

# EPA's Power Sector Rules

Office of Air and Radiation

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FEDERALISM/UMRA  
CONSULTATION

SEPTEMBER 22, 2022

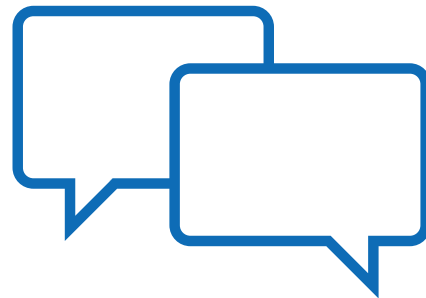
# Purpose of Federalism/ UMRA Consultation



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Provide information to  
State and Local  
Government Associations  
and their members on OAR  
Power Sector rulemakings

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Solicit input on key areas of  
EPA's Power Sector  
rulemakings

# Upcoming OAR Power Sector Rules

Greenhouse  
Gas (GHG)  
Emissions

## GHG NSPS

Proposed New Source  
Performance Standards for  
Greenhouse Gas Emissions from  
New, Modified, and  
Reconstructed Stationary  
Sources: Electric Generating Units

## GHG EGs

Proposed Emission Guidelines for  
Greenhouse Gas Emissions from  
Existing Electric Generating Units

Hazardous  
Air  
Pollutants  
(HAP)  
Emissions

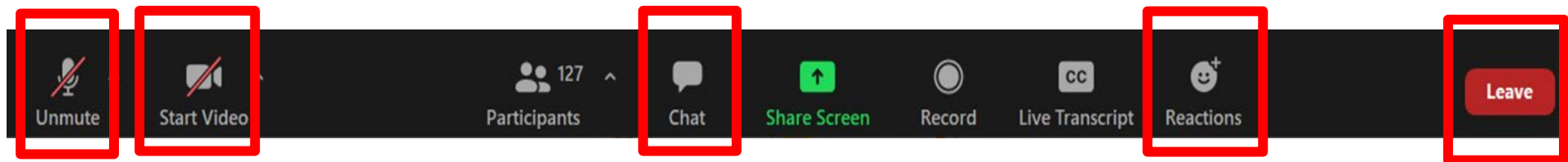
## MATS RTR

Review of National Emission  
Standards for Hazardous Air  
Pollutants for Coal- and Oil-Fired  
Electric Generating Units Residual  
Risk and Technology Review

Also known as the Mercury and  
Air Toxics Standards RTR

# Meeting Instructions and Tips

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Click to find  
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meeting

