

EPA's GHG and MATS Rule for Power Plants

CAAC

New Source Review-Toxics

Subcommittee

April 24, 2012



Proposed Carbon Pollution Standard for New Power Plants



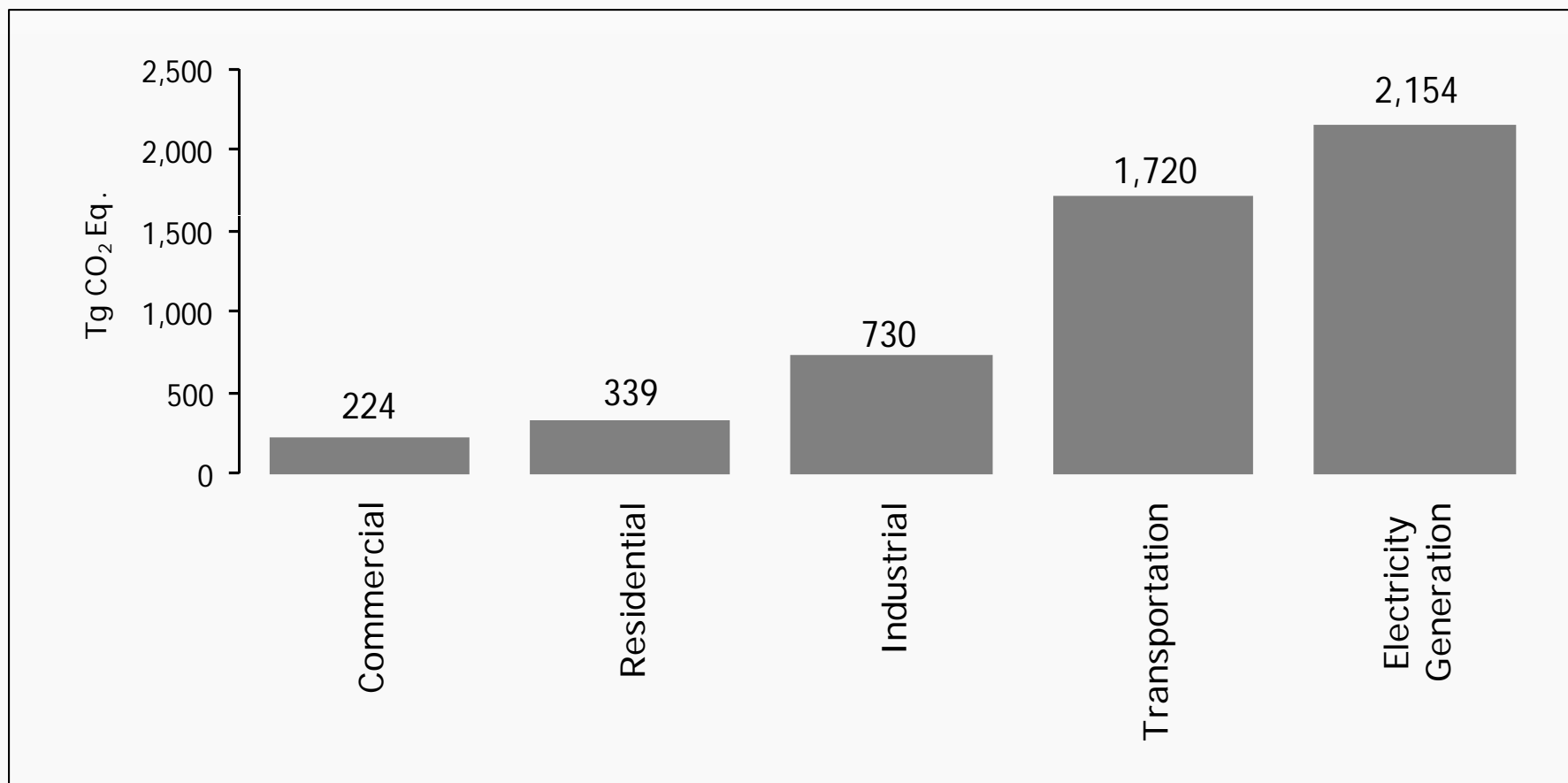
- Background
- Highlights of Proposed Carbon Pollution Standard
- Next Steps



