Edison Electric Institute

Power by Association℠

Electric-Gas Coordination

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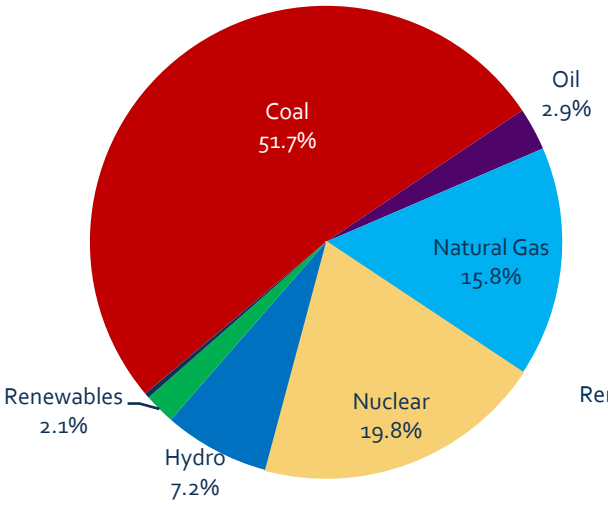
NASEO Annual Meeting
September 10, 2012
Minneapolis, Minnesota

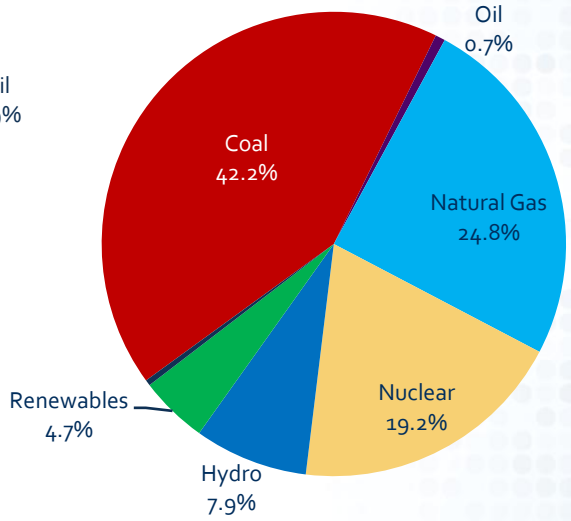
Changing Generation Mix

Generation Mix

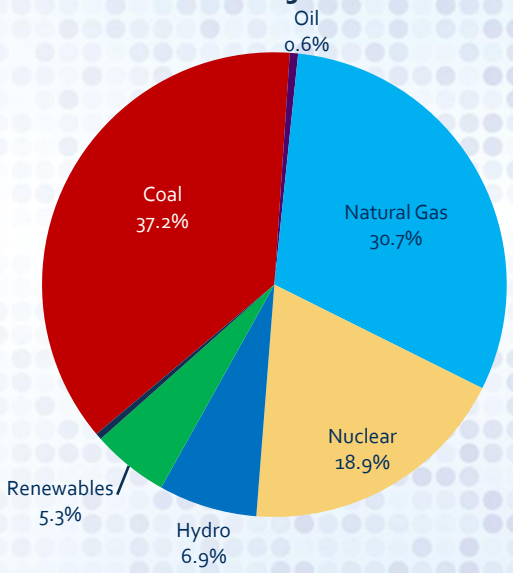
2000



2011



2012 (Projection)*



2035 – EIA Projection
Coal:38%
Gas: 28%

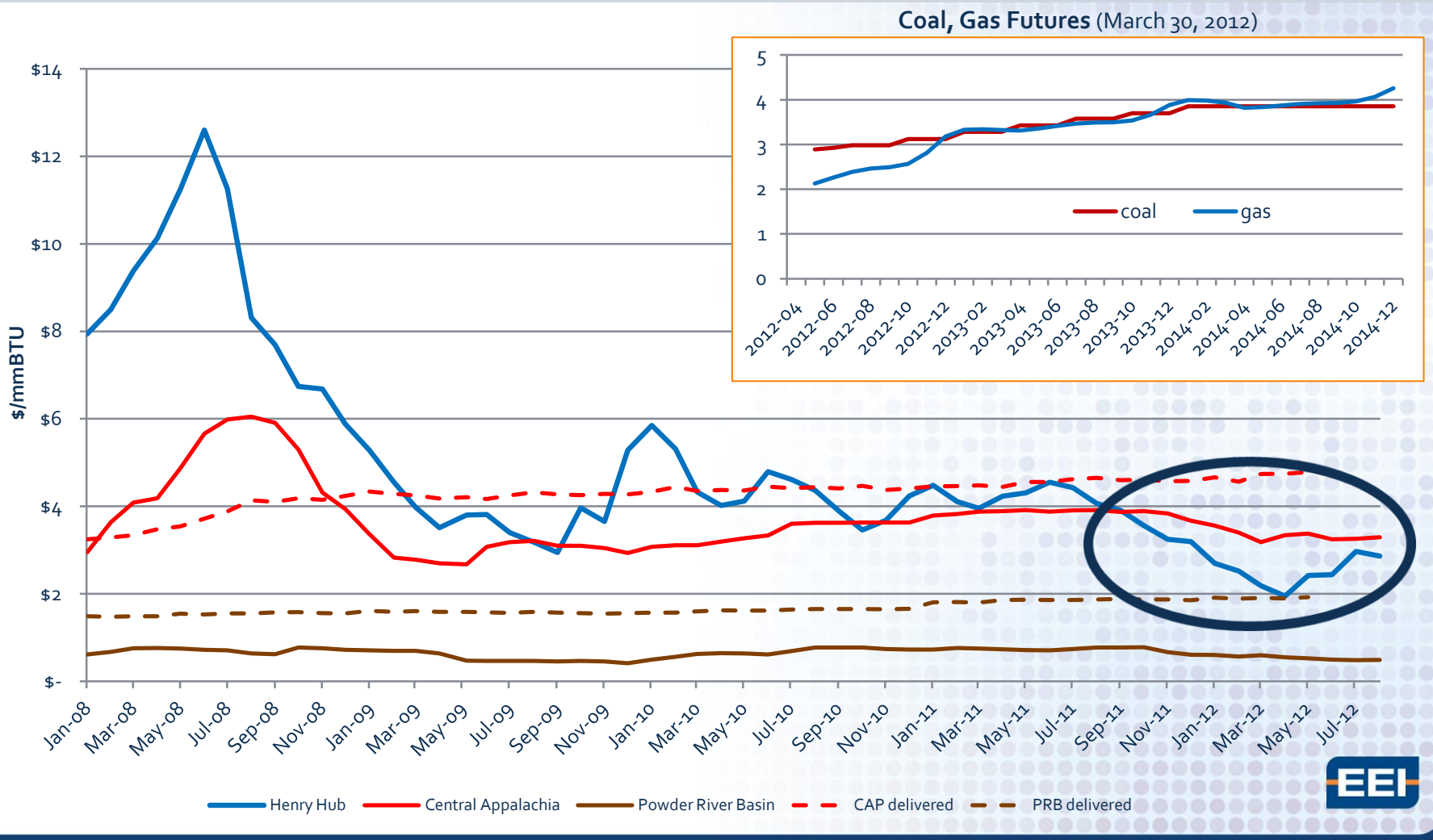
Source: DOE – Energy Information Administration