# Welcome

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OCIR Roll Call

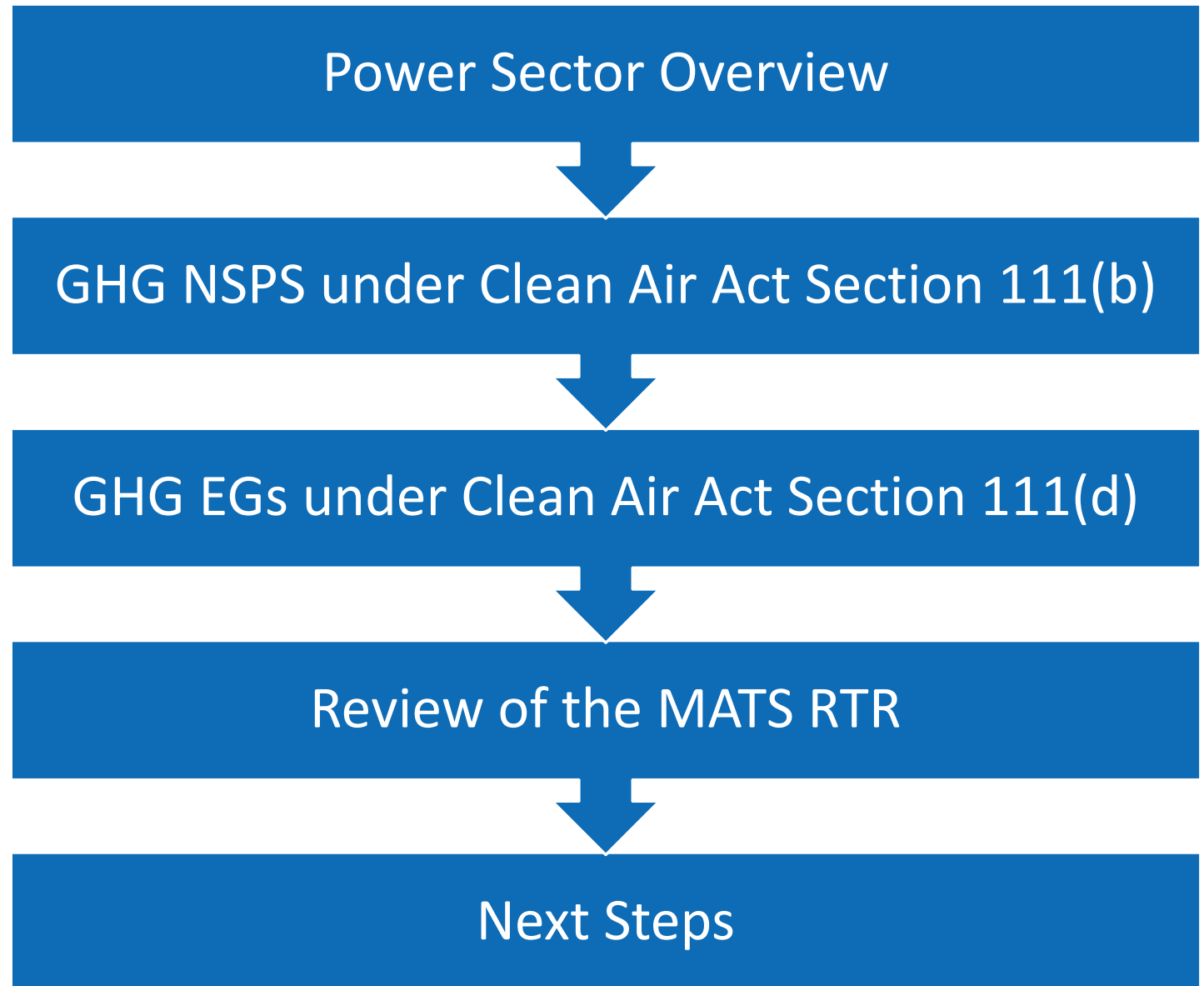
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OCIR Welcome

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OAR Welcome

# Today's Presentation



# Power Sector Overview

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# Power Sector Overview

The U.S. power sector has been in transition since approximately 2005

Coal-fired electric generation has **decreased** from ~51% to ~20% of total

Natural gas-fired electric generation has **increased** 22%

- Includes stationary combustion turbines operating as base load electric generating units (EGUs) and as on-demand non-base load EGUs, supporting the grid during peak demand

