



The banner features a silhouette of a city skyline with various buildings, a power plant with smokestacks, wind turbines, and solar panels. The EPA logo is positioned on the right side of the banner.

THE CLEAN POWER PLAN

epa.gov/cleanpowerplan #ActOnClimate #CleanPowerPlan

2015



Summary

EPA is taking three actions that will significantly reduce carbon pollution from the power sector, the largest source of carbon pollution in the US

- Clean Power Plan (CPP) – existing sources
- Carbon Pollution Standards – new, modified and reconstructed sources
- Federal Plan proposal and model rule

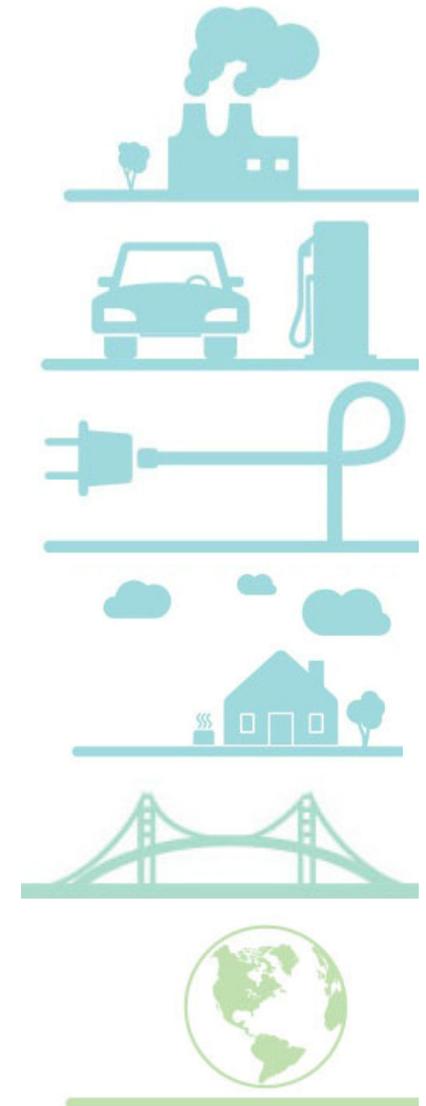
EPA's actions

- Achieve significant pollution reductions
- Deliver an approach that gives states and utilities plenty of time to preserve ample, reliable and affordable power
- Spur increased investment in clean, renewable energy



Climate Action Plan

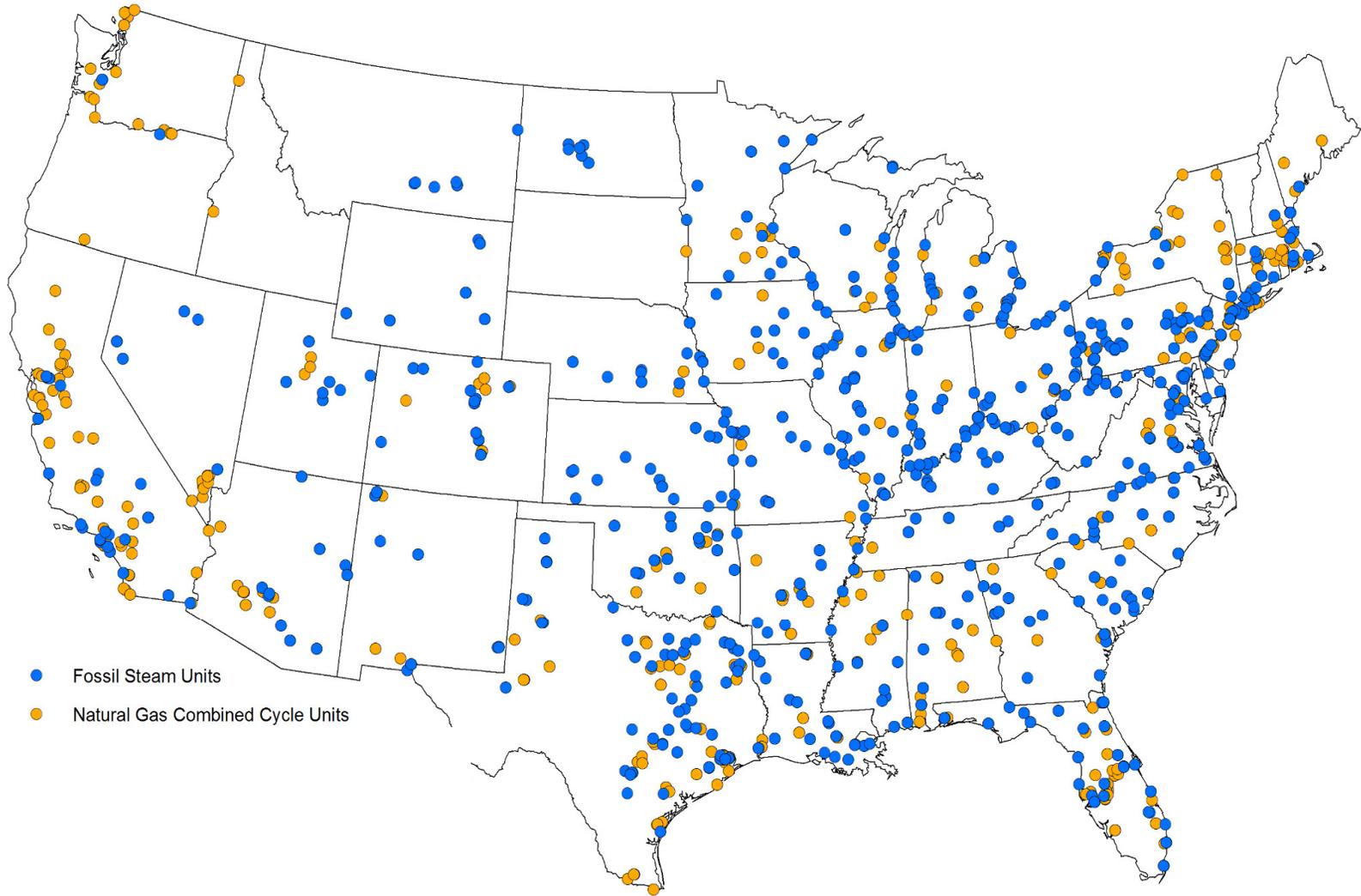
- Building a 21st century transportation sector
- Cutting energy waste in homes, businesses, and factories
- Reducing methane and HFCs
- Preparing the U.S. for the impacts of climate change
- Leading international efforts to address global climate change
- **Reducing carbon pollution from power plants**





The Clean Power Plan

What sources?





Outreach Shaped the Clean Power Plan

- More than two years of unprecedented outreach and public engagement
- Responds to the critical changes that stakeholders and states asked the agency to make and incorporates many of their good ideas
 - More than 4 million public comments submitted to the EPA and
 - Hundreds of meetings with stakeholders
- Public engagement was essential throughout the development of the Clean Power Plan, and that outreach will continue during the implementation



Clean Power Plan Timeline





The Clean Power Plan

Final Rule Overview

- Relies on a federal-state partnership to reduce carbon pollution from the biggest sources – power plants
- Carrying out EPA’s obligations under section 111(d) of the Clean Air Act, the CPP sets carbon dioxide emissions performance rates for affected power plants that reflect the “best system of emission reduction” (BSER)
- EPA identified 3 “Building Blocks” as BSER and calculated performance rates for fossil-fueled EGUs and another for natural gas combined cycle units
- Then, EPA translated that information into a state goal – measured in mass and rate – based on each state’s unique mix of power plants in 2012
- The states have the ability to develop their own plans for EGUs to achieve either the performance rates directly or the state goals, with guidelines for the development, submittal and implementation of those plans



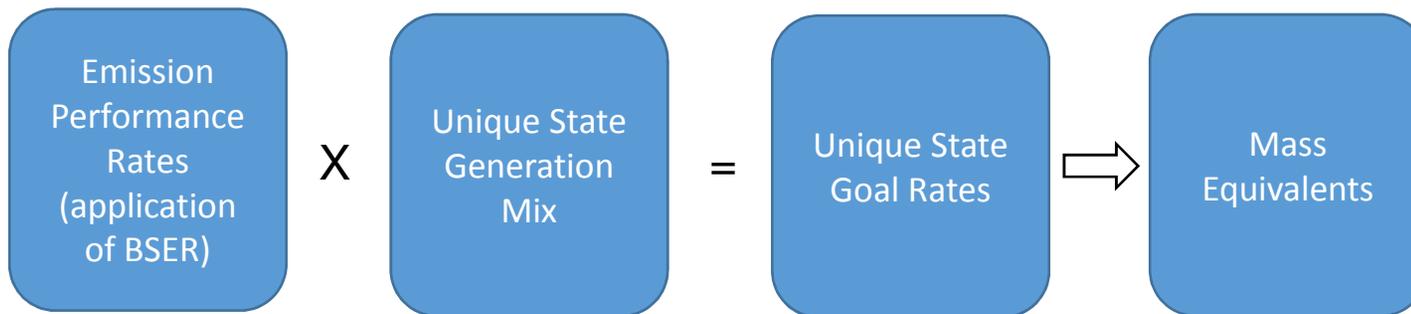
Best System of Emission Reduction: Three Building Blocks

Building Block	Strategy EPA Used to Calculate the State Goal	Maximum Flexibility: Examples of State Compliance Measures
1. Improved efficiency at power plants	Increasing the operational efficiency of existing coal-fired steam EGUs on average by a specified percentage, depending upon the region	<ul style="list-style-type: none"> -Boiler chemical cleaning -Cleaning air preheater coils -Equipment and software upgrades
2. Shifting generation from higher-emitting steam EGUS to lower-emitting natural gas power plants	Substituting increased generation from existing natural gas units for reduced generation at existing steam EGUs in specified amounts	Increase generation at existing NGCC units
3. Shifting generation to clean energy renewables	Substituting increased generation from new zero-emitting generating technologies for reduced generation at existing fossil fuel-fired EGUs in specified amounts	Increased generation from new renewable generating capacity, e.g., solar, wind, nuclear, and combined heat & power



Category-Specific Performance Rates

Power plants are subject to the same standards no matter where they are located.



EPA is establishing carbon dioxide **emission performance rates** for two subcategories of existing fossil fuel-fired electric generating units (EGUs):

1. Fossil fuel-fired EGUs (generally, coal-fired power plants) – 1,305 lbs CO₂/MWh
2. Natural gas combined cycle units – 771 lbs CO₂/MWh

Emission performance rates have been translated into equivalent state goals. In order to maximize the range of choices available to states, EPA is providing state goals in three forms:

- rate-based goal measured in pounds per megawatt hour (lb/MWh);
- mass-based goal measured in short tons of CO₂
- mass-based goal with a new source complement (for states that choose to include new sources) measured in short tons of CO₂



Changes from Proposal to Final Respond Directly to Comments

ITEM	PROPOSAL	FINAL
Compliance Timeframe	2020	2022
Building Blocks	Four Building Blocks	Three Building Blocks (see next row) and refinements to Building Blocks
Demand-Side Energy Efficiency	Included as a Building Block	No longer a Building Block - though EPA anticipates that due to its low costs and large potential in every state, demand-side energy efficiency will be a significant component of state compliance plans under the CPP
Timing of Reductions	S-curve, Commenter dislike the cliff	Steps down glide path more gradually: 2022-2024 2025-2027 2028-2029



Changes from Proposal to Final Respond Directly to Comments

ITEM	PROPOSAL	FINAL
Goal Setting	Formula included energy efficiency, (EE), new nuclear, and existing renewable energy (RE) sources in the Best System of Emission Reduction (BSER)	BSER: Apply three building blocks to set two uniform CO2 emission rates; generally, 1. Fossil and 2. Natural Gas. EE, Nuclear and existing RE not included in goal setting.
Geographic focus	State/Tribe/Territory	Contiguous United States
Deadline for final state plan	June 2016 with opportunity for one or two year extension	September 2018: after initial submittal by September 2016
State plan options	Two Types: Direct emission limits and portfolio approach	Two types: emission standards and state measures
Interstate trading mechanisms	Up-front agreements	Up-front agreements not required Trading-Ready option



Choosing the Glide Path to 2030

- **Phased-in glide path**

- The interim period runs from 2022-2029 and includes three interim performance periods creating a reasonable trajectory (smooth glide path)
- Interim steps:
 - Step 1 – 2022-2024
 - Step 2 – 2025-2027
 - Step 3 – 2028-2029
- Provided that the interim and final CO₂ emission performance rates or goals are met, for each interim period a state can choose to follow EPA's interim steps or customize their own



Incentives for Early Investments

- EPA is providing the **Clean Energy Incentive Program (CEIP)** to incentivize early investments that generate wind and solar power or reduce end-use energy demand during 2020 and 2021
- The CEIP is an optional, “matching fund” program states may choose to use to incentivize early investments in wind or solar power, as well as demand-side energy efficiency measures that are implemented in low-income communities
- EPA will provide matching allowances or Emission Rate Credits (ERCs) to states that participate in the CEIP, up to an amount equal to the equivalent of 300 million short tons of CO₂ emissions. The match is larger for low-income EE projects, targeted at removing historic barriers to deployment of these measures.
- Also, states with more challenging emissions reduction targets will have access to a proportionately larger share of the match
- EPA will engage with stakeholders in the coming months to discuss the CEIP and gather feedback on specific elements of the program



Design Preserves Reliability

- The Clean Power Plan includes features that reflect EPA's commitment to ensuring that compliance with the final rule does not interfere with the industry's ability to maintain the reliability of the nation's electricity supply:
 - long compliance period starting in 2022 with sufficient time to maintain system reliability
 - design that allows states and affected EGUs flexibility to include a large variety of approaches and measures to achieve the environmental goals in a way that is tailored to each state's and utility's energy resources and policies, including trading within and between states, and other multi-state approaches
 - requirement that each state demonstrate in its final plan that it has considered reliability issues in developing its plan, including consultation with an appropriate reliability or planning agency
 - mechanism for a state to seek a revision to its plan in case unanticipated and significant reliability challenges arise
 - **reliability safety valve** to address situations where, due to an unanticipated event or other extraordinary circumstances, there is a conflict between the requirements imposed on an affected power plant and maintaining reliability
- EPA, Department of Energy (DOE) and the Federal Energy Regulatory Commission (FERC) are coordinating efforts to monitor the implementation of the final rule to help preserve continued reliable electricity generation and transmission

State Plans



Two State Plans Designs:

- States are able to choose one of two state plan types:

Emission Standards Plan – state places federally enforceable emission standards on affected electric generating units (EGUs) that fully meet the emission guidelines

- can be designed to meet the CO₂ emission performance rates or state goal (rate-based or mass-based goal)

State Measures Plan - state includes, at least in part, measures implemented by the state that are not included as federally enforceable emission standards

- designed to achieve the state CO₂ mass-based goal
- includes federally enforceable measures as a backstop

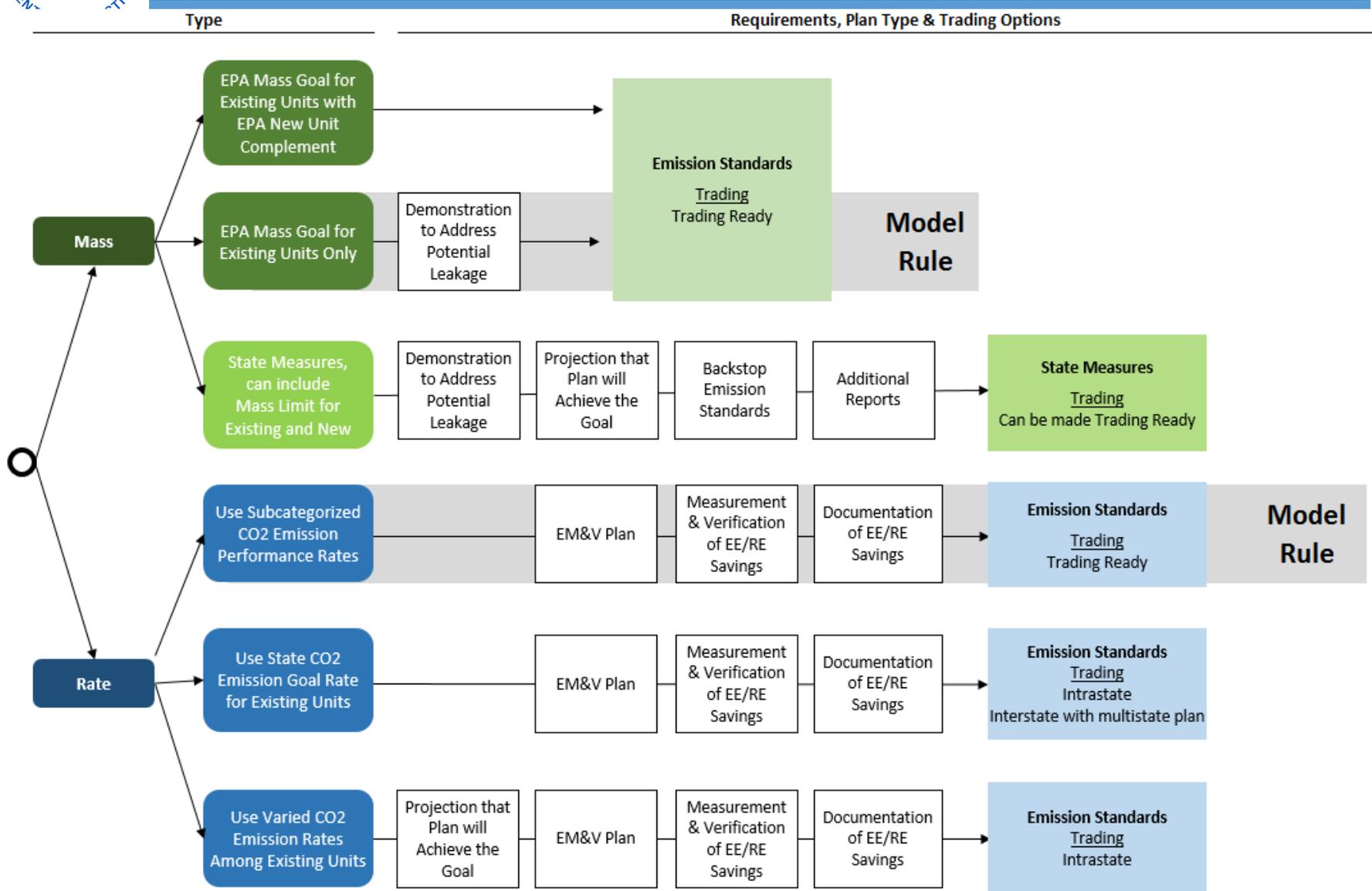


State Plan Development

- Many states are discussing plans that would enable them to collaborate with other states, including multi-state plans or linking plans through common administrative provisions (i.e. “trading ready”)
 - Trading-ready mechanisms allow states or power plants to use creditable, out-of-state reductions to meet their goal without the need for up-front interstate agreements
 - If states elect to collaborate, EPA can support the option for trading as a suitable choice for both EPA and states to implement the CPP
- In the CPP, EPA is finalizing state plan designs that suit state needs
 - Pathways for existing programs to reduce carbon emissions, individual state plans and multi-state trading approaches
- Federal plan proposes option for model trading program a state may then implement
 - Invites comment on mass and rate based model trading programs for EGUs
 - Invites comment on idea that all types of state plans can participate in trading



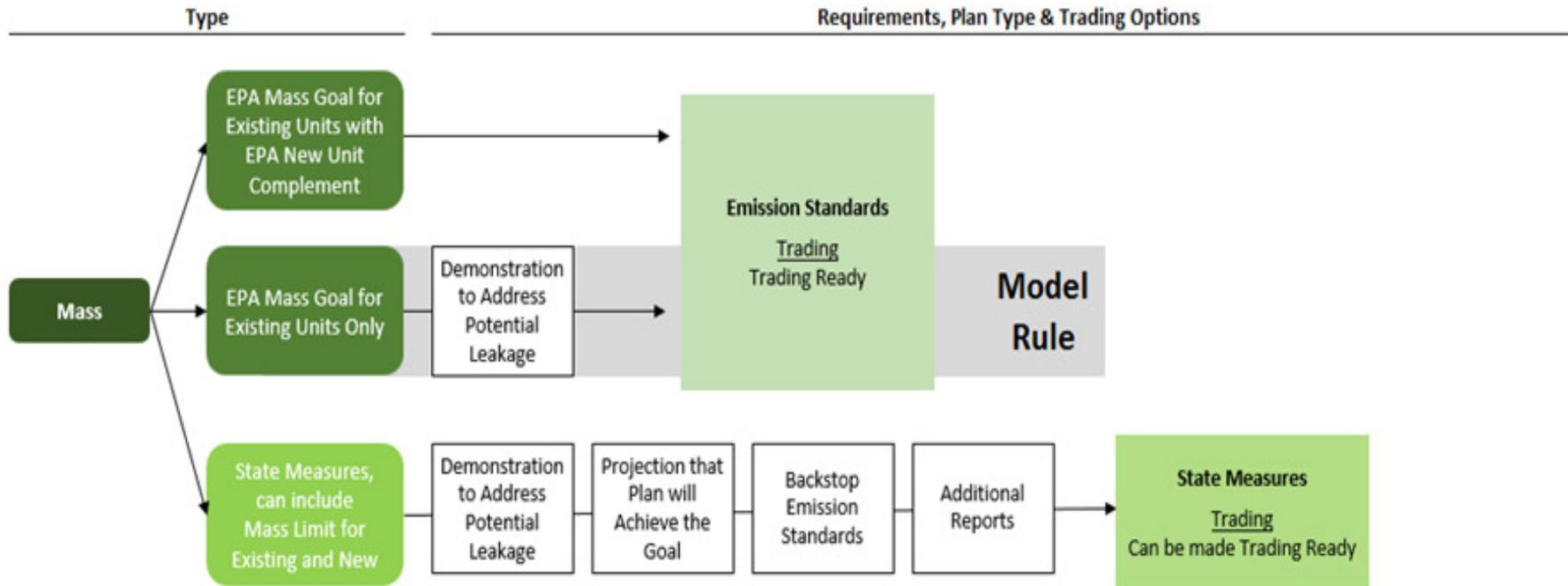
More State Options, Lower Costs





More State Options, Lower Costs

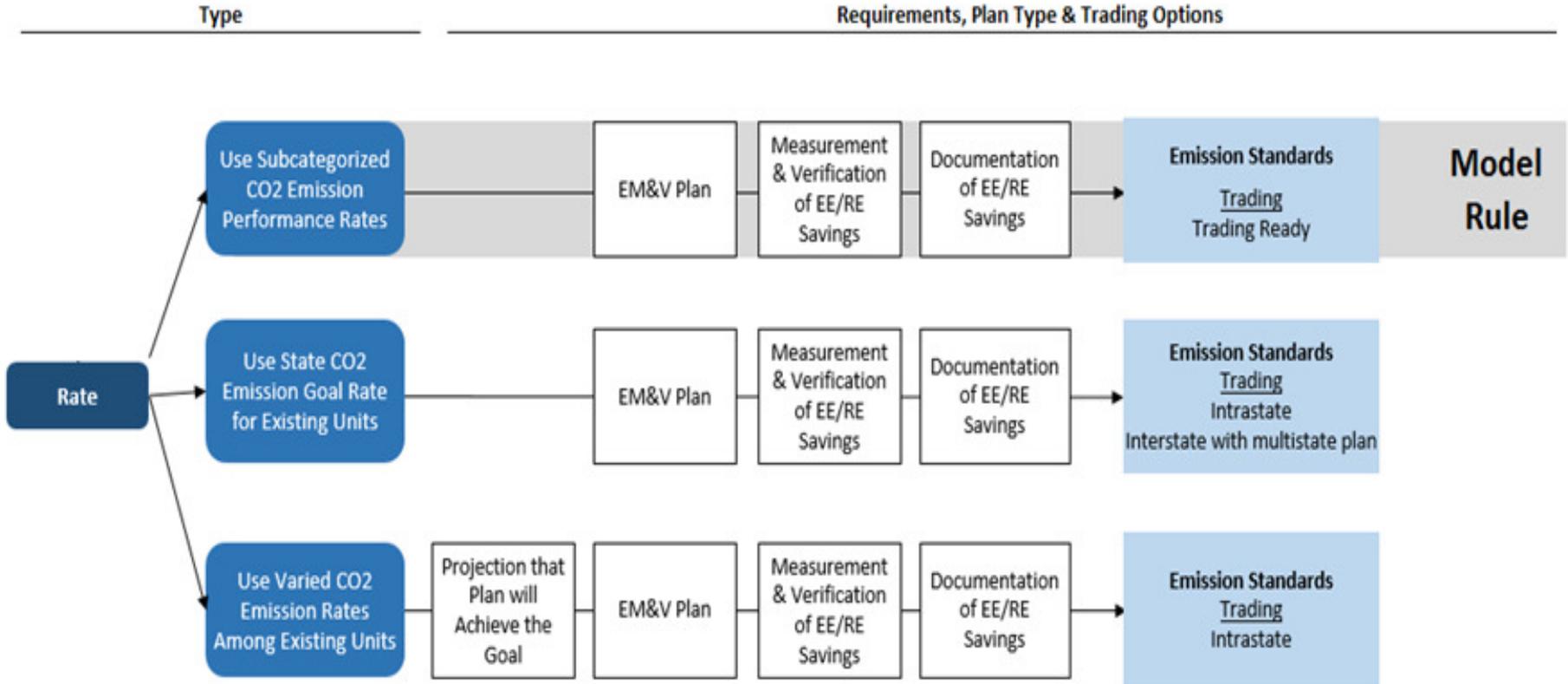
Mass Based Options





More State Options, Lower Costs

Rate Based Options





Many CO₂ Reduction Opportunities

- Heat rate improvements
- Fuel switching to a lower carbon content fuel
- Integration of renewable energy into EGU operations
- Combined heat and power
- Qualified biomass co-firing and repowering
- Renewable energy (new & capacity uprates)
 - Wind, solar, hydro
- Nuclear generation (new & capacity uprates)
- Demand-side energy efficiency programs and policies
- Demand-side management measures
- Electricity transmission and distribution improvements
- Carbon capture and utilization for existing sources
- Carbon capture and sequestration for existing sources



CPP: Plan Implementation Timeline

Submittals	Dates
State Plan OR initial submittal with extension request	September 6, 2016
Progress Update, for states with extensions	September 6, 2017
State Plan, for states with extensions	September 6, 2018
Milestone (Status) Report	July 1, 2021

Interim and Final Goal Periods ¹	Reporting
Interim goal performance period (2022-2029) ²	
- Interim Step 1 Period (2022-2024) ³	July 1, 2025
- Interim Step 2 Period (2025-2027) ⁴	July 1, 2028
- Interim Step 3 Period (2028-2029) ⁵	July 1, 2030
Interim Goal (2022-2029) ⁶	July 1, 2030
Final Goal (2030)	July 1, 2032 and every 2 years beyond

¹ Incentive Program. See section VIII.B of the final rule preamble for more information.

² The performance rates are phased in over the 2022-2029 interim period, which leads to a glide path of reductions that “steps down” over time. States may elect to set their own milestones for Interim Step periods 1, 2, and 3 as long as they meet the interim and final goals articulated in the emission guidelines.

^{3 4 5} State required to compare EGU emission levels with the interim steps set forth in the state’s plan. For 2022-2024, state must demonstrate it has met its interim step 1 period milestone, on average, state may choose to award early action credits (ERCs) or allowances in 2020-2021, and the EPA may provide matching ERCs or allowances, through the Clean Energy, over the three years of the period. For 2025-2027, state must demonstrate it has met its interim step 2 period milestone, on average, over the three years of the period. For 2028-2029, state must demonstrate it has met its interim step 3 period milestone, on average, over the two years of the period. See section VIII.B of the final rule preamble for more information.

⁶ State required to compare EGU emission levels with the interim goal set forth in the state’s plan. For 2022-2029, state must demonstrate it has met its interim goal, on average, over the eight years of the period.

Proposed Federal Plan and Model Rules

Pathways for Implementation



Proposed Federal Plan

Overview

- The federal plan and model trading rules provide a readily available path forward for Clean Power Plan implementation and present flexible, affordable implementation options for states
- The model rules provide a cost-effective pathway to adopt a trading system supported by EPA and make it easy for states and power plants to use emissions trading



Proposed Federal Plan

Overview

- Both the proposed federal plan and model rules:
 - Contain the same elements that state plans are required to contain, including:
 - Performance standards
 - Monitoring and reporting requirements
 - Compliance schedules that include milestones for progress
 - Ensure the CO₂ reductions required in the final CPP are achieved
 - Preserve reliability
- Co-proposing two different approaches to a federal plan— a rate-based trading plan type and a mass-based trading plan type
 - Both proposed plan types would require affected EGUs to meet emission standards set in the Clean Power Plan



Proposed Federal Plan

How does it work?

- Will be finalized only for those affected states with affected EGUs that EPA determines have failed to submit an approvable Clean Air Act 111(d) state plan by the relevant deadlines set in the emission guidelines
 - Even where a federal plan is put in place, a state will still be able to submit a plan, which if approved, will allow the state and its sources to exit the federal plan
- EPA currently intends to finalize a single approach (i.e., either the mass-based or rate-based approach) for every state in which it finalizes a federal plan



Proposed Federal Plan

How does it work?

- Affected states may administer administrative aspects of the federal plan and become the primary implementers
 - May also submit partial state plans and implement a portion of a federal plan
- Affected states operating under a federal plan may also adopt complementary measures outside of that plan to facilitate compliance and lower costs to the benefit of power generators and consumers

Carbon Pollution Standards



Carbon Pollution Standards

Overview

A **new source** is any newly constructed fossil fuel-fired power plant that commenced construction after January 8, 2014

A **modification** is any physical or operational change to an existing source that increases the source's maximum achievable hourly rate of air pollutant emissions. This standard would apply to units that modify after June 18, 2014

A **reconstructed source** is a unit that replaces components to such an extent that the capital cost of the new components exceeds 50 percent of the capital cost of an entirely new comparable facility. This standard would apply to units that reconstruct after June 18, 2014

- EPA set standards to limit carbon dioxide emissions from new, modified, and reconstructed power plants.
- In the Clean Air Act (CAA), Congress recognized that the opportunity to include the most advanced emissions controls into a source's design is greater for new sources than for existing sources; so it laid out distinct approaches for each under CAA section 111
- EPA is establishing separate standards for two types of fossil-fuel fired sources:
 - stationary combustion turbines, generally firing natural gas; and
 - electric utility steam generating units, generally firing coal
- EPA is deferring standards for some types of modifications at this time



Carbon Pollution Standards

Overview

- These final standards reflect specific concerns and technical input from the comments received on both the proposed Carbon Pollution Standards for New Sources and the proposed Carbon Pollution Standards for Modified and Reconstructed Sources
- The standards reflect the degree of emission limitation achievable through the application of the best system of emission reduction (BSER) that EPA has determined has been adequately demonstrated for each type of unit



Carbon Pollution Standards

Overview

- These limits provide the starting point for new fossil-fueled fired power plants, which must obtain permits under the Clean Air Act's New Source Review program. That program requires the use of Best Available Control Technology. EPA will revise its BACT Guidance to reflect these requirements and explain further requirements for applicants to evaluate advancing technology
- Because these standards are in line with current industry investment patterns, these standards are not expected to have notable costs and are not projected to impact electricity prices or reliability



Carbon Pollution Standards

Coal

New Coal-Fired Power Plants

- Best System for Emission Reduction (BSER) for new steam units is highly efficient supercritical pulverized coal (SCPC) with partial carbon capture and storage (CCS)
- Emission limit of 1,400 lb CO₂/MWh-gross
- Could meet by
 - Capturing about 20 percent of its carbon pollution
 - Co-firing natural gas



Carbon Pollution Standards

Coal

Modified Coal-Fired Power Plants

- BSER for modified units is based on each affected unit's own best potential performance
- Setting standards for units that make larger modifications, those resulting in an increase of hourly CO₂ emission of more than 10 percent
- Withdrawing standards for units that make smaller modifications, those resulting in an increase less than or equal to 10 percent. Delayed until EPA gathers more information



Carbon Pollution Standards

Coal

Reconstructed Coal-Fired Plants

- BSER is the performance of the most efficient generating technology for these types of units (i.e., reconstructing the boiler if necessary to use steam with higher temperature and pressure, even if the boiler was not originally designed to do so)
 - Sources with heat input greater than 2,000 MMBtu/h would be required to meet an emission limit of 1,800 lb CO₂/MWh-gross and
 - Sources with a heat input of less than or equal to 2,000 MMBtu/h would be required to meet an emission limit of 2,000 lb CO₂/MWh-gross.



Carbon Pollution Standards

Natural Gas

New and Reconstructed Stationary Combustion Turbines, Generally Natural Gas

- BSER is natural gas combined cycle (NGCC) technology
- Issuing final emission limit of 1,000 lb CO₂/MWh-gross for all sizes of base load units
- Non-base load units must meet a clean fuels input-based standard
- Sales applicability threshold determines whether a unit is “base load” or “non-base load”



Carbon Pollution Standards

Natural Gas

Modified Stationary Combustion Turbines, Generally Natural Gas

- Withdrawing standards for stationary combustion turbines that make modifications. Delayed until EPA gathers more information



Information and Resources

How can I learn more?

After two years of unprecedented outreach, the EPA remains committed to engaging with all stakeholders as states implement the final Clean Power Plan.

- For more information and to access a copy of the rule, visit the **Clean Power Plan website**: <http://www2.epa.gov/carbon-pollution-standards>
- For additional resources to help states develop plans, visit the **CPP Toolbox for States**: <http://www2.epa.gov/cleanpowerplantoolbox>
- For a graphical and detailed walk through of the EGU category-specific CO₂ emission performance rate and state goals, see **State Goal Visualizer**: <http://www2.epa.gov/cleanpowerplantoolbox>
- EPA provides **webinars** and **training** on CPP related topics at the air pollution control learning website. See: <http://www.apti-learn.net/lms/cpp/plan/>



Questions?

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