

# Clean Power Plan - Final Rule Overview

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Prepared for -

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# Presentation Overview

- Background
  - Federal regulations to control CO<sub>2</sub> from power plants
- Clean Power Plan Overview
- Clean Power Plan final vs. proposal
- Final Clean Power Plan goals for Missouri
- Compliance options and plan approaches
- Timeline

# EPA Actions on August 3, 2015

EPA released two final rules and one proposed rule to control CO<sub>2</sub> emissions from power plants

- Two final rules

- CO<sub>2</sub> emission standards for new power plants - 111(b)
- CO<sub>2</sub> emission standards for existing power plants - 111(d)

AKA – Clean Power Plan

- One proposed rule

- Proposed Model rules for existing plants - 111(d)
- Proposed Federal Plan for existing plants - 111(d)

# Clean Power Plan - Overview

- The Clean Power Plan sets CO<sub>2</sub> emissions performance rates for existing power plants that reflect the “best system of emission reduction” (BSER)
- EPA identified 3 “Building Blocks” as BSER and calculated nationally consistent performance rates for fossil fuel-fired electric steam generating units and another for natural gas combined cycle units
- EPA translated the performance rates into mass-based and rate-based state goals using each state’s unique mix of power plants in 2012
- The rule establishes guidelines for states to develop plans that require existing power plants to achieve either the performance rates directly or one of the state goals

## 21 Affected Missouri Sources Identified in Final CPP Rule

Plants highlighted in red have affected unit(s) with announced retirement and/or plans to switch to natural gas

Plant Name	Owner/Operator
<b>Labadie</b> <b>Meramec</b> <b>Rush Island</b> <b>Sioux</b>	Ameren (Union Electric Company)
<b>New Madrid</b> <b>St Francis Energy Facility</b> <b>Thomas Hill</b>	Associated Electric Cooperative, Inc.
<b>Chamois</b>	Central Electric Power Cooperative and Associated Electric Cooperative, Inc.
<b>Sikeston Power Station</b>	City of Carthage, Sikeston Bd. of Municipal Utilities, City of Fulton, and City of Columbia
<b>Columbia</b>	City of Columbia
<b>James River Power Station</b> <b>John Twitty Energy Center</b>	City of Springfield, MO
<b>Dogwood Energy Facility</b>	Dogwood Energy, LLC and North American Energy Services
<b>Asbury</b> <b>State Line Combined Cycle</b>	Empire District Electric Company
<b>Iatan</b>	Empire District Electric Company, KCP&L, KCP&L GMO, and Missouri Joint Municipal Electric Utility Commission
<b>Blue Valley</b>	Independence Power and Light
<b>Hawthorn</b> <b>Montrose</b>	KCP&L
<b>Lake Road</b> <b>Sibley</b>	KCP&L GMO

# CPP Comparison: Final vs. Proposal

- Compliance timeframe: starts in 2022 (2020)
- Building Blocks and State Goals have changed
  - Consistent National Performance Rates
- Existing RE and Nuclear no longer compliance options
- Deadlines for state plans September 2016 with option for two-year extension September 2018.
- “Trading Ready” approaches
- Clean Energy Incentive Program (CEIP) provides incentive for early action



# Missouri's Proposed vs. Final Rule Rate Comparison

Step	Proposed Rate (lbs CO <sub>2</sub> /MWh)	Step	Final Rate (lbs CO <sub>2</sub> /MWh)
Starting rate 2012 statewide adjusted average emission rate	1,963		2,008
Interim Period 2020-2029	1,621 ↓ 17%	Interim step 1 2022-2024	1,621
		Interim step 2 2025-2027	1,457
		Interim step 3 2028-2029	1,342
		Average Interim Goal	1,490 ↓ 26%
Final	1,544 ↓ 21%		1,272 ↓ 37%