Electricity Generation is the Largest Source of CO₂ Emissions



2009 CO₂ Emissions by Sector



Highlights of Proposed Carbon Pollution Standard



- On March 27, 2012 EPA proposed a carbon pollution standard for new fossil fuel-fired power plants.
- Currently there are no national limits on the amount of carbon pollution new power plants can emit.
- The proposed standard would ensure that new power plants use modern technology to limit this harmful pollution.
- EPA's proposed standard is flexible, achievable and can be met by a variety of facilities using different fossil fuels, such as natural gas and coal.

Highlights of Proposed Carbon Pollution Standard (cont)



- Proposes output-based emission standard of 1,000 pounds of CO₂ per megawatt-hour (lb CO₂/MWh gross).
- Applies to new:
 - Fossil fuel-fired boilers,
 - Integrated Gasification Combined Cycle (IGCC) units, and
 - Natural Gas Combined Cycle (NGCC) units.
- New combined cycle natural gas power plants could meet the standard without add-on controls.
- New coal or petroleum coke power plants would need to incorporate carbon capture and storage technology (CCS).
 - The proposal includes an alternative 30-year compliance period to allow these new plants to incorporate CCS at a later date to reach compliance.
- EPA is proposing that transitional sources will not be covered by this standard, provided they begin construction within 1 year of the proposal's publication.
- EPA is not proposing a standard for modified units or for reconstructions.

Flexibilities for New Coal-fired Power Plants



- New power plants that use Carbon Capture and Storage (CCS) would have the option to use a 30-year average of CO₂ emissions to meet the proposed standard, rather than meeting the annual standard each year.
- Provides flexibility for new power plants to phase in CCS technology
 - Plants that install and operate CCS right away would have the flexibility to emit more CO₂ in the early years as they learn how to best optimize the controls
 - Plants could wait to install or operate CCS for up to 10 years to take advantage of lessons learned from other early installations.
- For example, a new power plant could emit more CO₂ for the first 10 years and then emit less for the next 20 years, as long as the average of those emissions met the standard.
 - Because CO₂ is long-lived in the atmosphere, the 30-year averaging period is not expected to have a different impact on climate compared to a continuous emission rate limit or an annual emissions limit.
- This would also allow for CCS to become more widely available, which should lead to lower costs and improved performance over time.

Next Steps – Public Comment



- The proposed rule published in the Federal Register on April 13, 2012.
- The 60-day public comment period is open until June 12, 2012.
- EPA also plans to hold public hearings on this proposal. The dates, times and locations of the public hearings will be available soon.
 - They will be published in the Federal Register and also listed on <http://www.epa.gov/carbonpollutionstandard>

The Mercury and Air Toxics Standard (MATS)



