EESI/NEMA Briefing

Innovative Technologies to Strengthen the Grid

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Siemens is a Globally Integrated Technology Company

Global

- Operating in **190** countries
- **$100 billion** sales in fiscal 2013
- **362,000** employees
- **$5.7 billion** in R&D expenditures
- **29,800** R&D employees
- **290** manufacturing sites

U.S.

- **Siemens’ largest country market**
- **$24.3 billion** sales in fiscal 2013
- **53,000** employees
- **$1.4 billion** in R&D expenditures
- **6,300** R&D employees
- **130** manufacturing sites
Evolution of the Energy Grid

1900
- Thomas Edison develops the first electric systems
- Rural Electrification and continued Industrialization

1950
- "Re-urbanization" of cities

1980
- Grids are required to power the sprawling growth of suburbanization

2020
- "Re-urbanization" of cities is changing the way we work and live and has the potential to expand awareness, education, and responsibility to energy use.
Decentralization of grid design and generation

From centralized, unidirectional grid …

… to distributed energy and bidirectional energy balancing

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The State of the Utility Market

Key Challenges identified by sampling of 527 IOU/Muni/Coops

- Old Infrastructure: 48%
- Current Regulatory Model: 32%
- Aging Workforce: 31%
- Distributed Generation: 30%
- Flat Demand Growth: 28%
- Smart Grid Deployment: 23%
- Grid Reliability: 21%
- Coal Plant Retirements: 17%
- Renewable Portfolio Standards: 17%
- Energy Efficiency Mandates: 16%
- Emission Standards: 12%
- Cybersecurity: 11%

# Siemens as a holistic solution supplier

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<th>Grid Capability</th>
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<td>Sustainability</td>
<td>Federal, State, City, Consumer (&quot;Prosumer&quot;)</td>
<td>Variable Local Resources, Energy Use Follows Available Generation, Two-way Power Distribution</td>
<td>Integration of Renewable Resources, Demand Management, Storage, Adaptive Protection</td>
<td>Parker Ranch, HI Pantex AFB, TX</td>
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<td>Reliability</td>
<td>Utility</td>
<td>Passive grid, One-way Distribution of Power, Reactive Outage Response</td>
<td>Centralized Designs, Traditional Protection and Automation</td>
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Efficiency Projects

Key Elements:
- Grid Visibility
- Automation
- Problem Avoidance and Location
- Voltage Management
- “Fleet” Management

ANEC, VA
Feeder Automation
“Self-Healing” Grid

Hawaiian Electric, HI
Substation Automation
“Self-Healing” Grid

ONCOR, TX
Distribution Management

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Sustainability and Resiliency Projects

Key Elements:
- Grid Connected Energy Districts
- Integrated Renewable and Firm Generation
- Storage
- Demand Management
- Critical Infrastructure Support

Savona, Italy
Campus Micro-grid

Parker Ranch, HI
Community Sustainability

Co-op City, NY
Community Micro-grid

Pantex, TX
Military Sustainability

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What Can Congress Do?

Potential Approaches

• Reduce utility equipment depreciation schedule for selected devices (5yrs)
• Encourage State Regulators to adopt performance-based ratemaking policies
• Incent Investor Owned Utilities (IOU) to invest in Automation, Monitoring, Control and Analytics
• Incent state/city governments to identify and protect critical infrastructure in coordination with the regional utilities (CT, MA, NY, NJ)
• Congressman Donald Payne’s bill, H.R 2962 – The Smart Grid Study Act which calls for efforts to prepare, respond, mitigate and recover from natural disasters or cyber attacks. The bill will also provide for a cost/benefit of grid modernization
Thank you for your attention

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Answers for infrastructure and cities.