# Building Blocks Used to Set the Standards

1.	Coal Plants – Heat Rate Improvements	<ul style="list-style-type: none"> <li>• Applied Regionally</li> <li>• Eastern Region 4.3% Improvement</li> </ul>
2.	Redispatch to NGCC	<ul style="list-style-type: none"> <li>• Applied Regionally</li> <li>• Phased in</li> <li>• 75% of Net Summer Capacity</li> </ul>
3.	Renewables <del>&amp; Nuclear</del> *	<ul style="list-style-type: none"> <li>• No Nuclear</li> <li>• Incremental RE only</li> <li>• Based on Historical RE Penetration Levels</li> </ul>
<del>4.</del>	<del>Demand Side Energy Efficiency</del> *	<ul style="list-style-type: none"> <li>• No Demand-Side EE</li> </ul>

\* Demand-Side Energy Efficiency and New Nuclear are still allowable compliance options.

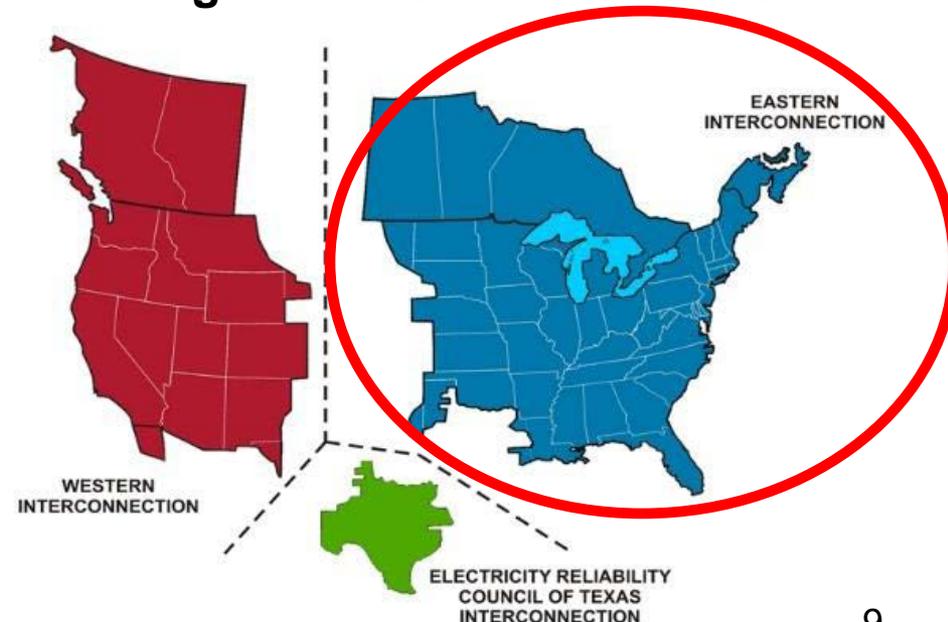
# Consistent National Performance Standards

- EPA divided the country into three regional interconnects and applied the building blocks to each
- The resulting performance standards from the least stringent region were used as the nationwide performance standards

