



Edison Electric Institute

Power by AssociationSM

For Electric Utilities The Future is Here

USEA WEC North America Regional Energy Forum
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Richard McMahon
Vice President, Energy Supply and Finance
Edison Electric Institute

Edison Electric Institute

The Edison Electric Institute (EEI) is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for 220 million Americans, operate in all 50 states and the District of Columbia, and directly employ more than 500,000 workers.

With more than \$85 billion in annual capital expenditures, the electric power industry is responsible for millions of additional jobs. Reliable, affordable, and sustainable electricity powers the economy and enhances the lives of all Americans.

EEI has 70 international electric companies as Affiliate Members, and 250 industry suppliers and related organizations as Associate Members.

Organized in 1933, EEI provides public policy leadership, strategic business intelligence, and essential conferences and forums.



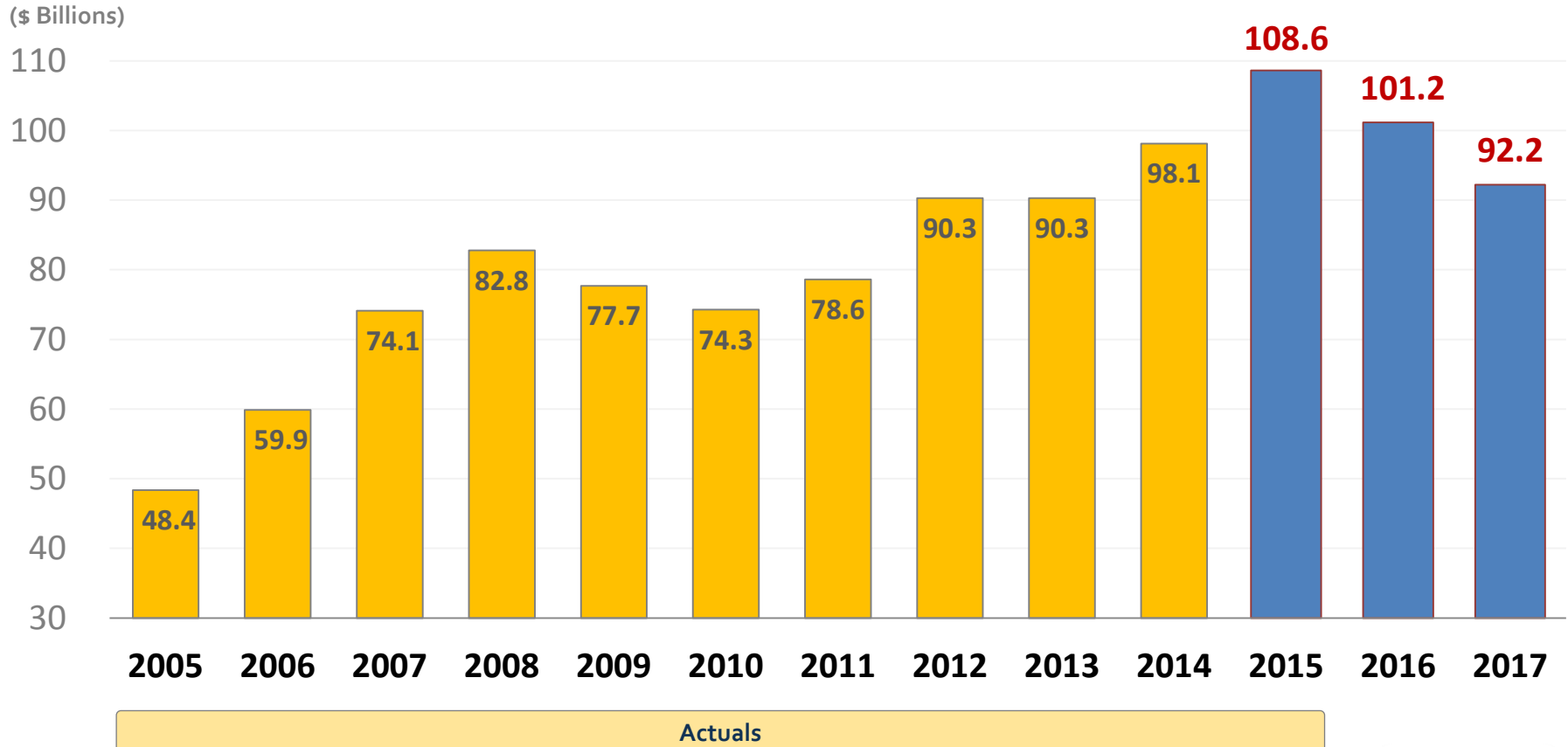
Thomas A. Edison



Agenda

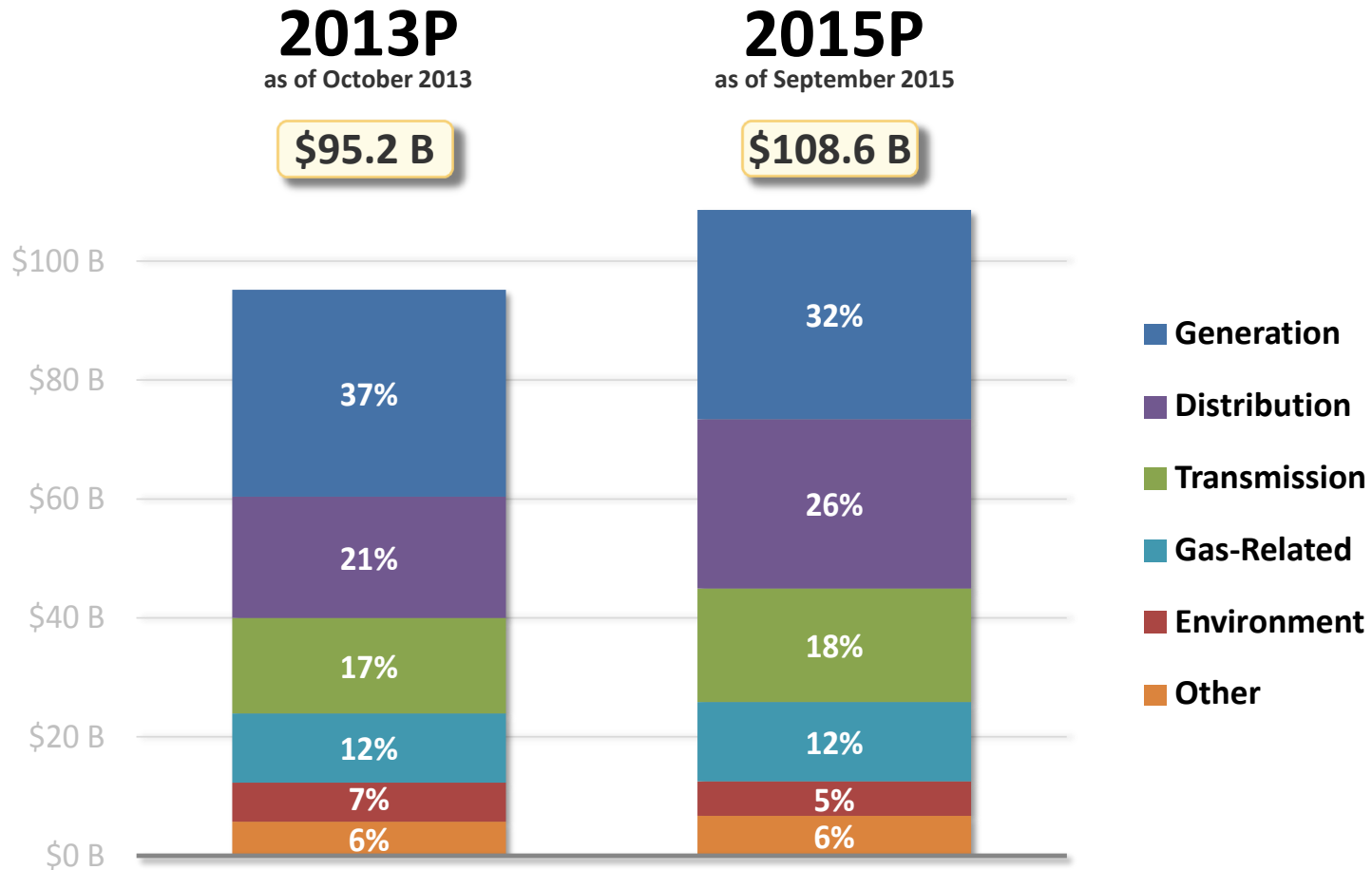
- Electric Utility Industry CAPEX and its Drivers
- Impacts on the Generation Fleet and the Grid
- Environment and CPP
- Cyber and Grid Security
- The Evolving Grid and Regulation

Industry Capital Expenditures



Notes: Total company spending of U.S. Investor-Owned Electric Utilities, consolidated at the parent or appropriate holding company.
Projections based on publicly available information and extrapolated for companies reporting fewer than three projected years (11% and 12% of industry for 2016 and 2017).

Projected Functional CapEx



Notes: Total company functional spending of U.S. Investor-Owned Electric Utilities. 2015P total does not sum to 100% due to rounding. Projections based on publicly available information and extrapolated for companies not reporting functional detail (1.3% of industry).

