

Welcome to the IDEA Webinar Series

The Clean Power Plan: Implications for Combined Heat & Power and District Energy Systems



September 17, 2015



Welcome to the IDEA Webinar Series

- ❑ The webinar will **start promptly at 3:30 pm EDT (Boston time) and is scheduled to last one (1) hour; with flexibility to extend for Q&A if needed.**
- ❑ Please **mute your phone** during the webinar. All lines are muted.
- ❑ If you are having problems with video or audio, please send a note via the Chat Box function on the right side. Click the Chat box and choose – “**Chat privately to Cheryl Jacques (host)**”. **Or call to IDEA at 508-366-9339.**
- ❑ **Questions to Presenters:** Please enter your **Questions** in the **Q&A** box at the lower right of the screen. These questions will be moderated and addressed as time allows. We plan to handle Q&A at the conclusion of the presentation.
- ❑ **Survey:** Please complete the brief on-line survey following the webinar.
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Agenda

- I. Welcome / Overview agenda / Introductions Rob Thornton, IDEA**
- II. EPA Clean Power Plan Sarah Dunham, US EPA**
 - i. Overview of Clean Power Plan: policy objectives and benefits
 - ii. Three Building Blocks for BSER; standards and timeline
 - iii. CO₂ Reduction options; CEIP and update on August 2015 version
 - iv. Proposed Federal Plan and Additional Resources
- III. Guidance to IDEA Members Mark Spurr, IDEA & Avi Zevin, Van Ness Feldman**
 - i. CHP at Affected Sources
 - ii. Non-Affected EGU CHP in a Rate-Based Plan
 - iii. Non-Affected EGU CHP in a Mass-Based Plan
 - iv. Proposed Federal Plan & Model Trading Rule
- IV. Moderated Q & A**
- V. Sources for Additional Information /Adjournment / Survey**

Webinar Leaders



Sarah Dunham
*Director, Office of
Atmospheric Programs*
***US Environmental Protection
Agency***



Mark Spurr
Legislative Director
***International District Energy
Association***



Avi Zevin
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Van Ness Feldman



The International District Energy Association

September 17, 2015

Deliberative – Do Not Cite or Quote



Summary

Climate change is a threat in the U.S. -- We are already feeling the dangerous and costly effects of a changing climate – affecting people’s lives, family budgets, and businesses’ bottom lines