Electric generation from renewables has **increased** ~11%

**Electric Power Generation by Fuel Type**

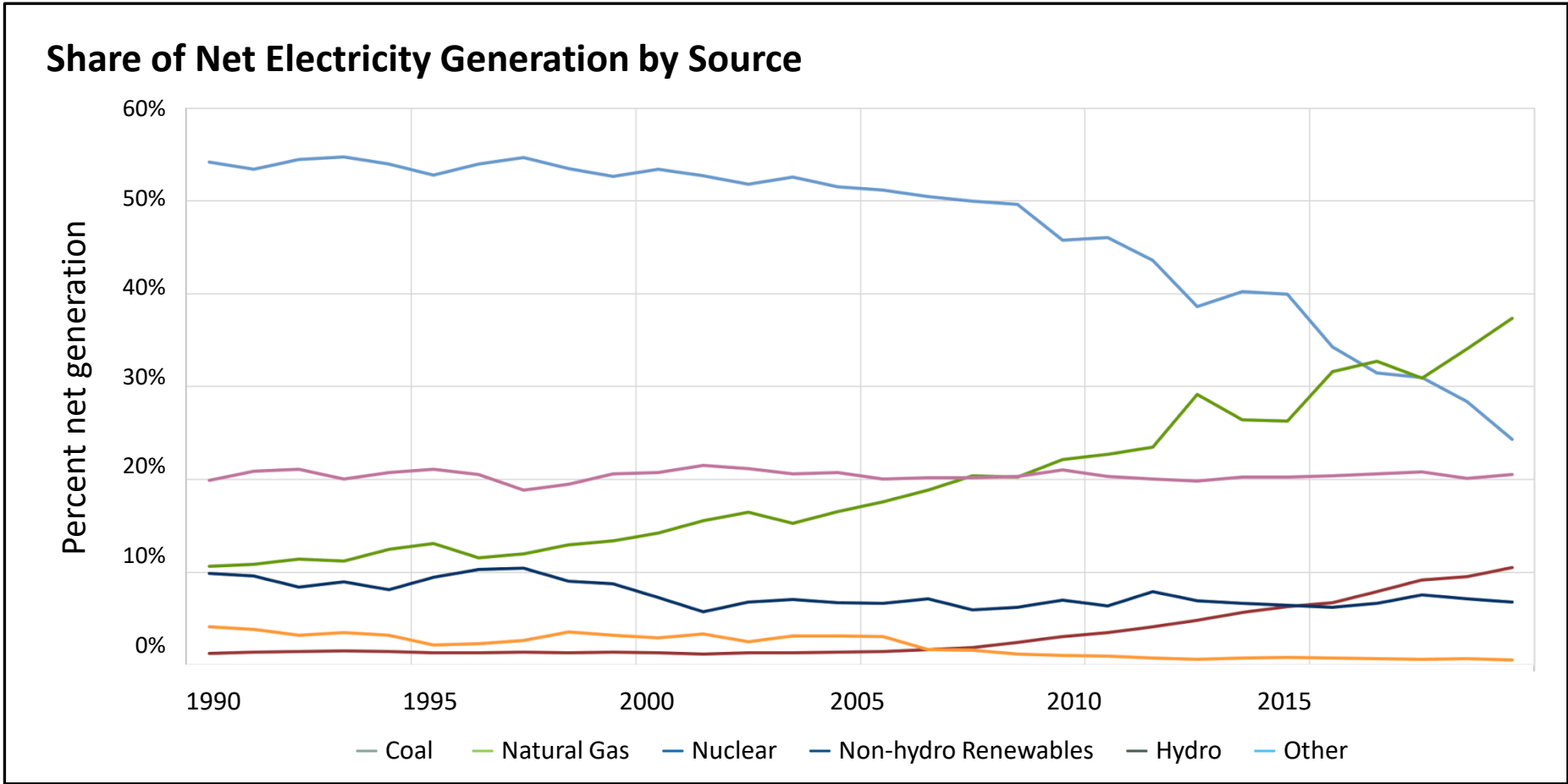
Fuel Type	1990	2005	2016	2017	2018	2019	2020
Coal	54.1%	51.1%	31.4%	30.9%	28.4%	24.2%	19.9%
Natural Gas	10.7%	17.5%	32.7%	30.9%	34.0%	37.3%	39.5%
Nuclear	19.9%	20.0%	20.6%	20.8%	20.1%	20.4%	20.5%
Renewables	11.3%	8.3%	14.7%	16.8%	16.8%	17.6%	19.5%
Petroleum	4.1%	3.0%	0.6%	0.5%	0.6%	0.4%	0.4%
Other Gases <sup>a</sup>	+	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
<i>Net Electricity Generation (Billion kWh)<sup>b</sup></i>	2,905	3,902	3,917	3,877	4,017	3,963	3,849

+ Does not exceed 0.05 percent.

(a) Other gases include blast furnace gas, propane, and other manufactured and waste gases derived from fossil fuels.

(b) Represents net electricity generation from the power sector. Excludes commercial and industrial CHP generation.

