

DRAFT Clean Power Plan Final Rule

August 20, 2015

Thomas Gross, Bureau of Air



IT'S A BIG DEAL!!!

- In the works for years
- New pollutant not envisioned to be regulated under the Clean Air Act.....somebody moved our cheese
- Cause substantial changes in dispatch of Kansas utilities
- Cost a lot of money
- Require massive effort from agencies, utilities, policy makers, and interest groups
- Must all happen in short period of time

THE CLEAN POWER PLAN

- Three actions by EPA on August 3, 2015
 - Final emission guideline regulations for existing EGUs
 - Final CO₂ NSPS standards for new, modified and reconstructed EGUs
 - Proposed Federal Plan and model rule for existing EGUs
- Final rule for existing EGUs issued pursuant to Section 111(d) of the CAA
- Uses three “Building Blocks” to establish Best System of Emission Reduction (BSER)
- BSER includes CO₂ emission rates for fossil-fuel EGUs and NGCC units

THE CLEAN POWER PLAN

- State goal in either mass or rate form
 - Mass - Caps total annual tons of carbon EGUs can emit
 - Rate - Caps carbon per unit of power produced
- State goals based on each state's mix of power plants in 2012 baseline year
- Substantially more stringent for Kansas
- States required to demonstrate reliability issues considered in developing plan
 - Reliability safety valve included

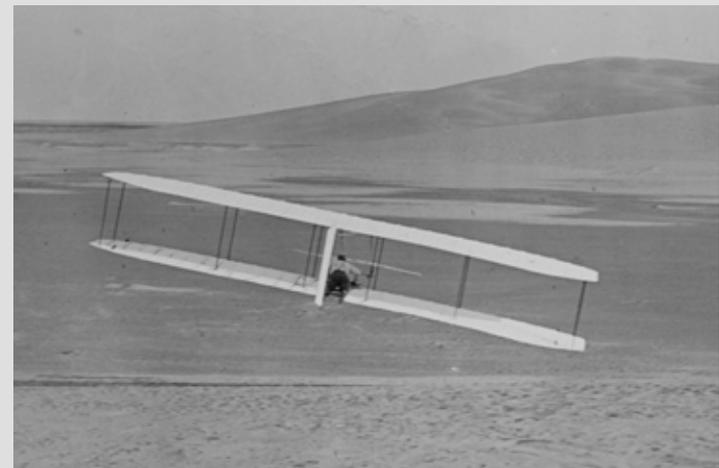


KEY CLEAN POWER PLAN DATES

Date	Action
August 3, 2015	Final Clean Power Plan rule issued
September 6, 2016	States submit final plan or initial plan with extension request
September 6, 2017	Progress update to EPA for states with extensions
September 6, 2018	State final plans due to EPA
January 1, 2022	First of three interim compliance periods begins
January 1, 2030	Final compliance date

GLIDE PATH TO 2030

- Interim period runs from 2022-2029 and includes three interim performance periods:
 - Step 1 – 2022-2024
 - Step 2 – 2025-2027
 - Step 3 – 2028-2029
- Interim and final CO₂ rates or goals must be met
- State can create their own glide path within limits???



KANSAS AFFECTED UNITS

- Coffeyville Mun. Power Plant Unit 4
- ***Empire District - Riverton Unit 12***
- Kansas City BPU - Nearman Unit 1
- Kansas City BPU - Quindaro Units 1 and 2
- KCP&L - La Cygne Units 1 and 2
- Mid-Kansas Electric - Cimarron River Unit 1
- Mid-Kansas Electric - Fort Dodge Unit 4
- Mid-Kansas Electric - Great Bend Unit 3
- Sunflower Electric - Garden City Unit S2
- Sunflower Electric - Holcomb Unit 1
- Westar Energy - Gordon Evans Units 1 and 2
- Westar Energy - Hutchinson Unit 4
- Westar Energy - Jeffrey Unit 1, 2 and 3
- Westar Energy - Lawrence Units 3, 4 and 5
- Westar Energy - Murray Gill Units 1, 2, 3 and 4
- Westar Energy - Tecumseh Units 7/9 and 8/10
- Winfield Mun. Power Plant #2, Unit 4