* Actual preliminary data for January-June; STEO for July-December

Reasons for Increased Use Natural Gas

- 53,000 MW of retirements or conversions of coal plants have been announced with retirement dates between 2010-2022
- Factors include:
  - Aging of the coal fleet - median construction age January 1966
  - Demand – Economy/Weather
  - EPA regulations
  - Fuel prices

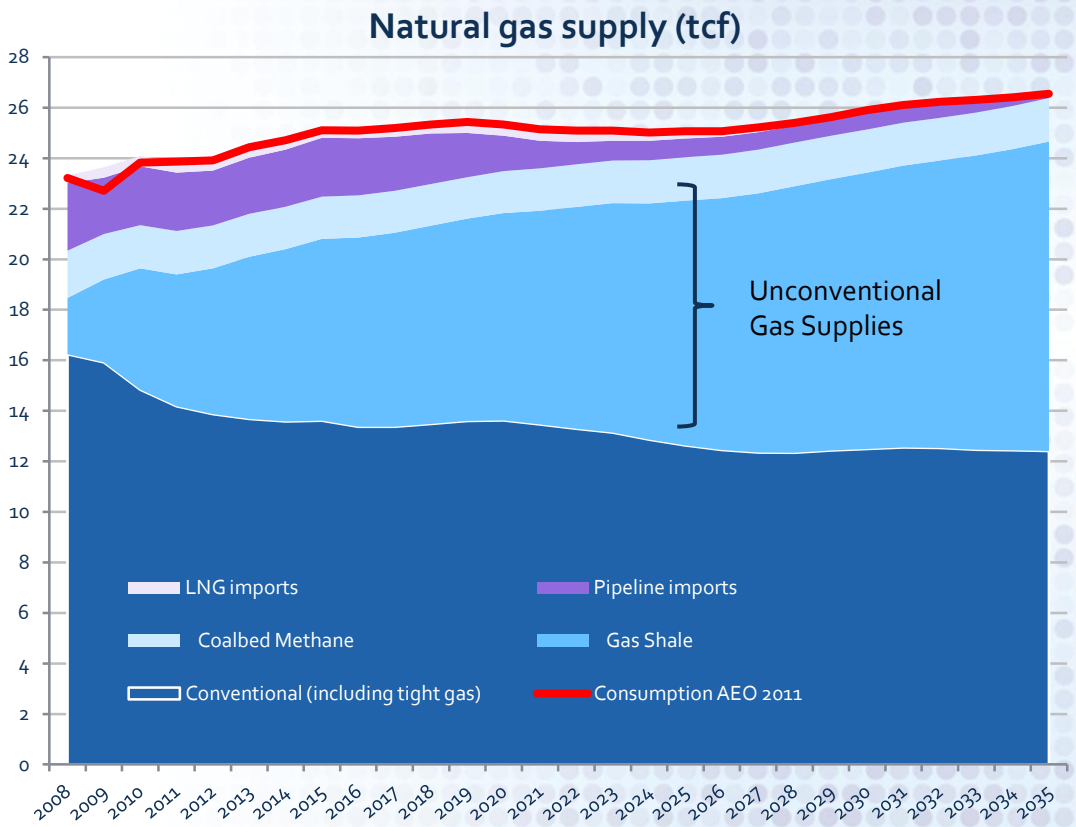
Prices Driving Switching



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

Natural Gas Trends

- Abundant shale resources
- Shale formations now account for more than 70% of total new production

