

Rulemaking for Greenhouse Gas Emissions from Electric Utility Generating Units

Update Briefing, February 26, 2014

Agenda

- ▶ President's Climate Action Plan
- ▶ Affected Sources
- ▶ Section 111(b) and (d) Overview
- ▶ Stakeholder Outreach
- ▶ Modified Sources
- ▶ Reconstructed Sources
- ▶ Existing Sources
- ▶ Questions/Comments
- ▶ Appendix A – State & Local Governments Potentially Subject to Regulation

Reducing Carbon Pollution from Power Plants

The President's Directive to EPA:

- ▶ Set flexible carbon pollution standards, regulations or guidelines, as appropriate, for power plants under section 111 of the Clean Air Act
- ▶ Focus on the following elements when developing the standards and guidelines
 - ▶ Stakeholder engagement on program design
 - ▶ Flexibilities in the program design
 - ▶ Costs
 - ▶ Continued importance of relying on a range of energy sources
 - ▶ Other regulations that affect the power sector

EPA's Task: Using the Clean Air Act Authority

1. Issue carbon pollution standards for new power plants
 - ▶ Proposal published in the Federal Register on January 8, 2014
 - Informed by the more than 2.5 million comments received on the April 2012 proposal
 - Reflects recent developments and trends in the power sector
 - Public hearing held in Washington, DC on February 6, 2014
 - Over 150 people testified in 2 concurrent sessions – representing industry, environmental groups, faith groups and the general public
 - Comments may be submitted through March 10, 2014
2. Issue carbon pollution standards for modified and reconstructed power plants
 - ▶ Proposal: June 2014
 - ▶ Final: June 2015

EPA's Task Using the Clean Air Act Authority (cont.)

3. Issue carbon pollution guidelines for existing power plants

- ▶ Issue federal guidelines for states
 - Work in partnership with states
 - States will develop plans that set standards for existing sources
 - States use EPA guidelines as a reference
- ▶ Federal guidelines should build on states' leadership and experience with programs that reduce GHGs
- ▶ Proposal: June 2014
- ▶ Final: June 2015
- ▶ States submit implementation plans to EPA: June 2016

Affected Sources

- ▶ Fossil fuel-fired steam generating units and integrated gasification combined cycle (IGCC) units that:
 - ▶ Have a design heat input greater than 73 MW (250MMBtu/h) heat input of fossil fuel (either alone or in combination with any other fuel);
 - ▶ Combust fossil fuel for more than 10% percent of the average annual heat input during a 3-year rolling average basis; and
 - ▶ Were constructed for the purpose of supplying, and supply, one-third or more of its potential electric output and more than 219,000 MWh net-electric output to a utility distribution system on an annual basis
 - ▶ *Fossil fuel* means natural gas, petroleum, coal, and any form of solid, liquid or gaseous fuel derived from such material for the purpose of creating useful heat