- Does not include 3 closed units

CHANGES FROM PROPOSAL TO FINAL

Item	Proposal	Final
Compliance Timeframe	2020	2022
Building Blocks	Four Building Blocks	Three Building Blocks
Demand-Side Energy Efficiency	Included as a Building Block	No longer a Building Block – can still be used
Timing of reductions	S-curve with a big cliff	Step down glide path with smaller cliffs
Goal setting	Formula included EE, new nuclear and RE sources	BSER: Apply three BBs to set CO ₂ emissions rates for fossil fueled boilers and gas turbines. EE, nuclear and existing RE not in goal setting.
Deadline for final state plan	September 2016 with opportunity for one or two year extension	September 2016: initial submittal with extension request; September 2018: Final state plan submittal
State plan options	Two types: direct emission limits and portfolio approach	Two Types: emissions standards and state measures
Interstate trading mechanism	Up-front agreements	Up-front agreements not required; Trading-ready option

BEST SYSTEM OF EMISSIONS REDUCTION

Building Block	Strategy used to Calculate Goal
1. Improved efficiency at power plants.	Increase efficiency of existing coal-fired steam EGUs.....based on interconnect potential
2. Shift from steam EGUs to NGCC gas turbines	Substituting increased generation from existing gas units for reduced generation at existing steam EGUsbased on 75% summer capacity
3. Shifting generation to clean energy renewables.	Substituting increased generation from new zero-emitting generation for reduced generation at existing fossil fuel EGUs.....based on state renewable potential

