements of a Host-Site
  - Leverage $11 Billion / $32 Billion Stimulus
Task 4 – Technology Transfer

• EPRI Smart Grid Resource Center
  – www.smartgrid.epri.com
  • Or smartgrid.epri.com
  • Or www.epri.com/smartgrid

• Use Case Repository
Smart Grid Resource Center

This site serves as a home for information about EPRI Smart Grid research, demonstration projects, and the Smart Grid Use Case Repository.

Smart Grid

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;
- reduce costs and improve efficiency.

Smart Grid Use Case Repository

The Use Case Repository is a public resource for the electric power industry to house Smart Grid related use cases as well as provide a forum for the industry to contribute to this effort by submitting their own use cases.

- Use Case Repository

Smart Grid Advisory Update Newsletter

- December
- November
- September

Smart Grid News

Energy Central features an Intelligrid report by EPRI’s Don Von Dollen – Month, Day, 200X

EPRI’s Green Grid report featured on Carbon Offsets Daily – Month, Day, 200X

M2M Radio discusses Smart Grid with EPRI’s Don Von Dollen – Month, Day, 200X

Smart Grid Use Case Repository

**Use Case Categories**
- General (18)
- Customer Services (22)
- Distributed Energy Resources (3)
- Distribution Operations (3)
- Market Operations (6)
- Transmission Operations (8)

View all Smart Grid Use Cases (61)

The Use Case Repository is a collection of Smart Grid use cases and requirements developed within the industry as well as through EPRI's smart grid demonstration initiative. All Use Cases are delivered as PDFs. All Use Cases are under the Creative Commons license. You may use the NIST Use Case Template to create your own use cases and submit them to mwakefield@epri.com for posting.

<table>
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<td>1/8/2009</td>
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**Category: Customer Services**

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Task 1.1 Regional Profiles Update

• Angela Chuang, EPRI Senior Project Manager
Task 2.1 Architecture Reference Design

• Steve Thiel & Charles Vincent, IBM
Break (Resume promptly at 5:00 PM)
Round Table Discussion

• Purpose – Identify common projects among team
• Explore opportunities to collaborate
• Identify opportunities for focused research

• Smart Grid Projects – Focused on Integration of DER
  – Discuss your Existing Smart Grid Projects
  – Discuss your Planned Smart Grid Projects
  – What are your biggest needs, issues, concerns?
  – What is the biggest opportunity?
Wrap up

• Future Meetings (Details TBD)
  – Late June, Hosted by FE in Red Bank, NJ
  – Fall, Hosted by PNM, Sandia National Labs in Albuquerque, NM
  – Winter 2010, Hosted by Con Edison, New York, NY

• Workshops?
  – IntelliGrid / Use Case: Train the Trainer

• Future Web Casts
  – Host-Site Peer Review (AEP, March)
  – Deliverables - updates as deliverables become available

• Newsletters (every 6-8 weeks)
  – Next newsletter in February
  – Monitor www.smartgrid.epri.com for more frequent news

• Questions?
  • Thank You!