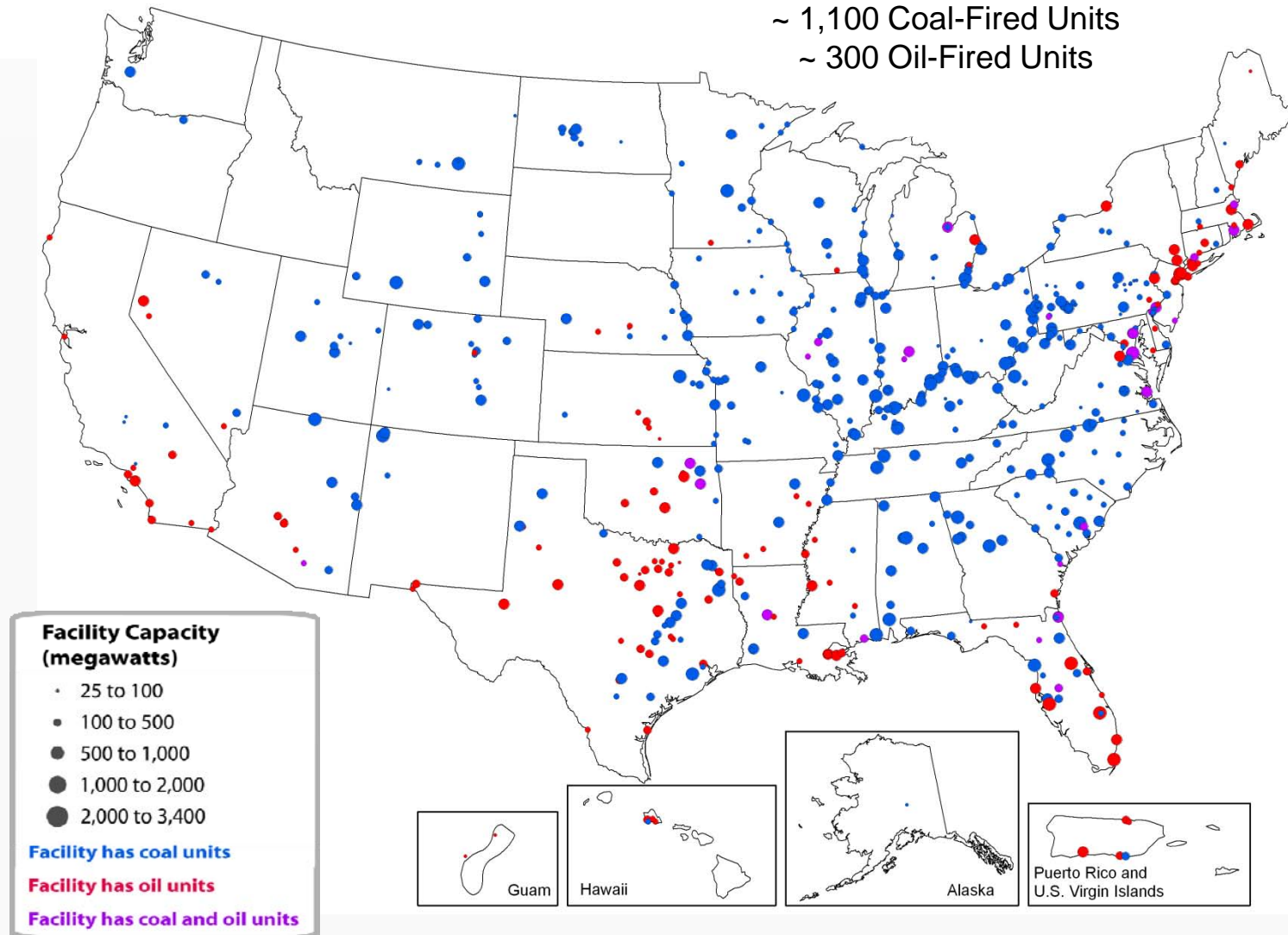
- Background
- Highlights of MATS
- Major Changes Since Proposal
- Costs and Benefits
- Compliance/Grid Reliability
- Next Steps



Location of Coal and Oil Power Plants



~ 1,100 Coal-Fired Units
~ 300 Oil-Fired Units



Source: National Electric Energy Data System (NEEDS 4.10 MATS) (EPA, December 2011) and EPA's Information Collection Request (ICR) for New and Existing Coal- And Oil-Fired Electric Utility Stream Generation Units (2010)

Overview of Action



- On December 16, 2011 EPA finalized the Mercury and Air Toxics Standards, *the first national standards* to reduce emissions of mercury and other toxic air pollutants from new and existing coal- and oil-fired power plants.
 - Published in the **Federal Register** on Thursday, February 16, 2012.
- Standards will reduce emissions of:
 - Metals, including mercury (Hg), arsenic, chromium, and nickel.
 - Acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF).
 - Particulate matter.
- Air toxic pollutants are linked to cancer, IQ loss, neurological damage, heart disease, lung disease and premature death.
- Standards create uniform emissions-control requirements based on proven, currently in-use technologies and processes.
 - Emissions reductions will be made through a range of strategies, including the use of existing emission controls, upgrades to existing emission controls, installation of new pollution controls, and fuel switching.
- EPA is actively engaging in outreach to stakeholders, including sources (*i.e.*, rural electric coops, public and investor owned utilities), states, tribes and permitting authorities.