## Nationwide Performance Standards

EGU Type	2030 Rate (lbs CO <sub>2</sub> /MWh)
Fossil Steam	1,305
NGCC	771

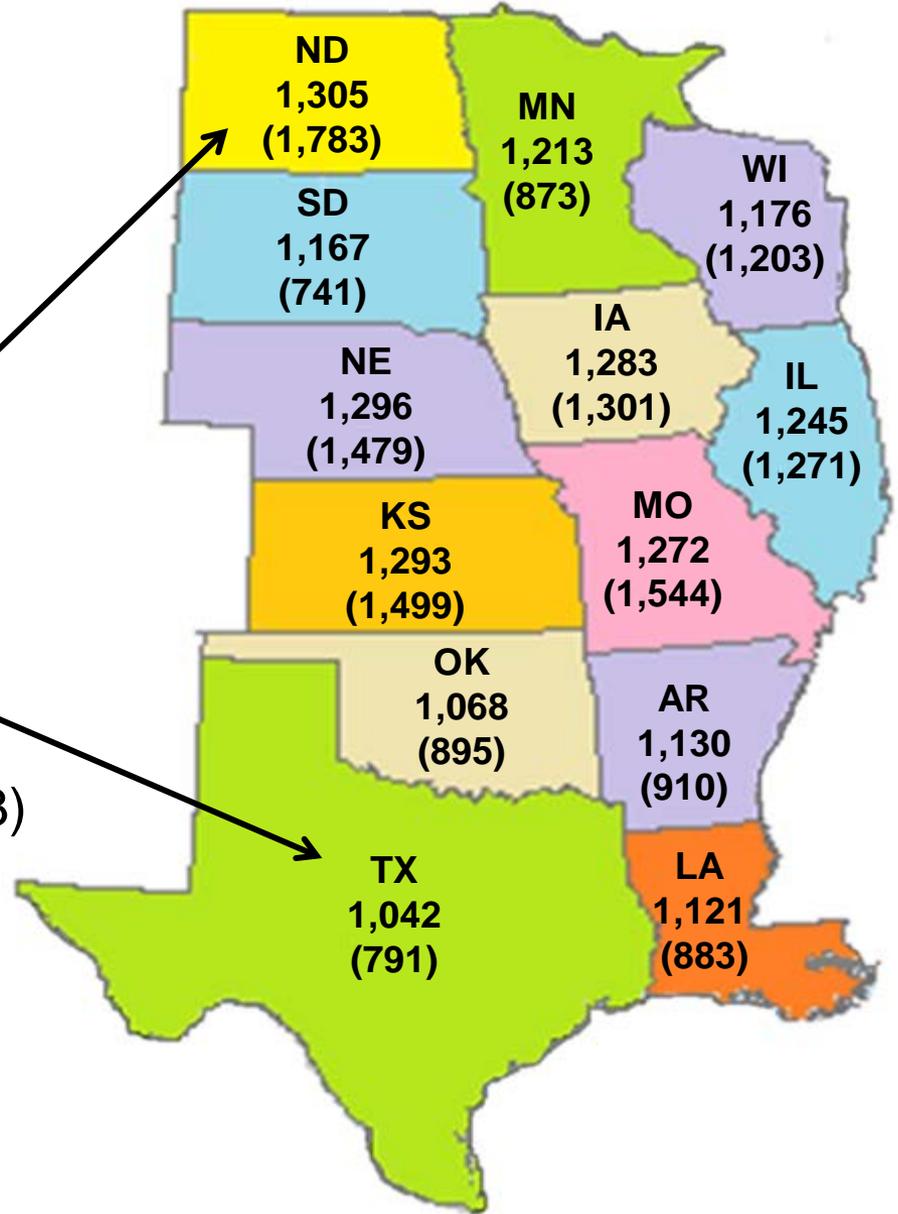
## Regional Interconnect Grids



# Mid-U.S. 2030 CPP Rate-Goals Final vs. (Proposal)

**Mid-U.S. Range (ND and TX)**

**Proposed Rule Range: (791 – 1,783)**  
**Final Rule Range: (1,042 – 1,305)**



Note: All goals are listed in units of lbs CO<sub>2</sub>/MWh

# Missouri's Final Clean Power Plan Goals

Timeframe	Rate Based Goals		Mass-Based Goals (without new units)		Mass-Based Goals (with new units)
	CO <sub>2</sub> Rate (lbs/Net MWh)		CO <sub>2</sub> Emissions (Short Tons)		CO <sub>2</sub> Emissions (Short Tons)
<b>2012 Actuals</b>		<b>2,008</b>		<b>78,039,449</b>	
Interim Step 1 2022-2024		1,621		67,312,915	67,587,294
Interim Step 2 2025-2027		1,457		61,158,279	62,083,903
Interim Step 3 2028-2029		1,342		57,570,942	58,445,482
<b>Interim Average (2022 – 2029)</b>	↓26%	<b>1,490</b>	↓19%	<b>62,569,433</b>	<b>63,238,070</b>
<b>Final Goals (2030 and beyond)</b>	↓37%	<b>1,272</b>	↓28%	<b>55,462,884</b>	<b>56,052,813</b>