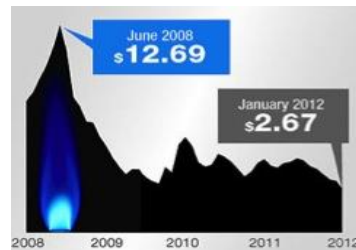


Drivers of Industry Investment

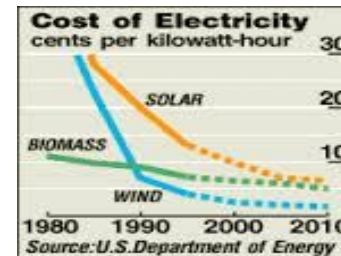
Environmental regulations



Low natural gas prices



Declining technology costs



Diversification



State renewable energy policies



Financial incentives



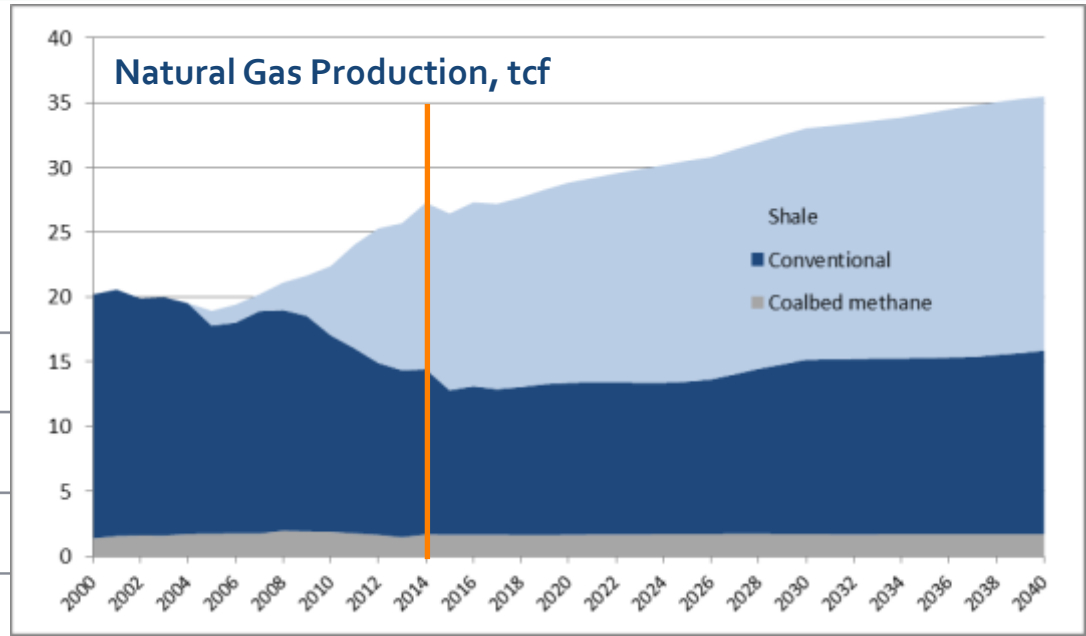
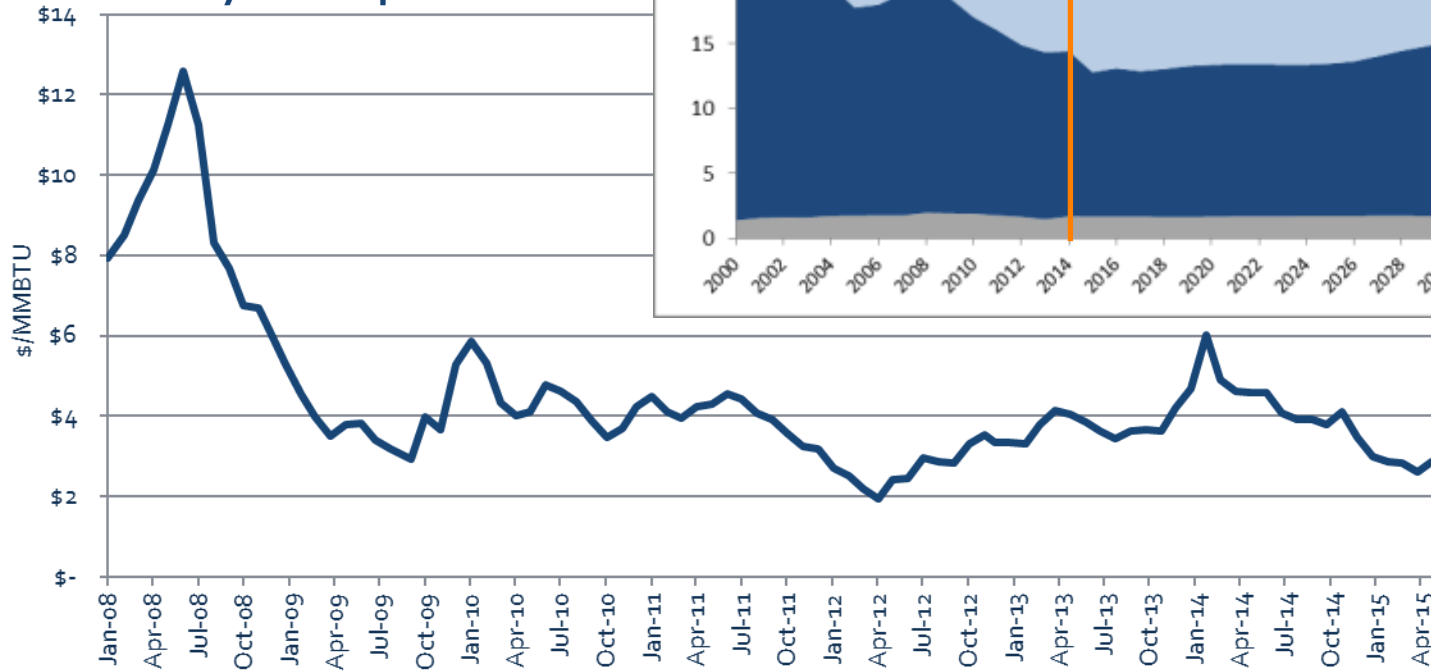
Customer demand