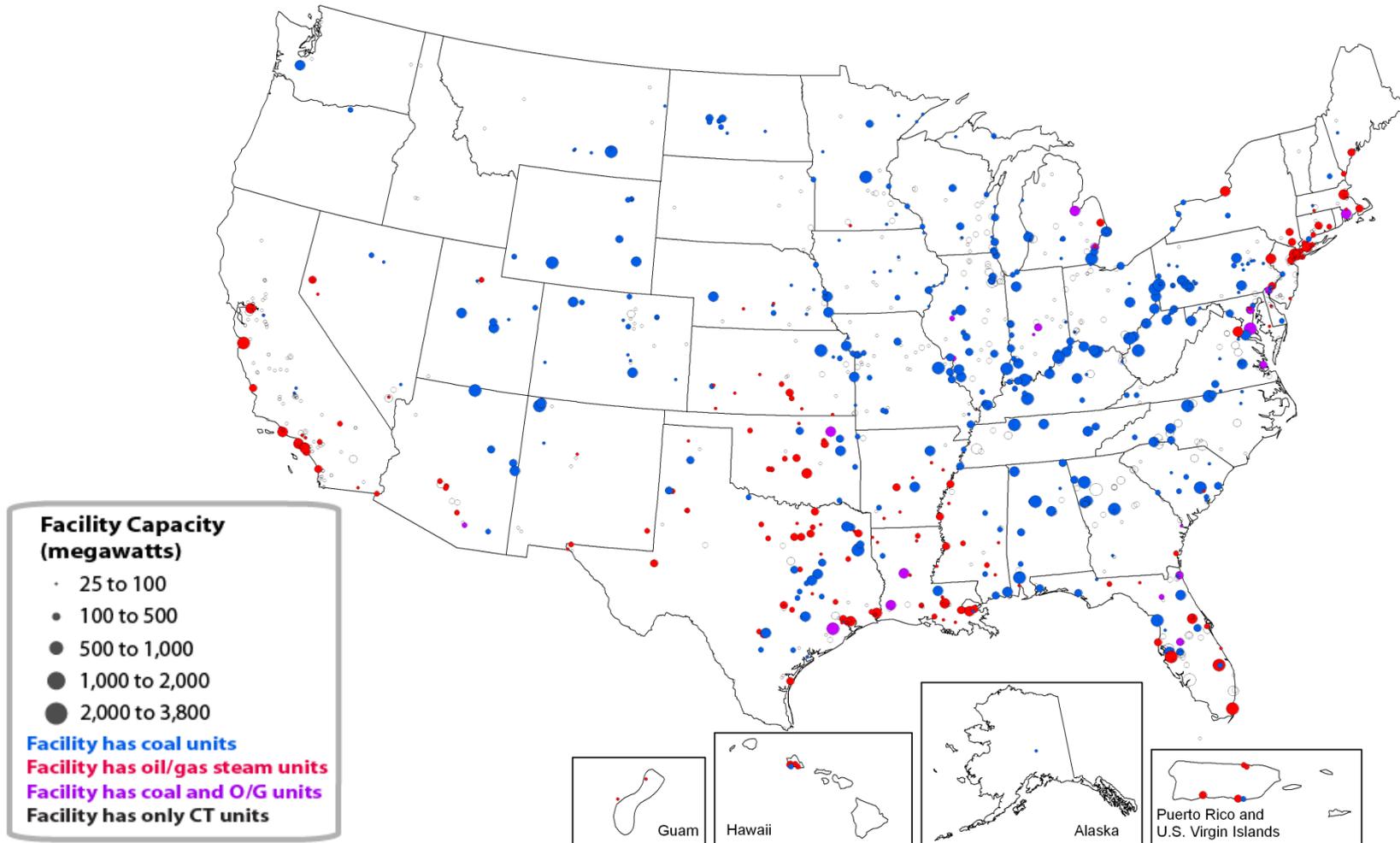
Affected Sources (cont.)

- ▶ Natural gas-fired stationary combustion turbines that:
 - ▶ Have a design heat input to the turbine engine greater than 73 MW (250 MMBtu/h);
 - ▶ Combust over 90% natural gas on a heat input basis on a 3-year rolling average basis; and
 - ▶ Were constructed for the purpose of supplying, and supply, one-third or more of its potential electric output and more than 219,000 MWh net-electrical output to a utility distribution system on a 3-year rolling average basis

Affected Sources (cont.)

- ▶ ≈ 1,212 utility boilers at 536 facilities
 - ▶ ≈ 827 coal-fired boilers at 373 facilities
 - ▶ ≈ 33 oil-fired boilers at 17 facilities
 - ▶ ≈ 352 gas-fired boilers at 172 facilities
- ▶ 4 IGCC plants currently operating in the U.S.
- ▶ ≈ 1,516 stationary combustion turbines at 526 facilities
- ▶ Includes investor-owned, publicly-owned and rural cooperative EGUs
 - ▶ 175 state/local jurisdictions are estimated to own EGUs that may be affected by this action
 - ▶ See Appendix A for list of potentially impacted state/local jurisdictions