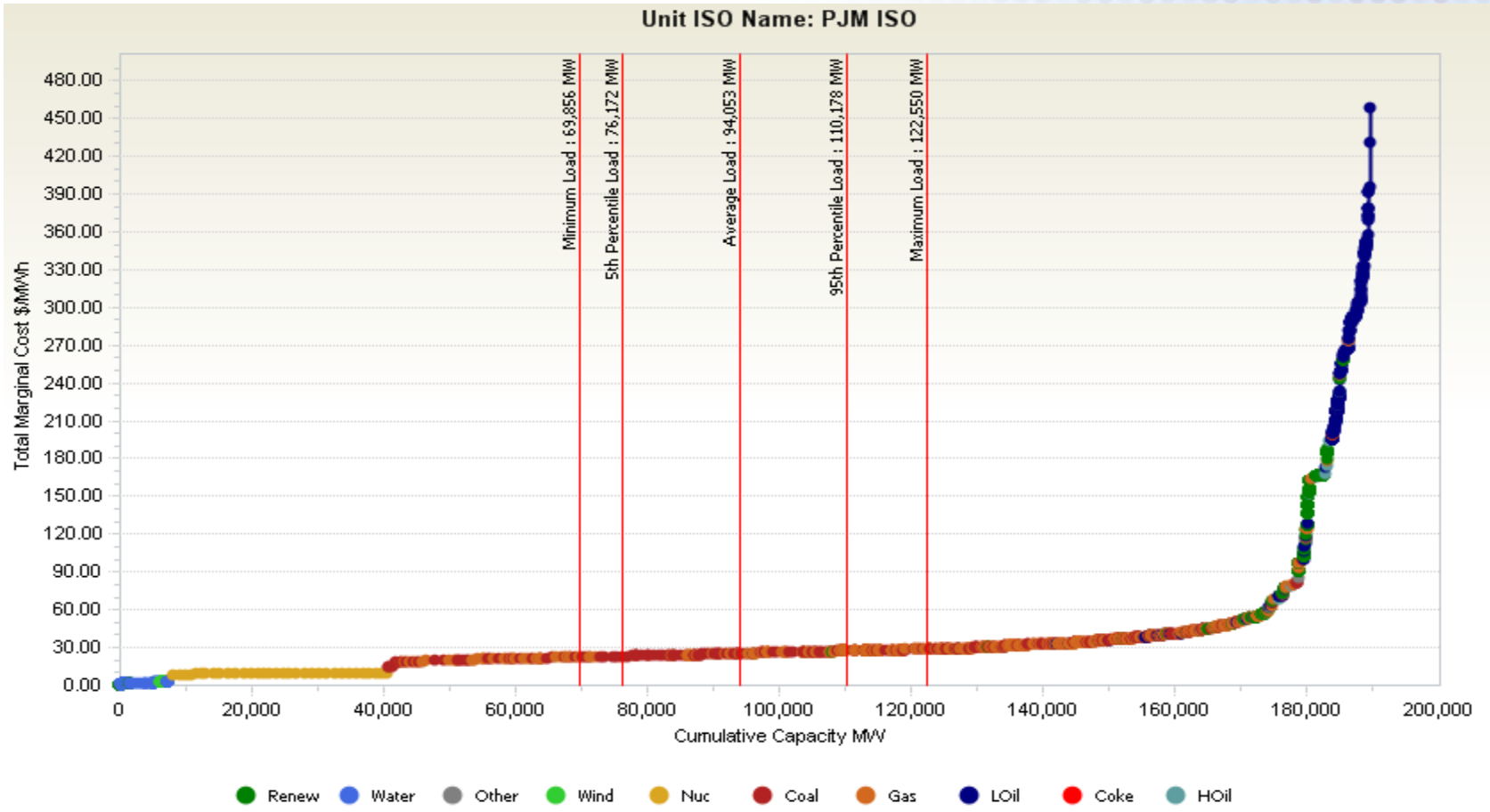


Source: Department of Energy, the Energy Information Administration – AEO 2011.