Natural Gas Market

Low Prices and Growing Production

Henry Hub Spot Price

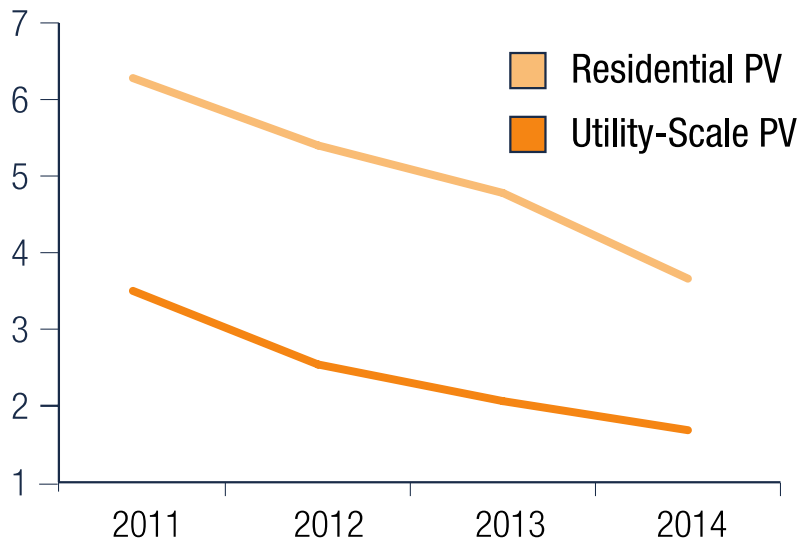


Solar PV Costs Have Declined

Solar PV costs decline

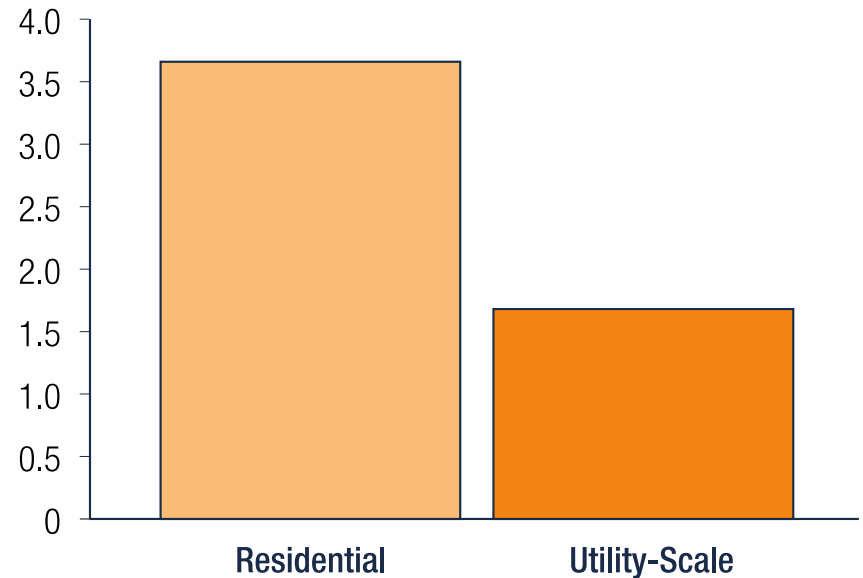
Large-Scale Utility Solar PV is About Half The Cost of Residential Rooftop Solar

Cost of Solar PV (\$/Watt)



Source: GTM/SEIA Solar Market Insight
Data is the average of quarterly data for each year.

Cost of Solar (\$/Watt in 2014)



Source: GTM/SEIA Solar Market Insight
Data is the average Q1-Q4 2014. Data only includes cost of PV technologies