Power Plants Covered by the EGU GHG Rule



Source: National Electric Energy Data System (NEEDS 5.13) (EPA, November 2013)

Note: This map displays facilities that are included in the NEEDS 5.13 database and that contain at least one coal, oil or gas-fired steam generating unit, or combustion turbine that generates more than 25 megawatts of power. This includes coal-fired units that burn petroleum coke and that turn coal into gas before burning (using integrated gasification combined cycle or IGCC). NEEDS reflects available capacity on-line by the end of 2015; this includes committed new builds and committed retirements of old units. In areas with a dense concentration of facilities, the facilities on the map may overlap and some may be impossible to see.

Clean Air Act Section 111

- ▶ Authorized in 1970
- ▶ Establishes a mechanism for controlling air pollution from stationary sources
 - ▶ Applies to sources for which the Administrator, in her judgment, finds “causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare”
 - ▶ Can apply to new, existing, modified and reconstructed sources
- ▶ More than 70 stationary source categories and subcategories are currently regulated under section 111
 - ▶ A full list of sources regulated under section 111 can be found in 40 CFR Part 60

CAA Section 111(b) for Modified & Reconstructed Sources

- ▶ Federal standards for reconstructed and modified sources are set following the same process used to set standards for new sources
- ▶ Standards reflect the degree of emission limitation achievable through the application of the best system of emission reduction (BSER) that the Administrator determines has been adequately demonstrated
 - ▶ EPA may distinguish among classes, types and sizes of sources
 - ▶ In determining BSER, EPA may take into account:
 - Technical feasibility of the system
 - Implementation costs
 - Amount of emission reductions
 - Promotion of advanced technology
- ▶ Modification – a physical change that increases the source’s maximum achievable hourly rate of emissions
- ▶ Reconstruction – when a single project replaces components and exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and it is technologically and economically feasible to meet the applicable standards

CAA Section 111(d) for Existing Sources

- ▶ Emission guidelines for existing sources are set by EPA
 - ▶ Different approach for achieving emission reductions than the approach used for new, reconstructed and modified sources
 - ▶ EPA establishes (1) a procedure for states to issue performance standards for existing sources and (2) guidance about the appropriate level of the standard
 - ▶ EPA has established section 111(d) regulations for 5 source categories
 - Sulfuric acid plants (acid mist)
 - Phosphate fertilizer plants (fluorides)
 - Primary aluminum plants (fluorides)
 - Kraft pulp plants (total reduced sulfur)
 - Municipal solid waste landfills (landfill gases)

CAA Section 111(d) for Existing Sources (cont.)

- ▶ Emission guidelines (cont.)
 - ▶ Common elements of past guidelines
 - Description of Best System of Emission Reduction (BSER) that has been adequately demonstrated
 - Degree of emission limitation achievable, costs and environmental impacts of application
 - Time required to implement
 - Other information to facilitate development of state plans
 - A goal for reductions – or “standard of performance” – based on a BSER analysis
- ▶ Section 111(d) is broad by design
 - ▶ Recognition that existing sources do not have as much flexibility as new ones to build emission controls into their design
 - ▶ Provides greater flexibility to EPA and states to design a program in consultation with a diverse range of stakeholders

CAA Section 111(d) for Existing Sources (cont.)

- ▶ How section 111(d) has worked:
 - ▶ Previously established guidelines have not prescribed technology that must be used to comply
 - ▶ Once EPA set the guidelines, states developed section 111(d) plans establishing standards of performance for the covered sources in their state
 - ▶ States submitted section 111(d) plans to EPA for review and approval
 - ▶ After evaluating the plans, EPA took action through notice and comment rulemaking
 - ▶ EPA has authority to prescribe a plan for a state in cases where the state fails to submit a satisfactory plan and to enforce the provisions of a plan in cases where the state fails to enforce them

CAA Section 111(d) for Existing Sources (cont.)

