New Frontiers of Smart Grid

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February 19, 2014
Con Edison Service Area

- 3.3 million electric customers
- 1.1 million gas customers
- 1,760 steam customers
- Delivers 40% of NYS electric peak consumption
- Area: 604 sq mi
- Peak Demand: 13,322 MW
- Load Density: 21.8 MW/sq mi
- UG network distribution: 86%
- N-2 design

Area: 47,214 sq mi
Peak Demand: 33,950 MW
Load Density: 0.72 MW/sq mi
Smart Grid Stimulus Projects
Distribution Automation Advancement

2009

- ~50 manually operated underground sectionalizing switches
- ~5400 underground transformer PTO sensors installed
- ~1200 overhead sectionalizing switches and reclosers
- Saturated SCADA system with limited cybersecurity capability
- Manually operated underground autoloop

2014

- ~200 SCADA ready smart underground switches
- ~17,250 underground transformer PTO sensors installed
- ~1800 overhead sectionalizing switches and reclosers
- Expanded cybersecure SCADA system with 75% increase in system capacity
- Intelligent underground autoloop with rapid network isolation through GPS synched switches
Smart Grid Investment Grant Benefits

**Increase System Reliability & Expand System Monitoring & Control**
- 46% reduction in the risk of major outages in targeted underground distribution networks
- 28% reduction in customer interruption rate (SAIFI) on targeted overhead circuits

**Expanded System Monitoring & Control**
- 300% increase in feeder sectionalizing capability across the underground distribution system
- 320% increase in underground transformer monitoring capability
- 75% increase in distribution SCADA system capacity
- 35% increase in automated feeder restoration capability on overhead distribution system
Smart Grid Investment Grant Benefits

**Defer Capital Infrastructure Investments**
- $5.9 million estimated deferral in infrastructure investments due to increased system capacity

**Increased System Efficiency through Condition Based Maintenance & Remote Operation**
- $4.2 million estimated restoration cost savings through preventive replacement of underground transformers

**Increased System Efficiency through Reduced System Losses**
- $0.3 million estimated annual energy savings through reduced energy losses
- 21 MW increased system capacity through reduced system energy losses
Smart Grid Demonstration Project
Distributed Energy Resource Management System

- Con Edison Distribution System Status integrated with Customer Resources
- Targeted Demand Response from the following
  - Building Management System (BMS)
  - Controller Connected to Standby Diesel Generator
  - Controller Connected to Electric Vehicle Charger with Standby Battery and PV Generation
  - ThinkEco Modlets
Demand Response Integration

SGDP Demand Response pilots have tested technologies that provide better visibility and real-time dispatch of customer-side solutions.

- Infrastructure and successful trials have been completed at demand response locations and distributed generation locations.
## Demand Response Enhancements

**Demonstration Project has potential to enhance current demand response capabilities**

<table>
<thead>
<tr>
<th>Current Demand Response</th>
<th>Demonstration</th>
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</thead>
<tbody>
<tr>
<td><strong>Visibility into location on network</strong></td>
<td>• Limited</td>
</tr>
<tr>
<td><strong>Magnitude</strong></td>
<td>• Discounted for uncertainty</td>
</tr>
<tr>
<td><strong>Timing</strong></td>
<td>• Two hours to day-ahead</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>• Not applicable</td>
</tr>
<tr>
<td><strong>Customer experience</strong></td>
<td>• Manual intervention</td>
</tr>
</tbody>
</table>
Challenges & Opportunities

Utility 2.0

Current Evolution

- Smart Grid
- EE/DR
- DG
- PV
- Targeted Solutions

Opportunity for a Comprehensive Review

- Distributed Resources
- IT Platform
- Data Services
- Rate Design
- Regulatory Models
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