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# The States and the Clean Power Plan

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Executive Director and Secretary

*Presented to 13<sup>th</sup> Annual EOR Carbon Management Workshop*

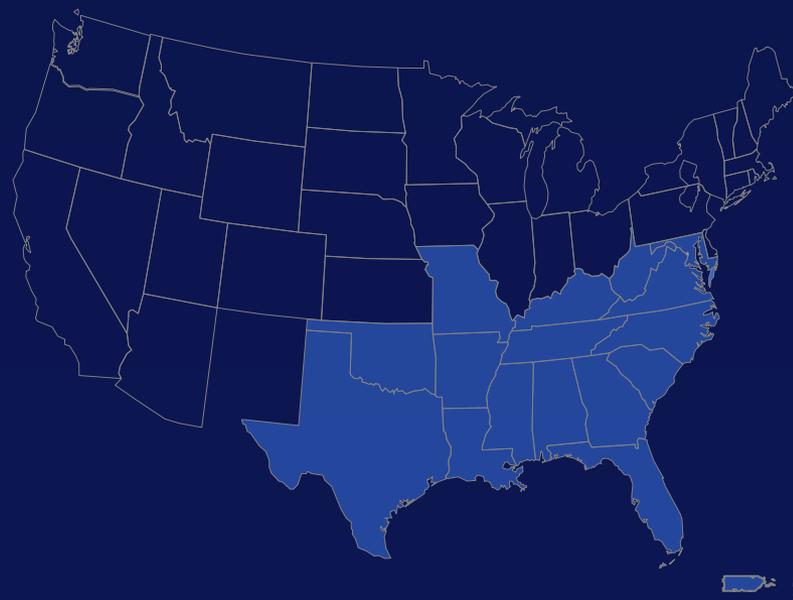
December 8, 2015

Midland, Texas

# Background

***Through innovations in energy and environmental policies, programs and technologies, the Southern States Energy Board enhances economic development and the quality of life in the South.***

*- SSEB Mission Statement*



- Established 1960, expanded in 1978
- 16 U.S. States and Two Territories
- Each jurisdiction represented by the governor, a legislator from the House and Senate and a governor's alternate
- Federal Representative Appointed by U.S. President

# Energy Resource Highlights in the South



- South produces over ½ U.S. energy supply, serves 40% of population
  - 7 of top 10 southern states lead manufacturing jobs per capita
  - Robust, innovative energy supply: traditional fuels, renewables and energy efficiency
  - \$5 Trillion economy
- Key energy production
  - 3 of top 5 coal, oil, and natural gas producing states in South
  - 66% of natural gas supply from South
  - 4 states produce >50% of U.S. domestic crude oil
  - WV, KY & TX produce 25% of nation's coal (among top 6 coal states)
- South leads nuclear and renewable fuels output
  - 26 nuclear plants operating, 5 units under construction
  - TX, OK and WV have 16 GW of wind capacity
- States adopting energy efficiency measures
  - WV and MS -'Most Improved' energy efficiency programs (2014 ACEEE Scorecard)
  - AR prioritizing energy efficiency

# Energy Facts in the South

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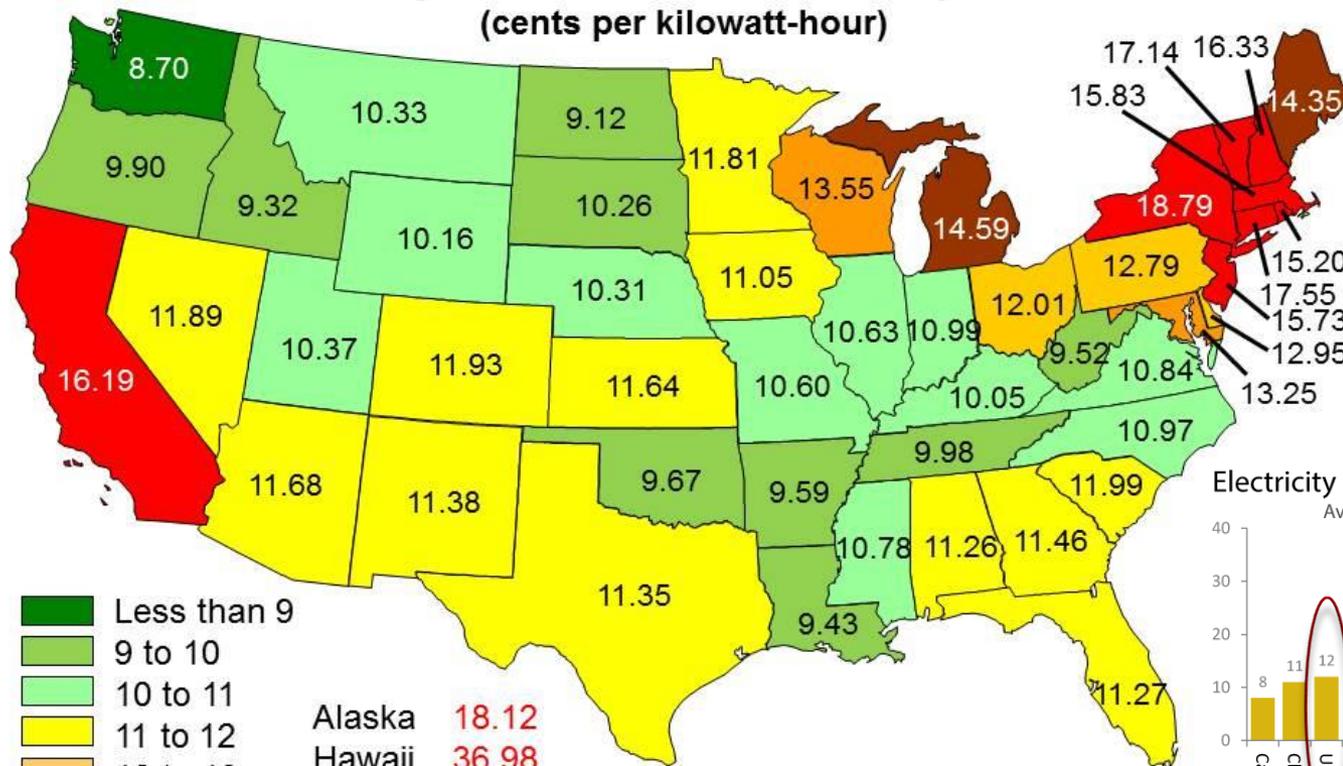
- **Electricity consumption** 47% of national consumption
  - 50% of residential consumption
  - 48% of commercial/ industrial consumption
- **Electricity production** 42% of national electricity generated
  - 52% of natural gas generation nationwide from the southern region
  - 43% of coal fired generation
  - 41% of nuclear power generation
  - 30% of wind generation
- **Electricity Prices (South v nationwide)**
  - Residential: 10.96 cents/KWh v 12.12
  - Commercial: 8.97 cents/KWh v 10.29
  - Industrial: 6.09 cents/KWh v 6.82
  - Average: 9.08 cents/KWh v 10.08

# Electricity Rates Vary Markedly by State



## State Average Residential Electricity Rates 2013

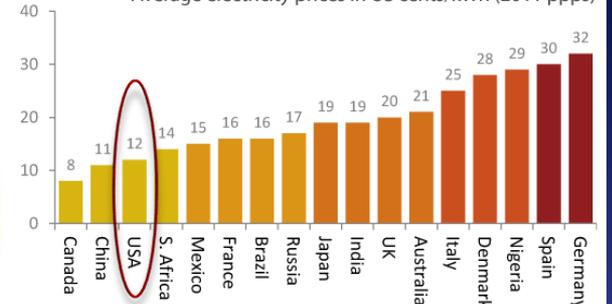
(cents per kilowatt-hour)



Alaska 18.12  
 Hawaii 36.98  
**US 2013 Average 12.12 cents per kw-hr**

### Electricity prices relative to purchasing power

Average electricity prices in US cents/kWh (2011 ppps)



Data: average prices from 2011 converted to USD using purchasing power parities  
 Sources: IEA, EIA, UN  
[shrinkthatfootprint.com](http://shrinkthatfootprint.com)

