United States Environmental Protection Agency

The Regulatory Impact Analysis (RIA) for the Mercury Air Toxics Standard (MATS)

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Regulatory Impact Analysis (RIA)

Overview

RIA: EPA's Process for Estimating Costs

- Sector-specific rule (e.g., MATS): EPA estimates costs of pollution control technologies expected to be installed to meet the standard set by the regulation
  - In sectors for which lots of data are available (e.g., electric power sector), it may be possible to develop facility-specific costs that are then summed to determine the total national cost
  - In cases with limited data, it may be necessary to use an average cost per facility based on a model unit
  - The costs estimated include capital costs and operations and maintenance costs
  - EPA also estimates monitoring, recordkeeping, testing and reporting costs; these are generally significantly lower than the costs of control technology

RIA: EPA's Process for Estimating Costs (cont)

- National Ambient Air Quality Standards (NAAQS): EPA develops illustrative control scenarios to estimate the potential costs of alternative standards
  - Control scenarios may cover a range of sectors and may include "extrapolated costs" to account for controls beyond currently available technology
  - Control scenarios are for illustrative purposes only and do not bind localities to applying a particular set of controls in order to attain a NAAQS standard

RIA: EPA's Process for Estimating Benefits

- 3-step process to estimate health benefits related to air pollution regulations
  1. Use atmospheric models to translate emission reductions into changes in ambient air concentrations
  2. Use risk estimates from peer-reviewed epidemiology studies to derive health impact function
     - Estimates the number of avoided health effects associated with an improvement in overall air quality
  3. Use widely accepted valuation techniques to put dollar value on avoided health effects
     - E.g., willingness-to-pay (WTP) and cost-of-illness estimates

RIA: EPA's Process for Estimating Benefits (cont)

- Valuing avoided premature deaths
  - Use peer-reviewed estimates of WTP to reduce risks of dying from diseases caused or exacerbated by pollution
    - Often referred to as the "value of a statistical life," or VSL
  - Current VSL approach is included in the Agency's 2000 Guidelines for Preparing Economic Analyses
    - Consistent with the range recommended by the Office of Management and Budget (OMB) in the 2003 Circular A-4 guidelines

RIA: Hg & PM Benefits

- Due to data limitations, the RIA estimates only a subset of benefits from reductions in mercury and other air toxics
  - Mercury benefits estimates do not include
    - Consumption of commercially-caught fish
    - Consumption of freshwater fish caught in most U.S. watersheds including estuaries and the Great Lakes
    - Health effects other than IQ loss (e.g., cancer and developmental delays)
  - These benefits are real, even if we cannot quantify them
- MACT regulations can result in “ancillary” benefits from PM reductions
  - Do not directly regulate PM, but benefits are still important to consider
  - OMB’s guidance on benefit cost analysis includes consideration of “ancillary” benefits achieved by a regulation

RIA: How EPA Avoids Double Counting Benefits

- Benefits estimated for new rules (e.g., MATS) are above and beyond those estimated for other rules already "on the books"
  - E.g., when estimating benefits for rules like MATS, the EPA includes other rules such as the Cross State Air Pollution Rule in the "baseline"
- Existing rules (e.g., MATS) are included in the analysis of the National Ambient Air Quality Standards (NAAQS)
  - Counted as progress toward meeting new proposed standards
  - Only benefits from additional local controls – those above and beyond existing rules – are quantified for NAAQS analyses
  - Account for human health benefits of air quality improvements occurring above and below the NAAQS level when estimating health risks of $PM_{2.5}$
    - Best available scientific evidence, and advice of independent scientific bodies, indicates health effects occur at all levels of $PM_{2.5}$ pollution
- While the question of double counting is asked more frequently about benefits, the same rules apply for costs

