EPRI Smart Grid Demonstration
Host Site Project

FirstEnergy/JCP&L
Host Site Overview/Update

Integrated Distributed Energy Resources Management

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February 3, 2009
## Presentation Outline

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JCP&L/FirstEnergy Overview

FE is a diversified energy company based in Akron, OH
JCP&L is one of FE’s seven electric utility operating companies
Nation’s 5th largest investor-owned electric system
JCP&L serves 1.1 million customers of 4.5 million FE customers
128,000 miles of transmission & distribution lines
Nearly $12 billion in annual revenues and more than $31 billion in assets
JCP&L/FE EPRI Host Site Demonstration Project

Comprised of:

- Integrated Control Platform and 8MW Direct Load Control pilot
- 15MW DLC Expansion
- 5MW Permanent Peak Load Shift program
- 3MW Electricity Storage program
- Distribution Sensors
- Other DER technologies

Project aligns with FirstEnergy IGCA Strategy

Project aligns with EPRI Smart Grid Strategy

JCP&L/FE EPRI Host Site Project
EPRI Smart Grid Demonstration
Direct Load Control, Integrated Control Platform

Integrated Control Platform and 8MW Direct Load Control pilot

- Premise information viewed by Operator on user interface
  - Alarm triggers based on monitored device parameters
  - Individual & aggregated load information
  - Building temperature

- Local Grid Sensing and Control
  - Residential Load Controllers
  - Commercial & Industrial integration with energy management systems

- Load management verification via reports and audit logs

- Customized load control programs
State Monitoring, Integrated Control Platform

*Integrated Control Platform and 8MW Direct Load Control pilot*

*Distribution Sensors*

*15MW DLC Expansion*

- Monitor and visualize state transitions of individual devices
  - Line mounted sensors
- **Action plans for state management**
  - Operator controlled
  - Real time verifiable
- **Customized verification reports**
Expanded Integration and Associated Benefits

- Integrated Control Platform and 8MW Direct Load Control pilot
- JCP&L/FE Host Site Project EPRI Smart Grid Demonstration
- Distribution Sensors
- 15MW DLC Expansion
- 3MW Electricity Storage program
- 5MW Permanent Peak Load Shift program
- Other DER technologies

- Condition-based monitoring and state estimation via enhanced platform capabilities
- System alarm coordination
- Automated condition response
- Integrated Electricity Storage
- Integrated Permanent Peak Load Shifting

Integration Planning, Analysis and Testing
Methodologies and Standards Development
Performance Requirements and Use Case Development
Integration Activities, Testing, and Analysis
## JCP&L/FE, EPRI Project Management Tasks

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<th>Task</th>
<th>Task Description</th>
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<td>1</td>
<td>Project Planning and Objectives Setting</td>
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<td>2</td>
<td>Equipment Deployment (Installation)</td>
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<td>3</td>
<td>System Integration Activities</td>
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<td>4</td>
<td>Monitoring and Performance Assessment</td>
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<tr>
<td>5</td>
<td>Performance and Integration Requirements</td>
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<tr>
<td>6</td>
<td>Benchmarking Project to Existing Methodologies and Standards</td>
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<td>7</td>
<td>Develop Use Case Scenarios</td>
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<tr>
<td>8</td>
<td>Develop Business Case Scenarios</td>
</tr>
<tr>
<td>9</td>
<td>Tasks to Support System Use</td>
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<td>10</td>
<td>Smart Grid Demo Project Analysis Activities</td>
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Operations Integration Due Diligence & Planning

Meetings with JCP&L/FE and vendor teams to determine integration system performance requirements:

- Feasibility of system use to support distribution operations
- Development of performance requirements for operational scenarios (system capabilities, visualization tools)
- Develop underlying Use Cases for operational scenarios
- Develop Cost Benefit Analysis for each Use Case
Use Case Development Process

- Integration of IntelliGrid Methodology into Project Framework
- Determine Operations and Planning Use Cases for Development
- Develop Data Collection and Verification Plan
- Conduct Testing and Use Case Model Analysis
- Refine Use Cases
- Develop Business Case and Cost Benefit Analysis
- Publish Final Analysis and Report
Integration of DER into JCP&L/FE Control and Communications Systems

Corporate Finance
- SAP
- ERP

Power Procurement & Market Ops
- Plan/Forecast
- Bid/Schedule
- Dispatch
- Trade/Contracts

Enterprise Application & Database Integration
- Dashboards
- EMS
- DMS
- Ops Planning
- SCADA
- DSM
- T&D Operations

T&D Planning & Engineering
- Asset Mgmt
- GIS
- OMS
- MWM

Distribution Management
- MDMS
- CIS
- IVR
- Billing

Customer Service

Communications Infrastructure

IDER Platform
- Substation Automation
- Distribution Automation
- Customer Integration & Data

Enterprise Application & Database Integration

Communications Infrastructure

Jersey Central Power & Light
A FirstEnergy Company

Smart Grid Demonstration Host Site Overview/Update
Project Update Slides, February 3, 2009
JCP&L/FE EPRI Smart Grid Host Site Project Participants

- EPRI
- JCP&L/FirstEnergy – prime contractor
- BPL Global, Ltd. – subcontractor
- Dynamic Energy Group – subcontractor
- Distribution Sensor vendors
- Electricity Storage vendors
- Permanent Peak Load Shifting vendors
- Other DER vendors
## Status

<table>
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<th>Milestone</th>
<th>Delivered</th>
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<tr>
<td>Launch Residential Deployed</td>
<td>9/08/08</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; 1,000 customers Deployed</td>
<td>10/25/08</td>
</tr>
<tr>
<td>4,000 A/C units Deployed</td>
<td>1/31/09</td>
</tr>
<tr>
<td>Initial Communications Network Deployed</td>
<td>11/25/08</td>
</tr>
<tr>
<td>Final Network Deployed</td>
<td>3/13/09</td>
</tr>
<tr>
<td>Network Startup/Burn-in Complete</td>
<td>3/20/09</td>
</tr>
<tr>
<td>BPU Approval, Large Business Solicitation</td>
<td>10/22/08</td>
</tr>
<tr>
<td>Launch Large Business Solicitation</td>
<td>11/24/08</td>
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<tr>
<td>Large Business Solicitation Complete</td>
<td>2/28/09</td>
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<tr>
<td>BPU Approval, Small Business Solicitation</td>
<td>10/22/08</td>
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<tr>
<td>Launch Small Business Solicitation</td>
<td>12/05/08</td>
</tr>
<tr>
<td>Small Business Solicitation Complete</td>
<td>2/13/09</td>
</tr>
<tr>
<td>Form Stakeholder Teams to Focus Integration Efforts</td>
<td>2/11/09</td>
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Feedback Instructions

- On the phone, state your Name, Affiliation, and Question/Feedback

- To submit Questions or Feedback electronically, please email to Matt Wakefield: mwakefield@epri.com by Monday February 9th

Thank You!