EGU PERFORMANCE RATES

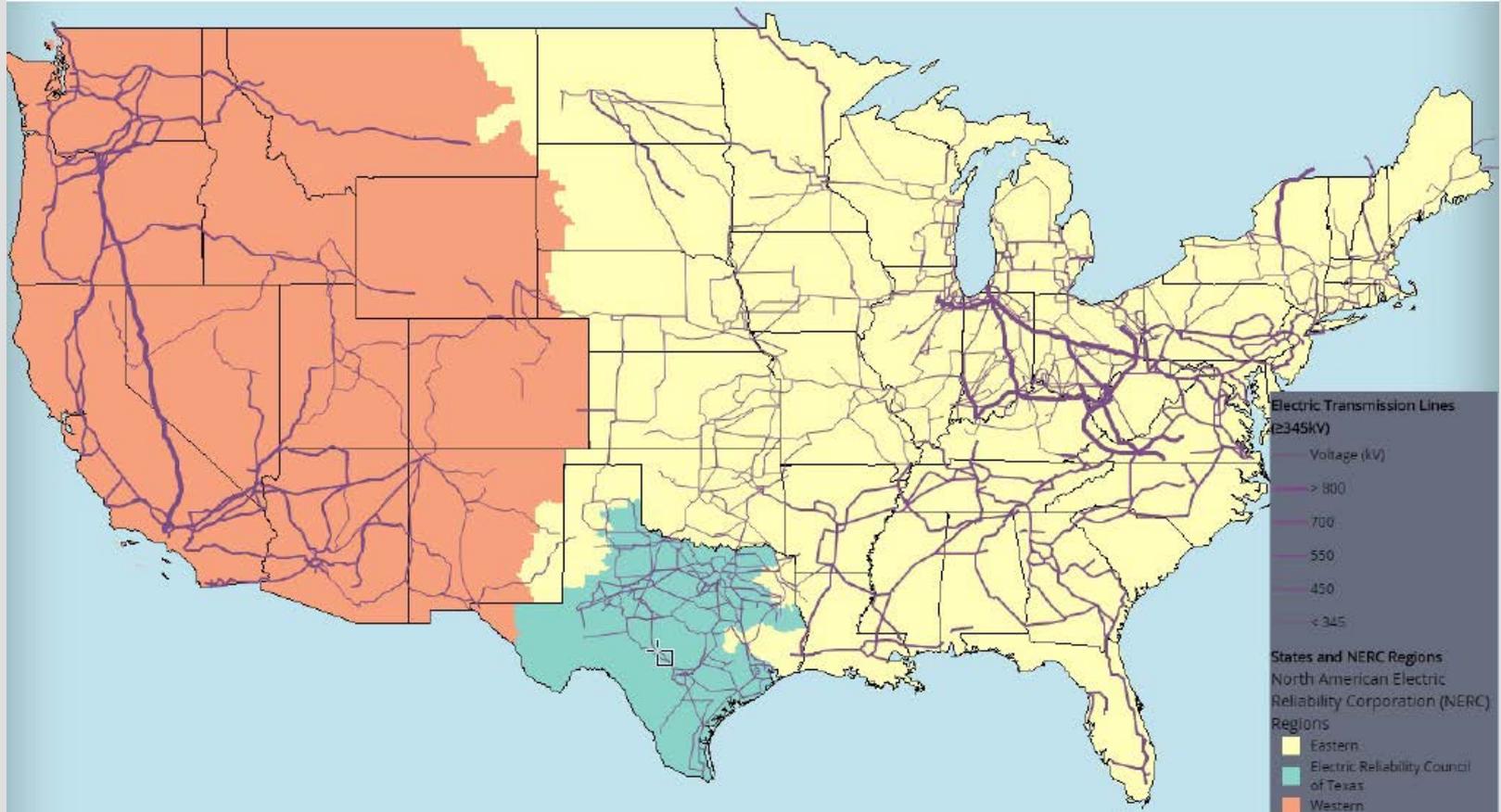


- Rates established for two categories of existing EGUs
 - Fossil fuel-fired EGUs – 1,305 lbs/MWh
 - Natural gas combined cycle units – 771 lbs/MWh
- Rule sets state goals in three forms:
 - Rate-based in lbs/MWh
 - Mass-based in tons of CO₂
 - Mass-based with new source complement in tons of CO₂

KANSAS INTERIM AND FINAL GOALS

	CO ₂ Rate (lbs/net MWh)	CO ₂ Emissions (short tons)	
2012 Historic ¹	2,319	34,353,105	
2020 Projections (without CPP)	1,870	41,894,916	
	Rate-Based Goal (lbs/net MWh)	Mass-Based Goal (annual average CO ₂ emissions in short tons)	Mass-Based Goal existing + new source complement
CPP interim period (2022–2029)	1,519	24,859,333	25,120,015
Interim period 2022–2024 ²	1,654	26,763,719	26,870,692
Interim period 2025–2027 ³	1,485	24,295,773	24,656,647
Interim period 2028–2029 ⁴	1,366	22,848,095	23,189,053
Final goal (2030 and beyond)	1,293	21,990,826	22,220,822

GENERATION AND DISTRIBUTION



- Eastern, Western and Texas interconnects

SOURCE CATEGORY RATE CALCULATIONS

- Step 1: Compile 2012 unit-level data; aggregate to state level; adjust for unit level outages; sum baseline totals
- Step 2: Aggregate adjusted emissions and generation data for coal steam, O&G steam, and NGCC
- Step 3: Calculate baseline emission rates for fossil steam and NGCC
- Step 4: Calculate regional fossil steam emission rate resulting from applying building block 1
 - 4.3% heat rate improvement for Eastern Interconnect applied only to fossil steam units

SOURCE CATEGORY RATE CALCULATIONS

- Step 5: Calculate regional fossil steam and NGCC generation levels resulting from building block 3
 - Building block 3 based on renewable potential for state
- Step 6: Calculate regional fossil steam and NGCC generation levels resulting from building blocks 2
 - BB2 based on dispatch of NGCC at 75% summer efficiency
- Step 7: Determine performance rates for each region reflecting heat rate improvement and generation shifts
- Step 8: Least stringent regional rate is the emission performance rate for the category
 - **1,305** lbs/MWh for fossil steam
 - **771** lbs/MWh for NGCC

