SIEMENS

EESI/NEMA Briefing

Innovative Technologies to Strengthen the Grid

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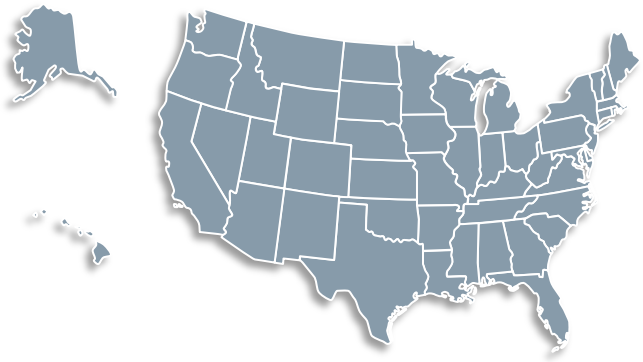
Siemens is a Globally Integrated Technology Company

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**

1950

Rural Electrification and continued **Industrialization**

1980

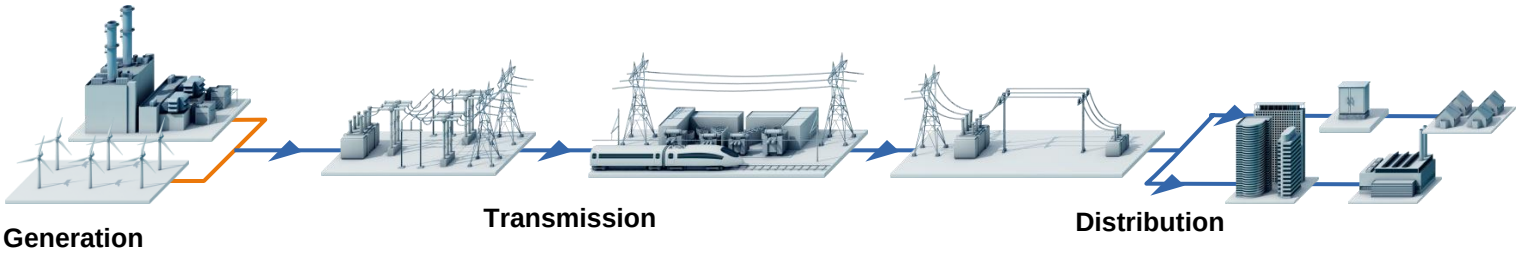
Grids are required to power the sprawling growth of **suburbanization**

2020

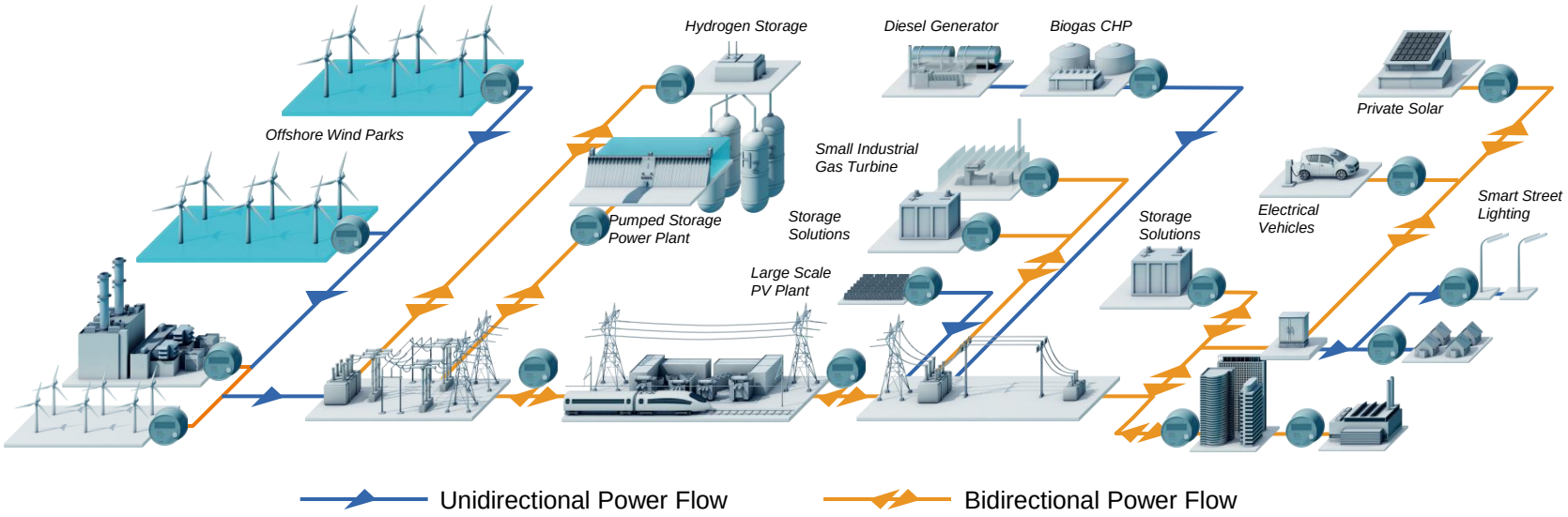
"**Re-urbanization**" of cities is changing the way we work and live and has the potential to expand awareness, education, and responsibility to energy use