# Available Compliance Options

- Three Building Blocks:
  - Improve efficiency at existing plants
  - Redispatch coal to existing NGCC
  - Increase renewable energy
- Other options:
  - Demand-side EE
  - New nuclear/upgrades to existing nuclear
  - Combined Heat & Power
  - Biomass
  - Natural gas co-firing/convert to natural gas
  - Transmission & distribution improvements
  - Energy storage improvements
  - Retire older/inefficient power plants
  - Trading

# State Plan Approaches

- Choose form of the compliance goal
  - Rate-based: (lbs CO<sub>2</sub>/MWh)
    - Performance rates, statewide rate-goal, or state-defined rates
  - Mass-based: (tons CO<sub>2</sub>)
    - Include or Exclude new units
    - State measures option
- Different plan elements required depending on plan approach
- Interstate trading ability is affected by plan approach

# Rate-Based Approach (overview)

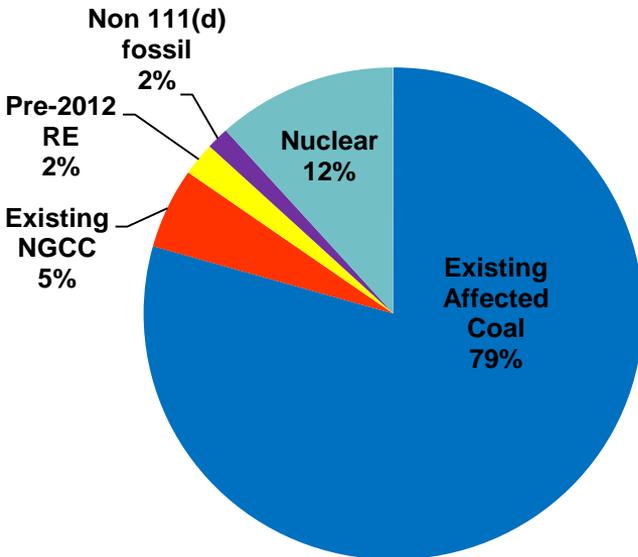
- Requires compliance with a rate:  $\left(\frac{\text{lbs CO}_2}{\text{MWh}}\right)$
- Emission Rate Credits (ERCs) are generated (ex-post) through EE/RE and other compliance options
  - 1 ERC = 1 MWh with 0 CO<sub>2</sub> emissions
  - EM&V plan required for all ERC generation
- ERCs are added to each source's denominator to lower their rate
- ERCs may be banked for future years or traded/sold among individual sources
- New units are not subject and cannot generate ERCs

# Mass-Based Approach (overview)

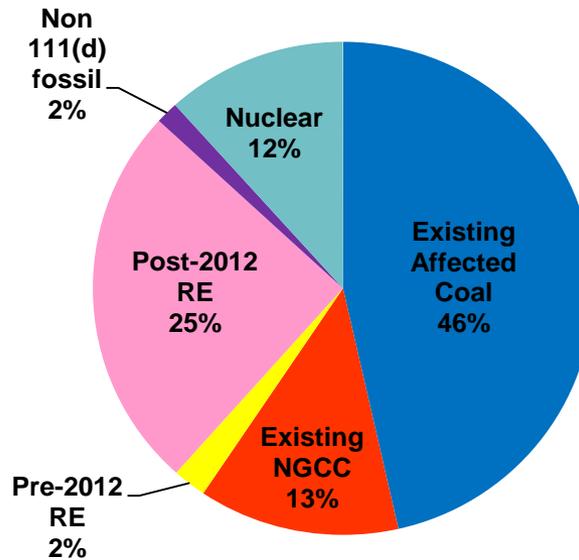
- Traditional regulatory trading approach
  - Examples:  
Acid Rain, NO<sub>x</sub> Budget Program, CAIR, CSAPR
- State-wide annual budget of allowances (tons CO<sub>2</sub>)
  - (Emissions are capped)
- Allowances are allocated to individual sources
  - Each allowance permits one ton of emissions
  - Allowances may be banked for future years or traded/sold among individual sources
- Plan must address emission leakage to new units