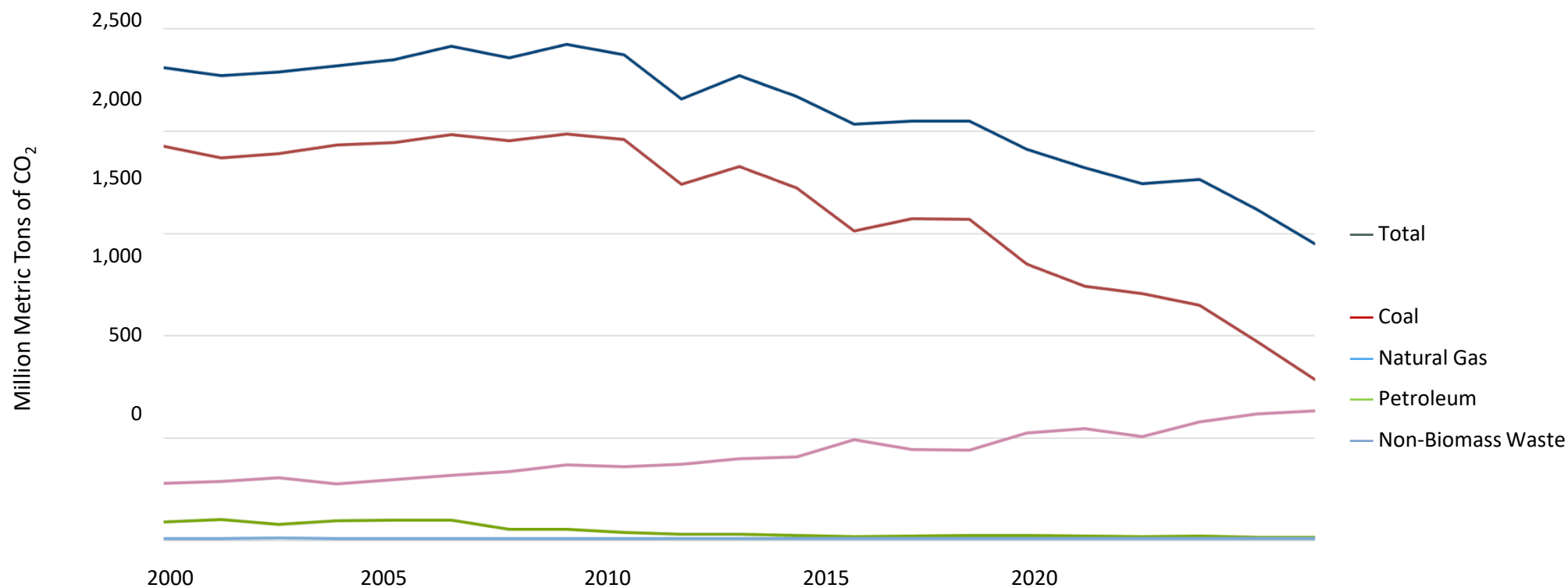




# Power Sector Overview

- A primary driver of recent fuel switching includes low natural gas prices and the associated increase in natural gas generation
- Since 2005, the cost of natural gas has decreased 64% while the cost of coal has increased 66%

## CO<sub>2</sub> Emissions by Power Sector Fuel Type



# Power Sector Greenhouse Gas Emissions

- The Power Sector – through combustion of fossil fuels to generate electricity – is the second largest source of carbon dioxide (CO<sub>2</sub>) emissions in the U.S. (30.5%)
- 40% reduction in overall CO<sub>2</sub> emissions from power sector since 2005
  - CO<sub>2</sub> emissions from natural gas EGUs have increased 98% since 2005, reflecting a continued shift from coal to natural gas

# Funding Considerations

- **Bipartisan Infrastructure Law (BIL)** provides for significant investments in infrastructure and programs
- **Inflation Reduction Act (IRA)** provides for significant investments in clean energy technologies and supporting infrastructure
- Specific funds to potentially support addressing GHG emission reductions from EGUs include:

Significant tax credits benefitting technologies such as clean hydrogen and carbon capture, utilization, and storage

Department of Energy loan guarantee programs to provide a backstop for financing of pollution control equipment

U.S. Department of Agriculture programs to finance clean energy technologies with rural coops

EPA programs to capitalize private green banks and fund state-led greenhouse gas reduction plans

# Questions for Consideration

- EPA's regulations will be proposed and finalized **in the context of transition** within the power sector
- The regulatory approach should capture the most current information about **investment decisions** in the sector
  - Are there any significant recent announcements or commitments to transitioning generation of which the Agency should be aware?
  - How does passage of the IRA impact investments in the transitioning power sector?