- ▶ How state plans have worked:
 - ▶ States determine the combination of measures that will meet the guidelines
 - ▶ State plans set standards of performance
 - Can be identical to EPA's guidelines
 - Can differ from, but be equivalent to, EPA's guidelines
 - ▶ State plans provide for implementation and enforcement
 - States have had flexibility when applying the standard of performance in their plans to take into consideration, among other factors, the remaining useful life of the source
 - ▶ Timeframe to submit state plans has been set by EPA in the guidelines

Stakeholder Outreach

- ▶ EPA has engaged in extensive stakeholder outreach
 - ▶ Will inform the emission guidelines and standards development
 - ▶ EPA held 11 public listening sessions in October & November 2013
 - More than 1,600 people spoke
 - ▶ EPA provided multiple opportunities to engage with each state
 - EPA officials met with state leaders, including governors, environmental commissioners, energy officers, public utility commissioners and air directors
 - ▶ Other stakeholders EPA officials have met with include:
 - Electric utility associations
 - Electric grid operators
 - Labor unions

Stakeholder Outreach (cont.)

- ▶ Other stakeholders (cont.):
 - Leaders representing large and small industries
 - Utilities and utility industry representatives
 - Energy industry representatives (e.g., coal and natural gas interests)
 - Companies offering technologies to reduce/prevent carbon pollution (e.g., renewable energy and energy efficiency interests)
 - Representatives of energy intensive industries (e.g., iron and steel, and aluminum)
 - Environmental justice organizations
 - Environmental groups
 - Religious organizations

- ▶ EPA established a new email account called “Carbon Pollution Input” to which over 2,000 emails providing stakeholder input have been submitted

Stakeholder Outreach (cont.)

- ▶ Key messages from stakeholders
 - ▶ Broad agreement that opportunities exist to lower the carbon emissions of power generation through a wide range of measures
 - Measures implementable at the source
 - Measures implementable across the broader power generation system
 - ▶ Multiple opinions about how broader system measures could factor into programs
 - System-wide measures factored into the goals EPA establishes
 - System-wide measures allowed for compliance, but not factored into goals
 - ▶ Varied views regarding form and stringency of standards
 - Rate-based versus mass-based
 - Provide states flexibility to choose among multiple forms of the goals or to set their own goals
 - Goal stringency should vary by state to account for different circumstances

Stakeholder Outreach (cont.)

- ▶ Key messages (cont.)
 - ▶ General support for giving states flexibility
 - Recognize existing programs and achievements in reducing CO₂ emissions
 - Allow state plans to take into account the reductions already achieved
 - Allow compliance options that permit the use of approaches that are outside the facility fence line (e.g., demand-side management)
 - ▶ Broad agreement that states need more time to develop and submit plans
 - Necessary due to legislative/regulatory schedule in many states
 - Would allow and promote multi-state and regional programs and cooperation
 - ▶ Support for flexibility in the timing of state plan implementation and compliance with goals
 - Accommodates diverse CO₂ reduction potential
 - Supports approaches that are more cost-effective
 - ▶ General concern that rulemaking could have negative impacts on:
 - Jobs and ratepayers
 - Reliability of power
 - Utilities (e.g., stranded generation assets)

Modified Sources

- ▶ Trigger: Physical change that results in an increase in the maximum potential hourly emission rate
- ▶ Potential regulatory approaches
 - ▶ Boilers/IGCC units
 - EGU case-specific numerical standard
 - National standard
 - ▶ Combustion turbines
 - Numerical standard
- ▶ EPA doesn't project any modified EGUs
 - ▶ Historically, few EGUs have notified EPA that they have modified - an increase in the hourly rate for pollutants most often results from an increase in the ability to combust fuel
 - ▶ Increases in a pollutant that are a result of the installation of a pollution control technology are not considered NSPS modifications (pollution control project exemption)

Reconstructed Sources

- ▶ Trigger: Fixed capital cost of the new components for a single project must exceed 50 percent of the fixed capital cost that would be required to construct a comparable new facility
- ▶ Potential regulatory approaches
 - ▶ Boilers/IGCC units
 - Efficiency standard based on combustion technology
 - Considering separate standards based on EGU size
 - ▶ Combustion turbines
 - Numerical standard
- ▶ EPA doesn't project any reconstructed EGUs
 - ▶ Aware of one EGU that has triggered reconstruction and it was the result of an industrial accident (Hawthorn Power Plant in Kansas City, MO)

