

Reducing Toxic Pollution from Power Plants

Final Mercury and Air Toxics Standards (MATS)

December 2011



Overview of Action

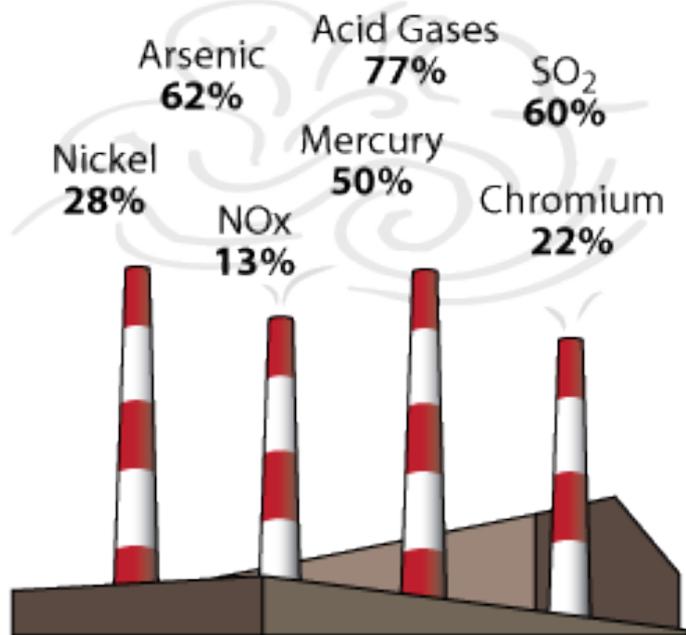
- On December 16, EPA finalized the Mercury and Air Toxics Standards, *the first national standards* to reduce emissions of mercury and other toxic air pollutants from new and existing coal- and oil-fired power plants
- Standards will reduce emissions of:
 - Metals, including mercury (Hg), arsenic, chromium, 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
- For more information on these Mercury and Air Toxics Standards:
<http://www.epa.gov/mats>



Power plants are big emitters and many lack advanced controls

Portion of US air pollution that comes from power plants

Portion of U.S. air pollution that comes from power plants



About **40%**

Of coal-burning units don't use add-on controls such as scrubbers

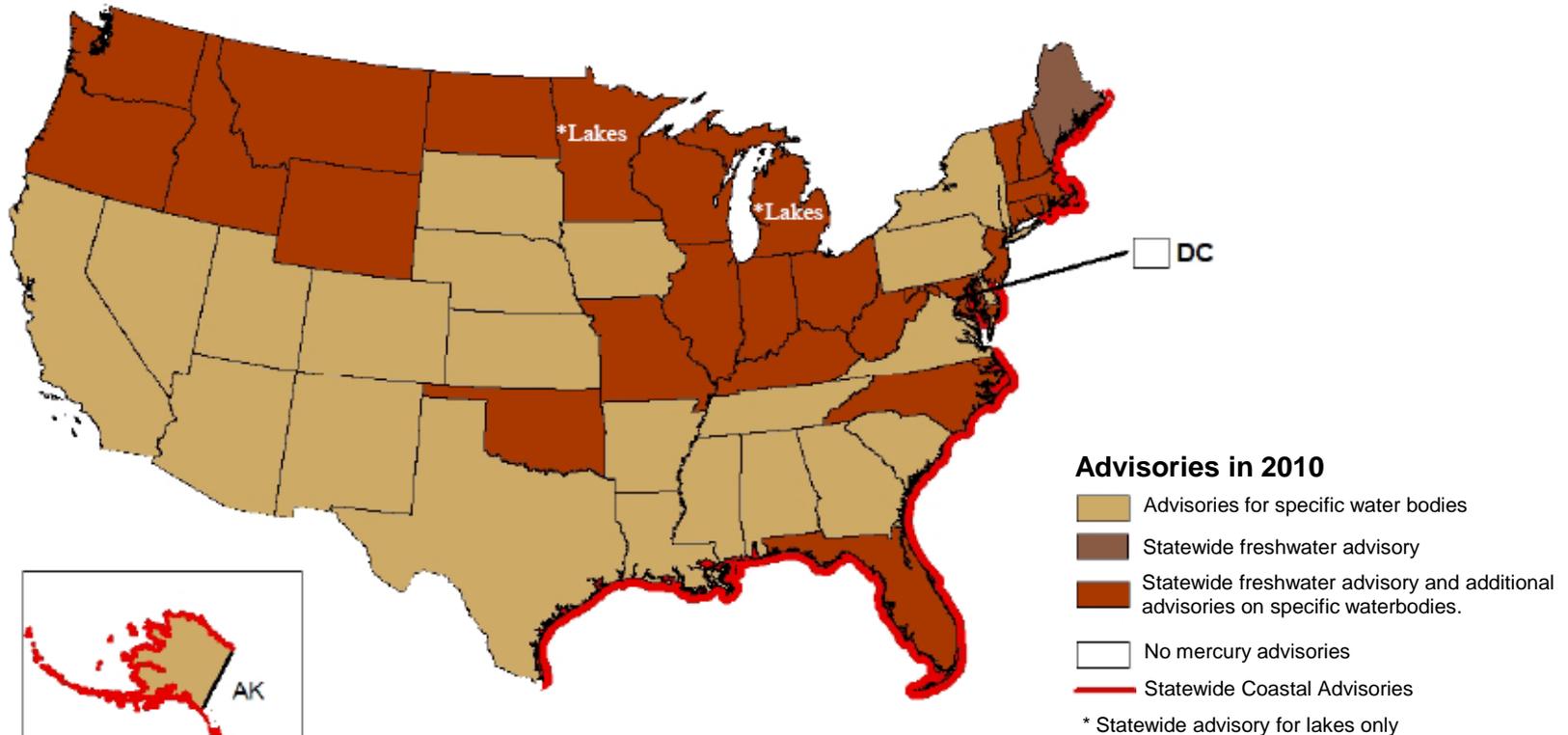
Sources: Portion of pollution -- NEI Trends Data (2009) and IPM (2010) (SO₂, NO_x); MATS rule modeling platform, based on inventory used for 2005 NATA (Hg); Inventory used for 2005 NATA (other toxics). Percent of units: EPA Base Case v. 4.10 PTR

Toxic Emissions from Power Plants Are a Serious Public Health Concern

- Power plants emit mercury, arsenic, other metals, acid gases, and particles into the air that harm people's health.
 - Uncontrolled releases of mercury from power plants damage children's developing nervous systems, which can reduce their IQ and impair their ability to think and learn
 - Mercury and many of the other toxic pollutants also pollute our nation's lakes and streams, and contaminate fish
 - Other metals such as arsenic, chromium, and nickel can cause cancer
 - Acid gases cause lung damage and contribute to asthma, bronchitis and other chronic respiratory disease, especially in children and the elderly
 - Particles cause premature death, increased numbers of hospital admissions and emergency department visits, and development of chronic respiratory disease.
- People – especially pregnant and nursing women, women who may become pregnant, and young children – who eat large amounts of fish from mercury-contaminated freshwater lakes and rivers in the U.S. are at the greatest risk
 - This includes Native American, Laotian, Vietnamese, African-American, Hispanic, and Caucasian subsistence fishers and their families
- The standards will also result in additional reductions of SO₂, which will reduce fine particles in the air we breathe and prevent thousands of deaths and hundreds of thousands of illnesses each year



Fish Consumption Advisories for Mercury are Everywhere



NOTE: This map depicts the presence and type of fish advisories issued by the states for mercury as of December 2010. Because only selected waterbodies are monitored, this map does not reflect the full extent of chemical contamination of fish tissues in each state.

Source: 2010 National Listing of Fish Advisories
http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/upload/nlfa_slides_2011.pdf



Power Plants Are the Largest Remaining Source of Mercury Emissions in the U.S.

- In 1990 three source categories made up approximately two-thirds of total U.S. mercury emissions: municipal waste combustors, medical waste incinerators, and power plants
 - Two of the three are now subject to federal emissions standards
 - So are many other industries, such as cement plants and steel manufacturers
- Until today, more than 20 years after the 1990 CAA Amendments passed, there was no federal limit for toxic emissions – including mercury – for coal- or oil-fired power plants

Industrial Category	1990 Emissions tons per year (tpy)	2005 Emissions (tpy)	% Reduction
Power Plants	59	53	10%
Municipal Waste Combustors	57	2	96%
Medical Waste Incinerators	51	<1	>98%

Source: EPA's 2005 NATA Inventory Modified for the Toxics Rule 2005 Base Year (2010)



Key Power Plant Rules Overdue

1990: Clean Air Act Amendments (CAA) required EPA to issue standards to reduce emissions of air toxics, also called hazardous air pollutants, from many sources, and to study whether to do so for power plants

- Since then, EPA has issued air toxics standards for most major source categories – but not for power plants

1998: EPA released the Utility Toxics Study Report to Congress

2000: EPA listed power plants for regulation under the CAA air toxics provisions

- EPA determined it was “appropriate and necessary” to regulate emissions of air toxics from power plants, triggering CAA requirements to regulate power plants
- Mercury cited as pollutant of greatest concern but other toxics of potential concern include arsenic, chromium, cadmium, nickel, hydrochloric acid, dioxin/furan

2005: EPA reversed power plant air toxics determination

- EPA determined it was neither “appropriate nor necessary” to regulate emissions of air toxics from power plants and removed those units from the CAA section 112(c) source category list
- EPA issued the Clean Air Mercury Rule (CAMR), which regulated mercury from power plants through a cap and trade program under CAA section 111

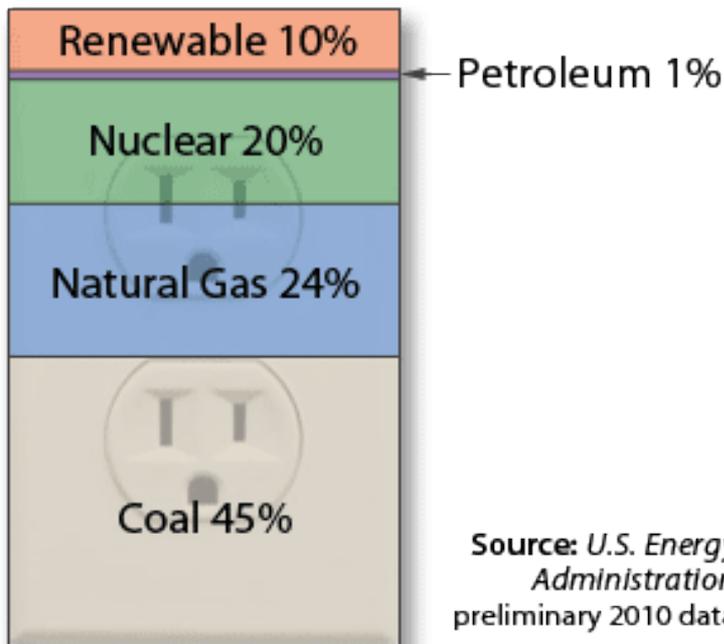
2008: DC Circuit Court vacated both EPA's action removing power plants from the section 112(c) source category list and CAMR

2011: EPA is under consent decree to issue proposed toxics standards for power plants by March 16, 2011, and issue final standards by December 16, 2011



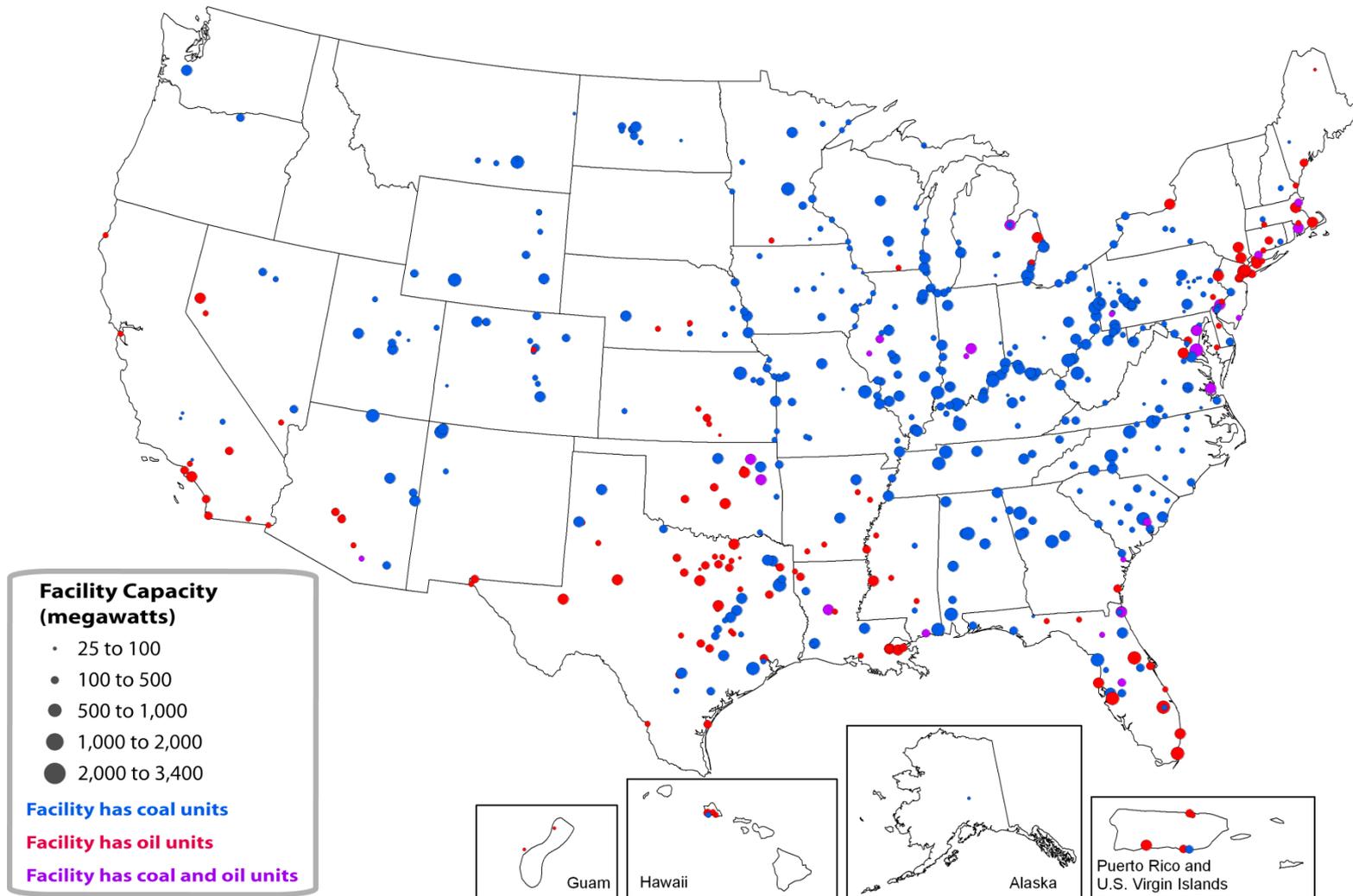
U.S. Electricity Generation

Sources of US Electricity Generation, 2010



- Coal-fired units > 25 MW make up approximately 45% percent of nationwide electricity generation
 - Bituminous coal ~ 50% of coal generation
 - Subbituminous ~45% of coal generation
 - Lignite ~ 5% of coal generation
- Oil-fired units > 25 MW make up approximately 1% of nationwide electricity generation
- MATS will not substantially change the current make-up of the power sector

Location of Coal and Oil Power Plants



Active Public Comment Process

- Proposal released for public comment on March 16, 2011
- EPA actively sought public feedback on the proposed standards
 - Held 3 public hearings: Philadelphia, Atlanta and Chicago.
 - Extended the public comment period 30 days to August 4, 2011
- We received more than 900,000 total comments, including some 20,000 pages of detailed comments on specific aspects of the standards. The vast majority of the comments were supportive of the rule
- The final standards were finalized on December 16, 2011



MATS covers approximately 1,400 coal- and oil-fired units > 25 MW at about 600 power plants nationwide

- Includes units that burn coal, coal refuse, oil, or a synthetic gas derived from coal either exclusively, in combination together, or in any combination with other supplemental fuels. Natural gas power plants are not affected by this rule
- MATS covers emissions of all hazardous air pollutants from power plants
- The rule sets a few standards (for mercury, acid gases, non-mercury metal air toxics, and organic air toxics) to limit emissions of these pollutants
 - Most of these standards are numeric emissions limits; the standard for organic air toxics is a work practice standard
 - In some cases, these standards are “surrogates” for a number of pollutants. (e.g. setting a numeric HCl emissions limit to control all acid gases)
 - For many standards, sources can choose to meet the primary standard or an alternate standard. (e.g. MATS also sets a numeric SO₂ emissions limit as an alternate surrogate for acid gases)
- The CAA requires EPA to set the emission standards for existing sources at a level that is at least as stringent as the emission reductions achieved by the average of the best performing 12% of sources in the category



Emissions Limits

Coal units (approximately 1,100 covered)

- Separate mercury standards set for two subcategories of coal-fired power plants:
 - Mine-mouth units designed for and burning low rank, virgin coal with a calorific value less than 8,300 Btu/lb
 - All other coal-fired units
- Sets numeric emissions limits for mercury, acid gases (using HCl as a surrogate for all acid gases), and non-mercury metallic toxic pollutants (using filterable PM as a surrogate)
 - Also sets alternate numeric emissions limits for acid gases (using SO₂ as a surrogate) and non-mercury metallic toxic pollutants (using total metal air toxics as a surrogate)
- Sets work practice standards for organic air toxics, including dioxin

Oil units (approximately 300 covered)

- Sets separate standards for 3 subcategories of oil-fired power plants:
 - Limited-use oil-fired units
 - Non-continental oil-fired units
 - All other oil-fired units
- Sets numeric emissions limits for metal air toxics including mercury (using total metal air toxics as a surrogate) and for acid gases (using HCl and HF as surrogates)
 - Also sets alternate compliance options

Sets work practice standards for organic air toxics, including dioxin



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 the definition of coal subcategories
 - 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
 - Provided an alternative compliance option for sources that plan to comply by averaging across multiple units



Benefits of MATS Are Significant

- The final rule will: prevent 90 percent of the mercury in coal burned in power plants from being emitted to the air; reduce 88 percent of acid gas emissions from power plants; and cut 41 percent of sulfur dioxide emissions from power plants beyond the reductions expected from the Cross State Air Pollution Rule
- Reduces mercury exposure from power plants for pregnant women and children, reducing the risk of damage to children's developing nervous systems that can impair their ability to think and learn
- Protects Americans from cancer and other health risks from exposure to metals such as arsenic, chromium, and nickel
- Prevents thousands of premature deaths each year by reducing the amount of dangerous fine particles in the air across the country
 - This includes neighborhoods near power plants and neighborhoods hundreds of miles away from the nearest power plant
- Protects thousands of lakes and streams – and the fish that live there and the mammals and birds that eat them – by reducing mercury and acid rain pollution
- Provides employment for thousands of American workers building, installing, and operating the equipment to reduce emissions of mercury, acid gases, and other toxic air pollutants



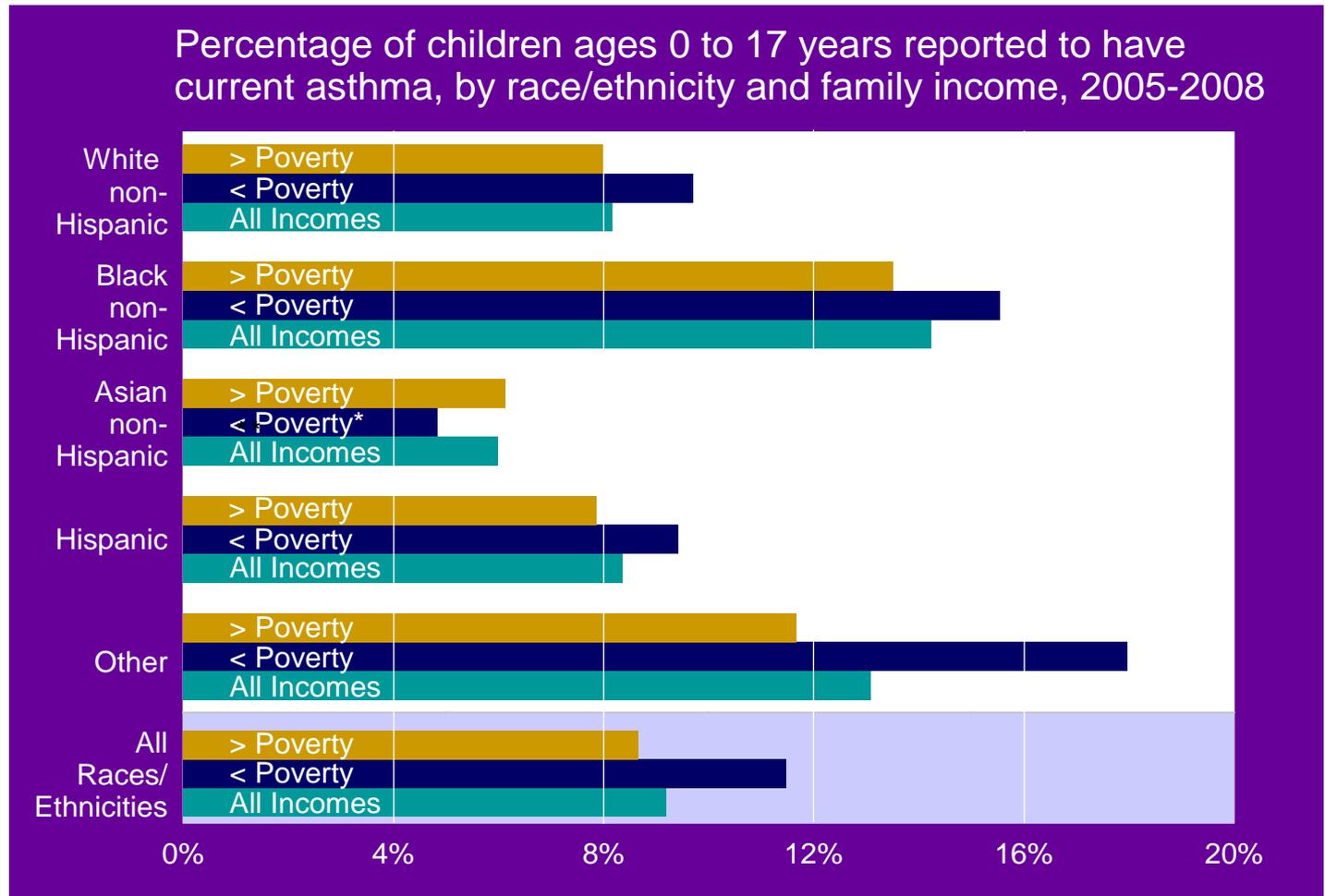
MATS Health Benefits in Detail

- The value of the improvements to health alone total \$37 billion to \$90 billion each year
- 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



These Health Benefits Are Widely Distributed

- For example, asthma is a significant public health concern and affects people of all racial and ethnic groups and income levels



Will MATS Turn The Lights Out?

- No. For 40 years, we have been able to implement the Clean Air Act without causing the lights to go out. MATS will not change that.
- EPA and DOE analyses indicate that there will be more than enough electric generating capacity to meet the nation's needs.
 - EPA's projects 4.7 GW will retire out of the more than 1000 GW that make up the nation's electric generating capacity. That's less than one half of one percent. Most of this capacity is decades old and does not have modern pollution controls installed.
- A March 2011 Bipartisan Policy Center report concludes that "scenarios in which electric system reliability is broadly affected are unlikely to occur."
- In August 2011, the Congressional Research Service analyzed a number of the claims from studies relied on by some in industry that reported alarming impacts on the nation's power supply and declared them to be strongly overstated. The report concluded that:
 - industry's claims were made "before EPA proposed most of the rules whose impacts they analyze, " and
 - are based on "more stringent requirements than EPA proposed in many cases."
- If any specific concerns about local electricity resources arise, a broad array of tools are available to utilities, system operators and State and Federal regulators to address them



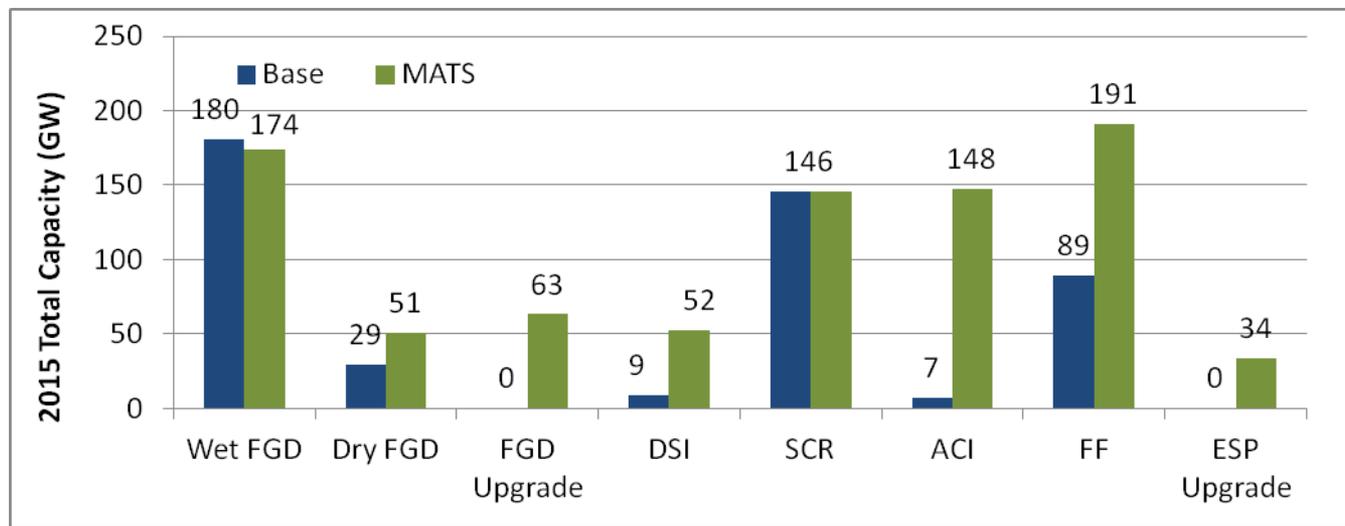
Timing

- EPA expects most facilities will comply with this rule 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.
- Existing sources generally will have up to 4 years if they need it to comply with MATS.
 - This includes the 3 years provided to all sources by the Clean Air Act. EPA's analysis continues to demonstrate that this will be sufficient time for most, if not all, sources to comply.
 - Under the Clean Air Act, state permitting authorities can also grant an additional year as needed for technology installation. EPA expects this option to be broadly available.
- 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. The EPA believes there will be few, if any situations, in which this pathway will be needed.



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

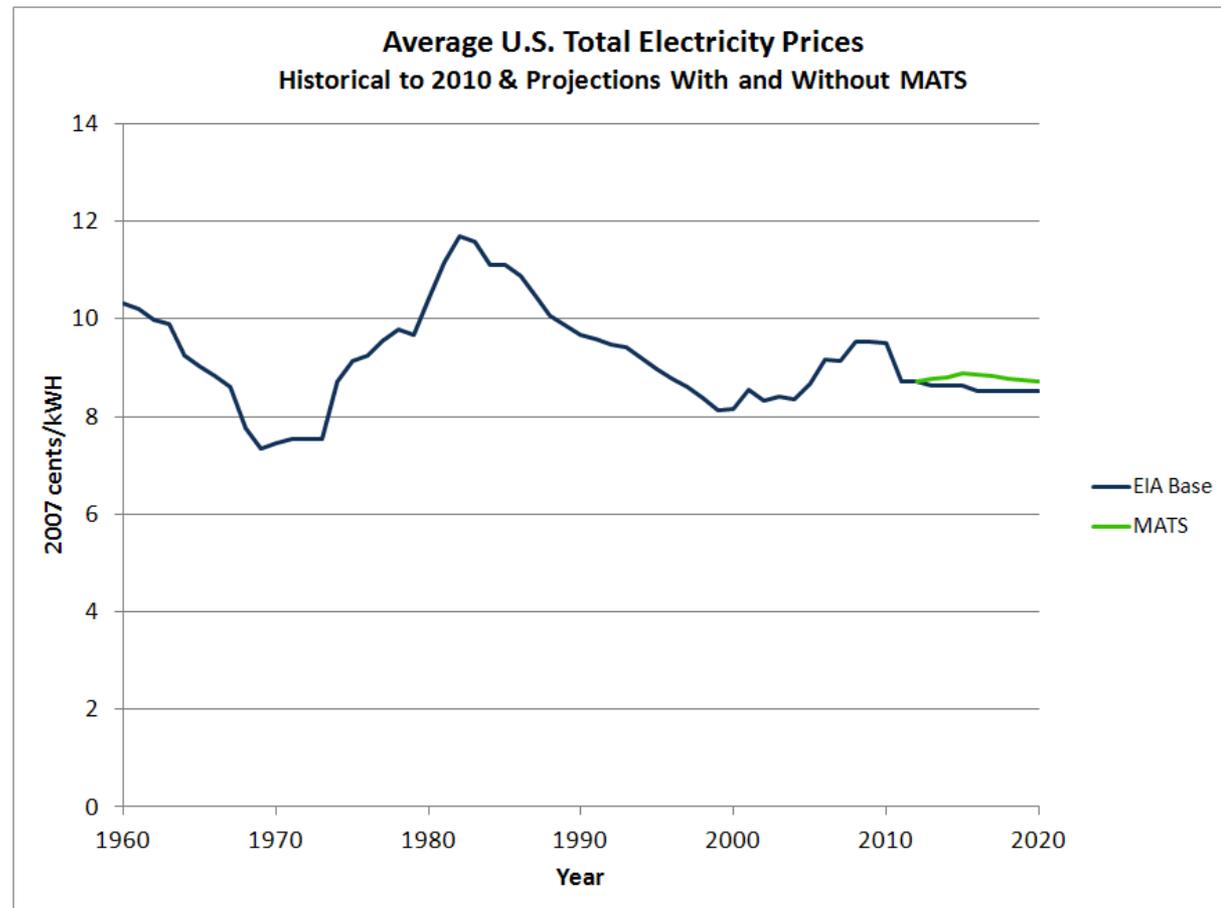


FGD: flu gas desulfurization (scrubber)
DSI: dry sorbent injection

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

Any effect on future electricity costs will be small and within normal historical fluctuations

- The graph shows the effect MATS may have on future electricity prices.
- The **blue line** shows historical electricity rates and what projected electricity rates would be without MATS (both from EIA). The **green line** shows how cleaning up power plants under MATS may lead to a slight increase in these prices in the future.
- However, the effect is small and keeps costs well within the normal historical fluctuation of electricity prices.
- In fact, even with MATS, electricity rates are projected to stay below historical highs.



Sources: EIA Historical (Annual Energy Review – October 2011); EIA Projected (Annual Energy Outlook 2011); EPA modeling of projected price increases using the Integrated Planning Model.



MATS Doesn't Just Save Lives, It Also Supports Jobs

- Money spent on pollution control at power plants creates high-quality American jobs
 - Jobs manufacturing steel, cement and other materials needed to build pollution control equipment
 - Jobs creating and assembling pollution control equipment
 - Jobs installing the equipment at power plants
 - Jobs operating and maintaining the equipment once it is installed
- This rule will provide employment for thousands, by supporting 46,000 short-term construction jobs and 8,000 long-term utility jobs



Source: EPA Regulatory Impact Analysis