Utilities Lead the Way on Solar Power

60% OF ALL INSTALLED SOLAR CAPACITY
IS LARGE-SCALE UTILITY SOLAR CAPACITY

FROM 2010-2014, ADDITIONS OF NEW
SOLAR CAPACITY HAVE GROWN **82%** PER YEAR
ON AVERAGE

\$9 billion/year

EXPECTED GROWTH OF INVESTMENT
IN SOLAR PV TECHNOLOGIES
FROM 2014-2020

IN 2014, NEARLY **4GW**
OF LARGE-SCALE SOLAR
CAPACITY WERE INSTALLED

UTILITIES REPRESENT **96%**
OF ALL ACTIVE & PLANNED
COMMUNITY SOLAR CAPACITY
IN THE UNITED STATES

LARGE-SCALE
UTILITY SOLAR PV
HAD AN AVERAGE COST OF

\$1.68

PER WATT IN 2014

→
COMPARED TO
←

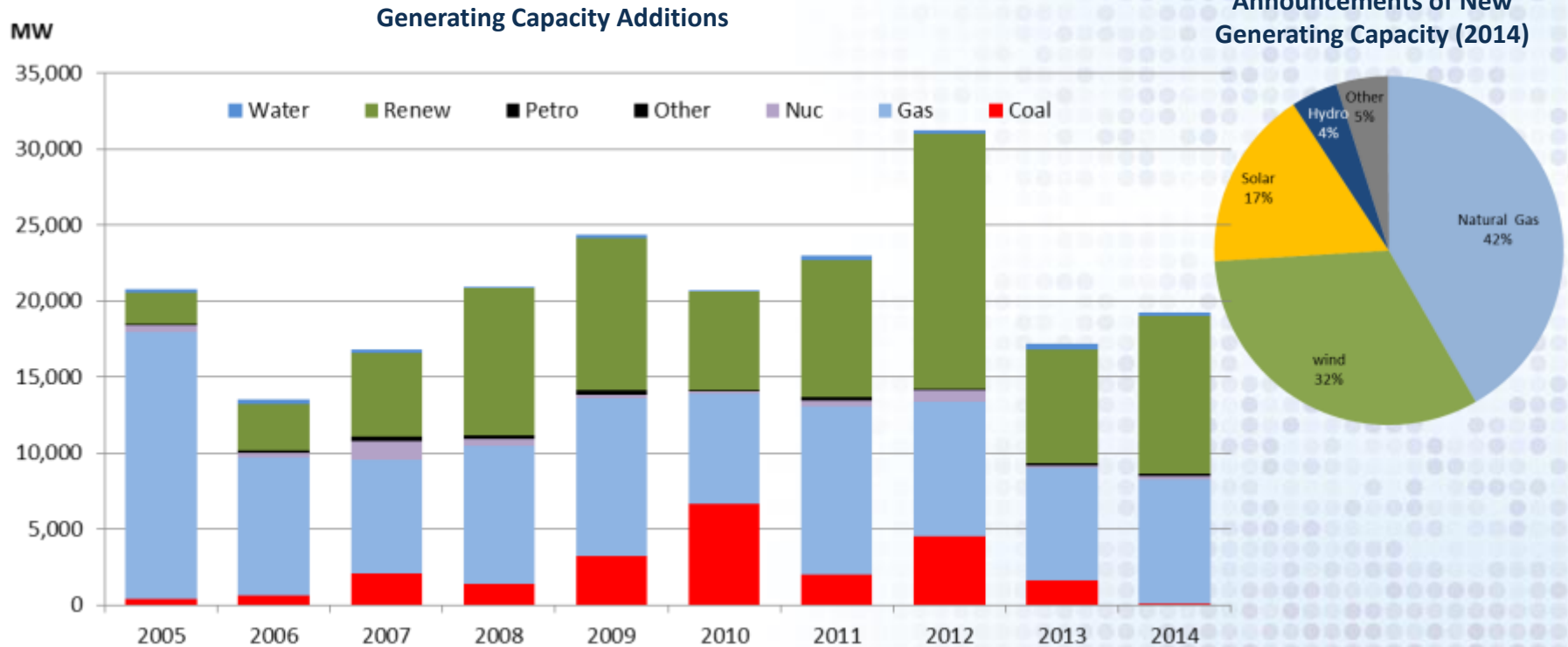
RESIDENTIAL
ROOFTOP SOLAR
HAD AN AVERAGE COST OF

\$3.66

PER WATT IN 2014

Cleaner Fleet

New generating capacity is fueled by non-hydro renewables and natural gas



Agenda

○ Environment and CPP

Environmental Regulatory Challenges: 2015 and Beyond

Air

Mercury & Air
Toxics Standards
(MATS)

Interstate
Transport
(CAIR/CSAPR)

Regional
Haze/Visibility

Multiple NAAQS

New Source
Review (NSR)

Climate

NSPS- New
Sources

NSPS-Existing
Sources

BACT Permitting

International
Negotiations

Water

316(b)

Effluent
Limitation
Guidelines

Waters of the
United States

Total Maximum
Daily Loads
(TMDLs)