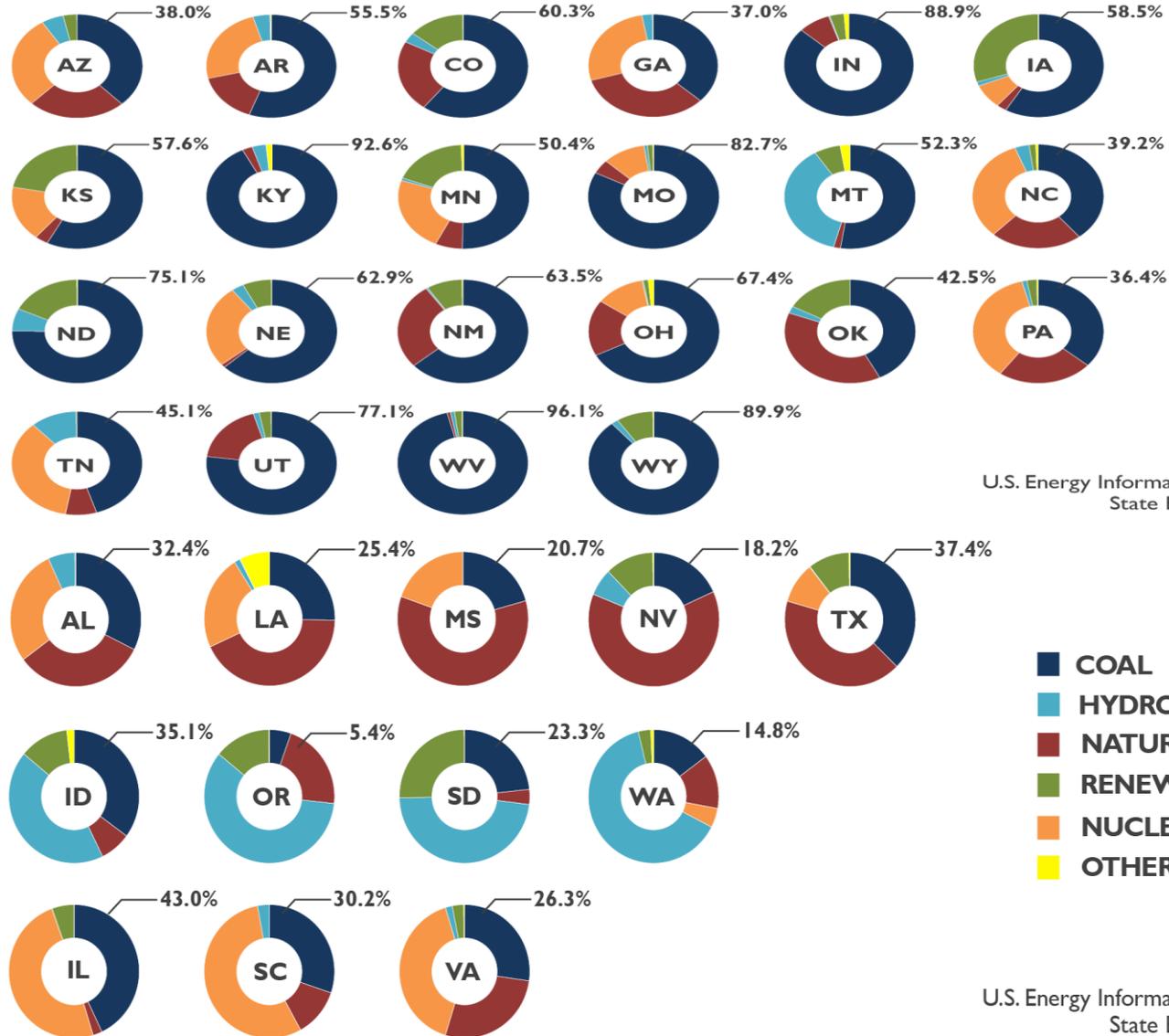
Energy Information Administration (2015)

# STATES WITH ELECTRICITY PRICES BELOW THE NATIONAL AVERAGE

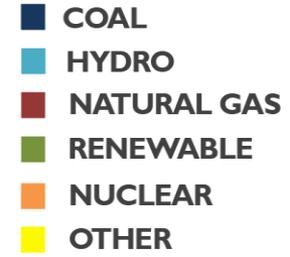
Note: Average Retail Electricity Price in 2014 was 10.45 cents/kWh



PRIMARY FUEL SOURCE	STATE
COAL	AR
	AZ
	CO
	GA
	IN
	IA
	KS
	KY
	MN
	MO
	MT
	NC
	ND
	NE
	NM
	OH
OK	
PA	
TN	
UT	
WV	
WY	
NATURAL GAS	AL
	LA
	MS
	NV
	TX
HYDRO	ID
	OR
	SD
	WA
NUCLEAR	IL
	SC
	VA



**DATA SOURCE**  
U.S. Energy Information Administration  
State Energy Data System



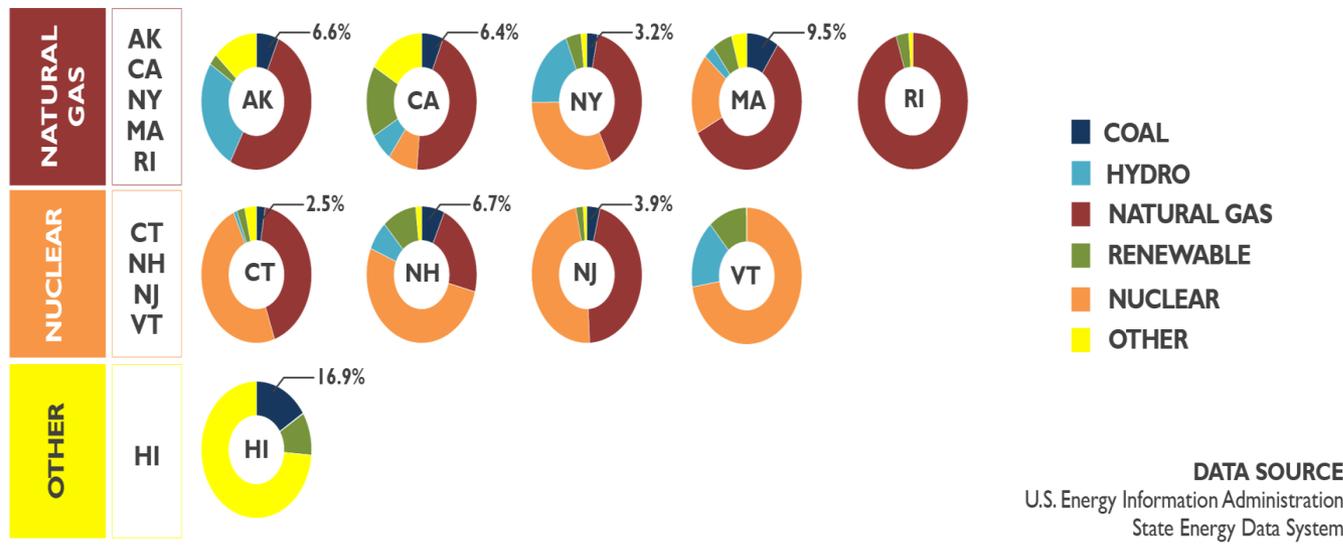
**DATA SOURCE**  
U.S. Energy Information Administration  
State Energy Data System

# States with Highest Electricity Rates



## STATES WITH HIGHEST ELECTRICITY PRICES

Note: Average Retail Electricity Price in 2014 was 10.45 cents/kWh



# Electric Generating Resources Vary in SSEB Region - 2013



## Predominantly Coal

- WV, Kentucky >93%
- Missouri 83%
- Arkansas 52%
- Maryland, Tennessee, OK 40-45%
- MS, LA, FL, SC, VA <30%

## Predominantly Natural Gas

- Mississippi, Florida >60%
- Louisiana 51%
- Texas 47%
- Oklahoma 41%
- Missouri, WV, TN, KY ~5%+/-

## Predominantly Nuclear

- South Carolina 57%
- TN, VA, MD, North Carolina 30-41%
- Georgia, Alabama 27%
- Oklahoma, Kentucky, West Virginia 0%

# Trending in the Electricity Sector

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- Electricity growth flat
  - Pre-Recession growth has not returned
  - Continued energy efficiency improvements drive down growth
- Natural gas prices low (v. coal)
  - Natural gas combined cycle plants being built
  - Gas units dispatch ahead of coal in some cases
- Utility IRPs: Coal retirements best option based on age & environmental regulation
- Price of renewable energy dramatically dropping
- Nuclear energy in the South to increase (6 GW at 5 new units)
- Natural gas infrastructure needs
- Electricity-Gas Market integration coordination needed
- Need for an updated business model due, in part, to distributed generation & demand response eroding revenue

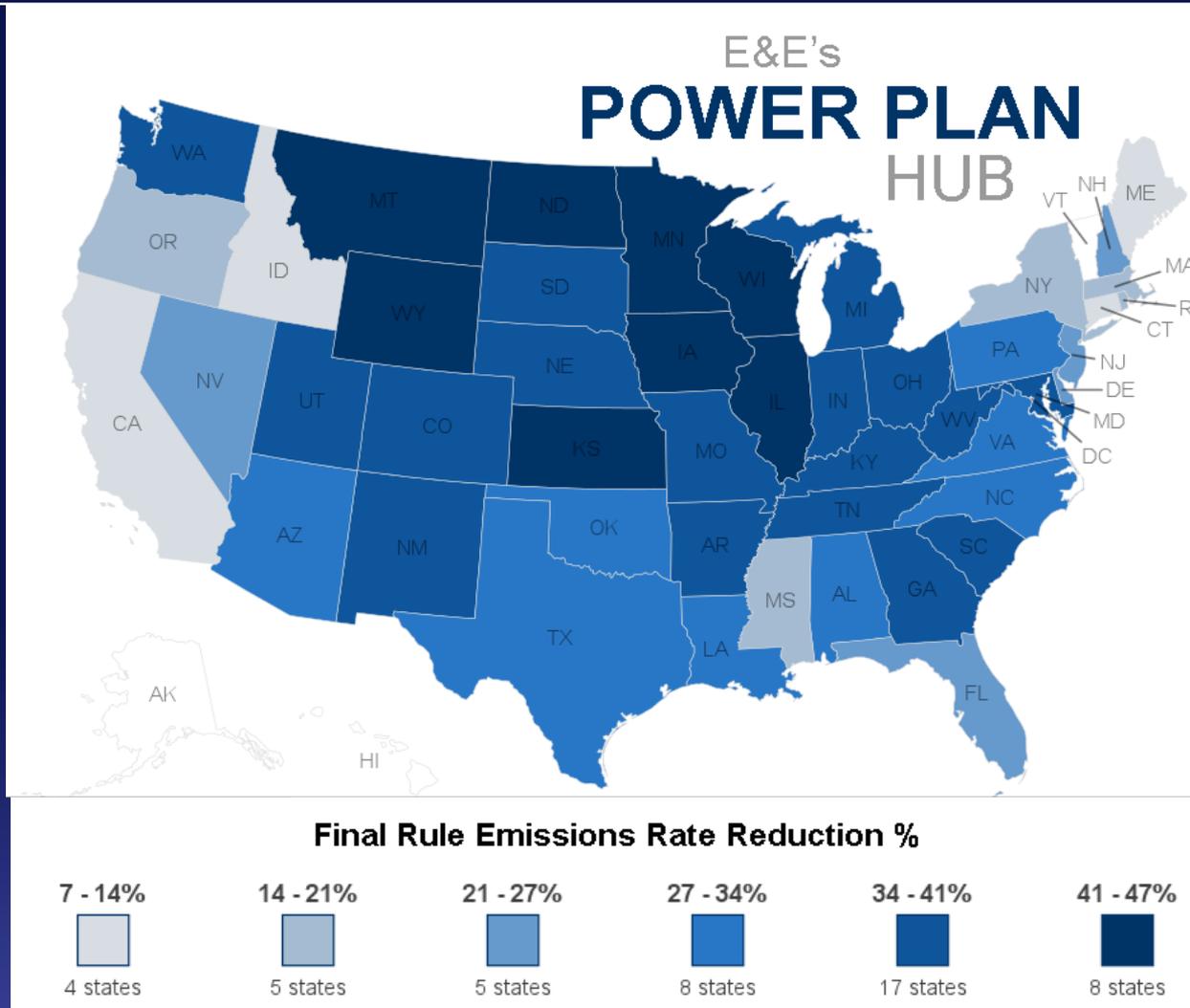
# The Clean Power Plan



## Proposed EPA 111(d) Regulatory Timeline

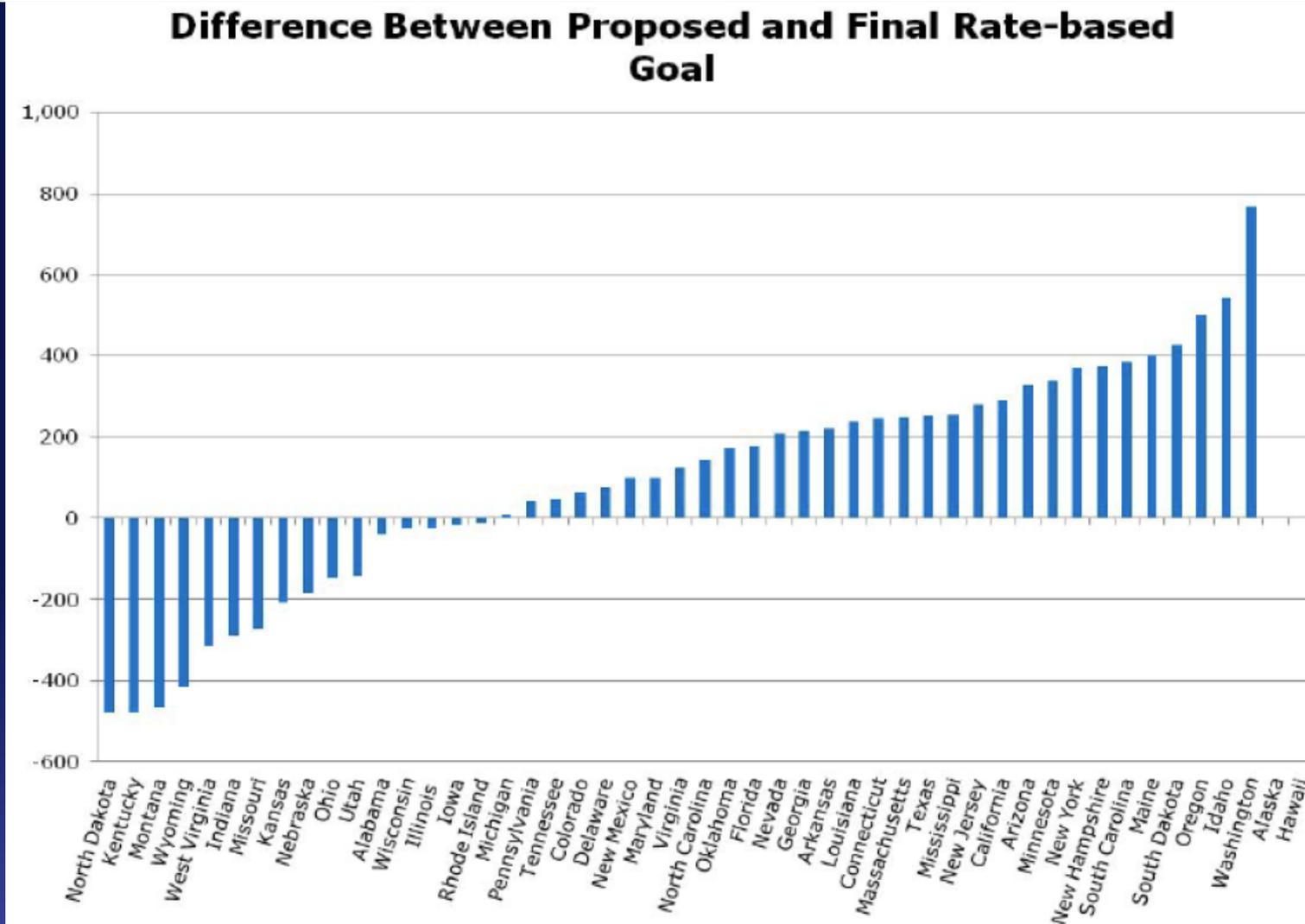


# CPP Final Rule Emissions Reductions Percentages



Source : Energy & Environmental News, [http://www.eenews.net/interactive/clean\\_power\\_plan](http://www.eenews.net/interactive/clean_power_plan)

# State Goals Alterations under CPP on August 3, 2015



Source : Sidley Austin , LLP

# State Reactions to Clean Power Plan Requirements

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**Because of the rule, "...manufacturers will be forced overseas for reasonable energy costs, taking good paying jobs away from West Virginia and forcing our men and women who lose jobs to move..."**

West Virginia Governor Earl Ray Tomblin

**"This unfunded mandate would require us to build new energy infrastructure to bring down carbon emissions... I am deeply concerned EPA's proposal could prevent me from one of my most important duties as Governor- to secure reliable, affordable electricity for Mississippians."**

Mississippi Governor Phil Bryant

**"States should write an implementation plan, moving ahead with planning, assuming the rule will survive. In the end, no one wants to see EPA write their implementation plan."**

Former U.S. EPA Administrator William Reilly

**Many states and regional entities (RGGI, e.g.) are hosting stakeholder meetings this winter to determine how best to meet requirements of the Clean Power Plan**

Arkansas DEQ, New Mexico Environment Department, RGGI, Iowa and Minnesota

# Sample Activities Related to Development of State Implementation Plans

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- **Arkansas Department of Environmental Quality**
  - Series of conference calls throughout December
- **South Carolina Department of Health and Environmental Control**
  - Public engagement session on state energy plan and EPA's Clean Power Plan
- **Georgia Environmental Protection Division of DNR**
  - Ongoing stakeholder engagement meetings continue
- **New Mexico Environment Department**
  - Hosting a series of public involvement meetings on Clean Power Plan
- **RGGI (Regional Greenhouse Gas Initiative)**
  - Stakeholder meetings to consider state approaches to CPP and to discuss broadening the RGGI market to include more trading partners
- **Iowa**
  - Meetings include RTOs MISO and SPP
- **Minnesota Pollution Control Agency**
  - Stakeholder meeting featuring update on prior multi-state meetings

# Implications of the Clean Power Plan on Existing Power System Resources

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- **Coal generation will decrease**
  - Unit Retirements
  - Operational changes – reduced minimum operating levels and increased ramping
- **Increased operation of existing natural gas combined cycle capacity and new NGCC capacity**
- **At-Risk Nuclear Capacity may be retained or uprated**
  - Zero carbon generation is valuable
  - Currently: low demand; low natural gas prices; no capacity value (some markets); renewable power at extreme low cost, especially at off-peak
- **Increases in Renewable Energy, Demand Response and Energy Efficiency Measures**
- **Increases in the value of storage as renewables come online – Intermittency**
- **Increase in value of Combined Heat and Power (CHP) applications**
- **Modifications to transmission system as generating resources change locationally**
- **Increases in transmission and distribution infrastructure**
- **Value of CCS and CO2-EOR increases**

# Cost Impacts of Final Clean Power Plan

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- **Impacts of Assumed 10 & 25% electricity price increase (2020-2040):**  
*(National Rural Electric Coop Association - July 2015 Study)*
  - Job losses: 882,000 -1.5 million annually
  - Loss in National GDP: \$2.8 – 5.4 Trillion
- **RTO, ISO Perspectives**
  - “Rule too early, complex, and uncertain to know impacts..assumptions are key- gas prices, cost of renewables, path of individual states (including trading)...”  
*Michael Kormos, EVP/ COO, PJM Interconnection*
  - “Impacts are unclear. States could trade allowances or not; the mix of costs are related to CPP and other factors..”  
*Kari Bennett, MISO Sr. Director of Program Strategy*
- **American Coalition for Clean Coal Electricity (ACCCE)**
  - Energy sector will spend some \$292 Billion to comply
- **EPA:** “Consumers will spend 7-8% less on electricity by 2030”
- “Final CPP rule drives a more aggressive transition to zero carbon, renewable energy”  
*Roger Bezdek, Management Information Services*

# Utility Reactions to Final Clean Power Plan Rules

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- **States should play to their strengths and plan according to specific characteristics of their systems**
- **“Policy drives resource mix and resource mix drives Reliability”**
- **Ensuring Reliability in face of a changing generation mix includes:**
  - Improved transmission infrastructure
  - Improved forecasting tools related to intermittent resources
  - Increased flexibility of existing coal fired generation
  - Improved operating efficiencies as system operators become more familiar with wind and solar generation
  - Bringing back capacity markets

# 2015 Adopted Resolutions of the Southern States Energy Board

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SSEB Board process yields member resolutions at annual meeting

- 1.2015–Resolution Regarding State Implementation Plans Under the Clean Power Plan
- 2.2015–Resolution Supporting Retention of the Current Ozone Air Quality Standard
- 3.2015–Resolution Encouraging Adoption of the Regulation Freedom Amendment
- 4.2015–Resolution in Support of Expanded Liquefied Natural Gas Exports
- 5.2015–Resolution Urging the Development of Critical Natural Gas Transmission Infrastructure
- 6.2015–Resolution Supporting Carbon Capture and Storage and Enhanced Oil Recovery

# 2015 SSEB Resolutions Relevant to the Clean Power Plan and CCS for EOR

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## Important role of coal and CCS – EOR in SSEB states

- Coal is a dominant fuel in the south with significant CO<sub>2</sub> emissions
- South has large range of geologic storage options available
- Economics of CCS and environment are both enhanced through CCS-EOR
- U.S. has global leadership role in CCS research and technology development

## Resolution 1: Supports state sovereignty in regulating electricity

- Attorneys General and Governors should take legal actions to prevent unlawful obligations being imposed on states and should consider actions they deem appropriate to counteract CPP

## Resolution 3: Supports Regulation Freedom Amendment

- State legislatures should adopt Amendment to prevent 'over-regulation'

## Resolution 6: Supports Carbon Capture and Storage and Enhanced Oil Recovery

### SSEB supports -

- policies and incentives advancing investment in CCS-EOR projects
- efforts to increase awareness of benefits of CO<sub>2</sub>-EOR