# GHG NSPS under CAA 111(b)

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NEW, MODIFIED, AND RECONSTRUCTED SOURCES

## CAA Section 111(b)

- For source categories that **cause or contribute significantly** to air pollution which may reasonably be anticipated to **endanger public health or welfare**, CAA section 111 requires EPA to establish standards of performance for new sources
- Standards must be set based on what is achievable through the application of the **best system of emission reduction (BSER)**
  - Cost (must not be “exorbitant,” “greater than the industry can bear,” or “unreasonable”)
  - Non-air quality health and environmental impacts
  - Energy requirements
  - Technology that has been adequately demonstrated

# Regulatory History – GHG NSPS

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## 2015: GHG NSPS set standards to limit carbon dioxide (CO<sub>2</sub>) emissions from fossil fuel-fired electric generating units (EGUs)

- 40 CFR part 60, subpart TTTT
- Established standards for stationary combustion turbines generally firing natural gas and electric utility steam generating units generally firing coal
- Apply to new units or existing units that meet conditions for being modified or reconstructed
- Reflect the degree of emission limitation achievable through the application of BSER that EPA determined has been adequately demonstrated for each type of unit
  - NSPS for newly constructed and reconstructed combustion turbines based on efficient generation and the use of clean fuels
  - NSPS for newly constructed fossil fuel-fired steam generating EGUs (*i.e.*, utility boilers and gasification units) based on the use of a supercritical pulverized coal (SCPC) boiler and partial carbon capture, utilization, and storage (CCS)

# Stationary Combustion Turbines, Generally Natural Gas

## Applicability

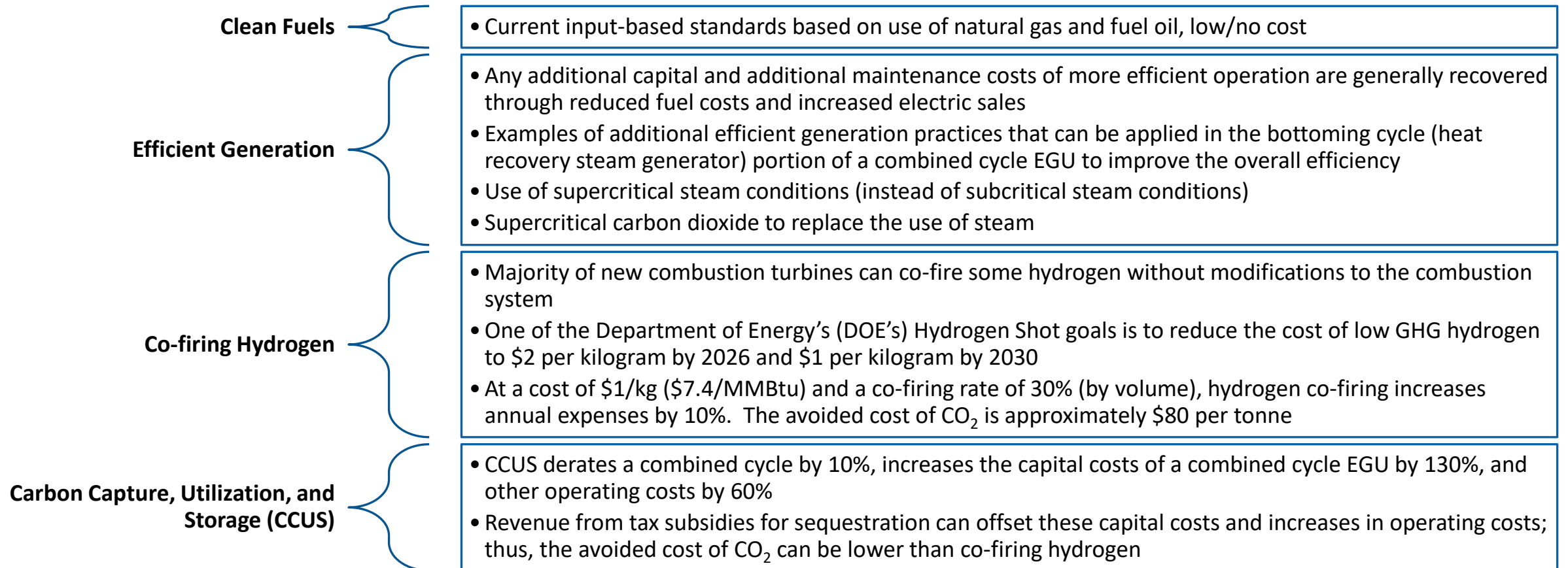
- Natural gas-fired base load combustion turbine
  - Combusts more than 90% natural gas, and
  - Supplies more than the site-specific electric sales threshold to the electric grid
    - Electric sales threshold is determined based on the design efficiency of the EGU
- Non-base load and non-natural gas-fired combustion turbines
  - Combustion turbines not meeting the natural gas-fired base load applicability criteria