Waterbody-
Specific Standards

Land & Natural Resources

Transmission Siting
and Permitting

Avian Protection

Endangered
Species

Vegetation
Management

Waste & Chemical Management

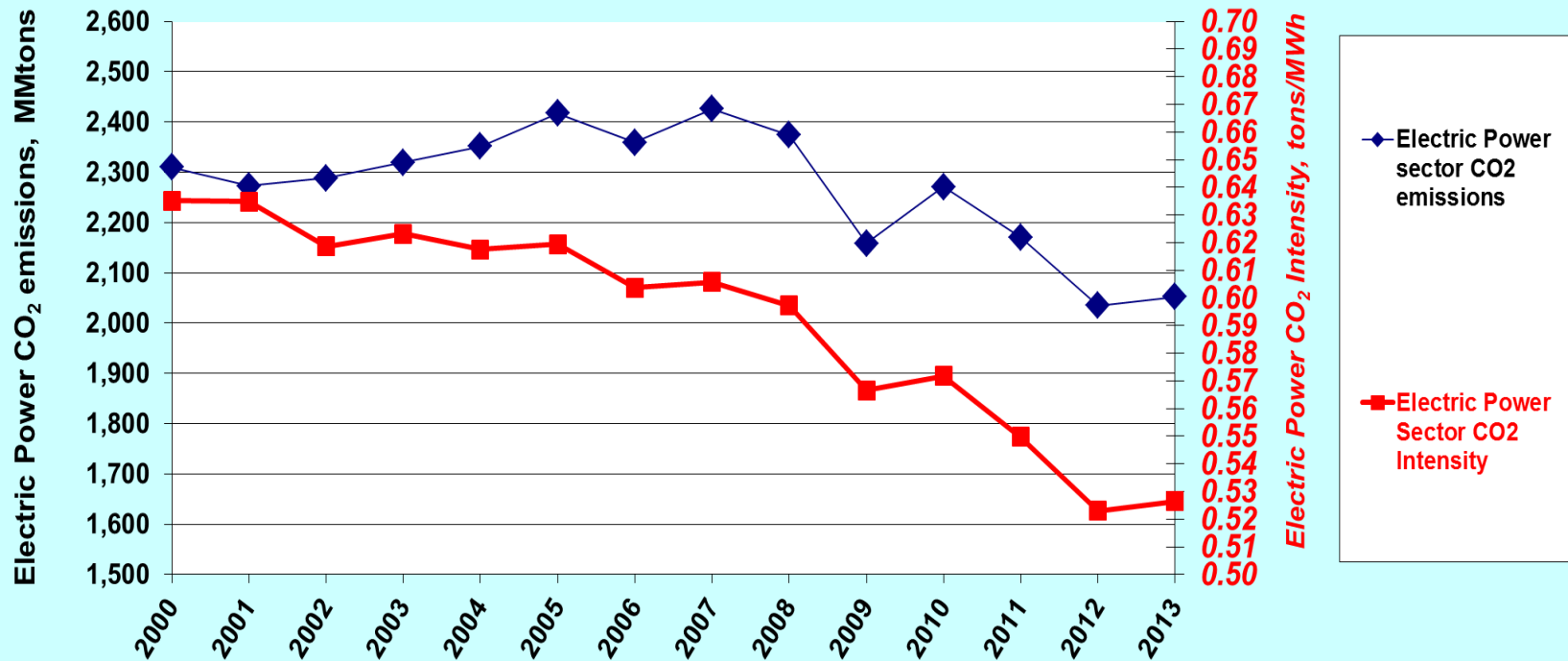
Coal Ash

PCBs in Electrical
Equipment

HazMat Transport

CO₂ Emissions and Intensity

Electric Power Sector CO₂ Emissions Tonnage and Intensity, 2000-2013



Source: Developed from U.S. Energy Information Administration, *Monthly Energy Review March 2014*

The Final Clean Power Plan Structure

- Final CPP contains “guidelines” for states to regulate CO₂ emissions from existing fossil-based electric generating units
- Established uniform national emission rates for coal-based units and natural gas combined cycle (NGCC) units
 - Rates reflect EPA’s assessment of regional reductions from
 - Coal-based unit efficiency upgrades
 - Shifts in generation from existing coal-based units to existing NGCCs
 - Increased deployment of renewables
- Uniform national emission rates applied to state generation mixes in 2012 to create state goals
 - State goals are not enforceable against states
 - Compliance measured at the unit-level