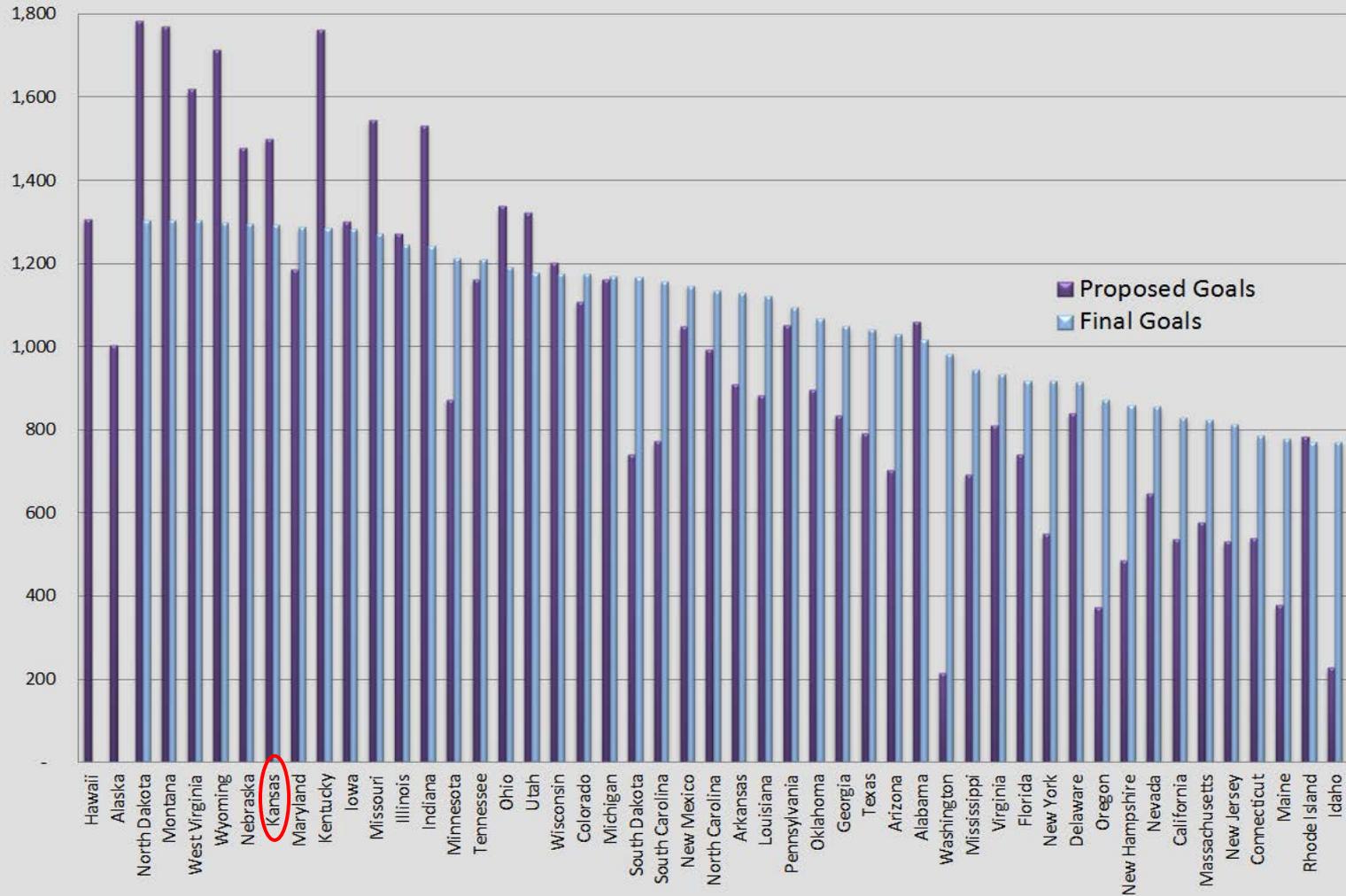
STATE EMISSION RATE GOAL CALCULATION

- State goal is weighted average of affected fleet rates from Step 8 using 2012 baseline generation



- Kansas 2030 goal = $(97.80\% \times 1,305 \text{ lbs/MWh}) + (2.20\% \times 771 \text{ lbs/MWh}) = 1,293 \text{ lbs/MWh}$

HOW DOES KANSAS COMPARE?



TWO STATE PLAN TYPES

■ Emission Standards Plan

- Federally enforceable emission standards on affected EGUs
- Either a rate or mass emissions standards plan

■ State Measures Plan

- Designed to achieve state CO₂ mass-based goal
- State measures that are not federally enforceable
- Includes federally enforceable measures as a backstop

■ State plan requirements

- Monitoring and reporting requirements
- Compliance schedules with milestones for progress

MASS-BASED PLANS

EPA Mass Goal for Existing Units with EPA New Unit Complement



Emission Standards

Trading Ready

State Measures, includes Mass Limit for Existing and NEW



Demonstration to Address Potential Leakage



Projection that Plan will Achieve the Goal



Backstop Emission Standards



Additional Reports



State Measures

Option for Trading

NEW SOURCE COMPLEMENT TO MASS GOALS

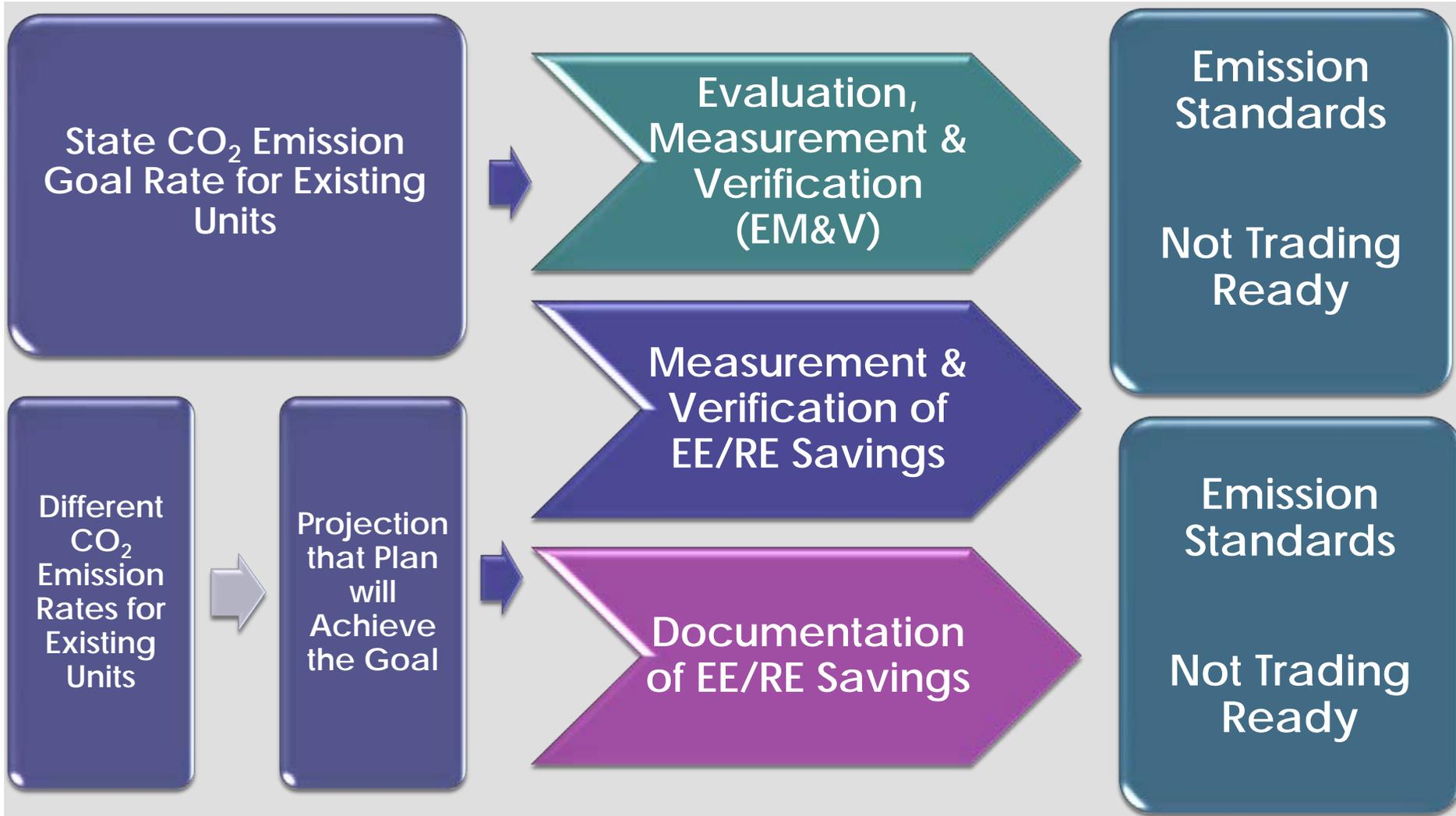
- Estimated new source emissions for incremental demand from 2012 forward
- Complements are emissions added to goal for mass-based plans that include both new and affected EGUs
- Methodology for quantifying new source complement
 - Calculate incremental generation for load growth from 2012
 - Subtract generation from under construction facilities
 - Subtract generation growth from affected EGUs and incremental renewable energy
 - Apportion remaining generation to states based on 2012 share of the interconnection's affected EGU generation total
 - Convert to emissions by using NGCC NSPS rate of 1,030 lbs/MWh.