Decentralization of grid design and generation

From centralized, unidirectional grid …

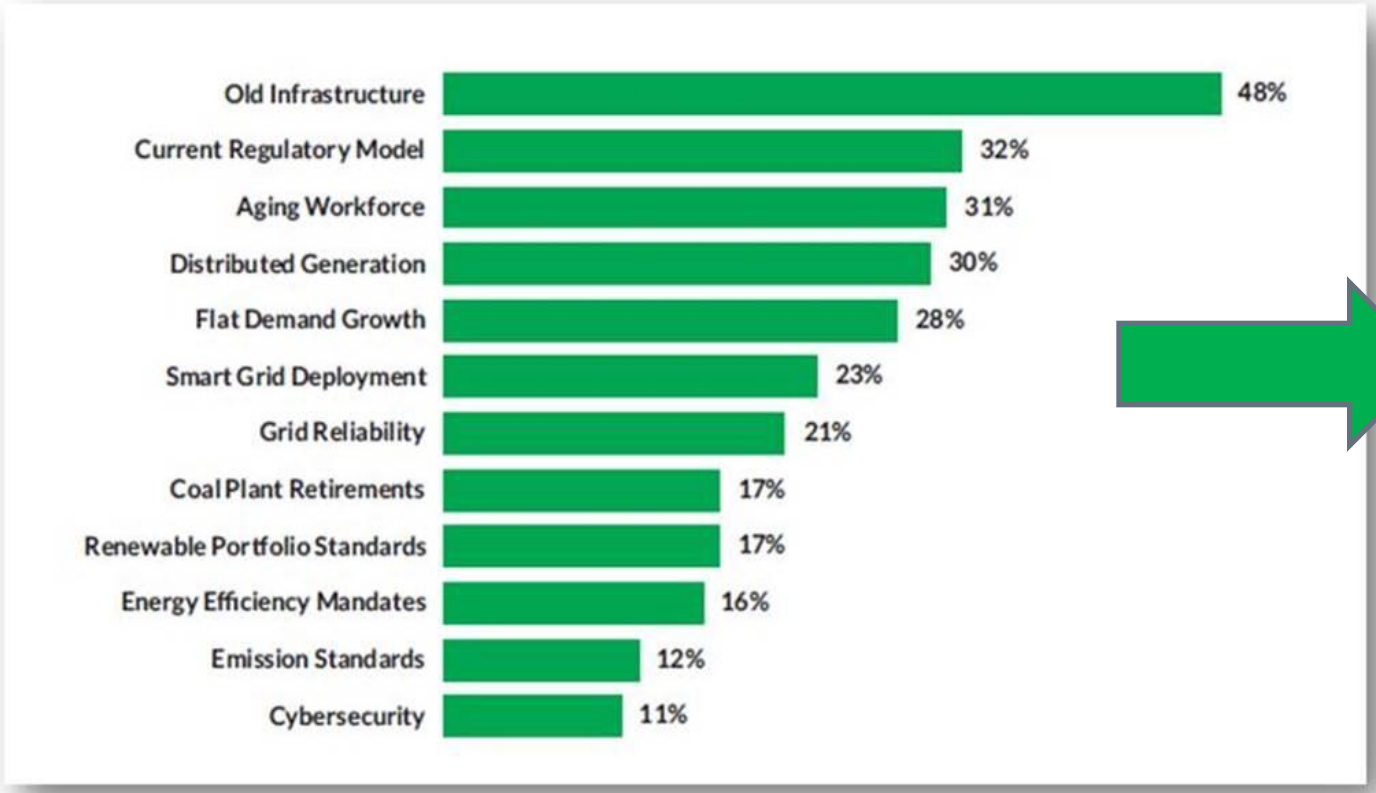


… to distributed energy and bidirectional energy balancing



The State of the Utility Market

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



Key Grid Capabilities

- Resilience
- Sustainability
- Efficiency
- Reliability

Source: Utility Dive, The State of the Electric Utility, February 2014

Siemens as a holistic solution supplier

Grid Capability	Focal Point	Characteristics	Technical Approach	Examples
Resilience	Federal, State, City, Utilities, Consumer	Decentralized Design, Firm Local Generation, Multi-utility Integration, Critical Infrastructure Support	Decentralized Design, Managed Degradation, Integrated resource management, Micro-grids	Savona, Genoa, Italy Co-op City, NY
Sustainability	Federal, State, City, Consumer (“Prosumer”)	Variable Local Resources, Energy Use Follows Available Generation, Two-way Power Distribution	Integration of Renewable Resources, Demand Management, Storage, Adaptive Protection	Parker Ranch, HI Pantex AFB, TX
Efficiency	Utility	Active Grid, Visibility, Automate Outage Response, Streamline Operations	Distribution Management, Substation Automation, Feeder Automation, Voltage Management, AMI/Metering	ONCOR Control Center (TX), HECO Self-Healing Grid (HI), A&N Distribution Feeder Automation, (VA)
Reliability	Utility	Passive grid, One-way Distribution of Power, Reactive Outage Response	Centralized Designs, Traditional Protection and Automation	----------

Efficiency Projects

ANEC, VA
Feeder Automation
"Self-Healing" Grid

Hawaiian Electric, HI
Substation Automation
"Self-Healing" Grid

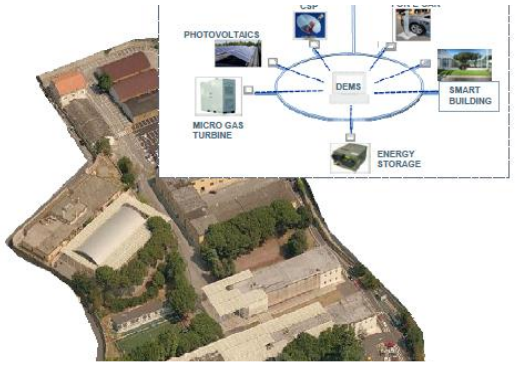
Key Elements:
- **Grid Visibility**
- **Automation**
- **Problem Avoidance and Location**
- **Voltage Management**
- **"Fleet" Management**

ONCOR, TX
Distribution Management

Sustainability and Resiliency Projects

Key Elements:

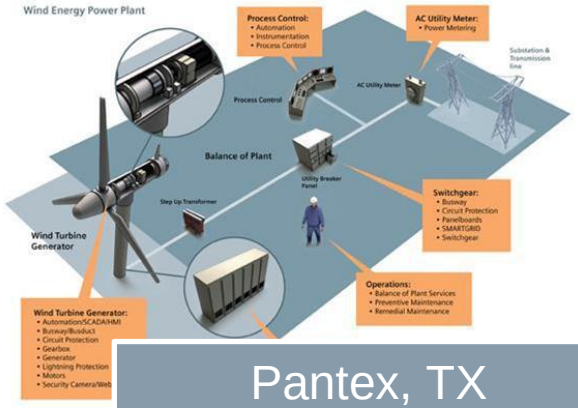
- Grid Connected Energy Districts
- Integrated Renewable and Firm Generation
- Storage
- Demand Management
- Critical Infrastructure Support



Savona, Italy
Campus Micro-grid

Parker Ranch, HI
Community Sustainability

Co-op City, NY
Community Micro-grid



Pantex, TX
Military Sustainability

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.