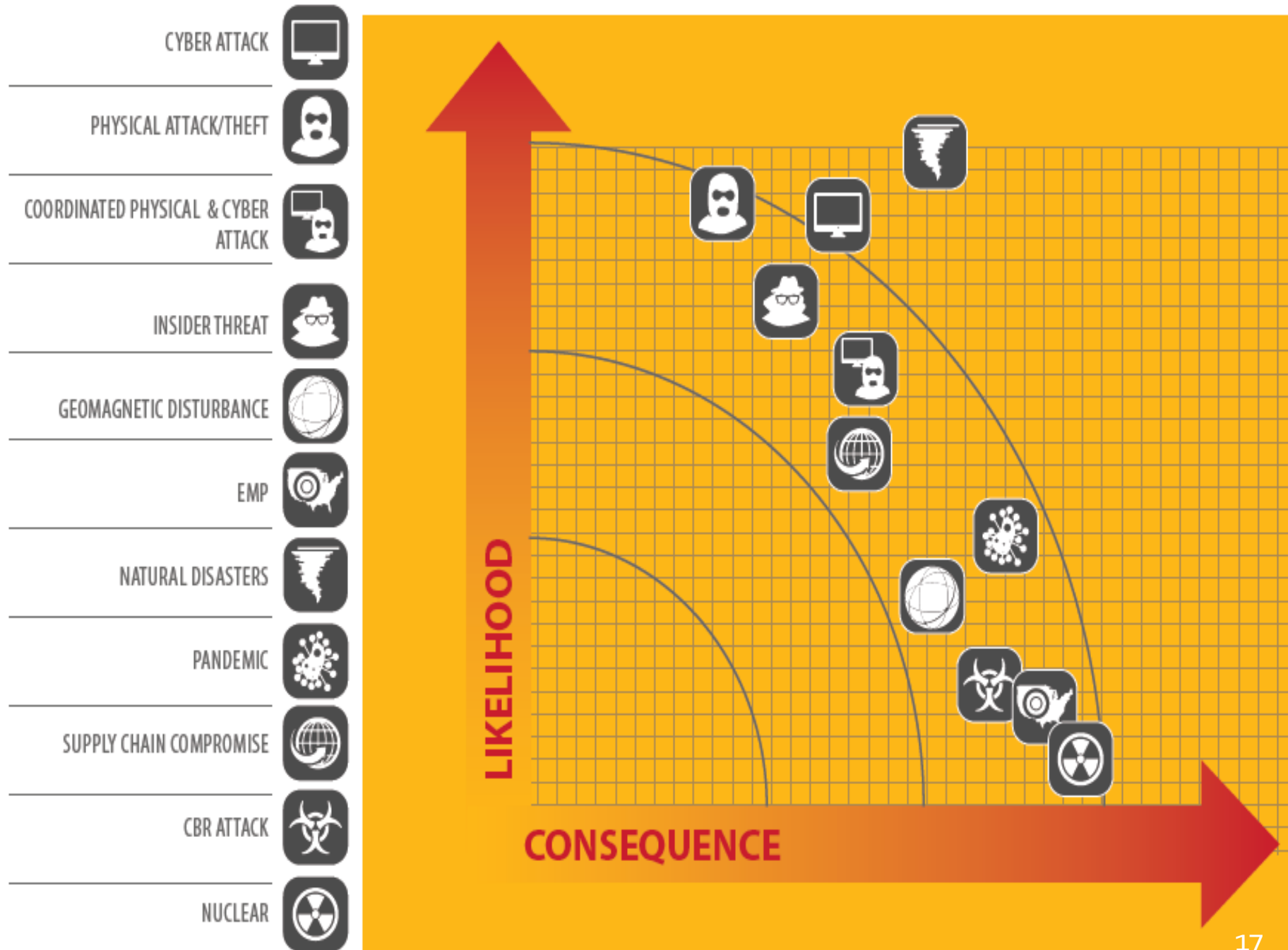
Final Clean Power Plan: The Big Picture

- States' main job is to design compliance plans
 - If states don't file compliance plan, EPA will subject units in those states to less flexible federal plan
- State plans must:
 - Require units to make reductions
 - Decide whether to allow units to trade reductions to demonstrate compliance
 - Measure compliance in terms of rate or mass
- Units decide how and when to achieve reductions (or procure/buy reductions credits or allowances)
- EPA assumes that a national trading system will emerge

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○ Cyber and Grid Security

THREAT LANDSCAPE: ELECTRIC UTILITY SECTOR



Grid Security Is a Top Priority

- The electric industry's approach to protect critical assets is known as defense in depth which includes:
 - preparation
 - prevention
 - response and recoveryto address the wide variety of hazards to electric grid operations
- Effective infrastructure protection is protecting the most critical grid components against the most likely threats – man made or natural phenomena.
- Electric Subsector Coordinating Council – CEO driven



Agenda

○ The Evolving Grid

Keys to Realizing Market Structure Objectives

- Accurate Energy Price Formation
- Fair and Competitive Capacity Market Design
- Compensating Valuable Resource Attributes



