EDISON ELECTRIC INSTITUTE

Electric Industry Update

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FUPWG Spring 2010 Meeting
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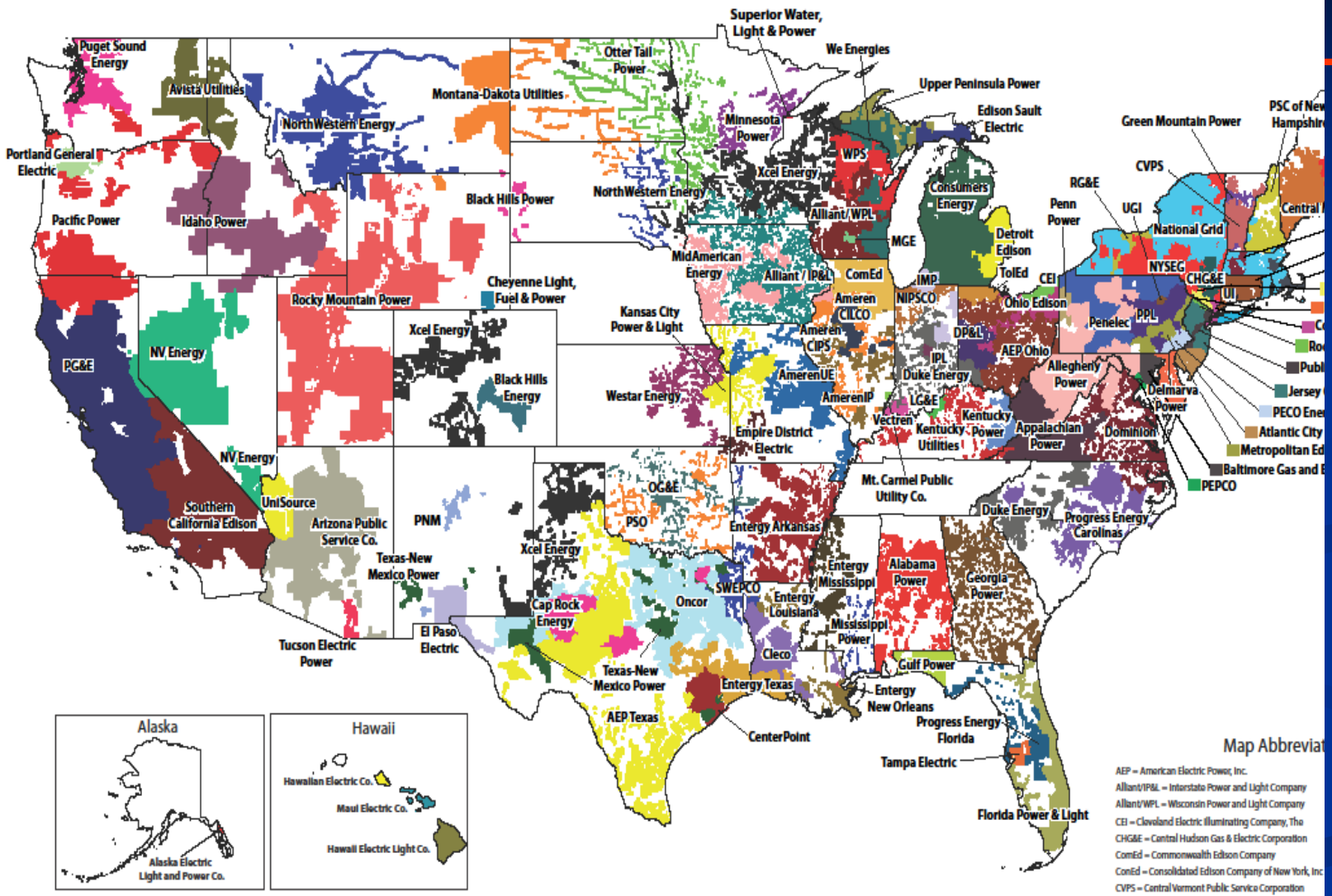
What's On the Minds of Your Utilities?

- Transformation of the Electricity Industry
  - Emerging smart technology
  - Financial reform
  - Reliability
  - Major initiatives to address climate change
  - Gaps / Lack of Clarity in Federal / State Decisions on Infrastructure and Market Issues
- Operating in a carbon constrained world

EEI

- Our members serve 95% of the ultimate customers in the shareholder-owned segment of the industry,
- and represent approximately 70% of the U.S. electric power industry.
- We also have more than 80 international electric companies as Affiliate Members
- Organized in 1933, EEI works closely with all of its members, representing their interests and advocating equitable policies in legislative and regulatory arenas.
- EEI provides public policy leadership, critical industry data, market opportunities, strategic business intelligence, forums, and products and services.

EEI U.S. Member Company Service Territories De



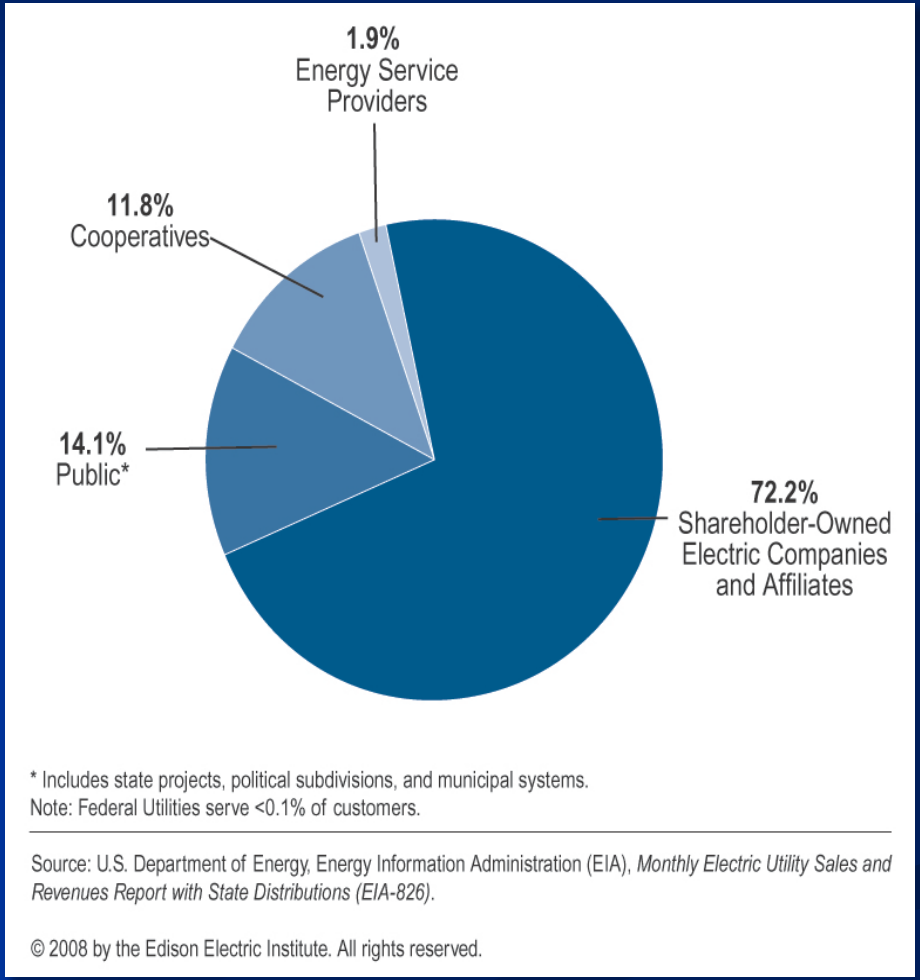
Map Abbreviat

AEP = American Electric Power, Inc.
Alliant/IP&L = Interstate Power and Light Company
Alliant/WPL = Wisconsin Power and Light Company
CEI = Cleveland Electric Illuminating Company, The
CHG&E = Central Hudson Gas & Electric Corporation
ComEd = Commonwealth Edison Company
ConEd = Consolidated Edison Company of New York, Inc
CVPS = Central Vermont Public Service Corporation
DP&L = Dayton Power and Light Company, The
IMP = Indiana Michigan Power
IPL = Indianapolis Power & Light Company
LG&E = Louisville Gas and Electric Company
MGE = Madison Gas and Electric Company
NYSEG = New York State Electric & Gas Corporation

Produced by Edison Electric Institute's Project Support Group. Data Source: Ventyx,Inc., The Velocity Suite 2009.