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

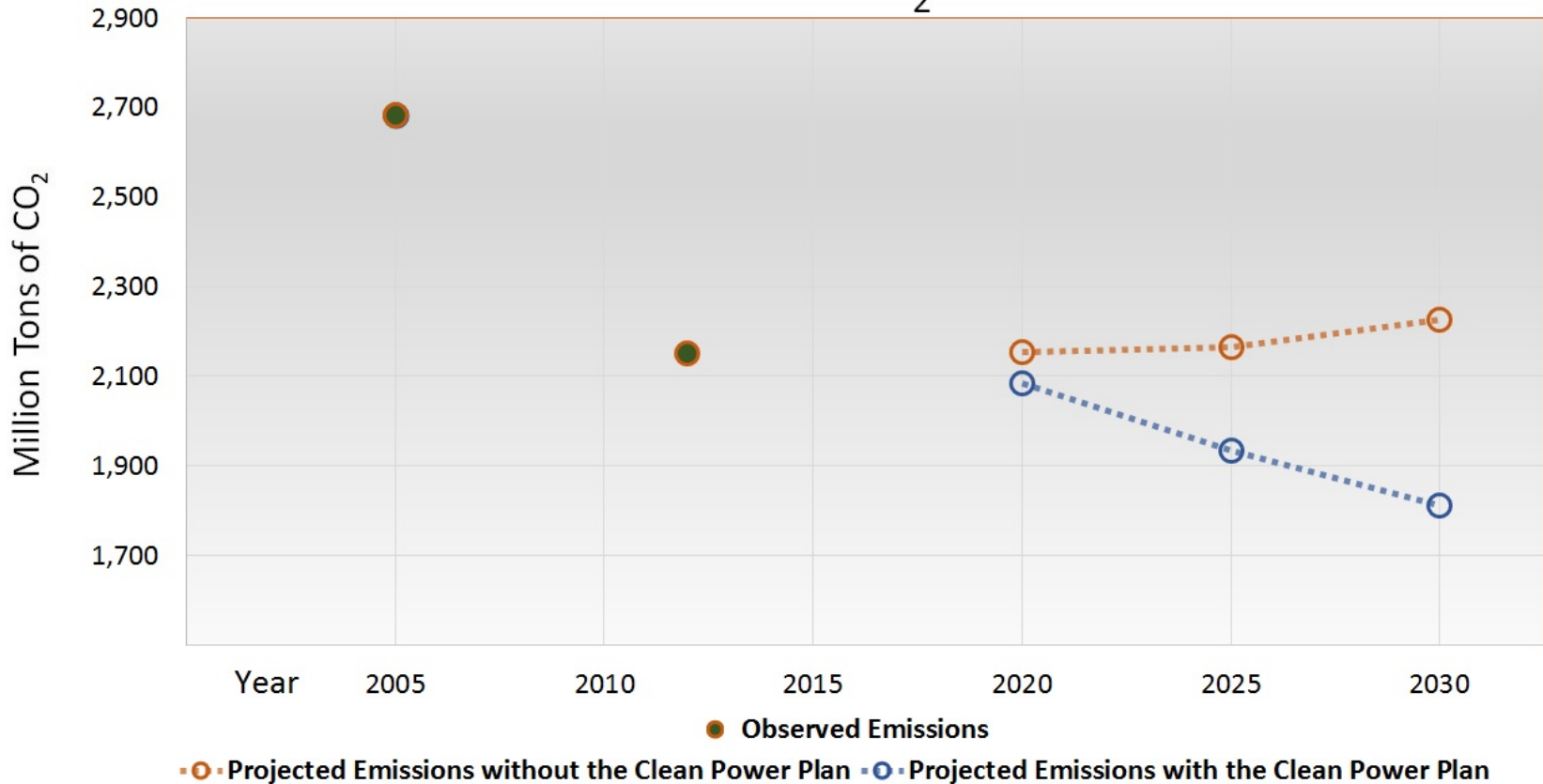
EPA’s actions

- 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



Transition to Clean Energy is Happening Faster than Anticipated

Power Sector CO₂ Emissions

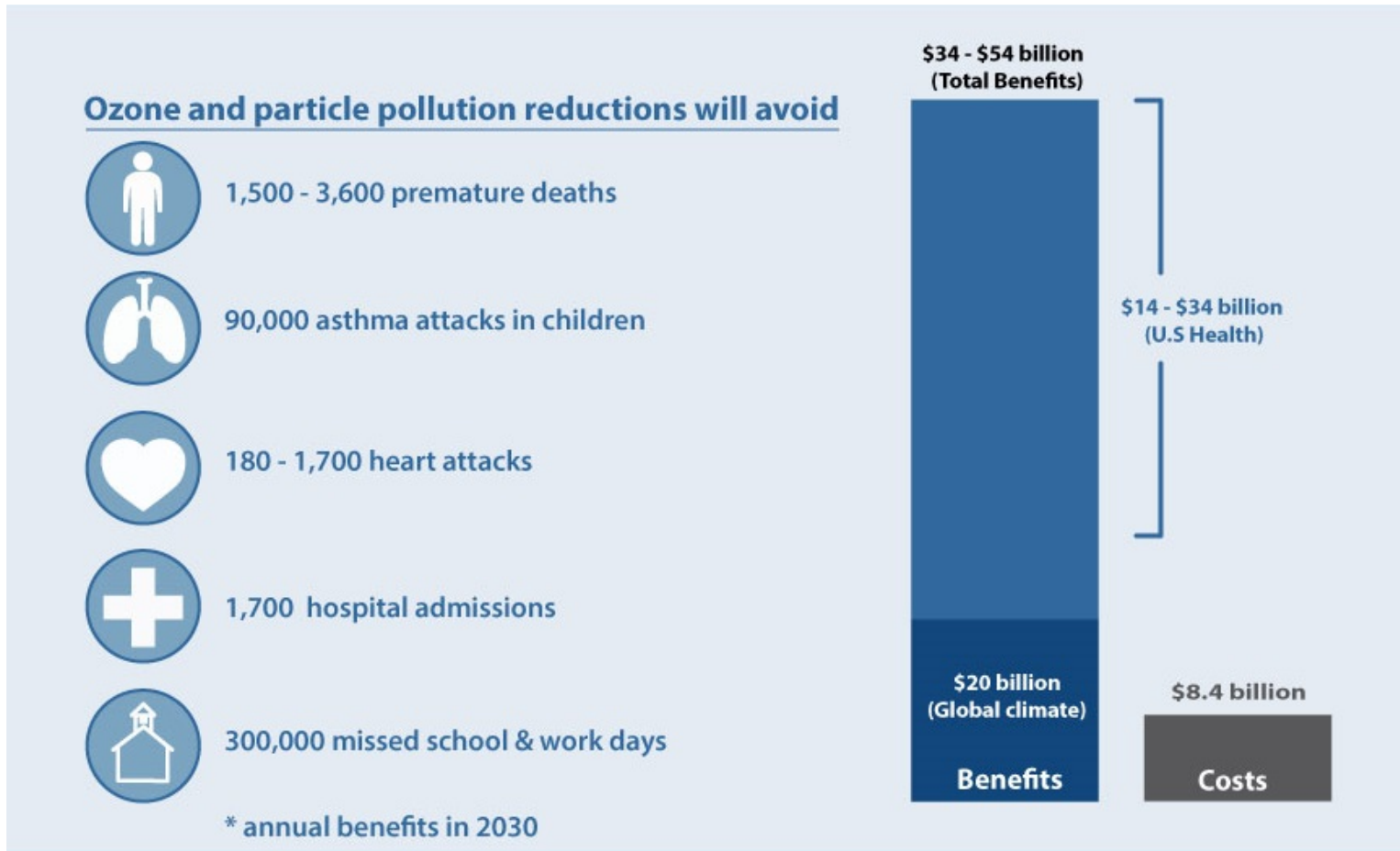


Carbon and air pollution are already decreasing, improving public health each and every year. The Clean Power Plan accelerates this momentum, putting us on pace to cut this dangerous pollution to historically low levels in the future. When the Clean Power Plan is fully in place in 2030, carbon pollution from the power sector will be 32 percent below 2005 levels, securing progress on and making sure it continues.



Benefits of the Clean Power Plan

The transition to clean energy is happening faster than anticipated. This means carbon and air pollution are already decreasing, improving public health each and every year.



While this chart reflects health benefits in 2030, EPA's Regulatory Impact Analysis for the CPP estimates health benefits due to reduced emissions beginning in 2020.



The Clean Power Plan

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



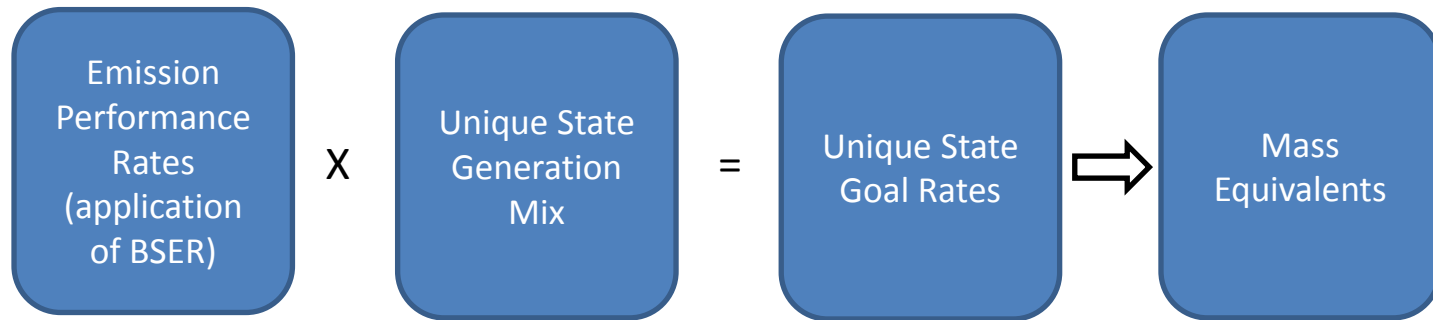
Best System of Emission Reduction: Three Building Blocks