### Congress -

- should enact federal incentives to increase available CO<sub>2</sub> supply for oil industry
- should support legislation and budget measures to help develop and deploy CCS-EOR technologies

# Current Legislative Efforts to Promote CCS for Enhanced Oil Recovery

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## Senators Bennett (CO) and Portman (OH) bill (November)

- Helps power plants and industrial facilities finance purchase and installation of CCS equipment
- Captured CO<sub>2</sub> can be for EOR or storage
- Tax exempt Private Activity Bonds (PABs) to finance projects
- Reduces project costs
  - Increases oil production from existing wells
  - Reduces CO<sub>2</sub> emitted into atmosphere
  - Increases national energy security

## Senators Booker (NJ) and Whitehouse (RI) CCS Tax Proposal

- CCS is necessary tool to mitigate climate change
- U.S. should be a leader in international technology solutions to climate change
- Considerations include: Investment Tax Credits; 45Q Tax Relief; Tax Relief for CCS for EOR

## CCUS Amendment to House Energy Bill (HB 8)\* by Texas Representative Marc Veasey

- Requires DOE report on potential commercial use of CCUS, including EOR

# Applying Technology Innovation and the Future of Coal

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- **DOE grants for CCS pilots**
  - Southern's Plant Barry CCS improvements
  - CO2 Technology Center – Mongstad, Norway (TCM)
    - Micro-algae pilot facility(U. KY partnership)
    - Amino silicone compounds test
    - Pilot to improve/ lower cost of Alstom's chilled ammonia process
  - NRG test of Inveny's VeloxoTherm post-combustion project - Petra Nova
- **EPRI Review *Beyond Ultra Supercritical***
- **Recent/ Upcoming Clean Coal Plants**
  - Edwardsport (IN) - 618 MW IGCC (2013)
  - Virginia Hybrid Energy Center - 585 MW Clean Coal (2012)
  - JW Turk Plant (AR) – 600 MW Ultra Super Critical (2012)
  - SaskPower Boundary Dam #3 CCS Project – 161 MW (2014)
  - Petra Nova (TX) – 240 MW Post Combustion Capture of 90% of CO2 for EOR (2016 )
  - Kemper County IGCC MS – (2016)

# NCC Principles and Recommendations Regarding Policy Parity for Technology Innovation in CCS\*

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## Principles

- **CCS deployment at commercial scale requires policy parity with other low carbon technologies**
- **Funding for CCS R,D, & D should be enhanced and focused**
- **Public acceptance continues to be a major hurdle**
- **GHG emissions controls need international initiatives**

## Recommendations

- **Increase financial incentives for CCS**
  - **Mitigate capital risk**
  - **Provide operating incentives**
- **Regulatory Improvements**
  - **Streamline siting and permitting of capture, pipelines, and storage facilities**
  - **Address barriers such as NSR when installing carbon capture equipment**
- **Research Development & Demonstration**
  - **DOE identify incentives for commercial-scale CCS projects**
- **Enhance Communication and Collaboration**

[www.secarbon.org](http://www.secarbon.org) | [www.sseb.org](http://www.sseb.org) | 22

*\*Based on **Leveling the Playing Field**, NCC, November 2015 report to Secretary of Energy Moniz*

# Using Enhanced Oil Recovery (EOR) to Offset Cost of CO2 Capture Technology

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- CO2 Capture technology is critical
  - to reduce CO2 emissions
  - to continue to burn coal as primary fuel
- EOR using CO2 provides financial benefits improving economics of CO2 capture
- Infusion of RD&D funds is key to success of CO2 capture technology
- Proposal: Utilize value on carbon to improve system economics
- “Policy-shapers” will set U.S. as CCS leaders
  - States: Policies to encourage CO2 reduction, e.g. through Clean Power Plan
  - Coal Stakeholders:
    - DOE Storage reservoir characterization
    - Comprehensive revenue neutral value on carbon
    - Ample, aggressive RD&D funding
    - Consider national energy and power standard
  - Set 10-year Government-Industry supported research plan on CO2 storage

# The States and the Clean Power Plan - Highlights

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- Clean Power Plan impacts will be dependent on fossil fuel use in each state
- States currently considering dual approach: legal options and developing alternative State Implementation Plans
- Existing Power System operation will be modified as a result of the CPP
- Trends in the electricity sector will influence CPP impacts
- Funding mechanisms for commercialization of CCS will enhance development
- CCS – EOR solutions are economic and environmentally satisfying



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*For additional resources, please visit:*  
***[www.sseb.org](http://www.sseb.org)***

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