Types of Electric Utilities

- Shareholder-Owned Utilities
- Cooperatively Owned Utilities
- Government-Owned Utilities
  - *Federally Owned Utilities*
  - *State-Owned*
  - *Municipally Owned*
  - *Political Subdivisions*



What Does it Mean to be Regulated?

Rights

- Protected service territory
- Recovery of legitimate costs
- Fair return on investment
- Allowed to charge “non-competitive” rates

Responsibilities

- Obligation to serve
- Expenditures must be prudent
- Investments must be “used and useful”
- All rate increases must be justified and approved

Regulation of IOUs: States

- Generally, state governments regulate:
  - *adequacy of retail electric service;*
  - *mergers;*
  - *facility planning and siting on generation, transmission, distribution*
- In the 31 states without competition:
  - Rates are still determined by PUCs who look at the utilities entire cost of generating and delivering electricity to customers, and then set a rate that will reimburse the company for those costs plus a fixed rate of return
  - The PUCs' goal is to keep rates as low as possible while allowing the utility to remain financially healthy and meet their obligations to serve
- In 19 deregulated states and D.C., the generation portion is unregulated – transmission and distribution is regulated.

Regulation of IOUs: Federal

- *The federal government regulates interstate power sales and services (including reliability of grid), mergers; corporate structure*
- EPAct of 2005 created the Electric Reliability Organization (ERO), an independent, self-regulating entity that enforces mandatory electric reliability rules on all users, owners, and operators of transmission system.
- Other federal and state laws, rules, and regulations also apply to the electric utility industry, including, but not limited to:
  - *Anti-trust laws / Dept. of Justice / FTC*
  - *SEC requirements, including Sarbanes-Oxley*
  - *Environmental regulations/EPA*

Transformation Drivers

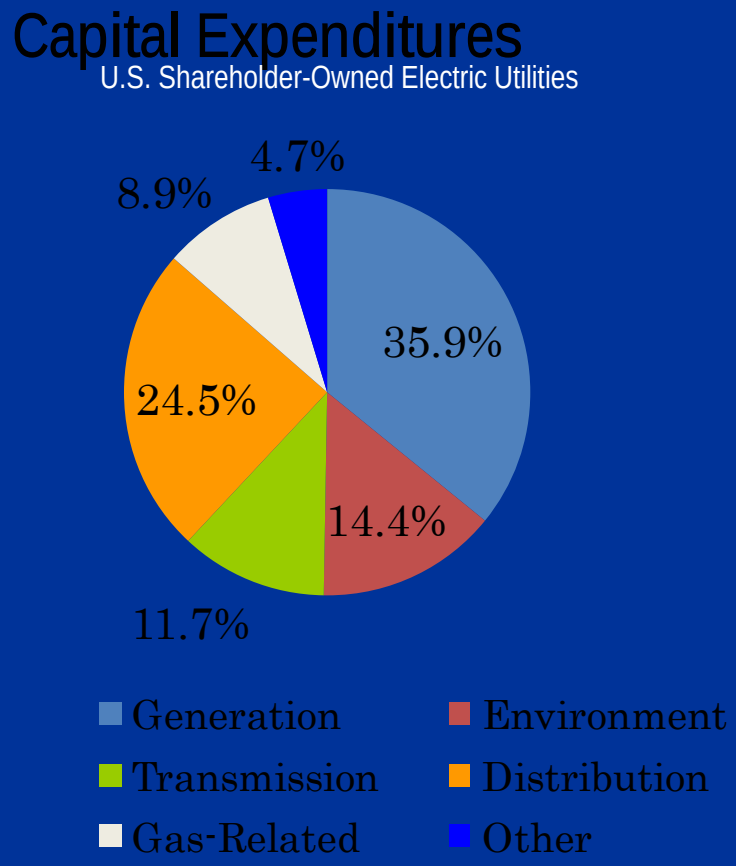
- Regulatory Changes
  - Deregulation, decoupling
- Policy Changes
  - Carbon legislation, ARRA, RPS, Cybersecurity
- Business Model Changes
  - Distributed Resources, demand response
- Customer Changes
  - PHEVs, more load, more PQ requirements, more green
- Technology Changes
  - Renewables, grid-scale storage

Financial Snap-Shot

- Recession has dampened demand, but forecasted to rebound and grow
  - Commodity, equipment, and labor costs are down, making it an ideal time to build and prepare for future demand increases
- Wall Street Restructuring affects access to capital markets and increasing cost of capital
  - As one of the most capital-intensive industries, reduced access to capital markets at higher costs, means that enhanced liquidity and financial flexibility is important
- Utility industry at the beginning of a major investment cycle
  - Driven by new technology, demand growth, efficiency and environmental CAPEX
- Addressing climate change and new priorities will be costly

Industry Capital Expenditures are Growing

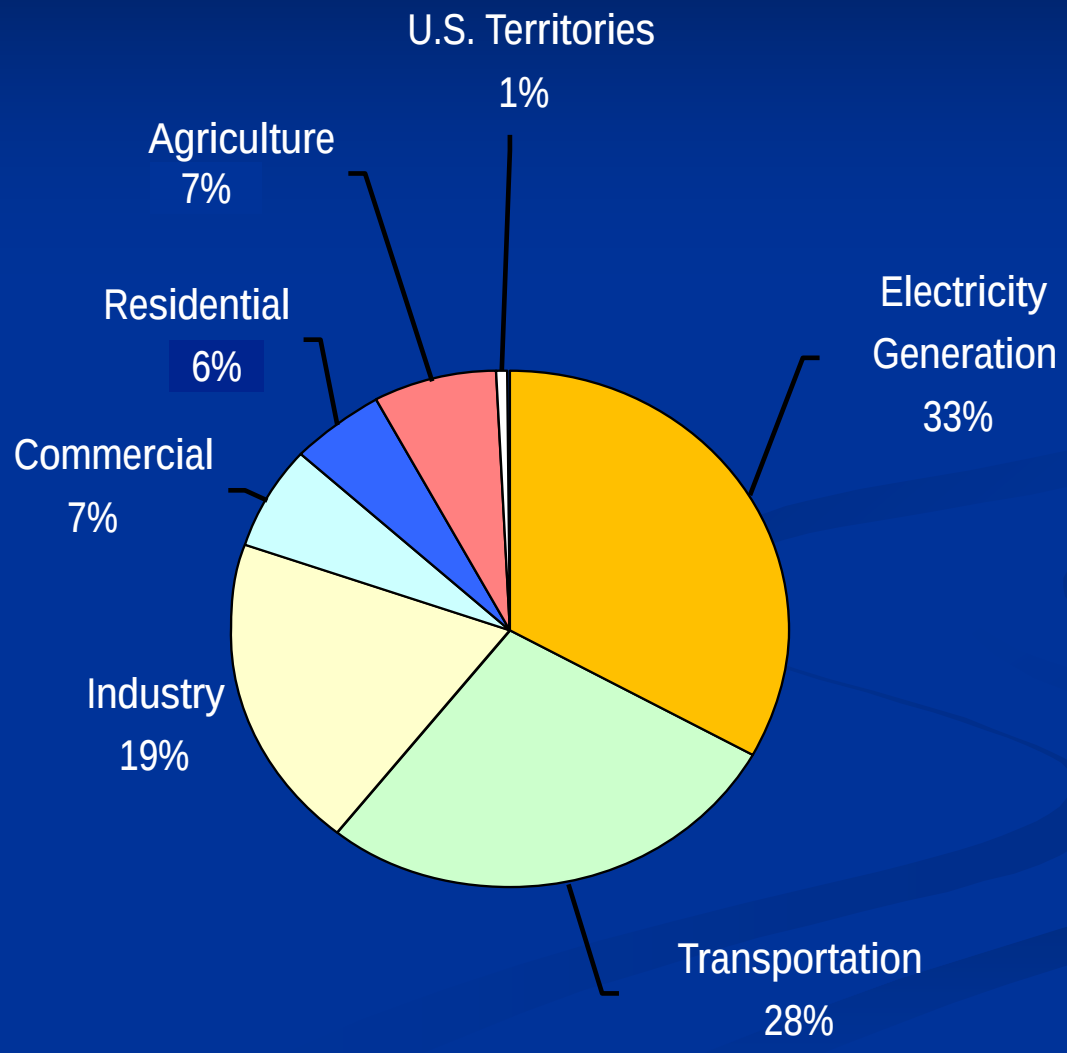
- Industry committed to reliability
  - making needed investments in generation, transmission, smart grid/ distribution & the environment
- Financial crisis initially brought sharp revisions for 2009
- Multi-year trend of soaring construction /materials costs reversed in Q3 2008, but starting to creep up again.
- Increased spending expected to continue into the future
  - Total CAPEX for 2010-2030 ~ $1.5 trillion*
    - Excludes impact from climate legislation