LEAKAGE

- Defined in section VII.D of the final rule
- The potential for affected EGUs to shift generation to new fossil fuel-fired EGUs subject to the NSPS
- Leakage issue must be addressed if state implements the mass-based model rule



RATE-BASED PLANS



EPA PROPOSED MODEL RULE

- Has proposals for both mass and rate trading programs
- Incentives for early investment
- “Trading ready” options for states and utilities
 - State does not have to formally partner with another trading ready state with approved plan
 - No requirement for interstate agreement
 - Federal plan proposes option for model trading program a state may implement
- EPA will support trading with EPA tracking systems

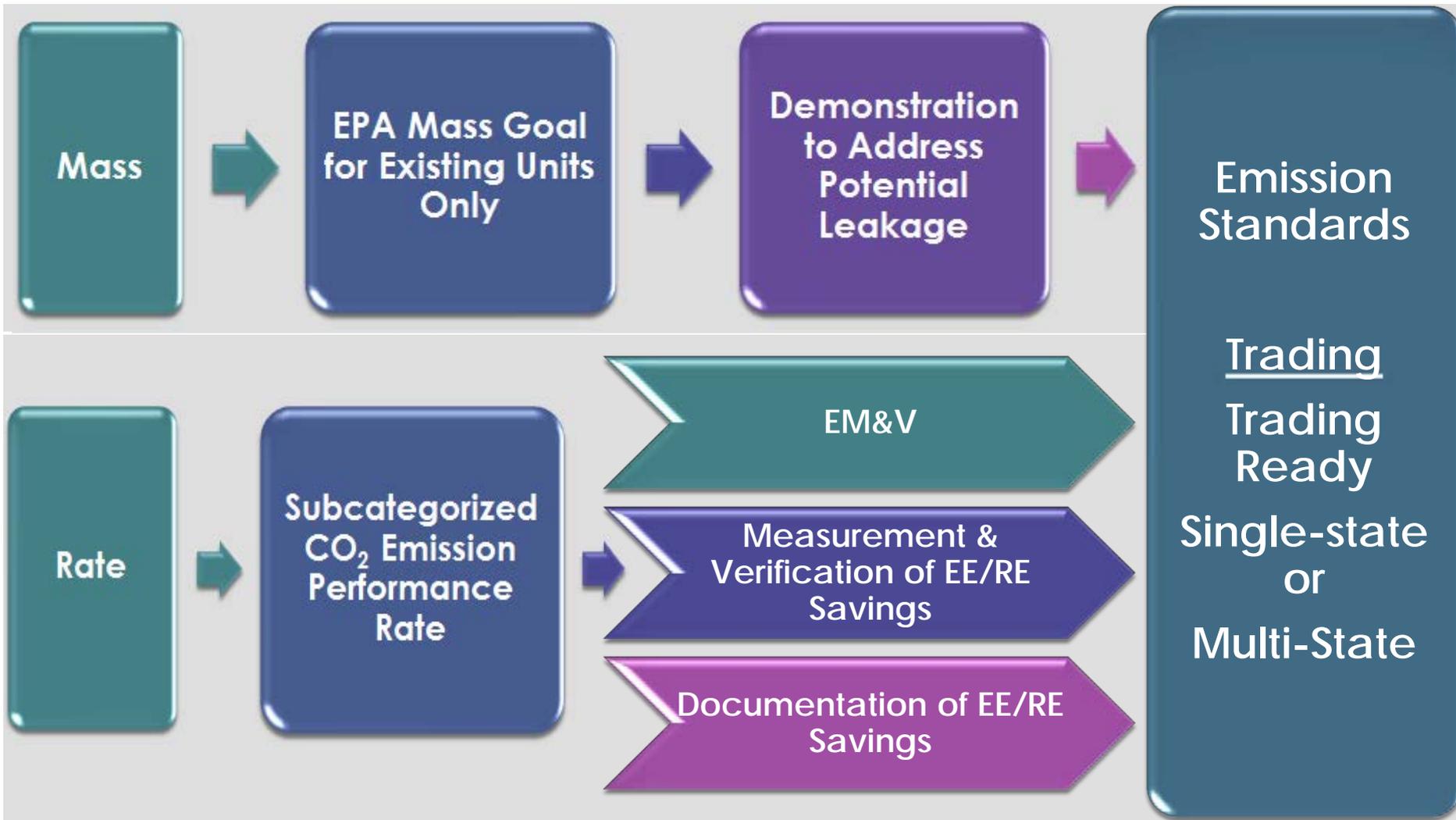
EPA PROPOSED MODEL RULE

- Mass based trading program allowance distribution
 - Clean Energy Incentive Program.
 - Output-based allocation set-aside.
 - Renewable energy set-aside
- Clean Energy Incentive Program
 - CEIP incentivizes early investments in renewables or reducing end-use energy demand during 2020 and 2021
 - CEIP targeted to RE and EE measures in low income communities
 - For both state and federal plans

PROPOSED FEDERAL PLAN

- Federal plan would apply to affected EGUs
- Will only be finalized if:
 - State does not submit plan by deadline
 - EPA disapproves a submitted plan
 - Includes both rate and mass-based plan
- EPA intends to finalize a single approach
- One pathway to a trading system supported by EPA
- Affected states may administer portions of the FIP and become the primary implementers
- States can exit federal plan upon submittal and approval of a state plan

STATE PLANS WITH PROPOSED MODEL RULES



CO₂ REDUCTION OPPORTUNITIES

- Heat rate improvements
- Fuel switching to a lower carbon content fuel
- Combined heat and power
- Qualified biomass co-firing and repowering
- Renewable energy (new & capacity uprates)
- Nuclear generation (new & capacity uprates)
- Demand-side energy efficiency programs
- Demand-side management measures
- Electricity transmission and distribution improvements
- Carbon capture and utilization or sequestration

CPP PATH FORWARD

- Complete review of final rule
- Evaluate impact of more stringent goal on Kansas utilities