## Current Requirements

- New and Reconstructed
  - Natural gas-fired base load emissions standard (applies to all sizes): 1,000 pounds carbon dioxide per megawatt-hour on a gross-output basis
  - Non-base load: clean fuels input-based standard
- Modified
  - Did not set a standard



# Combustion Turbines Potential Control Strategies and Costs



# Questions for Consideration: GHG NSPS

- Spring 2022: EPA released a draft white paper on GHG control technologies for combustion turbines, including efficient combustion, carbon capture, utilization, and storage, and hydrogen

**Link to draft white paper:**

[https://www.epa.gov/system/files/documents/2022-04/epa\\_ghg-controls-for-combustion-turbine-egus\\_draft-april-2022.pdf](https://www.epa.gov/system/files/documents/2022-04/epa_ghg-controls-for-combustion-turbine-egus_draft-april-2022.pdf)

- What are your thoughts regarding how EPA should consider those technologies as we consider developing the proposed NSPS under CAA section 111(b)?
- What other factors should be considered as we develop the CAA section 111(b) proposal?

# GHG EGs under CAA 111(d)

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EXISTING SOURCES

## CAA Section 111(d)

- For source categories that **cause or contribute significantly** to air pollution, which may reasonably be anticipated to **endanger public health or welfare**, CAA section 111 requires EPA to:
  - Establish standards of performance for new sources and
  - For certain pollutants, issue regulations under which states establish standards of performance for existing sources
- In response to EPA's emission guidelines, states are required to craft plans that establish **standards of performance for existing sources** and submit that plan to EPA
- When issuing regulations for existing sources, EPA allows states to consider the **remaining useful life of those sources, and other factors**, in applying standards of performance in their state plans

# Regulatory History – GHG EGs

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## **2015 – Finalized emission guidelines for existing power plants (Clean Power Plan or CPP)**

- 40 CFR part 60, subpart UUUU
- Provided framework for states to use in developing plans to limit CO<sub>2</sub> emissions from fossil fuel-fired power plants
- Never took effect due to a U.S. Supreme Court stay

## **2019 – Repealed CPP and finalized Affordable Clean Energy (ACE) rule**

- 40 CFR part 60, subpart UUUUa
- Set emission guidelines based on efficiency improvements at existing EGUs
- January 2021 – U.S. Court of Appeals for the D.C. Circuit vacated the ACE rule and repeal of CPP
- June 2022 – U.S. Supreme Court overturned D.C. Circuit's decision in *West Virginia v. EPA*

# Questions for Consideration: GHG EGs

- ACE rule and CPP proposals identified options for systems of emission reduction that included:
  - Fuel-switching or co-firing;
  - Carbon capture, utilization, and storage (CCUS); and
  - Improvements in operating efficiency
- We welcome input on whether EPA should consider these systems in developing proposed emission guidelines under CAA section 111(d)
  - What are your views on the feasibility, cost, air pollution impacts, energy impacts, or other advantages and disadvantages of these systems?
  - Are there particular types or subcategories of EGUs for which one or more of these systems would be particularly appropriate or inappropriate?
  - Are there particular conditions, criteria, or limitations that EPA should consider with respect to any of these systems to address climate, public health or environmental justice considerations?
  - Are there other systems EPA should be considering, as alternatives to or in conjunction with these systems?