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	-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 electric generating units (generally, coal-fired power plants)
2. Natural gas combined cycle units

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

Clean Power Plan Timeline





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



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
- The CEIP will help ensure that momentum to no-carbon energy continues and give states a jumpstart on their compliance programs
- 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

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	<p>S-curve. Commenters disliked the “cliff”</p>	<p>Steps down glide path more gradually:</p> <p>2022-2024 2025-2027 2028-2029</p>
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 CO ₂ emissions rates: generally, 1. Fossil and 2. natural gas. EE, nuclear and existing RE not included in goal setting
Geographic focus	State/tribe/territory	Contiguous U.S.
Deadline for	June 2016 with opportunity	September 2018: after initial submittal by September



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
- 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
- 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
 - Proposes a finding that it is necessary or appropriate to implement a section 111(d) federal plan for the affected EGUs located in Indian country. CO₂ emission performance rates for these facilities were finalized in the Clean Power Plan



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>
- Through graphics and interactive maps, the **Story Map** presents key information about the final Clean Power Plan. See: <http://www2.epa.gov/cleanpowerplan>
- For community-specific information and engagement opportunities, see the **Community Portal**: <http://www2.epa.gov/cleanpowerplan/clean-power-plan-community-page>
- 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/>

Clean Power Plan Implications for CHP & District Energy

Guidance to IDEA Members

**International District Energy Association (IDEA)
Webinar**

Sept. 17, 2015

Mark Spurr

IDEA Legislative Director

Avi Zevin

Van Ness Feldman






Outline

- **CHP at Affected Sources**
- **Non-Affected EGU CHP in a Rate-Based Plan**
- **Non-Affected EGU CHP in a Mass-Based Plan**
- **Proposed Federal Plan & Model Trading Rule**



Is my CHP unit an Affected EGU?

- Is my CHP unit subject to regulation?
 - Is it “existing”?
 - Is the generator ≥ 25 MW?
 - Does it burn fossil fuels for $> 10\%$ heat input?
 - Does it primarily sell electric power?
 - Annual net sales exceed greater of:
 - 219,000 MWh
 - *Potential electrical output multiplied by design efficiency*



Example: CHP unit with 60% design efficiency can sell electricity at annual average capacity factor of 59% without being subject to CPP.



If my CHP unit is regulated, how do I comply?

- In a mass-based compliance plan:
 - Measured emissions \leq emission limit
 - Potentially adjusted if co-firing biomass
- In a rate-based compliance plan:
 - Compliance emissions rate \leq emission limit

Compliance Rate

$$= \frac{\text{Measured lbs. CO}_2}{\text{Electric MWh} / 0.95 + \text{Useful thermal MWh} + \text{ERCs}}$$



Avoided Line Loss Credit

100% is a change
from Proposed Rule

Purchased
from other
entities



CHP at Non-Affected EGU (Rate-Based Plan)

- Can generate ERCs for use by affected EGUs
 - New or uprated CHP generation only
 - Must be grid connected
- For CHP, ERCs discounted to reflect only those emissions attributable to incremental electric generation
 - State plan must provide methodology for crediting
 - Presumptively approvable methodology in proposed model rule
 - Compare emission rate of electrical output:
 - $$\frac{\text{Total emissions} - \text{emissions associated with useful thermal output}}{\text{total electrical generation}}$$
 - With a “reference emission rate”.
 - Unclear what rate to use. State rate? Fossil steam? NGCC?
 - Credits based on the difference between these rates.
- WHP treated differently. Considered non-emitting.
 - Get 1 ERC for each MWh
 - Must meet certain size limits