Reliability

- Sufficient capacity the system can rely on
- Fuel diversity

Economic Sustainability

- Low cost/efficient system
- Reasonable return/ sustained investments

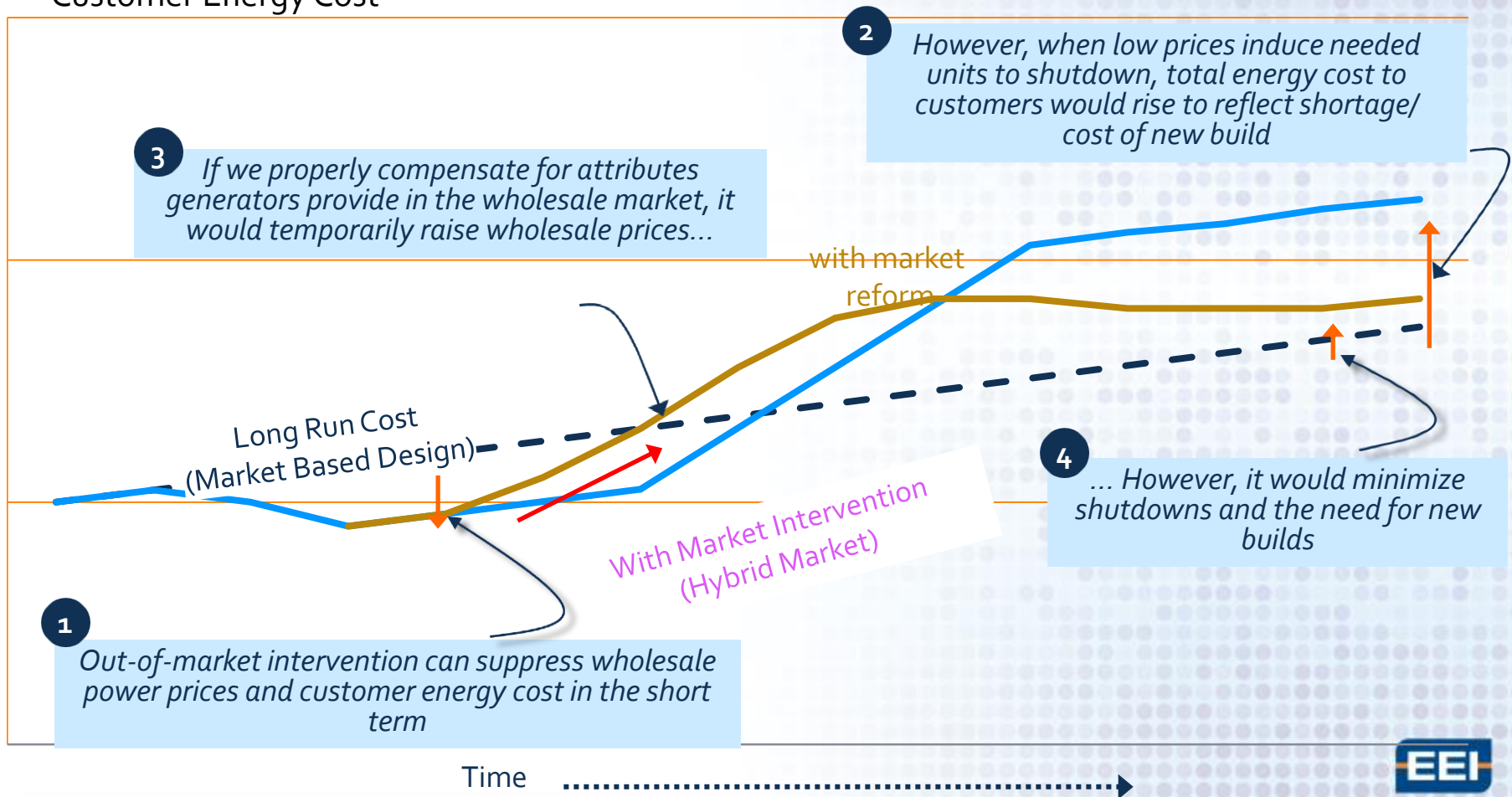
Environmental Sustainability

- Achieve carbon targets
- Reduce other pollutants

Wholesale Market Energy Price Formation Challenges

Customer Energy Cost

Illustrative



New Technologies and Residential Demand Charges Empower Consumers



Evolution of Rates: Three-Part Rates

Better reflect costs and eliminate cost-shift
Promote energy efficiency
Potentially lower costs for customers

Three-Part Rate

Volumetric Charge

Variable. Based on consumer's monthly electricity consumption (e.g. fuel costs)

Fixed Charge

Fixed. Based on fixed costs incurred by utility (e.g. like metering, poles)

Demand Charge

Fixed but can vary over time. Based on a customer's maximum kW demand over a billing cycle (e.g. transmission and generation capacity)

Getting there

The transition to three part rates should be carefully planned and gradual

The rate change will affect each customer differently

Changing to three part rate should be revenue neutral for utilities

Three part rates can result in lower electricity bills for consumers, promote reduction of peak demand



Conclusion

- The integrated grid is the backbone of our economy. Electric utilities are making needed investments in the integrated grid to meet the growing demands of our digital society
- Electric utilities are empowering customers with more choices and control, while ensuring that our electric supply is reliable, affordable and clean.
- Regulation is evolving to ensure a diverse and resilient integrated electric grid, as well as the deployment of new technology and innovation that will benefit ALL customers.



Questions?

A composite image featuring a night cityscape with a full moon in the sky. The city lights are visible in the foreground, and the moon is in the upper left quadrant of the dark sky.

Richard F. McMahon, Jr

Vice President, Energy Supply & Finance

Edison Electric Institute

rmcmahon@eei.org