* *The Brattle Group,* preliminary findings from The Edison Foundation presentation titled Transforming America's Power Industry. Represents the entire Power sector.

Climate Change and Washington

U.S. GHG Emissions By Sector EIA



Background on Climate Change

- Consensus that federal climate change legislation is needed
- EEI CEOs developed framework that companies could all support
- And a set of principles

Background on Climate Change

- EEI Climate Principles
  - Ensure the development and cost-effective deployment of a full suite of climate-friendly technologies
  - Minimize economic disruption to customers and avoiding harm to the competitiveness of U.S. industry and
  - Ensure an economy-wide approach to carbon reductions

President Obama's Energy / Environmental Views

Climate Change

80% reduction by 2050
H.R. 2454 & S.1733 83% reduction by 2050

Renewable Portfolio Standards

25% by 2025
H.R. 2454 20% by 2020
S.1462 15% by 2021

Energy Efficiency

Overhaul of Federal Efficiency Codes In H.R. 2454 & S.1462

Smart Grid

Increased Government Support In H.R. 2454, S.1462 and stimulus package

Climate Change Questions
Key Questions

- How do you minimize the impact of compliance costs on customers?
- What must U.S. climate change legislation and carbon management strategy include to
  - Ensure economic growth?
  - Ensure energy security?
  - Avoid unfairness?

Key Climate Specific Questions?

- Economy Wide?
- Cap-and-Trade?, Cap-and-Dividend?, or Carbon Tax?
- Mitigating Customer Impacts?
  - Allowances
  - Offsets
  - Strategic allowance reserve
  - Other approaches
- Targets and Timetables?

Targets and Timetables
Leading Congressional Proposals

H.R. 2454

- 3 % below 2005 by 2012
- 17 % below 2005 by 2020
- 42 % below 2005 by 2030
- 83 % below 2005 by 2050

S.1733

- 3% below 2005 by 2012
- 20% below 2005 by 2010
- 42% below 2005 by 2030
- 83% below 2005 by 2050

U.S. CAP proposal

- 3 % below to 2 % above 2005 by 2012
- 14-20 % below 2005 by 2020
- 42 % below 2005 by 2030
- 80 % below 2005 by 2050

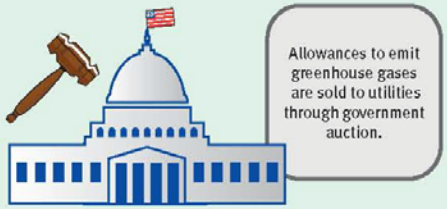
Allowances:

Allocations or Auctions?

Why Allocate Emissions Allowances?

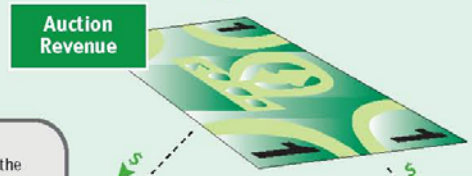
Auctioning Allowances Would Sharply Increase Costs To Customers.

How An Auction Works



Allowances to emit greenhouse gases are sold to utilities through government auction.

Through their electricity bills, customers pay to cover the costs of allowed emissions AND for the costs of reducing emissions.



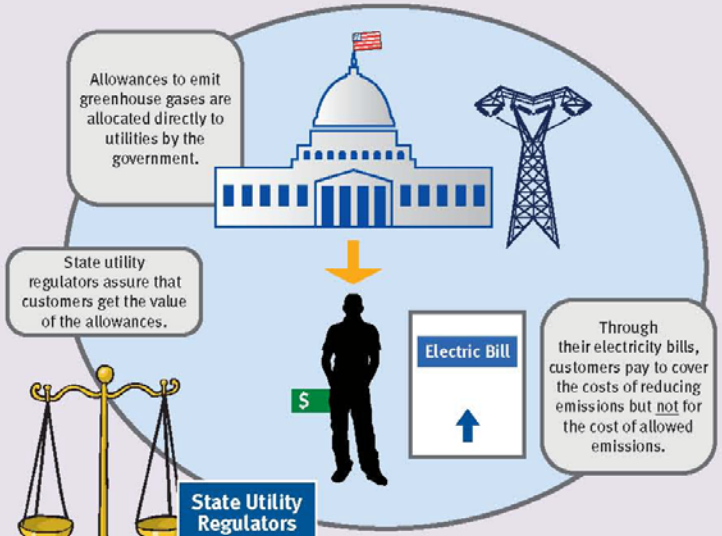
Some of the money from the auction gets rebated by the government to some customers.

Some customers get nothing.

The remainder of revenues may be funneled to government programs totally unrelated to reducing GHG emissions or mitigating compliance costs to all electricity customers.

April 2009

How An Allocation Works



Allowances to emit greenhouse gases are allocated directly to utilities by the government.

State utility regulators assure that customers get the value of the allowances.

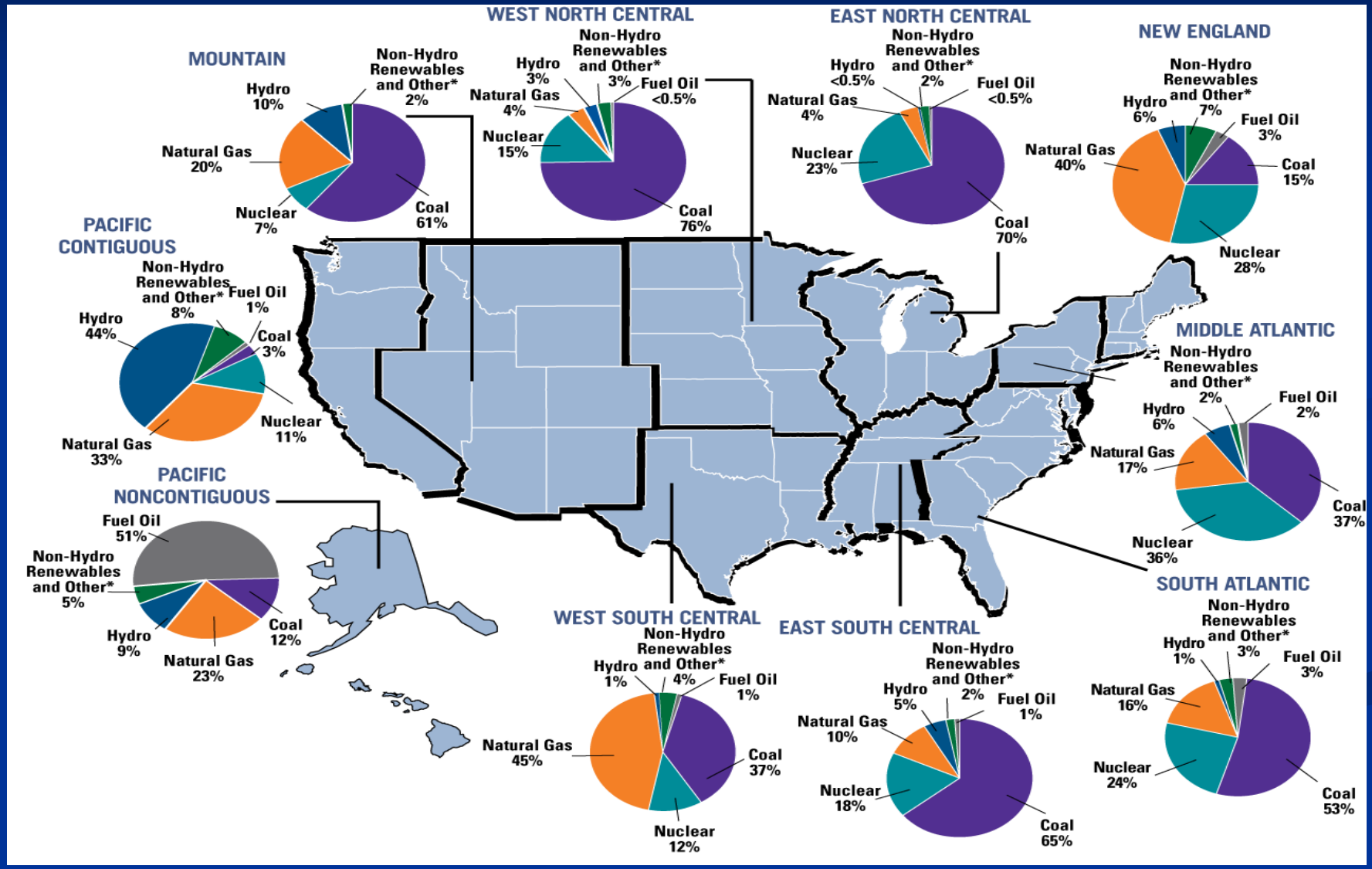
Through their electricity bills, customers pay to cover the costs of reducing emissions but not for the cost of allowed emissions.

State Utility Regulators

All Customers Get the Benefits of Not Having To Pay for Allowed Emissions

Residential | Commercial | Industrial

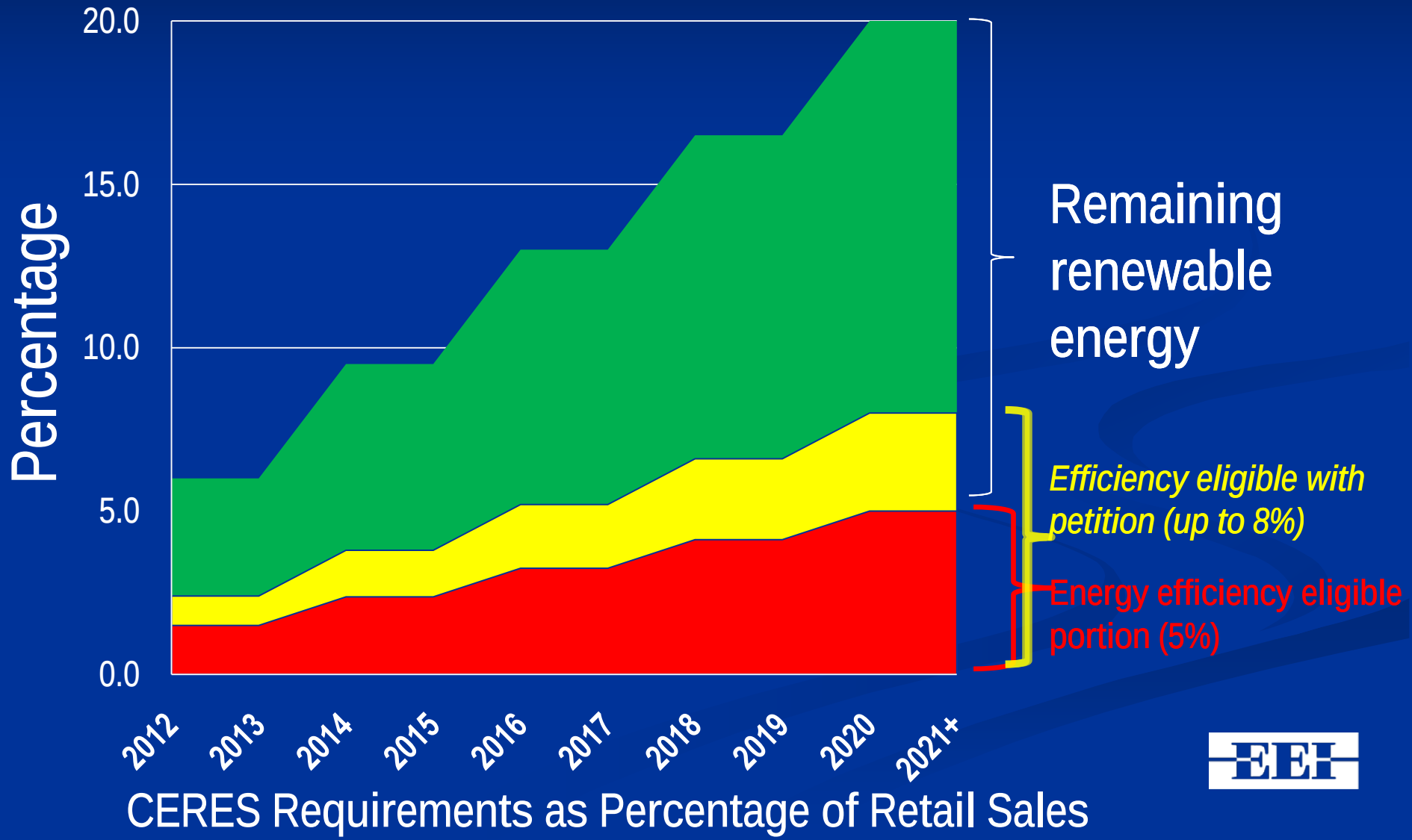
Legislation Likely to Affect Regions Differently



Combined Efficiency and Renewable Electricity Standard (CERES) HR 2454

- Establishes 20% federal combined efficiency and renewable electricity standard by 2020 for retail electricity suppliers
- 75% must be qualified renewables unless a state petitions for more efficiency (up to two-fifths)
- Program administered by FERC
- Electricity Savings Definition: reductions in electricity consumption, relative to business as usual
- Alternative compliance option; trading and banking option; civil penalties

Waxman-Markey CERES Requirements
20% by 2020



The American Clean Energy and Security Act of 2009 (H.R. 2454)
Economic Impact Projections

Impacts in 2030	Energy Information Administration	Environmental Protection Agency	Charles River Associates	Heritage Foundation
GDP Loss	0.8%	0.37% – 1.06%	1.3%	2.8%
Employment Loss	0.6 million (0.4%)	1.0 million (0.6%)	2.5 million (1.5%)	1.9 million (1.2%)
Cost per Household	$288	$277 - $366	$830	N/A
CO_2 Allowance Price (2008$)	$66.22	$28.74	$46.00	N/A
Electricity Price (% over Baseline)	20%	13%	22%	N/A

How Will Emissions Reductions be Achieved?

Assumptions on Nuclear, Renewables, Energy Efficiency Vary

	Generation Mix in 2008	Projected Generation Mix in 2030			
	EIA	EIA Base Case	H.R. 2454 (EIA)	H.R .2454 (EPA)	H.R. 2454 (MIT)
Renewables	9.7%	15.9%	20.3%	15.2%	17.4%
Fossil Fuels	70.7%	66.4%	41.8%	45.7%	55.3%
Nuclear	19.6%	17.7%	30.8%	27.6%	18.6%
Reduced Consumption			7.1%	11.5%	8.6%

Political Landscape

- Can the Senate get to 60 votes? Not real likely this year after Massachusetts, down-economy, and the mood of electorate, election year, and now Supreme Court nomination process

- BUT Kerry, Liebermann, and Graham to introduce a more "bi-partisan" bill this week.
  - Will likely contain drilling, nuclear provisions
  - Targets for industry?
  - 17% by 2020

EPA Is Forcing The Issue

- 2007: U.S. Supreme Court ruled that CO2 a pollutant and carbon dioxide and other GHGs could be regulated under the Clean Air Act.
- December 2009: EPA published its final rule and Endangerment Finding noting that such releases would endanger public health and welfare.
- *Expected to be extensively litigated*
  - *Already a target to multiple legal action and legislation to stop it or slow it down*
  - *Lisa Jackson: Power plants and industry would have little incentive to implement modern technologies.*

EPA

- Jackson worries that other nations would then become the focal point for producing those same green energy technologies.
- Modified EPA's stance by delaying the regulations for one year.
- The earliest that any utility would be obliged to comply with the new rules is 2011 (applications)
- EPA regulation would affect power plants and other factories that emit 25K tons =>CO2/year. If such facilities are modernized, or if new ones are built, they would then be required to install "best available technologies."
- Strategies to completely derail GHG cuts are unlikely to prevail, majority on Congress favors some action.
- But at what pace? Given economy, lack of infrastructure, technologies, etc.

The Future of Providing Electricity in a Carbon Constrained World

What Will It Take to Address Climate Change?

There is no silver bullet!

- Renewables
- Energy efficiency
- Clean coal technologies
- Carbon capture and storage
- Nuclear
- Plug-in hybrid electric vehicles (Smart grid)

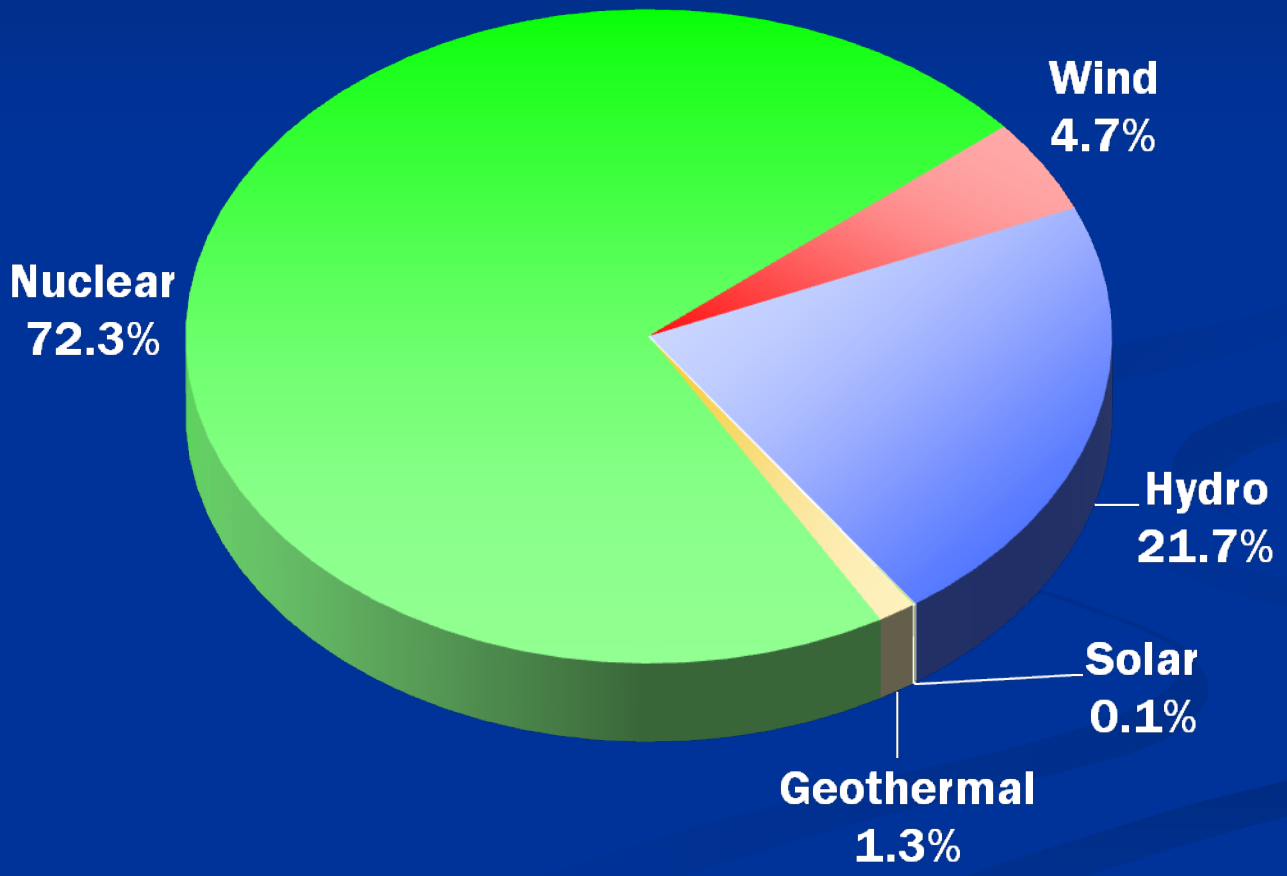
We need it all … but it will be costly!

How are We Going to Meet Targets and Timetables?