Existing Sources

- ▶ Emission guidelines will set state-specific goals
- ▶ Goals will likely be rate-based
 - ▶ States would be able to convert to mass-based goals
 - ▶ Would provide flexibility and accommodate existing state mass-based programs
- ▶ Goals would not include an assumption of CCS
 - ▶ State plans including CCS would get credit for it
- ▶ Setting goals – Potential design approaches
 - ▶ Source-based approach
 - Emission reduction measures that could be taken directly by power plants
 - ▶ System-based approach
 - Broader portfolio of measures including those taken beyond power plants but still reduce emissions at power plants

Existing Sources (cont.)

- ▶ Setting goals – Potential options to reduce emissions
 - ▶ Supply-side options
 - Actions at power plants that reduce/avoid CO₂ emissions
 - Heat rate improvements/energy efficiency at the EGU
 - Fuel switching to a lower-emitting fuel or co-firing with a lower-emitting fuel
 - Re-dispatch of EGUs based on CO₂ emission rate
 - Renewable energy portfolio requirements
 - ▶ Demand-side options
 - Actions at locations where electricity is used, as well as transmitted and distributed, that lower electricity demand
 - End-use energy efficiency requirements and programs
 - Demand-side management programs

Existing Sources (cont.)

- ▶ Approach for state plans -- considerations
 - ▶ Timing of submittals
 - ▶ Use of existing state and multi-state programs
 - ▶ Use of regional plans/partnerships
- ▶ Timing of reductions -- considerations
 - ▶ States are at different stages in improving CO₂ emissions
 - ▶ Time needed to attain emission reductions varies based on type of emission reduction measure used
 - ▶ Time needed for legislative approval if required

Questions?

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Appendix A

State & Local Governments Potentially Subject to Regulation

OWNERSHIP TYPE – MUNICIPAL

Alabama Municipal Electric Authority	Chanute Municipal Electric Utility	Floydada TX (City of)
Alexandria LA (City of)	Chaska Public Utilities	Freeport Inc (Village of)
Algona Municipal Utilities	Chillicothe Municipal Utilities	Fremont Department of Public Utilities
Alta IA (City of)	Clarksdale Water & Light Department	Gainesville Regional Utilities
American Municipal Power Inc.	Coffeyville Municipal Light & Power	Garland Power & Light
Ames Municipal Electric System	Colorado Springs Utilities	Geneseo Municipal Utilities
Anaheim CA (City of)	Colton Electric Utility Department	Gillette WY (City of)
Atlantic Municipal Utilities	Columbia Water & Light	Glendale Water & Power
Austin Energy	Connecticut Municipal Electric Energy Coop	Graettinger Municipal Light Plant
Austin Utilities	Conway Corp	Grand Haven Light & Power
Azusa CA (City of)	Coon Rapids IA (City of)	Grand Island Utilities
Bancroft Municipal Utilities	CPS Energy	Great Falls MT (City of)
Banning Electric Division	Dalton GA (City of)	Greenville Electric Utility System
Braintree Electric Light Department	Delaware Municipal Electric Corp	Hamilton Department of Public Utilities
Brownfield Municipal Power & Light	Detroit Public Lighting	Harlan Municipal Utilities
Brownsville Public Utility Board	Dover DE (City of)	Hastings Utilities (NE)
Bryan Texas Utilities	Eldridge IA (City of)	Henderson Municipal Power & Light
Burbank Water & Power	Farmington NM (City of)	Higginsville Municipal Utilities
Cedar Falls Utilities	Fayetteville Public Works Commission	Hingham Municipal Light Plant
Cerritos (City of)	Florida Municipal Power Agency	Holland Board of Public Works

State & Local Governments Potentially Subject to Regulation (cont.)