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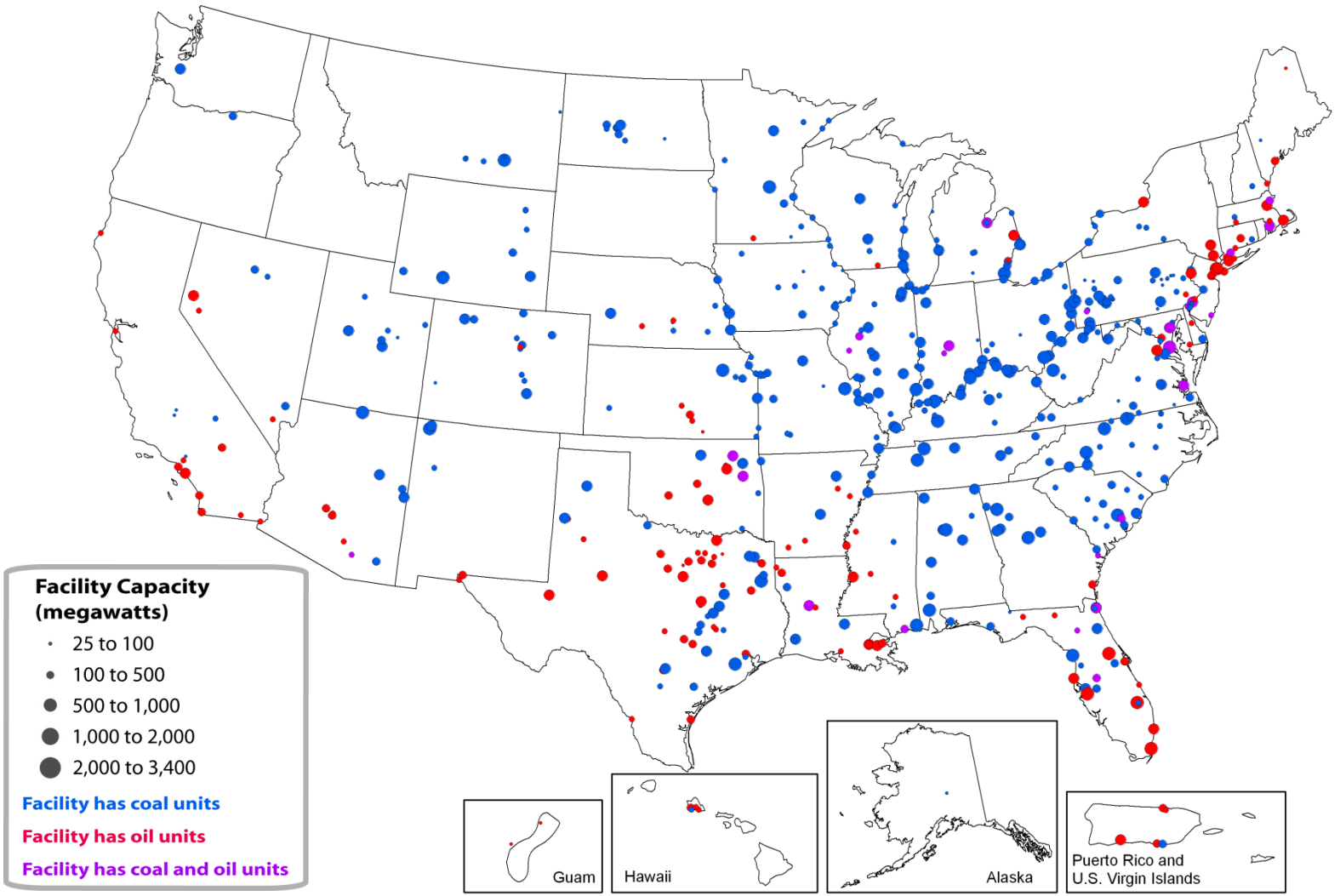
Mercury Air Toxics Standard (MATS)

MATS: Overview of Action

- On December 16, 2011, EPA signed the final 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 under section 112 of the Clean Air Act (CAA)
  - 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 emission-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