- To meet short-term targets
  - Power sector will rely on energy efficiency, renewables and natural gas
- In the medium term (*i.e.*, 2020-2025)
  - Targets should be harmonized with the development and commercial deployment of advanced climate technologies and measures
    - (*e.g.*, nuclear energy, advanced coal technologies with carbon capture and storage, PHEVs, smart grid)
- Electricity demand will increase 21% by 2030
  - Energy Information Administration forecast

U.S. Electricity Sources Which Do Not Emit Greenhouse Gases During Operation

2008



Source: Energy Information Administration

Updated: 4/09

Renewable Power & Energy Efficiency Market: Renewable Portfolio Standards

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

31 States including D.C. have Renewable Energy Portfolio Standards (RPS)

ND: 10% by 2015

SD: 10% by 2015

NE: proposed an RPS

KS: 20% by 2020

OK: Studying an RPS

MN: 25% by 2025; Xcel: 30% by 2020

IA: 105 MW

MO: 15% by 2021

WI: 10% by 2015

IL: 25% by 2025

MI: 10% MWh and 1,100 MW by 2015

OH: 12.5% by 2025

WV: 25% by 2025

KY: Report recommends RPS

WA: 15% by 2020

OR: 25% by 2025

CA: 33% by 2020

MT: 15% by 2015

NV: 25% by 2025

UT: 20% by 2025

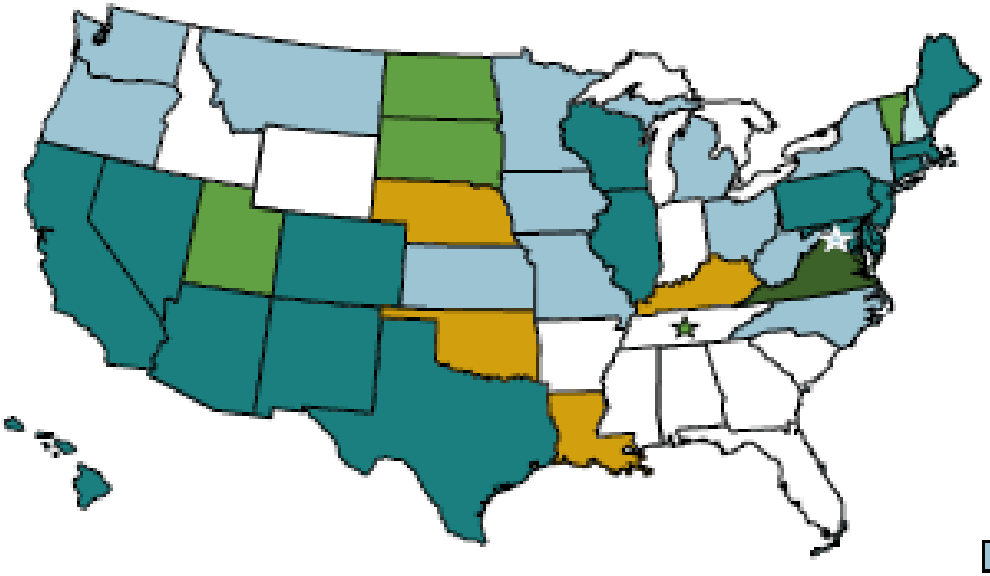
CO: 20% by 2020

AZ: 15% by 2025

NM: 20% by 2020

TX: 5,880 MW by 2015

HI: 40% by 2030



ME: 40% by 2017

NH: 23.8% by 2025

VT: 20% by 2017; all growth to 2012 from RE and EE

MA:15% by 2020

RI: 16% by end 2019

CT: 27% by 2020

NY: 29% by 2013

NJ: 22.5% by 2020

PA: 18% by 2020

DE: 20% by 2019

DC: 20% by 2020

MD: 20% by 2022

VA: 15% by 2025; goal with production incentives

NC: 12.5% by 2021

TVA: 50% by 2020

- RPS
- Accelerated or strengthened RPS
- Voluntary standards or goals
- Strengthened voluntary standard
- Proposed RPS or studying RPS

Updates at: http://www.ferc.gov/market-oversight/othr-mrkts/renew.asp

Notes: An RPS requires a percent of an electric provider's energy sales (MWh) or installed capacity (MW) to come from renewable resources. Most specify sales (MWh). Map percents are final years' targets. *TVA's goal is not state policy; it calls for 50% zero- or low-carbon generation by 2020. Alaska has no RPS.

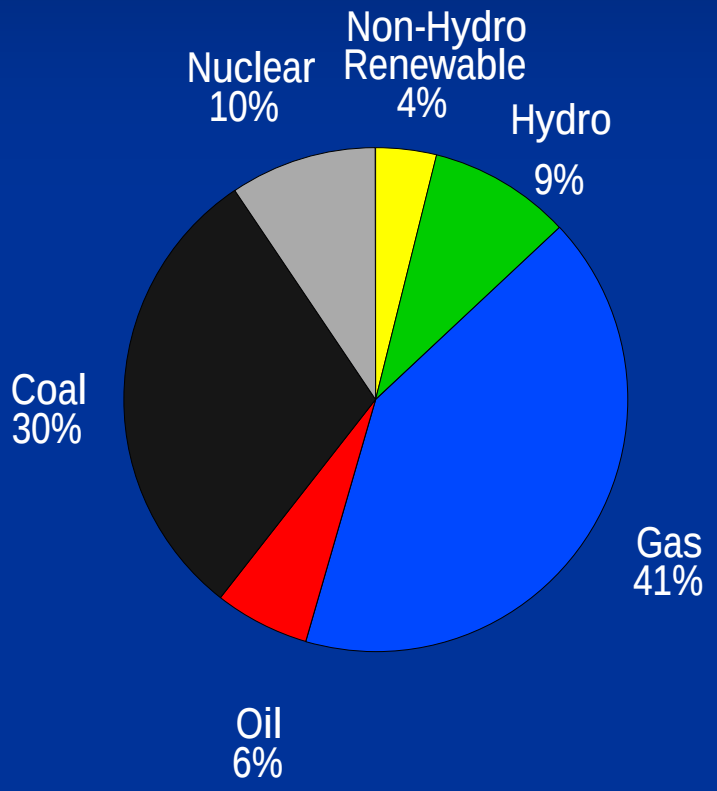
Sources: Derived from data in: LBNL, PUCs, State legislative tracking services, Pew Center, and the Union of Concerned Scientists. Details, including timelines, are in the Database of State Incentives for Renewables and Energy Efficiency: http://www.dsireusa.org

Updated October 19, 2009

Planned capacity additions reflect state RPS requirements

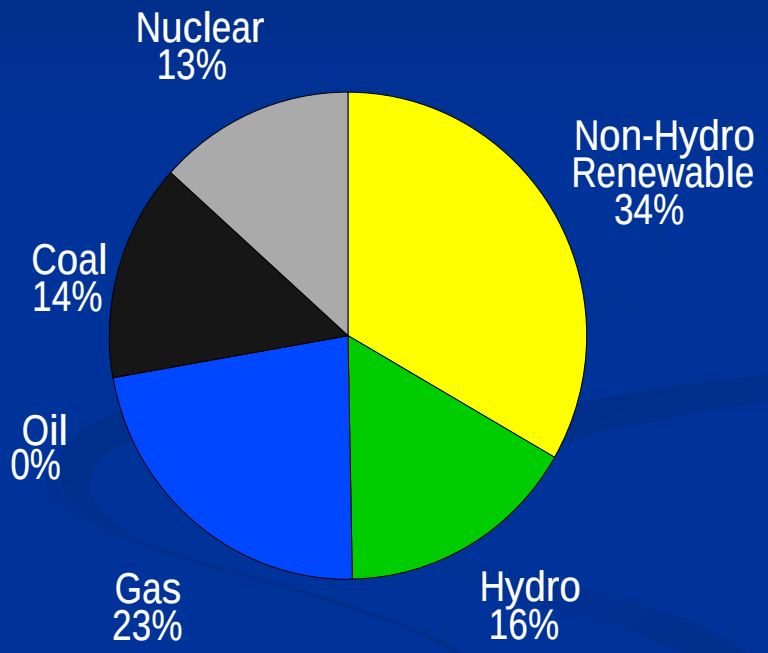
US Generation Capacity in 2008

(1,061 GW in Service)



Planned Capacity Additions to 2020

(352 GW)



Source; Ventyx Global Energy and Bernstein Analysis

Non-hydro renewables make up 4% of US capacity today but 34% of planned capacity additions through 2020.