# Questions for Consideration: GHG EGs

- CAA section 111 standards are typically “rate-based” limits expressed in terms of a quantity of pollution per unit of product produced or per unit of energy consumed

*Examples of rate-based limits: Pound per kilowatt hour (lb/kWh) or pound per million British thermal units (lb/mmBtu)*

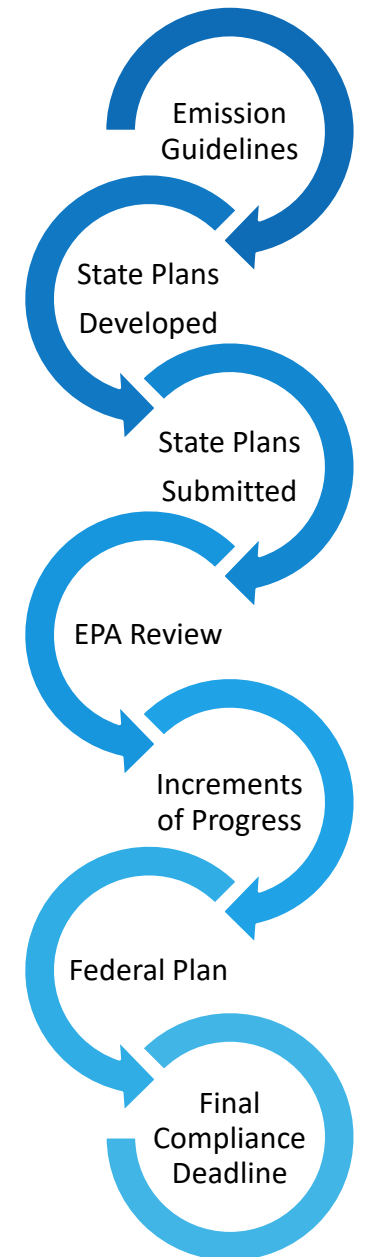
- What options should EPA be considering in expressing proposed limits on carbon dioxide (CO<sub>2</sub>) from existing power plants?

# Cooperative Federalism

- Establishing standards of performance for sources under 111(d) involves actions by both EPA and the states
  - EPA promulgates emission guidelines which include the BSER, the degree of emission limitation achievable through application of BSER and, often, presumptive standards of performance
  - States use this information to set standards of performance for each designated facility (*i.e.*, existing fossil fuel-fired EGUs in this context) and may consider source-specific factors in establishing standards; states submit this and other required information to EPA as a part of a state plan
  - EPA approves state plans that are satisfactory, at which point the standards of performance become federally enforceable
  - If EPA determines a state plan is not satisfactory, EPA is required to promulgate a federal plan for the state

Question for Consideration: GHG EGs

- What are tools and components of an emission guideline that EPA can provide to best support a state's role? Are there any specifics for an emission guideline for the power sector?





# Questions for Consideration: GHG EGs

- CAA section 111(d) gives states responsibility for designing state plans that establish, implement, and enforce standards of performance for CO<sub>2</sub> from existing power plants
  - What flexibilities should EPA offer to states and utilities regarding designing such plans?
  - How much time should an emission guideline provide for states to develop and submit plans to EPA?
  - Can EPA allow states to design alternative forms of emission limitations (*e.g.*, state-wide emissions budgets) and what limitations, conditions, or criteria should EPA establish to ensure such plans are satisfactory?
  - CAA section 111(d) provides that states must be allowed to consider “remaining useful life and other factors” in developing state plans. What requirements or guidance should EPA provide with respect to how such factors can be considered in the context of CO<sub>2</sub> from existing power plants?

# Cost Information

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- Regulations under 111(d) take considerable time, effort, and resources from all parties involved

## Questions for Consideration: GHG EGs

- What are the expected level of resources and cost incurred by states in the development of state plans for 111(d)?
- What are the expected level of resources and cost incurred by states in the implementation of state plans for 111(d)?

# Questions for Consideration: GHG EGs

- Because states and the federal government have a shared responsibility in the regulations under 111(d), there is also a shared responsibility to understand the local and broader environmental justice (EJ) impacts of these regulations
  - How much engagement and consideration do states initiate on EJ impacts for 111(d) state plans? What is the level of resources and costs for this?
  - What requirements, guidance, or tools and resources can EPA provide to ensure state plans improve air quality and reduce emissions in communities with EJ concerns?