# Fuel Mix Comparisons

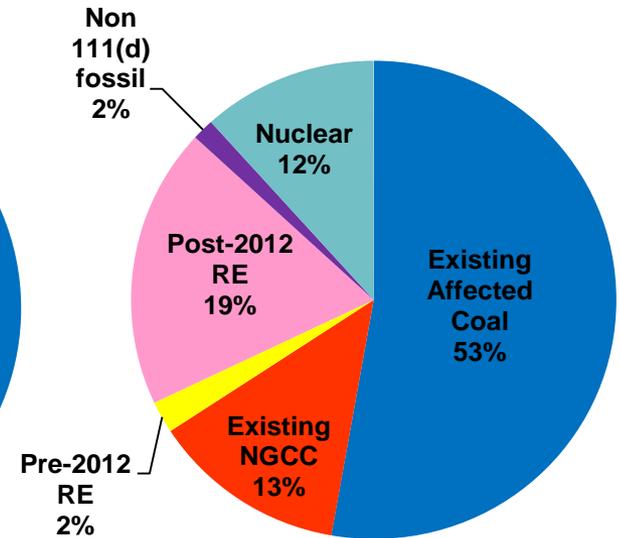
2012 Fuel Mix



2030 Rate-based  
Fuel Mix \*



2030 Mass-based  
Fuel Mix \*



\* 2030 fuel mixes are estimates and could vary significantly based on compliance options selected.

# Clean Energy Incentive Program (CEIP)

- States award CEIP allowances/ERCs to eligible projects and EPA matches the award
  - Renewable Energy
  - Energy Efficiency in low-income communities
- To be eligible
  - Construction (RE) or implementation (EE) must begin after the State submits final plan
  - Generation (RE) or savings (EE) must occur in 2020 and/or 2021 (EM&V plan required)
- State participation is optional

# Outreach and Coordination

- DNR plans to engage with numerous stakeholders throughout plan development
  - State Energy Office and Public Service Commission
  - Affected sources
  - ISOs/RTOs (Electricity Grid Operators)
  - EE/RE developers
  - Public engagement; particularly vulnerable communities
    - General outreach, EE/RE education, CEIP opportunities
- 30-day public comment periods for both Initial and/or Final Plans

# Clean Power Plan - Missouri Timeline \*

Tentative Date	Milestone
<b>August 3<sup>rd</sup>, 2015</b>	Final Clean Power Plan Released by EPA
<b>July of 2016</b>	Public Hearing for Initial Submittal/Extension Request
<b>August of 2016</b>	Adoption for Initial Submittal/Extension Request
<b>September 6<sup>th</sup>, 2016</b>	Initial Submittal Deadline
<b>August of 2017</b>	MACC Adoption of 2017 CPP Progress Report
<b>September 6<sup>th</sup>, 2017</b>	2017 CPP Progress Report Submittal Deadline
<b>April of 2018</b>	Public Hearing for Final Plan
<b>May of 2018</b>	Adoption of Final Plan
<b>September 6<sup>th</sup>, 2018</b>	Final Plan Submittal Deadline
<b>January 1<sup>st</sup>, 2022</b>	Interim Compliance Period Begins
<b>January 1<sup>st</sup>, 2030</b>	Final Compliance Period Begins

\* This timeline is tentative and gives the maximum time allowed to meet a Final Plan submittal deadline of September 6<sup>th</sup>, 2018. The actual schedule for plan development and adoption may be faster.

Division of Environmental Quality Director: Leanne Tippett Mosby

Date: 9/24/15

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