Rapid Growth of Shale Gas

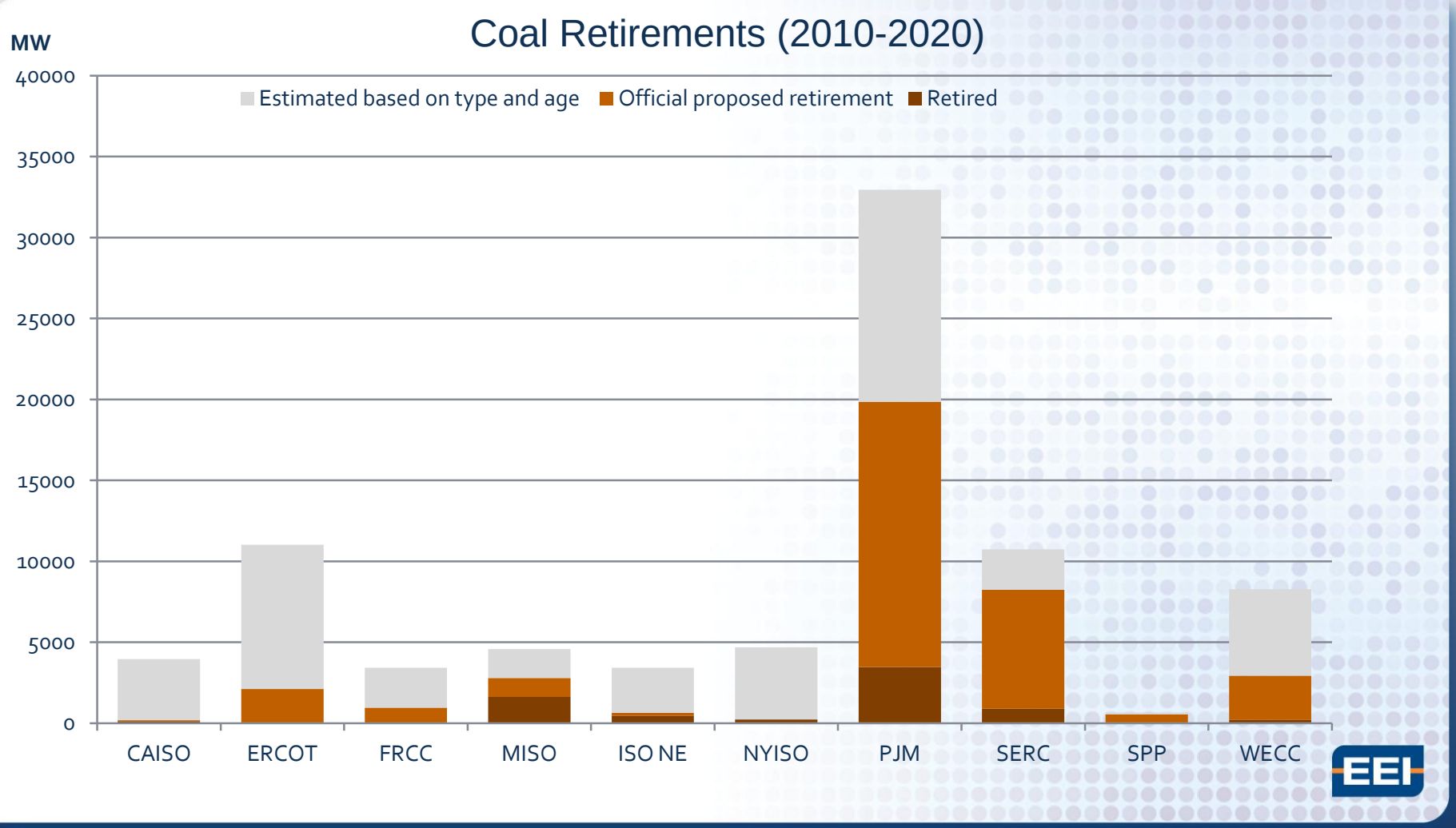
- Shale gas as a percentage of US natural gas supply
  - 2000 -- 1%
  - 2010 -- 23%
  - 2035 -- 34%
- 650 trillion cubic feet - DOE estimate of total shale gas in US (energy equivalent = 118 billion barrels of oil)
- Shale rigs account for over 43% of total gas rigs
- Power industry is largest potential growth sector

Economic Dispatch



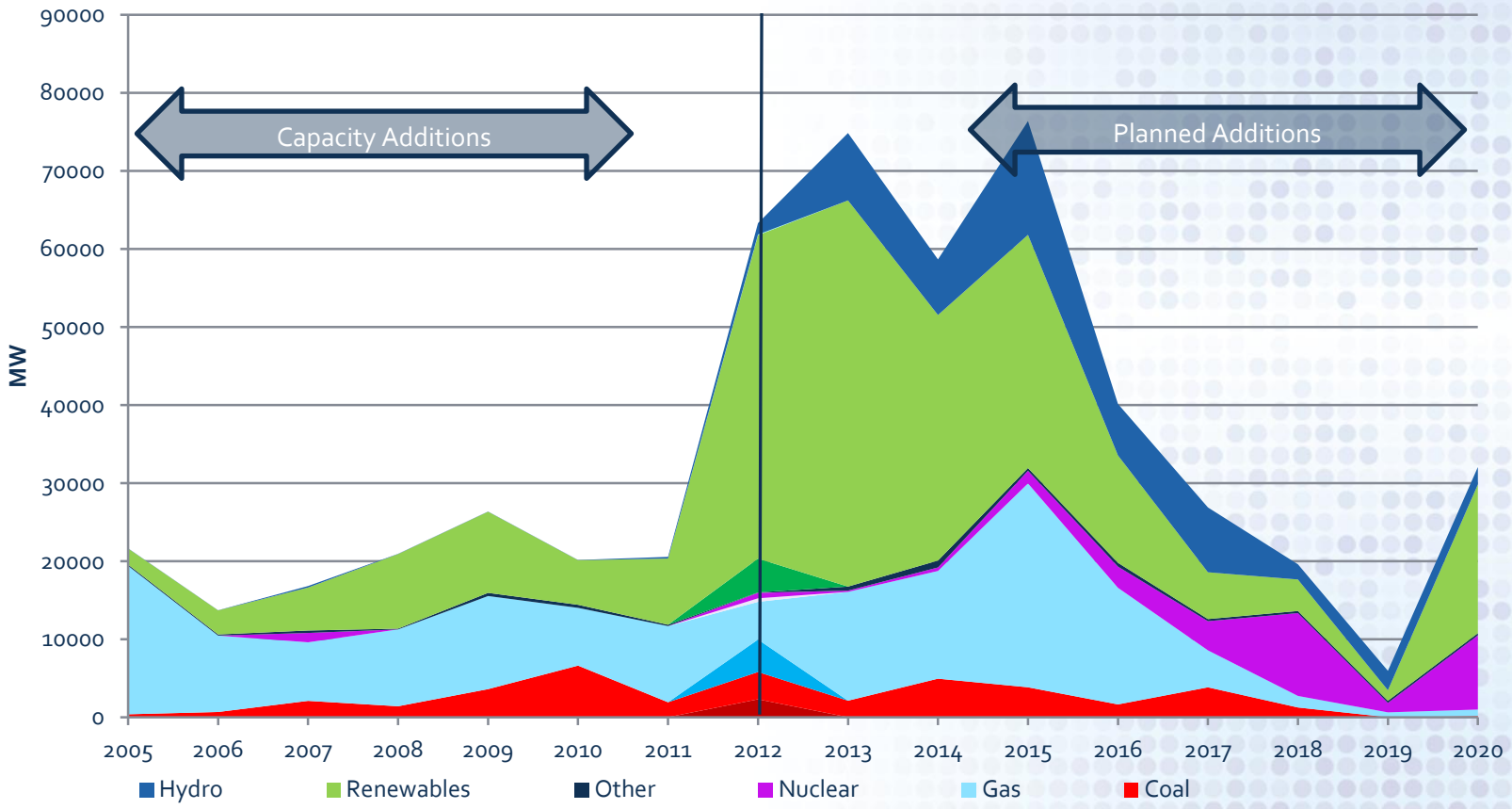
Source: Ventyx, Inc., The Velocity Suite. Curve includes all operating units. Cost and dispatch based on calculated and modeled data for 2/7/2012