# Review of MATS RTR

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MERCURY AND AIR TOXICS STANDARDS (MATS)  
RESIDUAL RISK AND TECHNOLOGY REVIEW (RTR)

# Overview of Clean Air Act Section 112

- Requires EPA to establish emission standards for source categories of major sources and area sources of hazardous air pollutants (HAP)
  - Major source standards reflect the maximum degree of reduction in HAP emissions
- CAA section 112(d)(6) requires EPA to review, and revise as necessary, emission standards considering developments in practices, processes, and control technologies at least every 8 years
  - Commonly referred to as the Technology Review
- CAA section 112(f)(2) requires to EPA to determine if additional standards are needed to provide an “ample margin of safety” to protect public health or to prevent an adverse environmental effect 8 years after standards are introduced
  - Commonly referred to as the Residual Risk Review
- Combined the CAA 112(d)(6) and (f)(2) reviews are commonly referred to as a Residual Risk and Technology Review or RTR

# MATS Rule

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- Applicability:
  - Coal- and oil-fired EGUs
- Current Requirements:
  - Technology-based standards for HAP emissions under CAA section 112
    - Numeric standards for mercury, non-mercury HAP metals (*e.g.*, nickel, lead, arsenic), and acidic HAP gases (*e.g.*, hydrochloric acid, hydrofluoric acid)
    - Work practice standards for organic HAP (*e.g.*, dioxins, benzene, formaldehyde) and startup and shutdown periods
- Regulatory History
  - **2012 – Set technology-based standards for mercury and other hazardous air pollutants emitted by coal- and oil-fired steam-generating EGUs with a capacity of more than 25 megawatts**
    - 40 CFR part 63, subpart UUUUU
    - Standards reflect levels achieved by the best-performing sources and apply to existing and new EGUs
  - **2020 – Finalized the RTR for coal- and oil-fired EGUs regulated by MATS rule**

# Review of MATS RTR – Overview

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- January 20, 2021 - President Biden signed Executive Order 13990, “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis”
  - Instructs EPA to review the 2020 final action titled, “National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Reconsideration of Supplemental Finding and Residual Risk and Technology Review”
  - Consider publishing a notice of proposed rulemaking suspending, revising, or rescinding the 2020 final action
- Accordingly, EPA proposed a reconsideration of the Supplemental Cost Finding in February and expects to finalize later this year
- Additionally, EPA is conducting an updated CAA 112(d)(6) technology review for the MATS emissions standards and may propose more stringent standards where appropriate

# Questions for Consideration: Review of the MATS RTR

- Is there information on performance or cost of new or additional control technologies, improved methods of operation, improvements or upgrades to existing controls, or other practices and technologies that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs?
- Do you have information regarding the cost or performance of technologies and practices relating to monitoring of HAP emissions, and control of HAP emissions during startup and shutdown events, that could result in cost-effective reductions in HAP or assure improved operation of existing controls?



# Next Steps

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# Input Requested

## for GHG NSPS, GHG EGs, and MATS RTR

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- EPA would appreciate specific data, costs, and actionable information
- Additional information or concerns you would like to share with EPA?

# Next Steps

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- EPA requests written comments or recommendations by November 21, 2022 (*i.e.*, within 60 days following today's meeting)
  - Submit comments to Docket ID No. EPA-HQ-OAR-2022-0723 at: <https://www.regulations.gov/docket/EPA-HQ-OAR-2022-0723>
- EPA anticipates:
  - Issuing proposed GHG rules for public comment in Spring 2023 and
  - Issuing proposed review of MATS RTR for public comment in Spring 2023
- EPA is seeking input from other key stakeholders and entities
  - Potential Small Business Advocacy Review Panel
  - Tribal government officials
  - Environmental justice-related organizations
  - Public health organizations
  - Nongovernmental organizations
  - Power generators
  - Labor
  - Federal partners
  - Others

# For More Information

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## Regulatory Questions

EPA Office of Air and Radiation  
Email: [PowerSectorGHG@epa.gov](mailto:PowerSectorGHG@epa.gov)

## General Consultation Questions

**Andrew Hanson**  
EPA Office of Congressional and  
Intergovernmental Relations  
Email: [hanson.andrew@epa.gov](mailto:hanson.andrew@epa.gov)

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## Links to Regulatory Websites

### **GHG NSPS:**

<https://www.epa.gov/stationary-sources-air-pollution/nsps-ghg-emissions-new-modified-and-reconstructed-electric-utility>

### **MATS Rule:**

<https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards>