Edison Electric Institute

Power by Association℠

Electric Industry Outlook

Challenges and Opportunities that Impact EEI Members and Their Federal Customers

Steve Kiesner

Director

National Customer Markets

Federal Utility Partnership Working Group

May 22, 2013

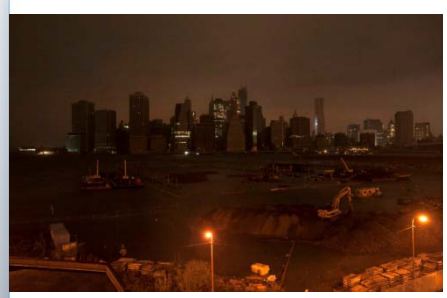
San Francisco, CA

Agenda

- Necessary infrastructure investments to address:
  - Reliability
  - Environmental and other policy requirements
  - And continue the development of a grid for the 21st Century
- Our move to natural gas and what it means to customers
- How technology is changing our world and those of our customers
- Potential Federal-Utility Partnerships with Electrification as a transportation fuel

Infrastructure Investments

Infrastructure



Cyber Attack on U.S. Electric Grid 'Gravest Short Term Threat' to National Security, Lawmakers Say

Workers came from afar to help Sandy recovery efforts

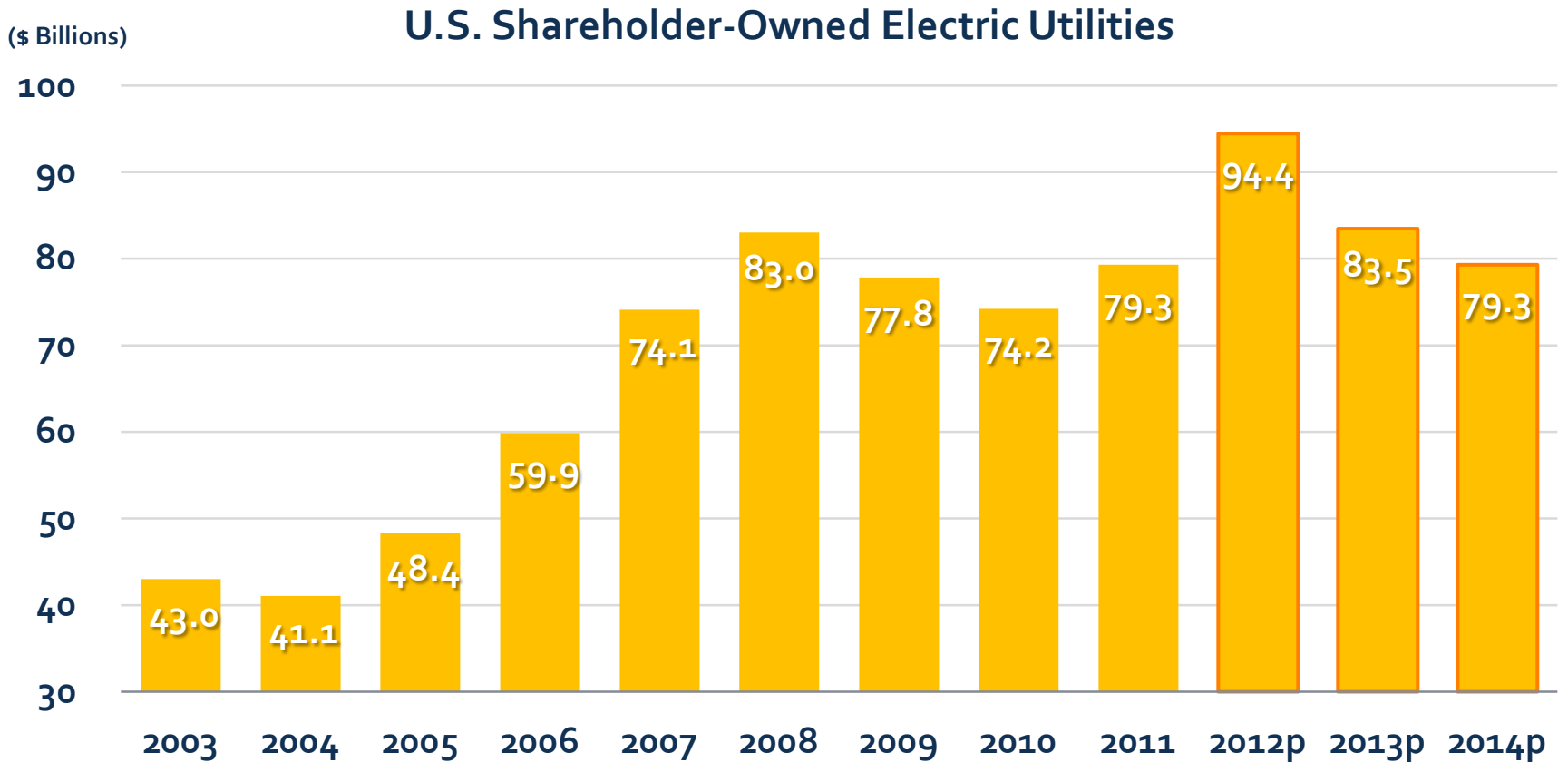
Utility smart grid spending almost doubles worldwide in 2012 'GreenWire