CHP at Non-Affected EGU (Mass-Based Plan)

- To implement a mass-based plan, states can establish an emission budget trading program covering:
 - Affected EGUs only, or
 - Affected EGUs and other fossil fuel-fired EGUs or emission sources
- EPA also gives states the option to include other emission sources in a trading system, such as industrial sources



CHP at Non-Affected EGU (Mass-Based Plan)

EPA gives flexibility to states in addressing “leakage,” providing three options

1. Regulate new non-Affected fossil EGUs
 - Similar to RGGI and California trading systems
2. Use allocation to counteract incentives to shift generation from Affected EGUs to unaffected fossil-fired sources. EPA is proposing two strategies in proposed federal plan & model rule:
 - Updating output-based allocations
 - Allowance set-aside that targets RE (“A set-aside can also be allocated to providers of demand-side EE, or to both RE and demand-side EE”)
3. Provide a demonstration that emission leakage is unlikely to occur.



Proposed Federal Plan & Model Trading Rule

EPA has proposed and requests comments on

- Federal plan for states that fail to submit an approvable plan
- Model trading rules for emissions trading that can be adopted by states even if they submit their own state plan rather than adopt the federal plan

EPA is co-proposing two different approaches

Rate-Based Approach

- Affected EGUs must meet emission standard in lbs. CO₂/MWH
- If emission rate is high, EGUs must acquire ERCs
- If emission rate is low, the EGU can sell allowances to other EGUs
- ERCs may be generated by Affected EGUs or by other entities



Proposed Federal Plan & Model Trading Rule

Mass-Based Approach

- EPA would create a state emissions budget equal to the total tons of CO2 allowed to be emitted by the Affected EGUs
- Allowances – *less three proposed allowance set-asides* – would be allocated to Affected EGUs based on their historical generation
- Proposed set-asides
 1. Portion of first compliance period allowances
 2. Portions of later period allowances
 3. 5% for all periods for RE
- **Potential set-asides**
 - EPA seeks comment on including other measures, including CHP, in additional set-asides
 - **IDEA will advocate a set-aside for CHP which meets the requirements for rate-based crediting**



Proposed Federal Plan & Model Trading Rule

- EPA intends to finalize either or both model trading rule options by summer 2016, prior to the deadline for state plan submittals
- EPA has stated that it currently intends to finalize a single approach, i.e., either rate- or mass-based
- EPA has requested comment on which approach is preferred, and many other aspects of the proposed rule
- Deadline 90 days after publication in the Federal Register (not yet published as of today)
- IDEA will be submitting comments
- IDEA members are urged to:
 - Provide input for IDEA comments
 - Provide input to regulators in your state for their comments on the proposed federal plan & model trading rule

Questions ?

- Please type your question in the Q&A box on the lower right hand side of the webinar page.
- We will try to address as many questions as time allows; based on submittal sequence and relevance.
- Additional questions can be sent to idea@districtenergy.org.

Additional Resources

- <http://www2.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants>
- <http://www2.epa.gov/cleanpowerplan/fact-sheet-overview-clean-power-plan>
- <http://www.districtenergy.org/assets/pdfs/2015-Annual-Boston/Proceedings/Tuesday/6C.3Spurr.pdf>
- www.districtenergy.org/assets/pdfs/111d/111d-Toolbox-v10.pdf
- www.districtenergy.org/blog/2014/06/14/background-epas-proposed-clean-power-plan-to-limit-ghg-emissions-from-existing-power-plants/
- www.districtenergy.org/assets/Legislative/EPA-911d/IDEA-Comments-on-EPA-Clean-Power-Plan-Final-Review-Draft-Nov-23-2014.pdf
- http://www.districtenergy.org/blog/2015/08/12/are-you-better-off-under-the-clean-power-plan-than-you-were-14-months-ago/?utm_source=rss&utm_medium=rss&utm_campaign=are-you-better-off-under-the-clean-power-plan-than-you-were-14-months-ago



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