Adjustments Since Proposal



- EPA used new information from the public comment process to adjust some aspects of the rule; the approach and methodology remain the same.
- As a result of additional data, changes include:
 - Adjusted some emissions limits, including using filterable PM as a surrogate for the metal toxics limit.
 - Clarified subcategory definitions to ensure the right units were covered in each category.
 - Added subcategories for non-continental oil-fired units and limited use oil-fired units.
 - Simplified and improved monitoring provisions for clarity, consistency and increased flexibility (e.g., continuous monitoring or quarterly testing, except for Hg).
 - Provided an alternative compliance option for sources that plan to comply by averaging across multiple units.
 - Expanded and clarified eligibility for additional time to avoid reliability concerns.

MATS Health Benefits in Detail

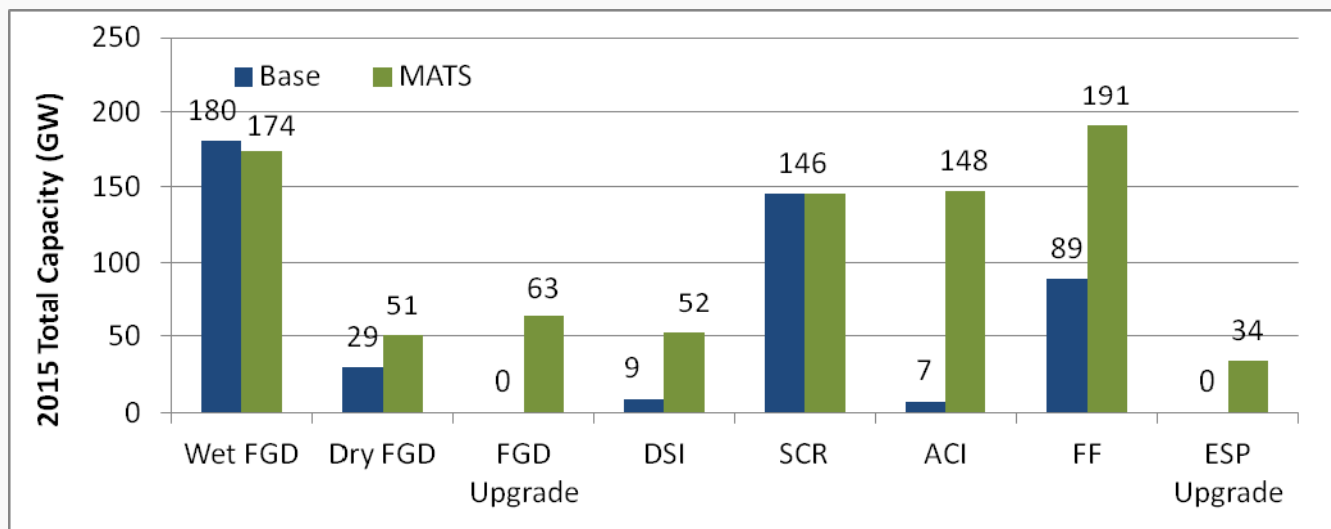


- The value of the improvements to health alone total \$37 billion to \$90 billion each year for those health benefits we were able to quantify.
- The estimated annual costs of this final rule are \$9.6 billion, about a billion dollars less than the proposed standards. This means that for every dollar spent to reduce this pollution, we will get \$3-\$9 in health benefits.
- Each year the rule is fully implemented, the rule will prevent serious health effects, including:
 - 4,200 – 11,000 premature deaths
 - 4,700 heart attacks
 - 130,000 asthma attacks
 - 540,000 missed work or “sick” days
- Avoiding “sick days” saves companies and families money. It is particularly important for the millions of Americans whose jobs do not provide paid sick leave and who risk losing their jobs if they miss work too often.
- The rule is also projected to annually prevent 5,700 hospital admissions and emergency room visits; 2,800 cases of chronic bronchitis; and 3.2 million days when people must restrict their activities each year.

Sources Can Achieve These Standards



- Proven control technologies to reduce these emissions such as scrubbers, fabric filters and activated carbon injection are widely available.
- Many units already use one or more of these technologies.
- As a result of this standard, some power plants will upgrade existing controls (especially particulate matter controls like electrostatic precipitators).
- Power plants may also install new controls (such as fabric filters, dry sorbent injection or activated carbon injection).

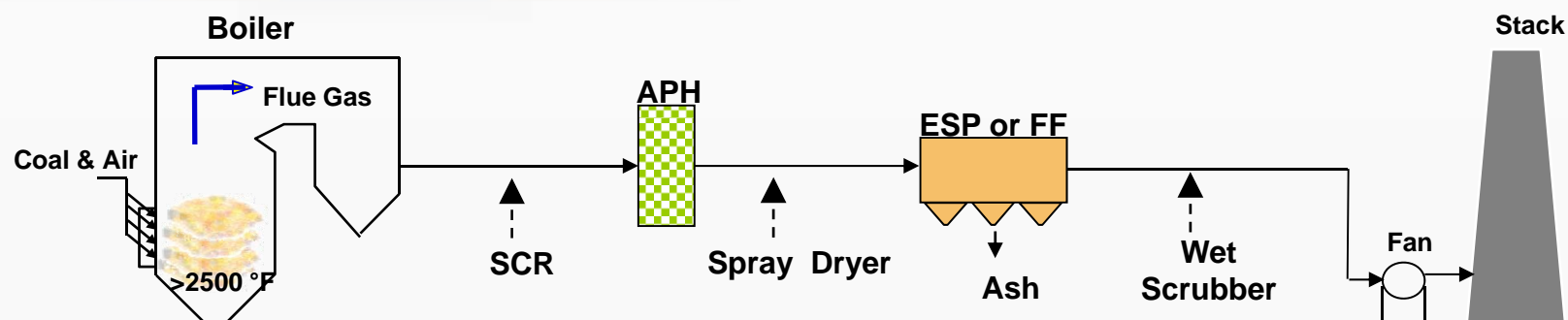


Retrofit pollution control installations on coal-fired capacity (by technology) with the base case and with the final MATS, 2015 (measured in GW capacity). Source: Integrated Planning Model run by EPA, 2011

FGD: flu gas desulfurization (scrubber)
DSI: dry sorbent injection

SCR: selective catalytic reduction
ACI: activated carbon injection
FF: fabric filter

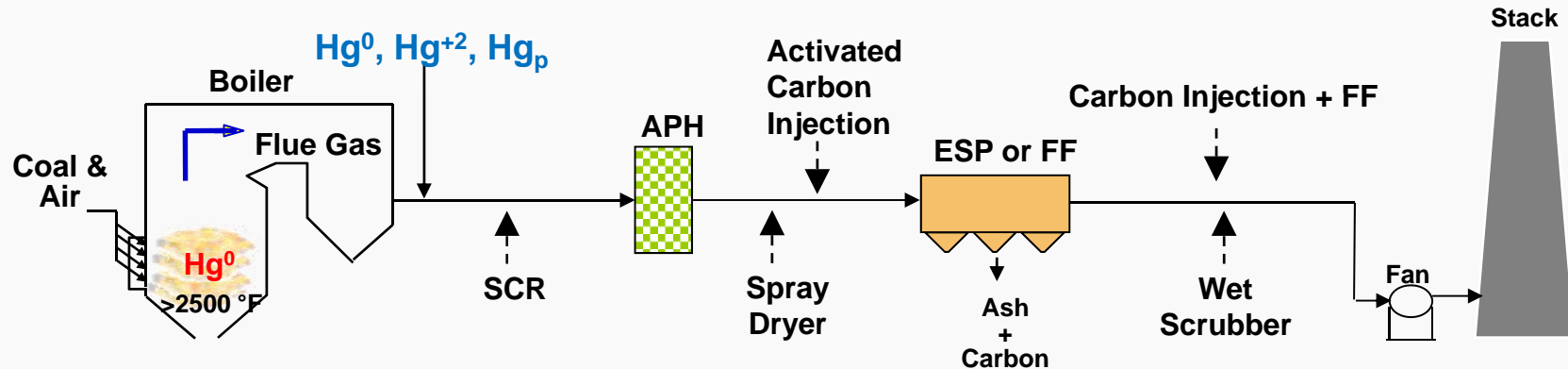
Power Plant Equipment and PM, NO_x, and SO₂ Controls



Control	Extent of Use ¹	Pollutant Reduction	Co-benefits
ESP	~ 270 GW (~78% of boilers)	Up to 99+% of filterable PM	More than 99+% capture of each of the HAP metals except Se and Hg
FF	~ 42 GW (~18% of boilers)	Up to 99.9+% of filterable PM	More than 99+% capture of each of the HAP metals except Se and Hg
SCR	~ 130 GW (~23% of the boilers)	More than 90 % reduction of NO _x possible, especially with LNB	Can oxidize mercury and enhance capture in a wet scrubber
Wet scrubber	~ 170 GW (~34% of the boilers) *	State-of-the-art is 98+% SO ₂ removal	Effective removal of acid gases (e.g., HCl, HF, SeO ₂) - can remove oxidized Hg
Spray dryer	~ 23 GW (~8% of the boilers) *	State-of-the-art is 90+% SO ₂ removal	Effective removal of acid gases (e.g., HCl, HF, SeO ₂) - can remove oxidized Hg

¹ From the National Electric Energy Data System (NEEDS) database and the Integrated Planning Model (IPM) used to support the final MATS regulation.

Power Plant Equipment and Mercury Controls



Control	Extent of Use	Pollutant Reduction	Co-benefits
Carbon injection	63 GW (~ 20% of capacity) ²	> 90 % control of coal mercury possible	Captured mercury is strongly bound to the carbon
Carbon injection + FF (TOXECON™)		> 90 % control of coal mercury possible	Separate removal of ash and AC avoids ash contamination and preserves beneficial use options
Wet scrubber	~ 170 GW	> 90 % control of coal mercury possible if the Hg is oxidized	Effective removal of acid gases (e.g., HCl, HF, SeO ₂) - can remove oxidized Hg
Spray dryer	~ 23 GW	> 90 % control of coal mercury possible if the Hg is oxidized	Effective removal of acid gases (e.g., HCl, HF, SeO ₂) - can remove oxidized Hg

² Total commercial bookings from ICAC. Number of ACI systems 115.

Compliance Timeline



- Effective date of rule: April 16, 2012.
- Compliance dates
 - Existing sources:
 - CAA-mandated 3 years under CAA section 112(i)(3)(A): April 16, 2015.
 - CAA-allowed additional year granted by permitting authority if necessary for the installation of controls under CAA section 112(i)(3)(B): April 16, 2016.
 - Pursuant to CAA section 113(a), OECA may issue an Administrative Order to provide reliability-critical units up to one additional year to come into compliance, as noted in its December 16, 2011, policy memorandum.
 - New sources: immediately upon startup or the effective date of this rule, whichever is later.

Further Information on MATS



- For general information on Mercury and Air Toxics Standards:
<http://www.epa.gov/mats> or <http://www.epa.gov/mats/powerplants.html>
- MATS Fact sheets and a copy of the rule available at:
<http://www.epa.gov/mats/actions.html>
 - Please note the rule is 210 pages long
- EPA is also providing a clear pathway for reliability critical units to obtain a schedule with up to an additional year to achieve compliance. This pathway is described in a separate enforcement policy document that can be found at <http://cfpub.epa.gov/compliance/resources/policies/civil/erp/>



Questions?

Thank you!

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