Commission lays out U.S. energy efficiency roadmap through 2030 REUTERS

U.S. coal-fired power plant retirements top 9,000 MW in 2012 REUTERS

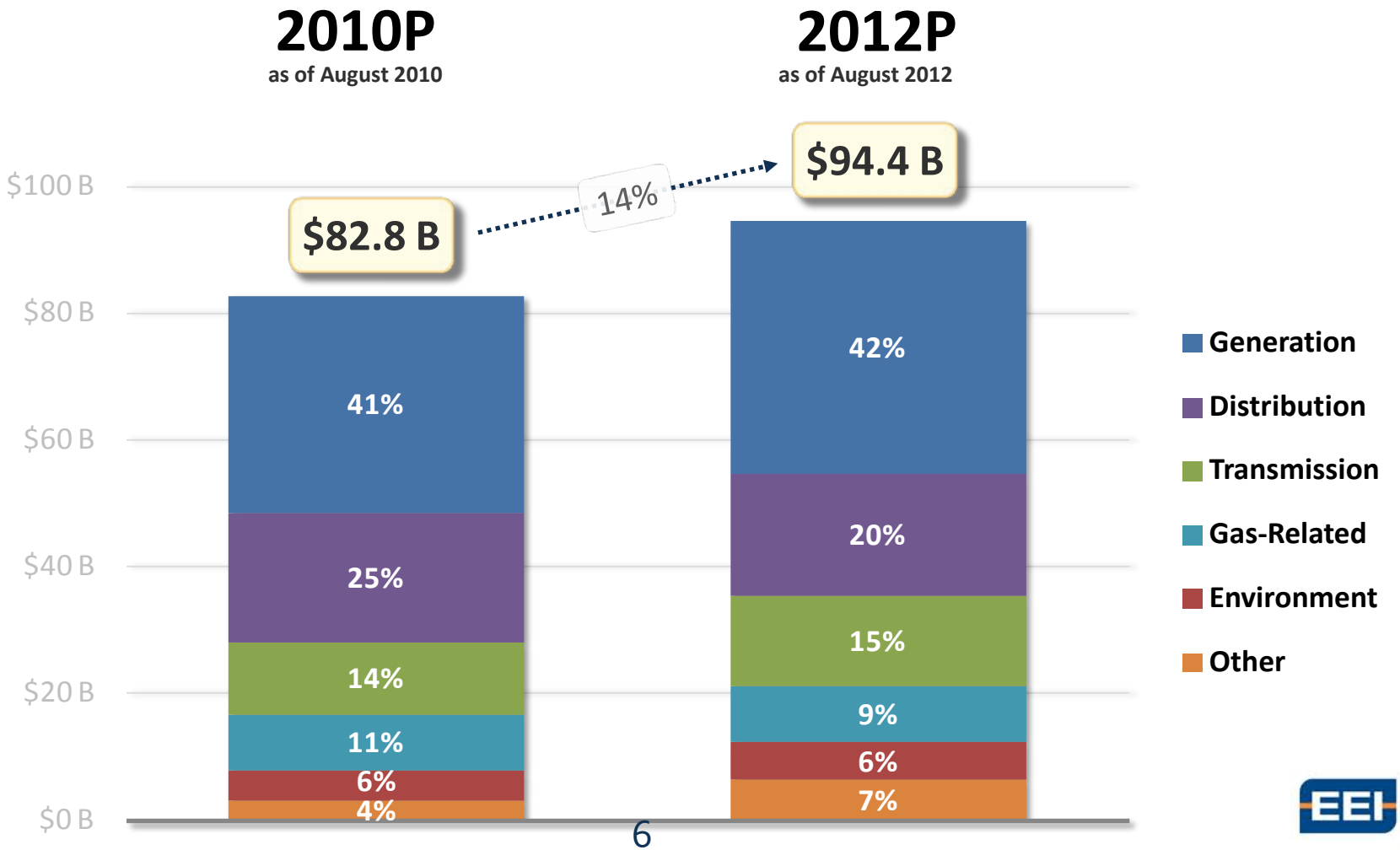
Next Generation Substation Automation Solution for Smart Substations Providence Journal

Industry Capital Expenditures



Source: EEI Finance Department, company reports, SNL Financial (August 2012)

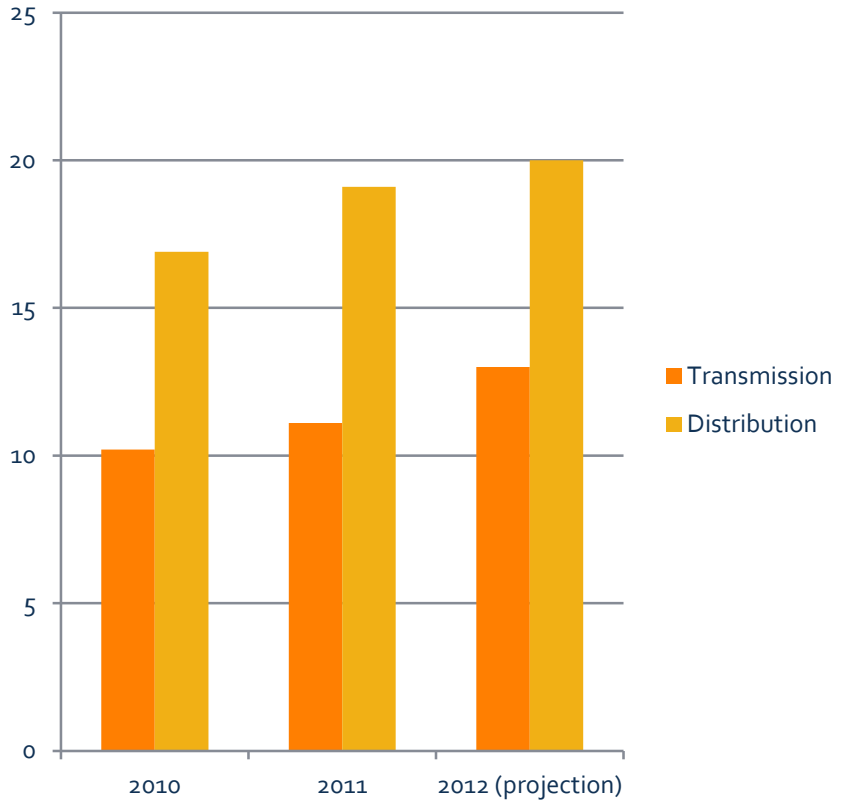
Projected Functional CapEx



Source: EEI Finance Department, company reports (August 2012)