Retirements



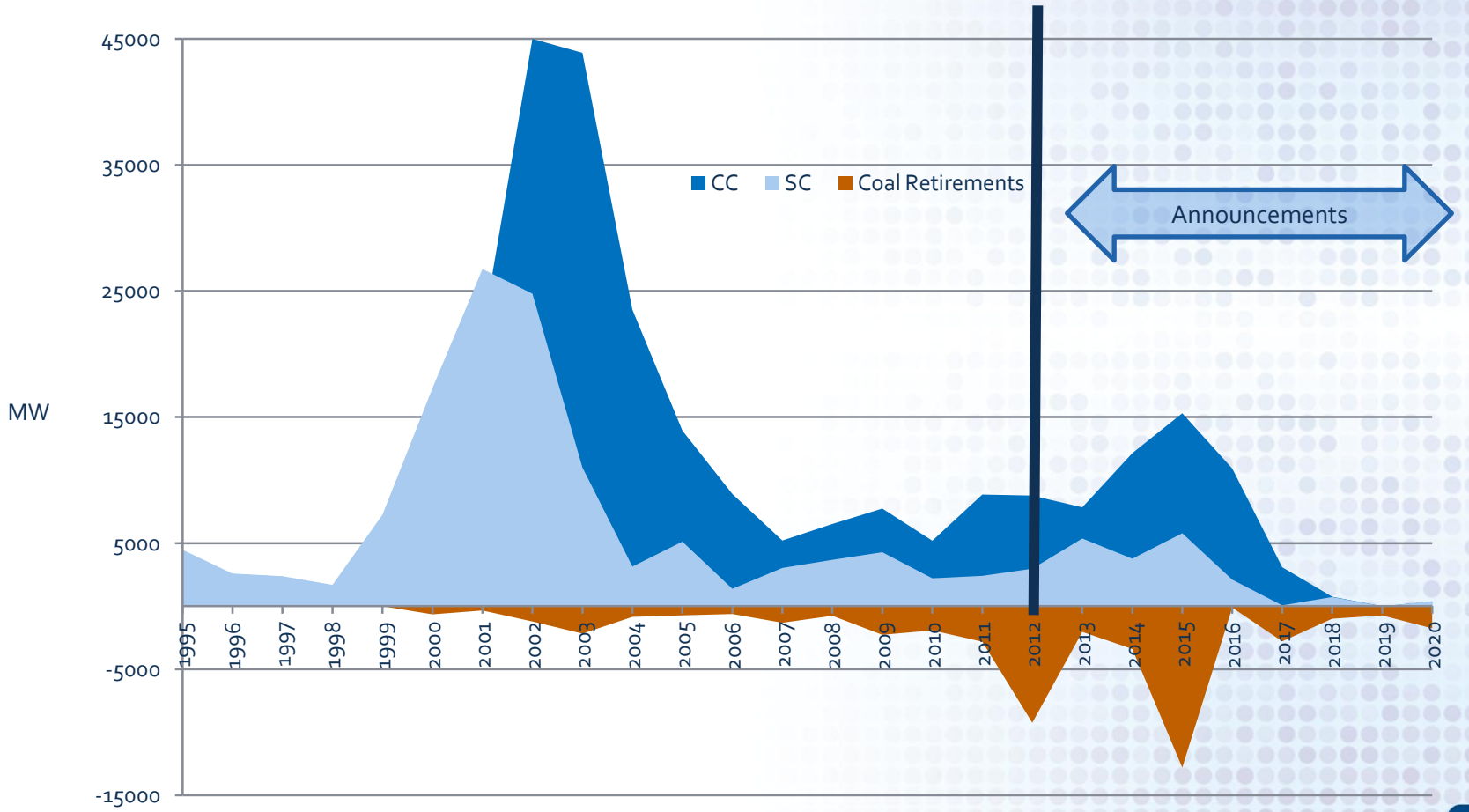
Source: EEI; Ventyx Inc, The Velocity Suite

Planned Capacity Additions



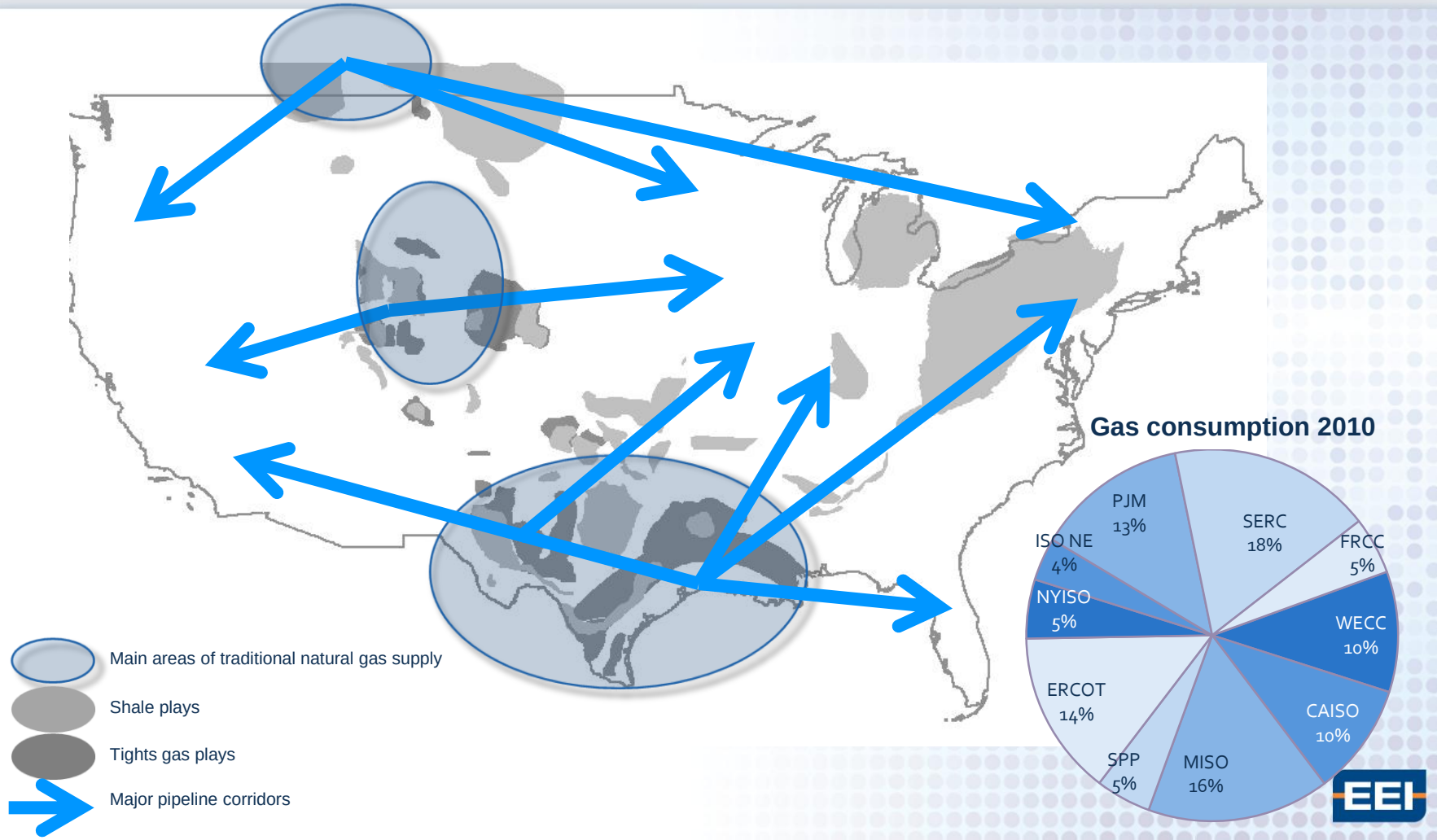
Source: EEI; Ventyx Inc, The Velocity Suite. Data as of August 2012

Natural Gas Capacity Additions



Source: EEI; Ventyx Inc., The Velocity Suite

Where Does the Gas Come From? Where Does it Go?



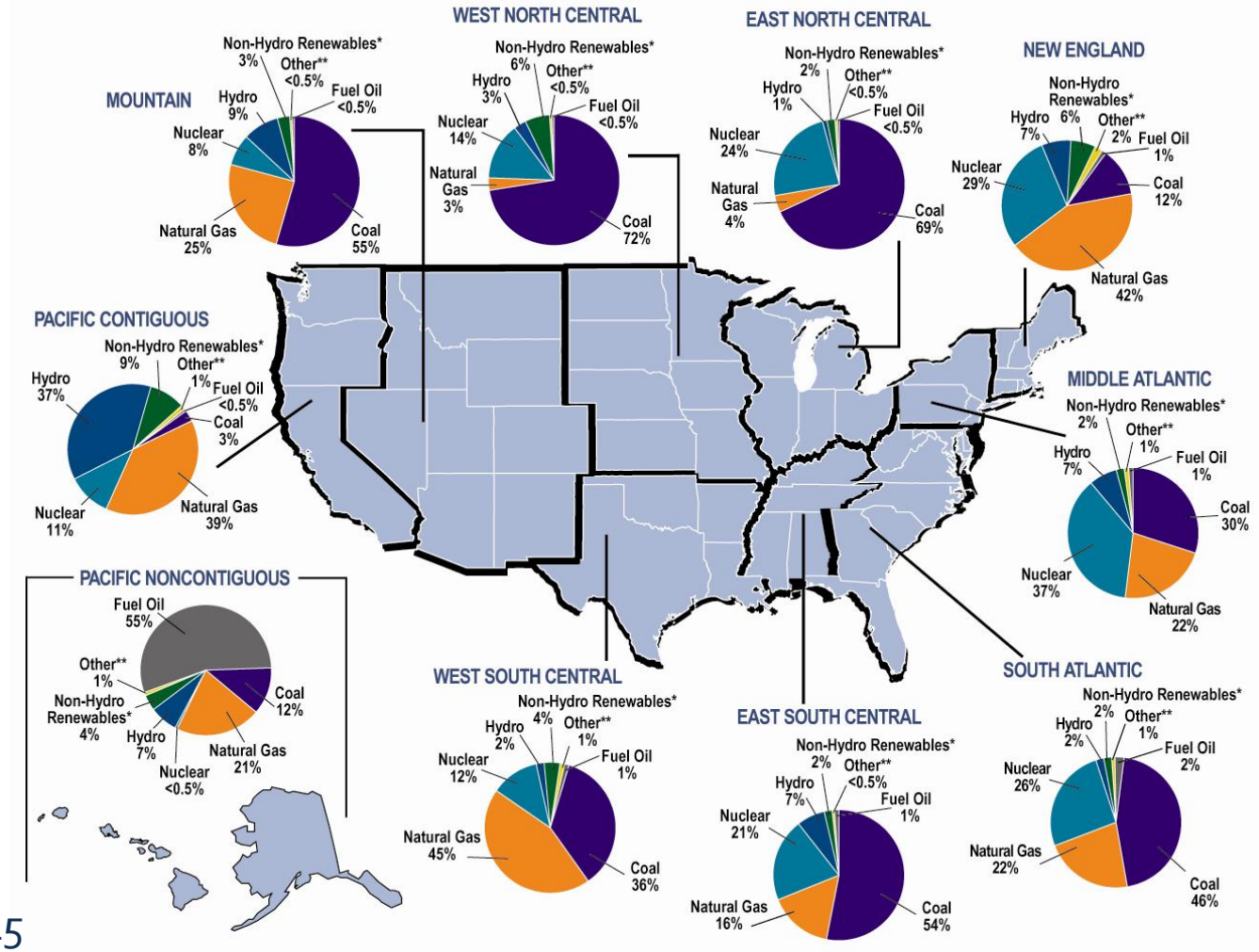
Source: DOE, Energy Information Administration

Implications

Coordination Issues

- Different Market Structures
- Electric-Gas Day
- Infrastructure Financing
- Pipeline Services
- Communication/Coordination

Different Regions of the Country Use Different Fuel Mixes to Generate Electricity



*Includes generation by agricultural waste, landfill gas recovery, municipal solid waste, wood, geothermal, non-wood waste, wind, and solar.

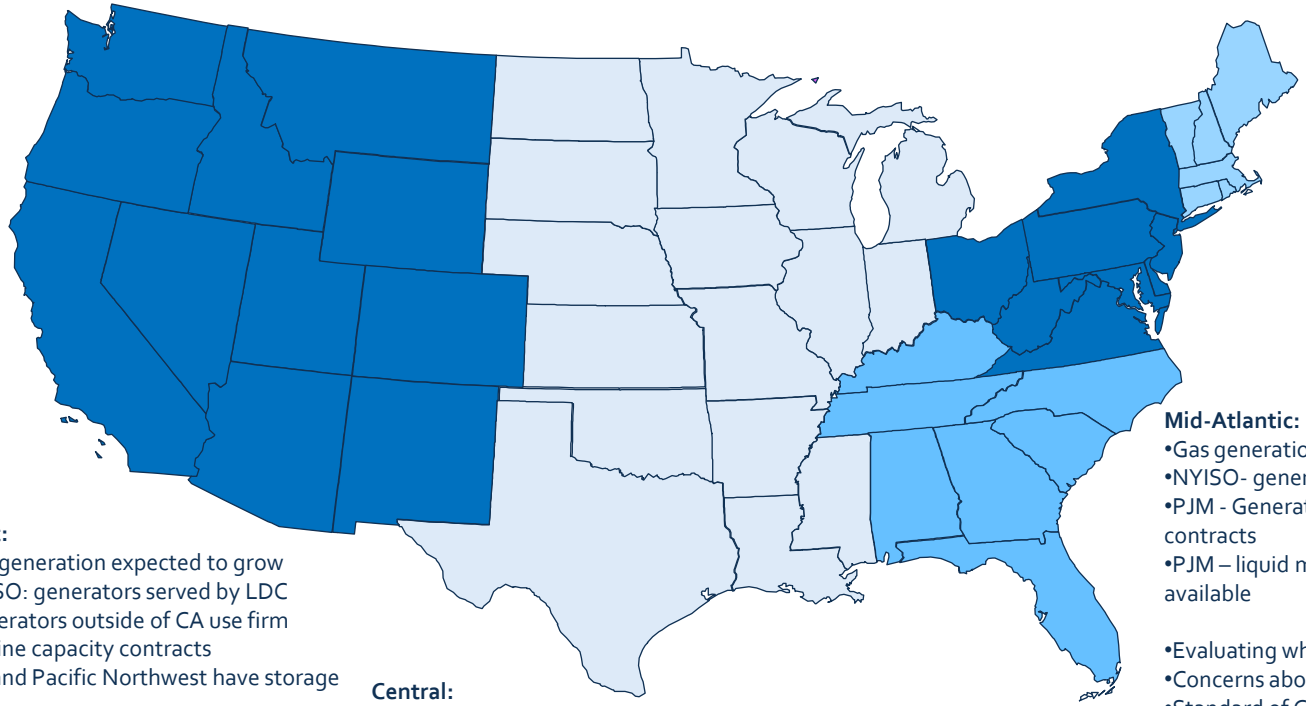
** Includes generation by tires, batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

Sum of components may not add to 100% due to independent rounding.

Source: U.S. Department of Energy, Energy Information Administration, Power Plant Operations Report (EIA-923); 2009 preliminary generation data.

May 2010

FERC Electric-Gas Coordination Regional Conferences - Regional Summary



West:
•Gas generation expected to grow
•CAISO: generators served by LDC
•Generators outside of CA use firm pipeline capacity contracts
•CA and Pacific Northwest have storage

•Changes needed
•Scheduling , additional intra-day flex
•Challenges associated with supporting VERs

Central:
• Gas generation expected to grow
•Some excess pipeline capacity
•Generators use interruptible pipeline capacity contracts

•Adjustments to the capacity release rules, increased nominations cycles, scheduling over weekends, etc.
•Standards of Conduct clarifications needed
•MISO concerned about capacity factors on gas fleet and gas availability going forward

New England:
•Gas generation comprise large percentage of existing generation; expected to grow
•No storage or production
•Pipeline capacity constrained
•Generators use interruptible pipeline capacity contracts

•ISO-NE is proposing changes to its capacity and energy markets to better align with the gas market
•Concerns about cost recovery for transportation

Mid-Atlantic:
•Gas generation expected to grow rapidly
•NYISO- generators served by LDC
•PJM - Generators use interruptible pipeline capacity contracts
•PJM – liquid market with pipeline capacity and storage available

•Evaluating what changes needed.
•Concerns about cost recovery for transportation
•Standard of Conduct clarifications needed

Southeast:
•Gas generation has grown rapidly
•Generators use firm pipeline capacity contracts
•Long term planning of pipeline needs
•Good communication with pipelines

•No changes are needed at this time
•Concerns expressed about "No-bump" rule

Need for Fuel Diversity

Fuel Diversity

- Electric utilities are committed to fuel diversity as a component of a reliable electric system.
- Utilities have traditionally invested in diverse fuel sources including gas, coal, nuclear, hydro, wind, solar etc.
- Number of factors affect investment decisions including state and federal regulations.

Environmental Regulatory Challenges:
2012 and Beyond

Air

- Utility MACT
- Interstate Transport (CAIR/CSAPR)
- Regional Haze/Visibility
- Multiple NAAQS
- New Source Review (NSR)

Climate

- NSPS- New & Modified Sources
- NSPS- Existing Sources
- BACT Permitting
- International Negotiations

Water

- 316(b)
- Effluent Guidelines Limitations
- Waters of the United States
- NPDES Pesticide Permits
- 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

DSIRE™
Database of State Incentives for Renewables & Efficiency

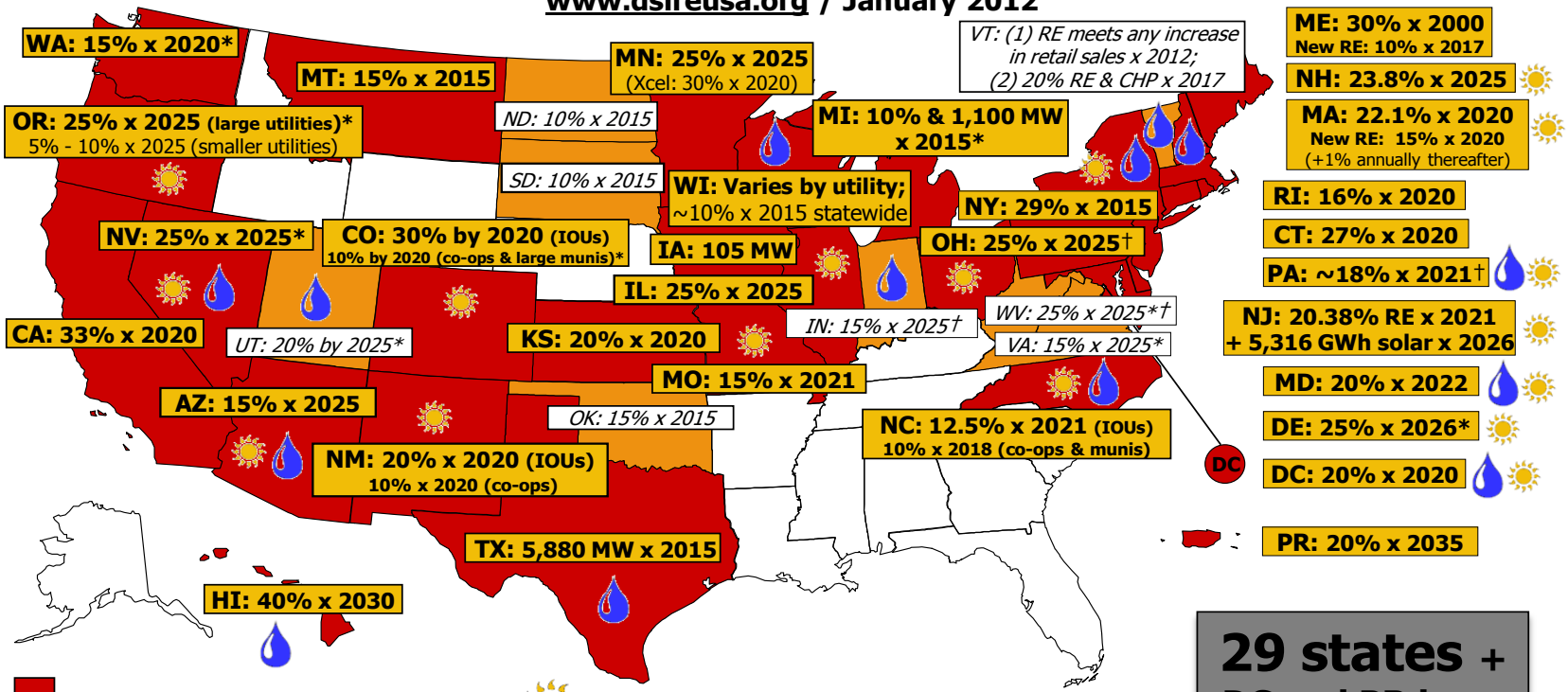
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

IREC Interstate Renewable Energy Council

North Carolina Solar Center

RPS Policies

www.dsireusa.org / January 2012



Renewable portfolio standard

Renewable portfolio goal

Solar water heating eligible

Minimum solar or customer-sited requirement

* Extra credit for solar or customer-sited renewables

† Includes non-renewable alternative resources

29 states + DC and PR have an RPS
(8 states have goals)

Questions?