OWNERSHIP TYPE – MUNICIPAL

Holyoke Gas & Electric Department	Laurens IA (City of)	North Attleborough Electric Department
Hudson Light & Power Department	Lincoln Electric System	North Carolina Eastern Municipal Power Agency
Hutchinson Utilities Commission	Littleton MA (Town of)	Northern Municipal Power Agency
Illinois Municipal Electric Agency	Los Alamos County	Omaha Public Power District
Imperial Irrigation District	Los Angeles Department of Water & Power	Orlando Utilities Commission
Independence MO (City of)	Lubbock Power & Light Department	Orrville OH (City of)
Independence Power & Light	Lyndonville Electric Department	Osceola AR (City of)
Indiana Municipal Power Agency	Manitowoc Public Utilities	Owensboro Municipal Utilities
Intermountain Power Agency	Marquette Board of Light & Power	Pasadena Water & Power Department
Jamestown Board of Public Utilities	Marshfield Electric & Water Department	Peabody Municipal Light Plant
JEA	Massachusetts Bay Transmission Authority	Ponca City OK (City of)
Jonesboro Water & Light	McPherson Board of Public Utilities	Provo City Corp
Kansas City Board of Public Utilities	Michigan South Central Power Agency	Redding Electric Utility
Keys Energy Services	Milford Municipal Utilities	Reedy Creek Improvement District
Kissimmee Utility Authority	Montezuma Municipal Utilities	Richmond Power & Light
Lafayette Utilities System	Morgan City LA (City of)	Riverside Public Utilities
Lake Worth Utilities	Municipal Electric Authority of Georgia	Rochester Department of Public Utilities
Lakeland Department of Electric Water Utilities	Muscatine Power & Water	Roseville Electric
Lamar Utilities Board	Nebraska City Utilities	Sacramento Power Authority
Lansing Board of Water & Light	New Hampton Municipal Light Plant	Santa Clara CA (City of)

State & Local Governments Potentially Subject to Regulation (cont.)

OWNERSHIP TYPE – MUNICIPAL

Santee Cooper	West Bend IA (City of)
Sikeston Utilities	West Memphis Utility Department
South Eastern Electric Development Corp.	Winfield KS (City of)
Spencer Municipal Utilities	WPPI Energy
Springfield MO (City of)	Wyoming Municipal Power Agency
Springfield Water, Light & Power Department	
St George Department of Water & Power	
Sumner Municipal Light Plant	
Tallahassee FL (City of)	
Taunton Municipal Lighting Plant	
Terrebonne Parish Consolidated	
Texas Municipal Power Agency	
Tipton IA (City of)	
Tulia TX (City of)	
Turlock Irrigation District	
Utah Municipal Power Agency	
Vero Beach Municipal Utilities	
Vineland NJ (City of)	
Waverly Light & Power	
Webster City IA (City of)	

State & Local Governments Potentially Subject to Regulation (cont.)

OWNERSHIP TYPE – SUBDIVISION

Arkansas River Power Authority
Calhoun Port Authority
Connecticut Resource Recovery Authority
Heartland Consumers Power District
Kansas Power Pool
Kentucky Municipal Power Agency
Kings River Conservation District
Lafayette Public Power Authority
Louisiana Energy & Power Authority
Massachusetts Municipal Wholesale Electric Co.
Missouri River Energy Services
Modesto Irrigation District
Municipal Energy Agency of Nebraska
Nebraska Public Power District
Northern Illinois Municipal Power Agency
Platte River Power Authority
PUD No 1 of Clark County
Sacramento Municipal Utility District
Salt River Project
Southern Nevada Water Authority
Utah Associated Municipal Power System
Western Minnesota Municipal Power Agency

OWNERSHIP TYPE – STATE

California Department of Water Resources
Grand River Dam Authority
Lower Colorado River Authority
Michigan Public Power Agency
Missouri Joint Municipal Electric Utility Commission
New York Power Authority
Northern California Power Agency
Oklahoma Municipal Power Authority