- Review types of plans and select preferred one
- Determine whether rate or mass approach is best for Kansas
- Brief joint legislative committee
- Options for managing issue of stranded assets
- Continue coordination with KCC, utilities and stakeholders on all of the above

CARBON POLLUTION STANDARDS (NSPS)

- EPA set standards (NSPS) to limit carbon dioxide emissions from new, modified, and reconstructed EGUs
- Standards for two types of fossil-fuel fired units:
 - Stationary combustion turbines, generally firing natural gas
 - Electric utility steam generating units, generally firing coal
- EPA is deferring standards for some types of modification

NSPS - COAL

- ***New Source*** – Construction on or after January 8, 2014.
 - BSER is supercritical pulverized coal with partial CCS
 - Emission limit of 1,400 lb CO₂/MWh-gross
- ***Modification*** – Modify on or after June 18, 2014.
 - BSER is based on each unit's best potential performance
- ***Reconstructed Source*** – Reconstruct on or after June 18, 2014.
 - BSER is most efficient generating technology for type of units
 - Heat input > 2,000 MMBtu/hr - 1,800 lb CO₂/MWh-gross
 - Heat input ≤ 2,000 MMBtu/hr - 2,000 lb CO₂/MWh-gross

NSPS – NATURAL GAS

- ***New and Reconstructed Stationary Combustion Turbines***
 - BSER is natural gas combined cycle (NGCC) technology
 - Limit of 1,000 lb CO₂/MWh-gross
 - Sales applicability threshold determines whether a unit is “base load” or “non-base load”
 - Non base load units must meet a clean fuels input-based standard
- ***Modified Stationary Combustion Turbines***
 - Withdrawing standards

INFORMATION AND RESOURCES

- Clean Power Plan Website with Interactive Maps:

<http://www2.epa.gov/cleanpowerplan>

- Regulatory Actions:

<http://www2.epa.gov/cleanpowerplan/carbon-pollution-standards-new-modified-and-reconstructed-power-plants>

- CPP Toolbox for States:

<http://www2.epa.gov/cleanpowerplantoolbox>

- Webinars and Training:

<http://www.apti-learn.net/lms/cpp/plan/>

Questions?

Thomas Gross
Bureau of Air
Kansas Department of Health and Environment
Tgross@kdheks.gov
(785) 296-1692



**Our vision is 'healthy Kansans living in safe and sustainable environments'.
The state belongs to all of us - "Kansas Don't Spoil It"**