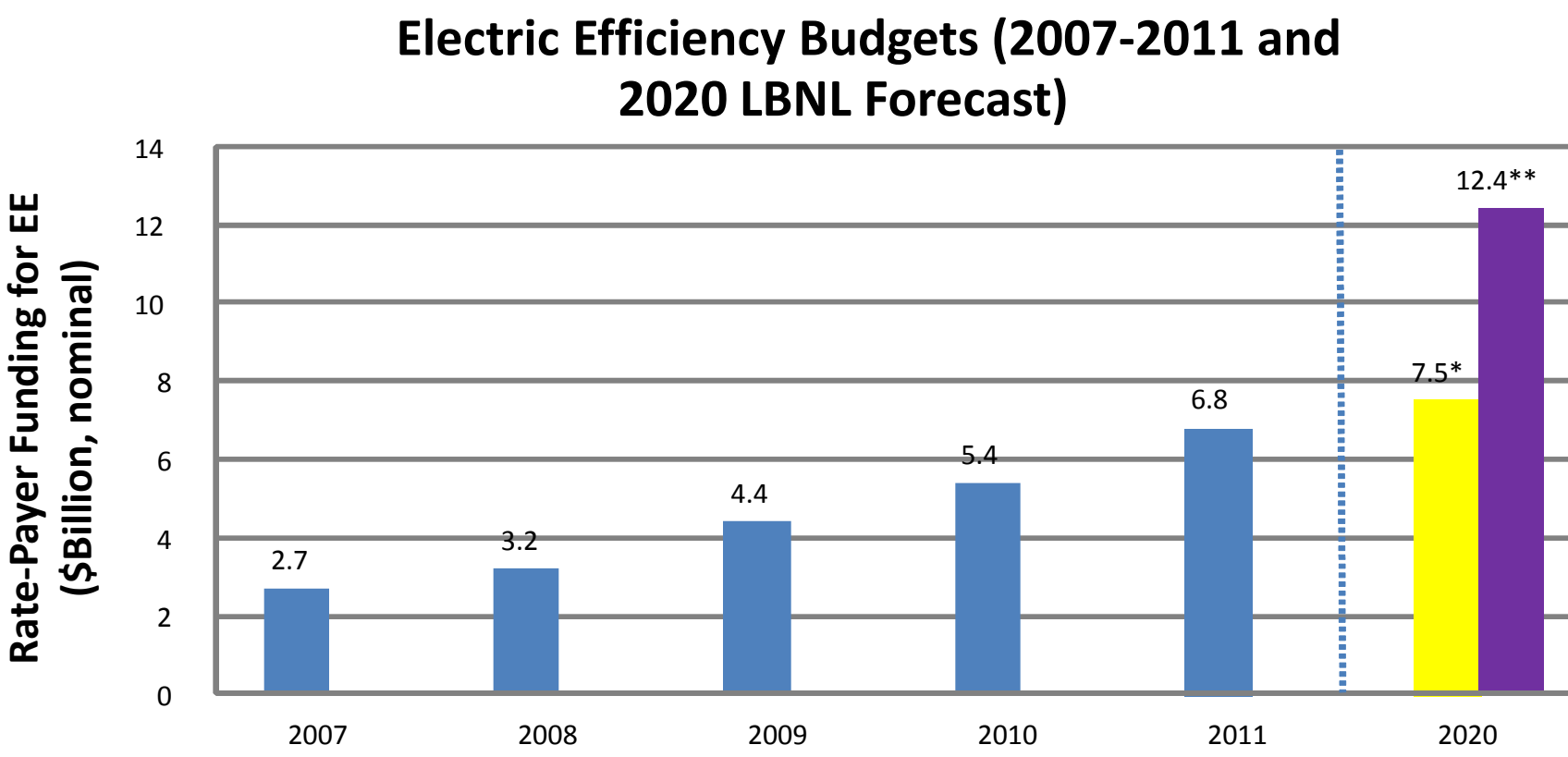
Investment in Transmission and Distribution

- EEI's members invested a record $30.3 billion in T&D in 2011 (nominal $)
- Short-term future investment ramps up, project 2012 investment of $33 billion in T&D (nominal $)



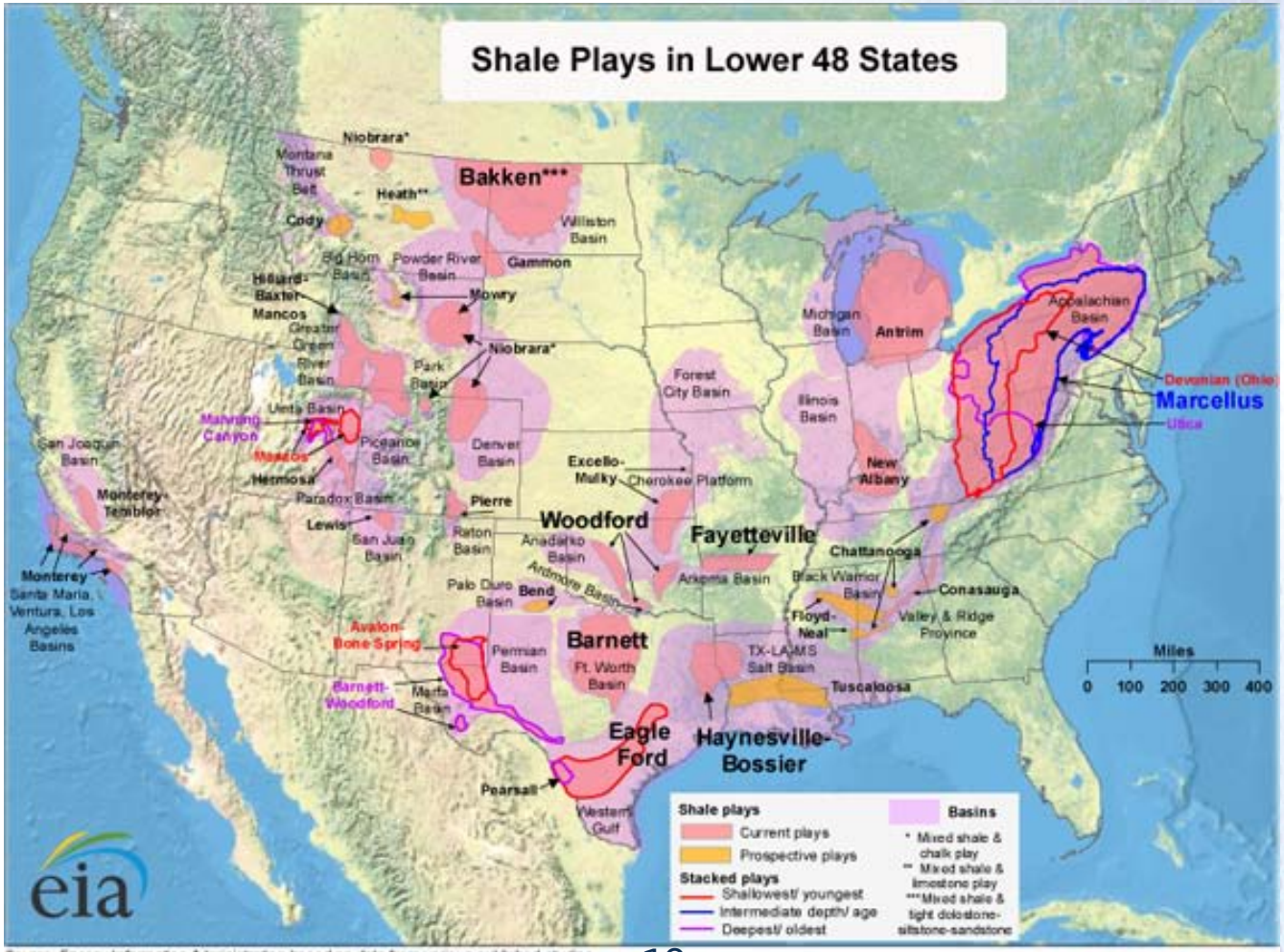
Source: *EEI Annual Property & Plant Capital Investment Survey* [$Billions (Nominal $)]

Electric Efficiency Budgets Are Growing Too



Supply Picture and Environmental Requirements: *Changing the Way We Run Our Businesses*

Shale Gas Fields

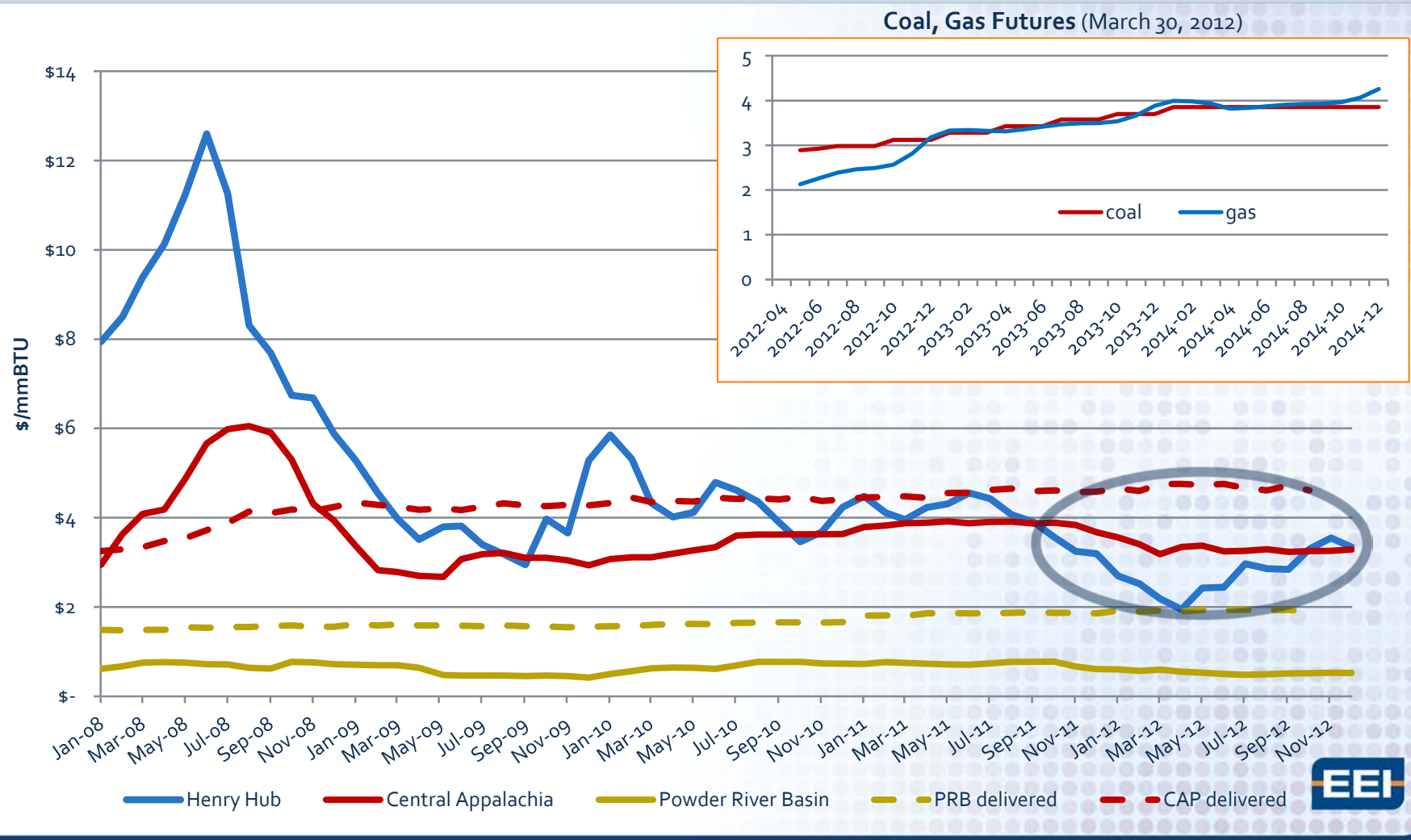


Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

Environmental Regulatory Challenges: *2013 and Beyond*

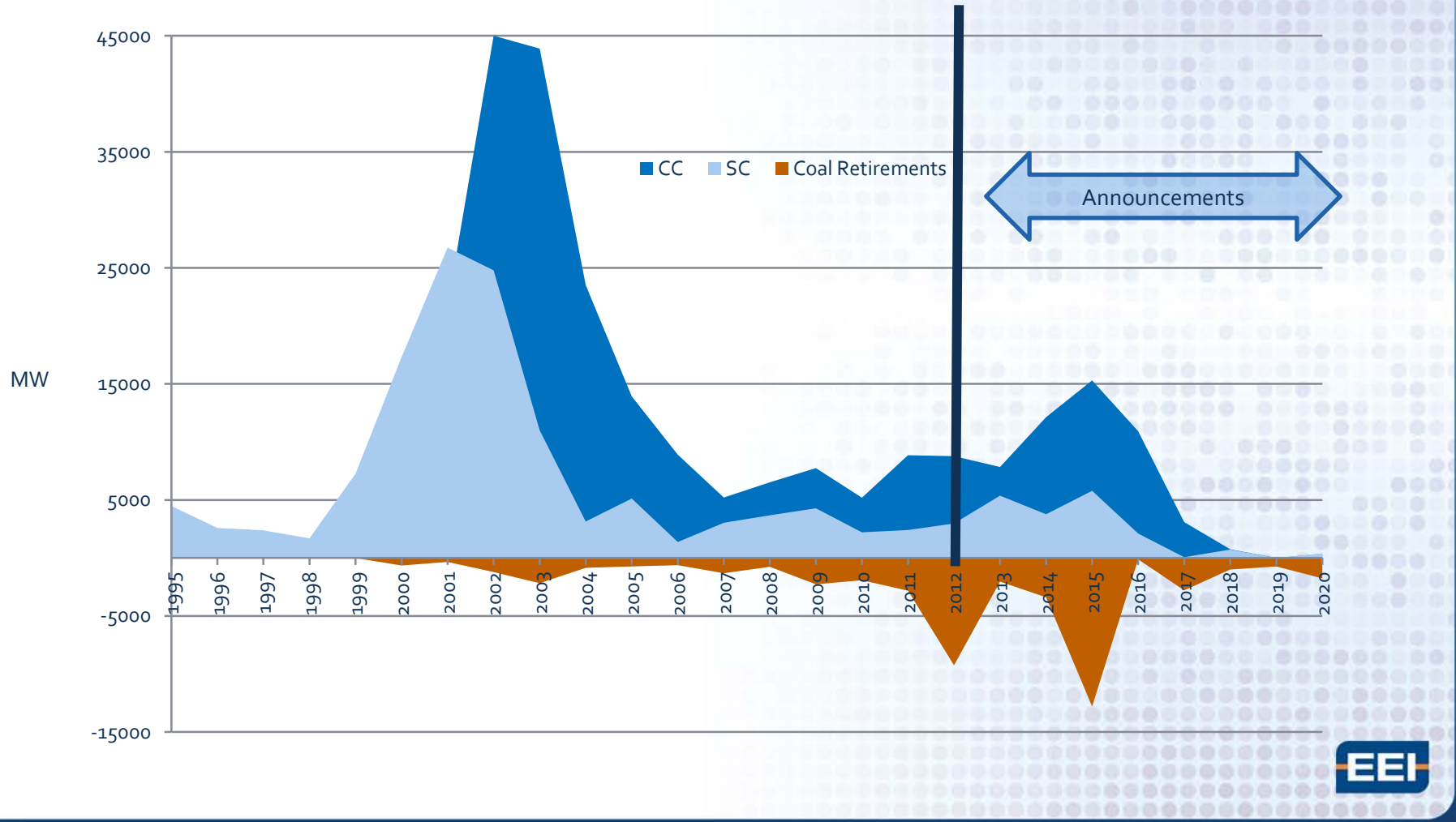
Air	Climate	Water	Land & Natural Resources	Waste & Chemical Management
Mercury & Air Toxics (MATS)	NSPS- New Sources	316(b)	Transmission Siting and Permitting	Coal Ash
Interstate Transport (CAIR/CSAPR)	NSPS- Existing Sources	Effluent Guidelines Limitations	Avian Protection	PCBs in Electrical Equipment
Regional Haze/Visibility	BACT Permitting	Waters of the United States	Endangered Species	HazMat Transport
Multiple NAAQS	International Negotiations	NPDES Pesticide Permits	Vegetation Management	
New Source Review (NSR)		Waterbody-Specific Standards		

Prices Driving Switching



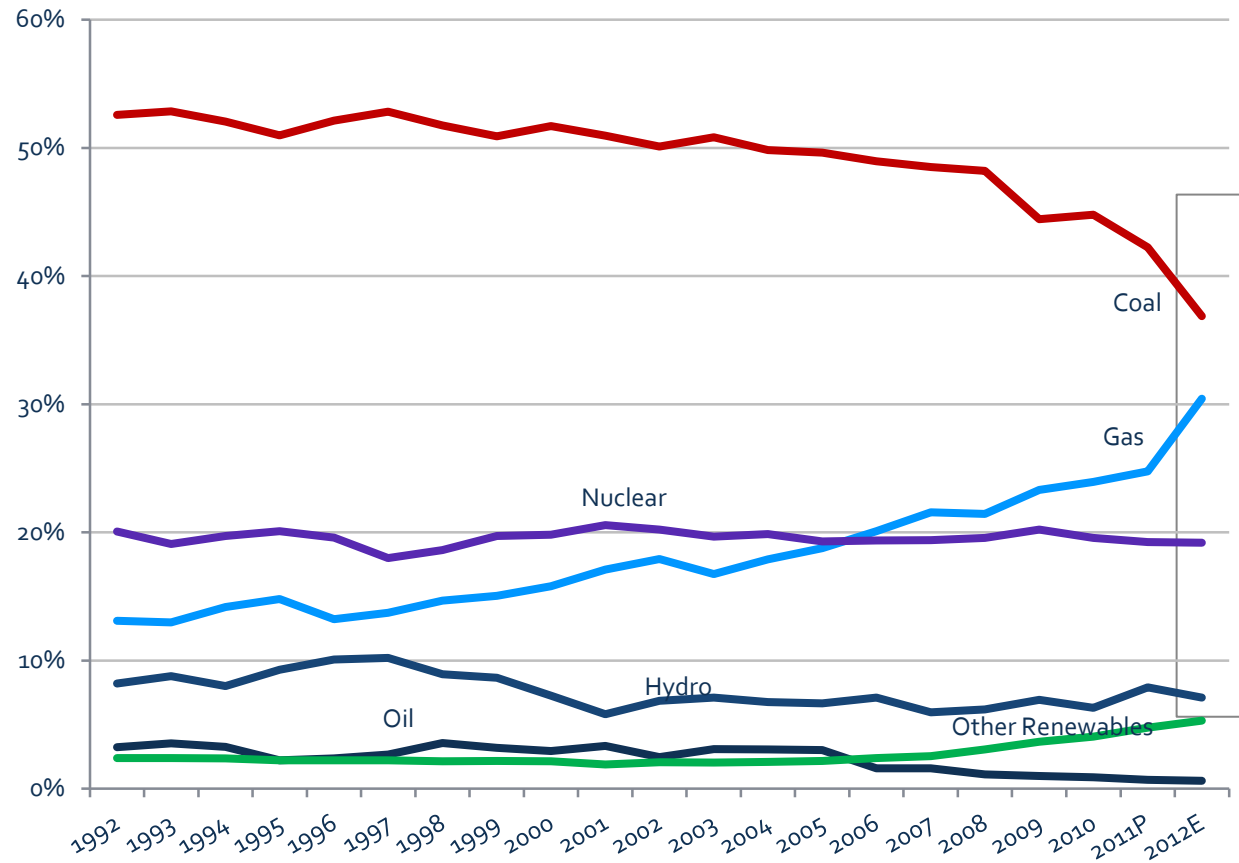
Source: Nymex; Ventyx, Inc, The Velocity Suite; SNL

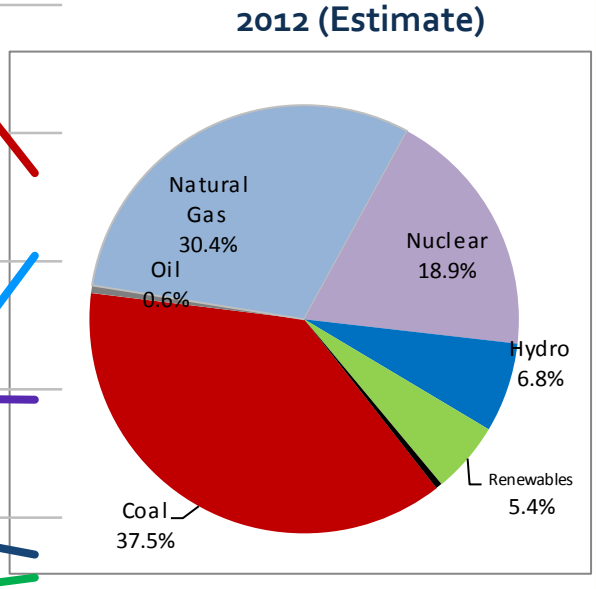
Natural Gas Capacity Additions



Source: EEI; Ventyx Inc., The Velocity Suite

Evolving Generation Mix





Source: DOE – Energy Information Administration

Natural Gas:

What Customers Need to Watch closely…

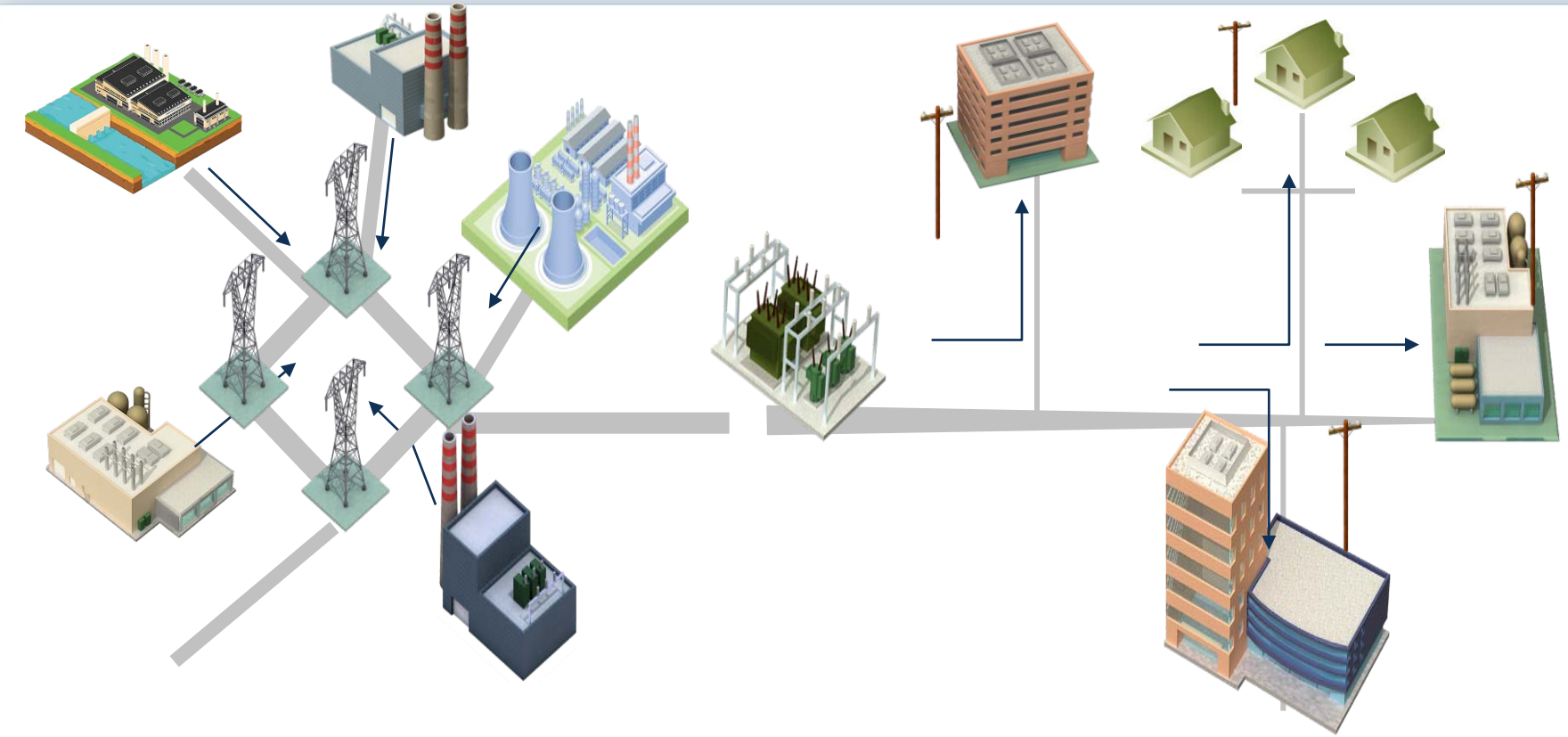
- **With the electricity industry's increasing move to gas, what does that mean to supply/demand/prices?**
  - Can the electric industry get long-term supply contracts?
  - Can we get dedicated pipeline capacity?
  - Cold winter scenario – how firm is our supply?
- **Will the transportation sectors go toward gas? What does that do to supply & price?**
- **What about LNG exports?**
- **What about Renewables at your facilities?**
- **Real and perceived environmental issues?**

Changing Electric Companies

Old (De-reg) vs. "New Retail Environment"

- **First wave of retail competition during late 1990s was driven by coalition of legislators, regulators, and large C&I customers**
  - Influenced by deregulation of other industries
  - Scope constrained by regulatory rules, *available technologies*
- **New retail "competition" is technology driven—new customer supply options**
  - Enabled by policies and capabilities of the smart grid
- **New retail competition represents a fundamental challenge to existing utility business models**

Central Generation Model



EPRI

Public Policies Are Accelerating the Transition

- 29 states plus D.C. have RPS programs, 17 with mandates for solar and other DG
- Net metering policies – present in 43 states
- Feed-In tariffs – adopted or proposed in a few states
- Virtual net metering – present in 14 states
- Subsidies, rebates, tax incentives, financing incentives. CA is providing $1.9 Billion over 10 years
- Zero net energy goals and targets, microgrids

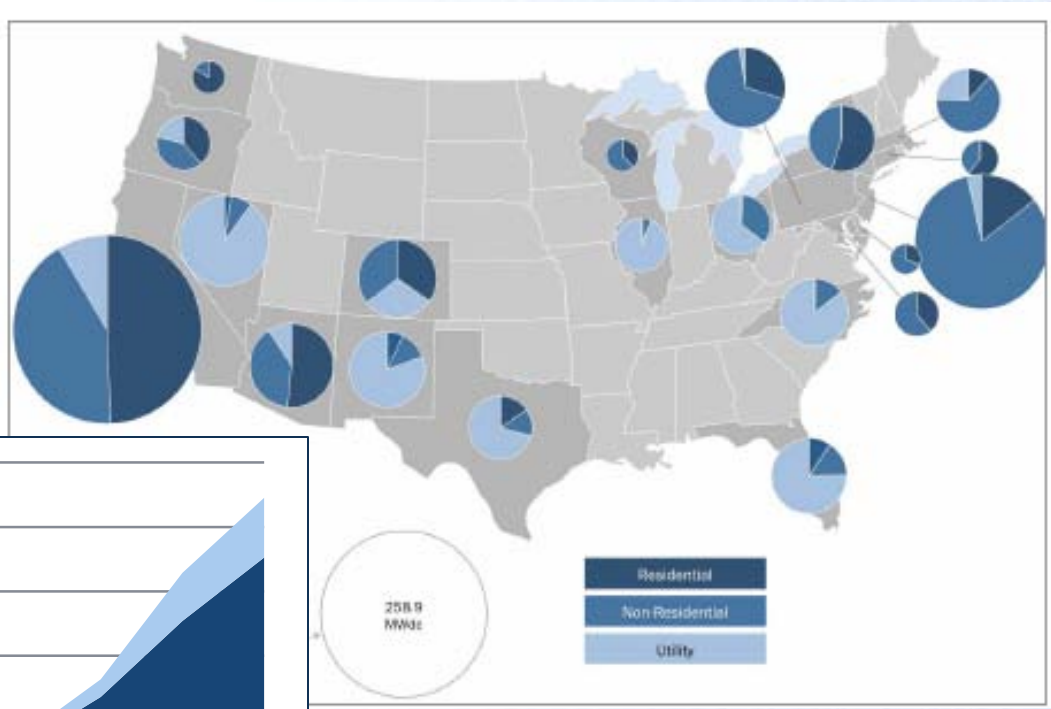
Other Factors Contributing to the Transition

- Department of Defense, the largest energy user in the U.S., is actively seeking to implement renewables, "islanding" policies, and virtual net metering
- Higher retail electric rates
- Declining cost of PV
- Evolution of "smart" infrastructure technologies (power electronics, storage, sensing and measurement, controls), high speed communications)
  - ARRA funding for AMI deployment, smart grid demos

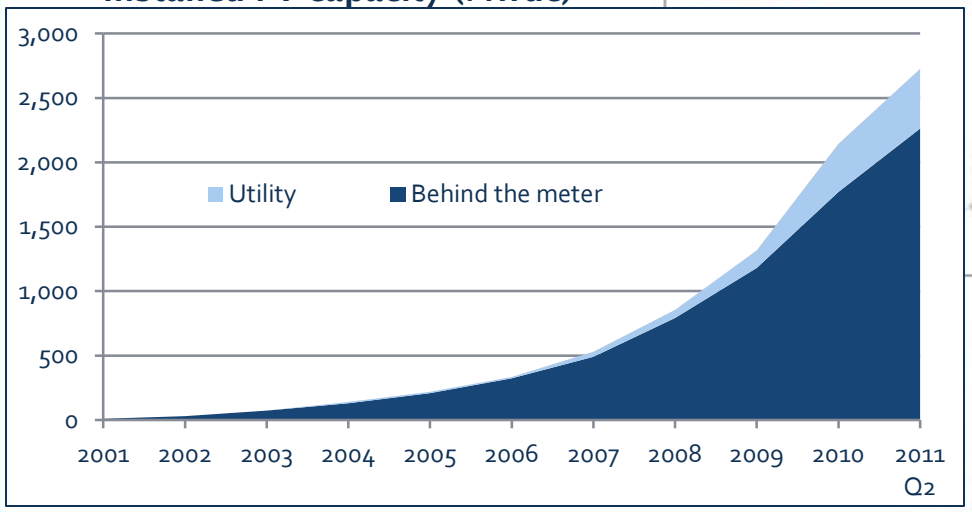
Distributed Generation/Solar PV Growth

PV Installations (MWdc)

2010 U.S. PV Installations by State and Market Segment



Installed PV capacity (MWdc)



Source: SEIA, *U.S. Solar Market Insight*, 2010

Source: SEIA, *U.S. Solar Market Insight*, 2011 Q2; Lawrence Berkeley National Laboratory, *Tracking the Sun IV*, September 2011; EEI

Challenges Ahead for Utilities in Smart Grid World

- Constant pressure to reassess smart grid technologies
- A blizzard of mandates
  - RPS, EE
  - Carbon constraints
  - Grid modernization
- Electric companies will have to prosper in the face of changing requirements
- And retain all of their "traditional" responsibilities
  - *Must cope with legacy costs for a system ill equipped for new trends*

Future

- It's not whether, it's when
  - - Pace will vary dramatically (it's already happening in some markets)
- The grid will be distributed, diverse, and much more complex
  - Generation expansion will run the gamut (centralized to co-gen, DR)
  - Customers will be grid-connected and grid-involved
  - T&D infrastructure will have to be transformed to accommodate this diversity
  - Distribution must be upgraded to handle of world of variable RE along with controllable demand and challenges users likes EV and server farms

Future (2)

- Managing the grid will become more complex and costly as we move closer to RPS targets
  - System balancing and stand by generation costs
- Energy Storage and EVs will be game changers
- New utility business models will emerge – but no single model will dominate the market. Instead there will be a continuum of choices:
  - *From suppliers of pure electrons to "behind the meter services" to pure wires company.*
  - *Utilities are going to figure where they want to be along that continuum*

The Transition Will Drive Investment Needs

- **Legacy distribution systems will need to be re-developed to support bi-directional and variable power flows safely and reliably**
- **Investments in:**
  - Physical infrastructure – including interconnections
  - Operating systems
  - Communication systems
  - Risk management, including cyber-security
  - Coordination with transmission and generation systems
- **Technological obsolescence will be an increasing challenge**

Criteria for a Successful Transition

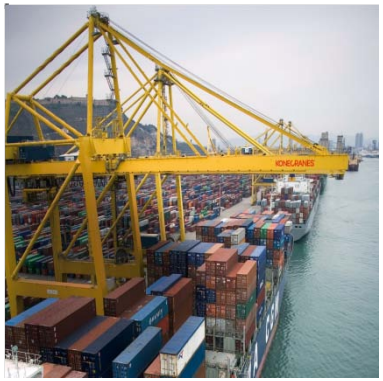
- **EEI and its members want to ensure that the transition is accomplished in a manner that protects**
  - Reliability
  - Safety
  - Fairness for all customers
  - Ability of regulated utilities to participate in evolving DER markets
  - **Expansion of utility-customer collaborations**
    - **Universal buy-in that these investments are necessary**

The Need for New Regulatory Policies

- **To ensure reliability:**
  - Ensure economic investments
- **To ensure safety:**
  - Update interconnection standards & procedures
- **To ensure fairness**
  - Innovative approaches to customer market segments

Unlimited Potential

Mining ▪ Ports ▪ Manufacturing ▪ Fleets ▪ PEVs ▪ Retail ▪ Warehousing



Multi-Pronged Communications Approach

EXPANSION OF ELECTRIFICATION

Through the Voice of the Customer

C&I CUSTOMERS

(Off-road and fleet, mining, airports, ports, material handling)

CONSUMERS

(PEVs: The Electric Generation)

Conclusion

- **Utility industry going through a major investment cycle, driven by the need to address:**
  - Reliability - approx $1.8 Trillion in the next 20 twenty years
  - Environmental Requirements: EPA regulating CAA and other requirements
  - Energy Efficiency priorities (Expected to spend $8-10 billion in 2013 vs. $ 2.7 B in 2007)
- **An Increasing Amount of Rate Cases to Pay for Investments**
- **Natural Gas is changing our world…**
- **Technology is changing our world…it's only the beginning**
- **Legislative and Regulatory initiatives can also change our business**
- **Let's sit down to discuss electrification opportunities and learn from one another**