Source: Bernstein Research

Biggest Challenge for Renewables … *Transmission*

- Planning
- Siting
- Cost Allocation

Renewables are Variable Resources!

Integrating Renewables
Operational Challenges

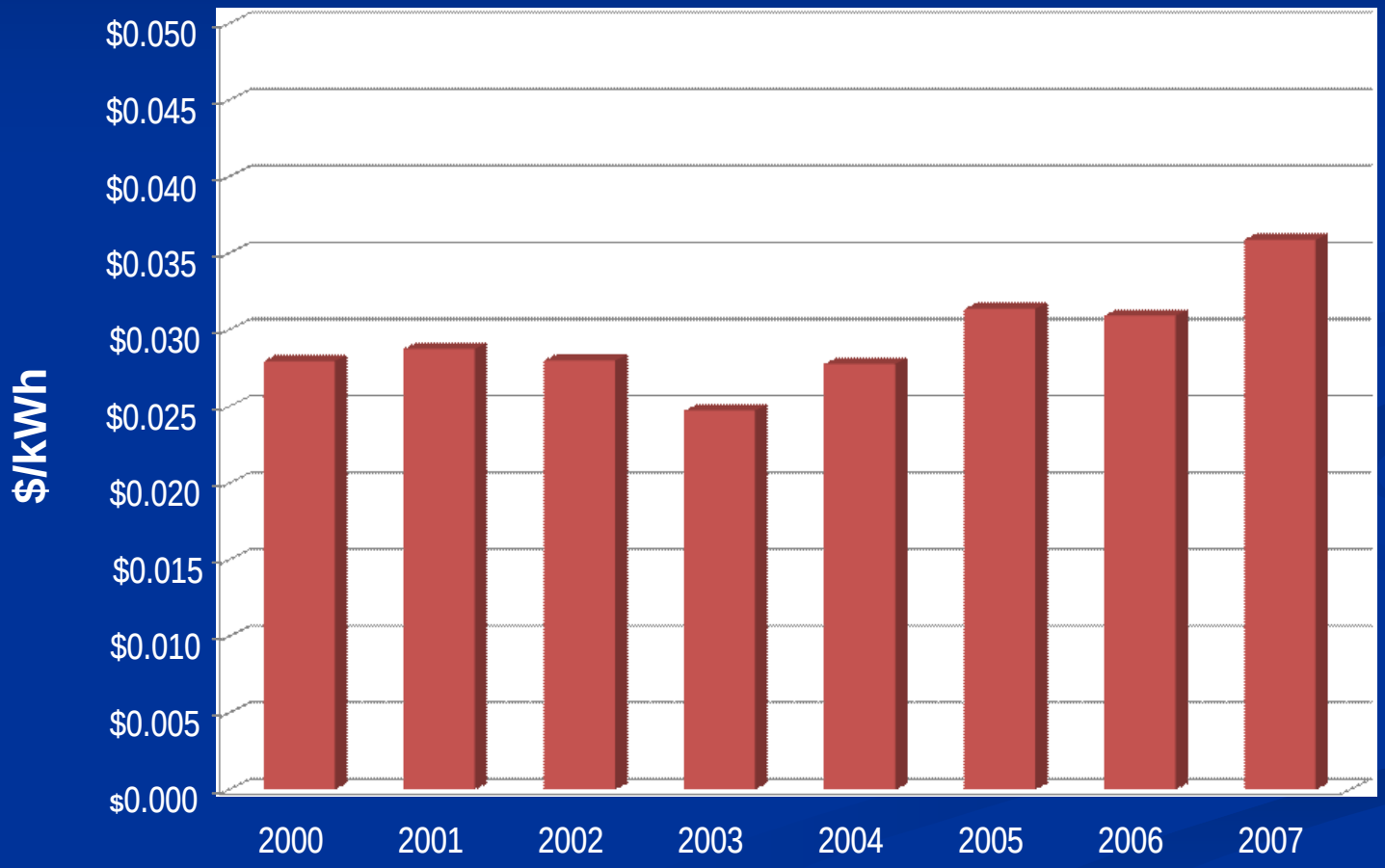
- Higher RPS levels can create significant surplus energy
  - Has created excess energy at night
- Requires more system backup to maintain reliability
  - Quick start and fast ramping technologies (peaking / storage) to manage generation variability and maintain reliability when wind falls off or clouds appear
- Smart grid can help mitigate some of these problems
  - Energy storage / off-peak electric vehicle charging can mitigate problem
  - Smart grid will help enable these new technologies

Efficiency Is The 1st, Best Option

- Climate change - to slow growth, reduce emissions
- Rate shock – to give customers new tools to control costs
- Reliability – to reinforce the grid against declining reserve margins
- Realistic savings potential - reduce growth rate from 1.2%/yr to .8%/yr, 37% of the growth in electricity use by 2030:
  - *Assessment of Achievable Potential for Energy Efficiency and Demand Response in the U.S. (2010 – 2030)*, EPRI http://www.edisonfoundation.net/IEE/reports/Rohmund.pdf

Energy Efficiency - Our 1st fuel
Ave. Cost ~$0.035 / kWh Saved

Total Utility EE Costs per kWh Saved



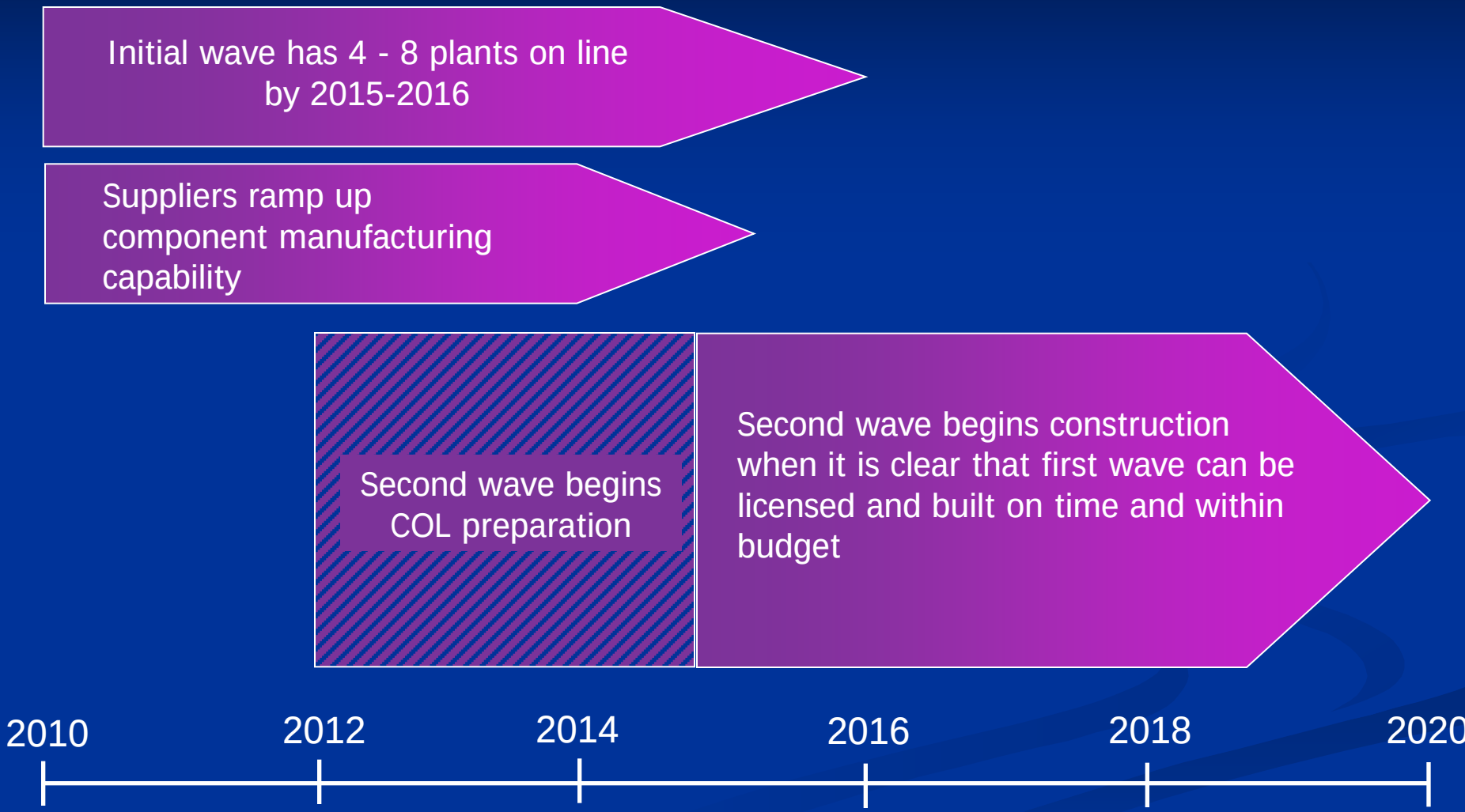
Source: The Edison Foundation – Institute of Electric Efficiency; EIA Form 861

Carbon Capture and Storage Challenges

- Capture
  - Develop cost-effective means of capturing CO_2 from combustion
- Transport
  - Ability to access current gas and CO_2 pipeline structure
  - Regulatory framework
  - Liability concerns
- Storage
  - Permitting and siting
  - Liability concerns
  - Full-scale demonstration projects
  - Public education and acceptance

…What About Nuclear?

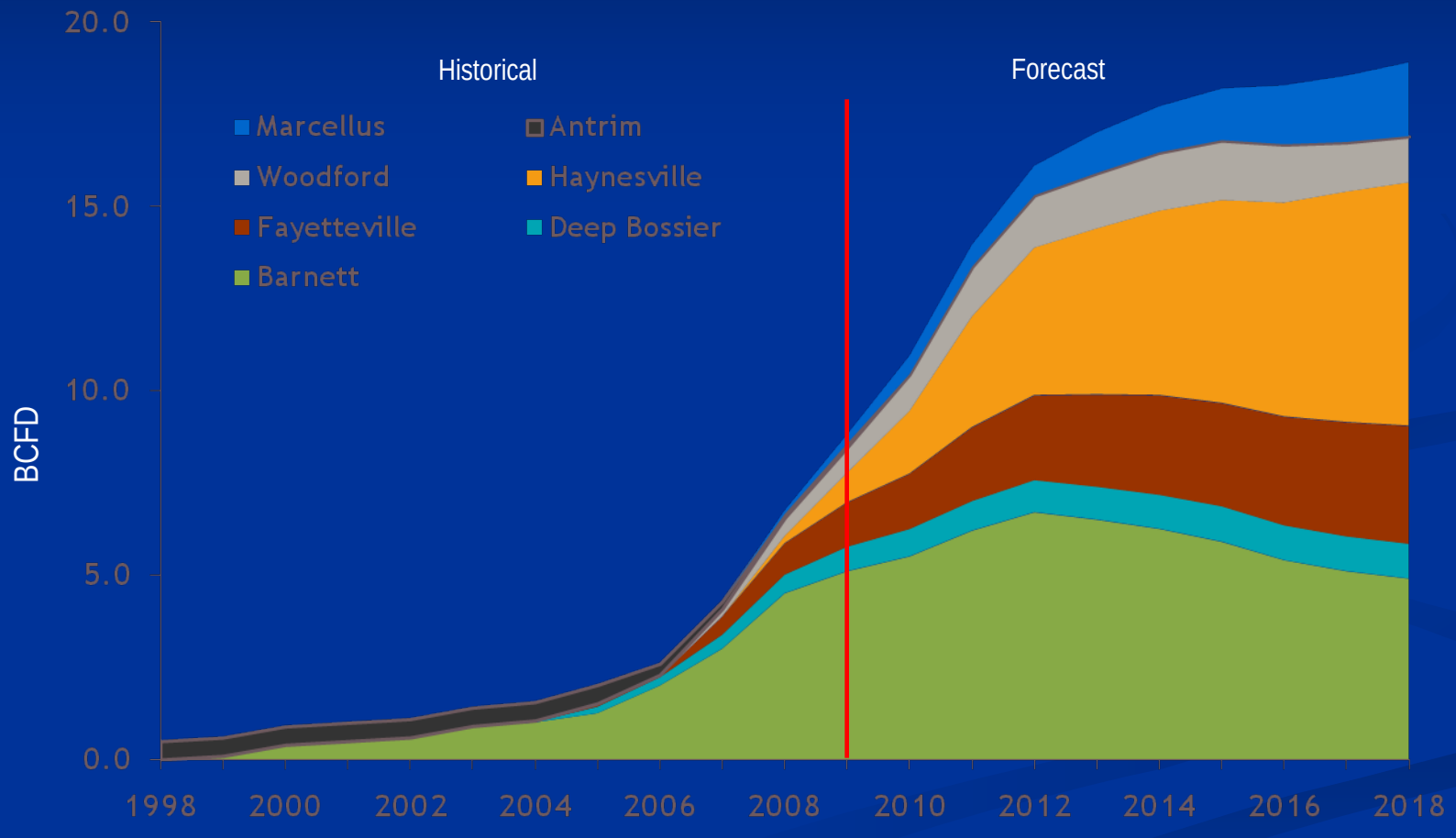
Expectations for the Future



Source: NEI

U.S. Shale – A Game Changer?

Gas Production Potential



Source: Tristone Capital, Devon Energy

SMART GRID
A Game Changing Technology

What is the Smart Grid?

An advanced, telecommunication / electric grid with sensors and smart devices linking all aspects of the grid, from generator to consumer, and delivering enhanced operational capabilities.

Smart Grid: What's In It for Commercial?

- Enhance reliability: grid will be better protected:
  - Cybersecurity and physical attacks
  - Weather disruptions
  - Increased power quality
  - Early Detection and Self-Correcting Grid

- A more efficient grid that will optimize current assets while integrating emerging technologies (e.g., renewables, storage devices)

- Information and tools to be responsive to grid conditions through the use of electrical devices and new services:
  - Respond to market price signals
  - Enhanced Energy Efficiency and Demand Response
  - Plug-in Hybrid vehicles

What Will the SG Look Like?

- Smart meters that provide near-real time usage data
- Time of use and dynamic pricing
- Smart appliances communicating with the grid
- EMS in homes as well as C&I facilities linked to the grid
- Growing use of PHEVs
- Networked sensors and automated controls throughout grid
- High use of renewables – 20% – 35% by 2020
- Distributed generation and microgrids
- “Net” metering – selling local power into the grid
- Distributed storage

Conclusions

1. The regulatory environment is changing.
   - Carbon regulation is coming, may be fragmented.
   - It will affect the way customers build their facilities and use electricity.
   - FERC's authorities and role is growing, may challenge state jurisdictions.
2. The utility business is changing.
   - We are getting "greener"
   - Carbon will be the dominant planning paradigm
   - Smart grids will be the dominant operating paradigm
3. The bottom line
   - Energy is the foundation of America's strength and competitiveness.
   - Energy policy must ensure that consumers and businesses have access to reliable, affordable energy.

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Thanks