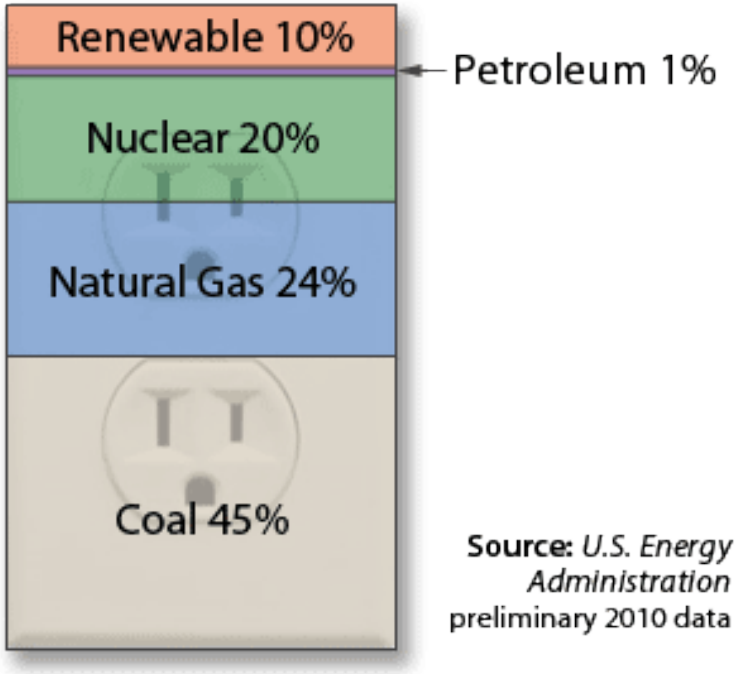
MATS: Location of Coal and Oil Power Plants



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)

MATS: U.S. Electricity Generation

Sources of US Electricity Generation, 2010



Source: *U.S. Energy Administration* preliminary 2010 data

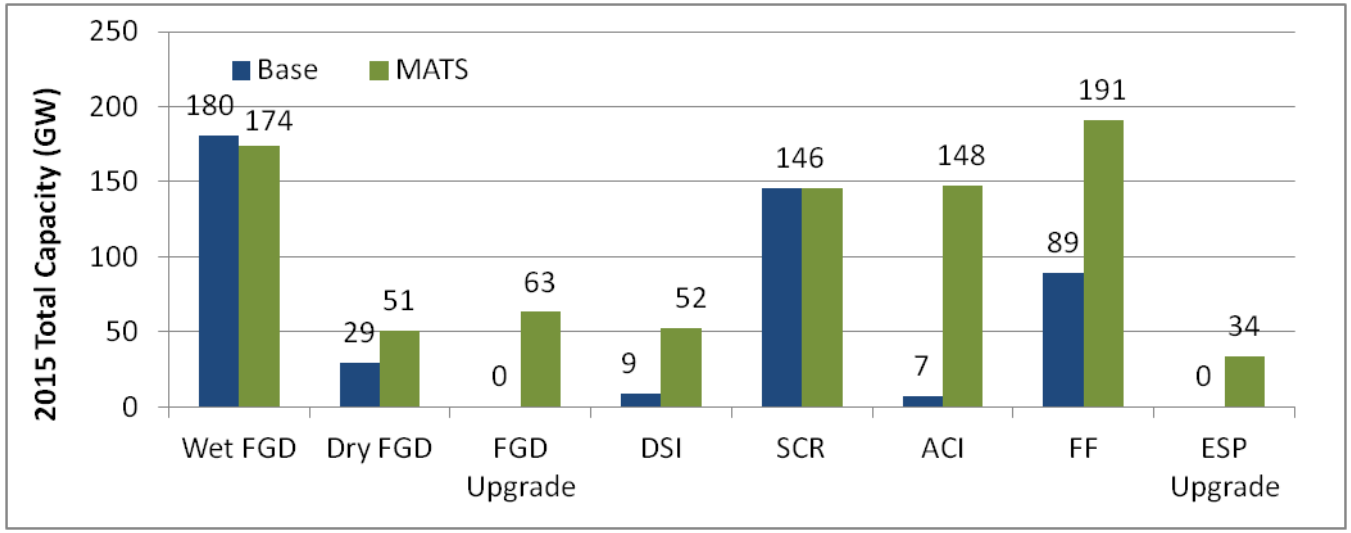
Source: U.S. Energy Information Administration, Monthly Energy Review (June 2011). Percentages based on Table 7.2a, preliminary 2010 data.

- 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

MATS: Sources Can Achieve MATS 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)

Pollution control installations on coal-fired capacity (by technology) with the base case and with the final MATS
Source: Integrated Planning Model run by EPA, 2011



FGD: flu gas desulfurization (scrubber)

DSI: dry sorbent injection

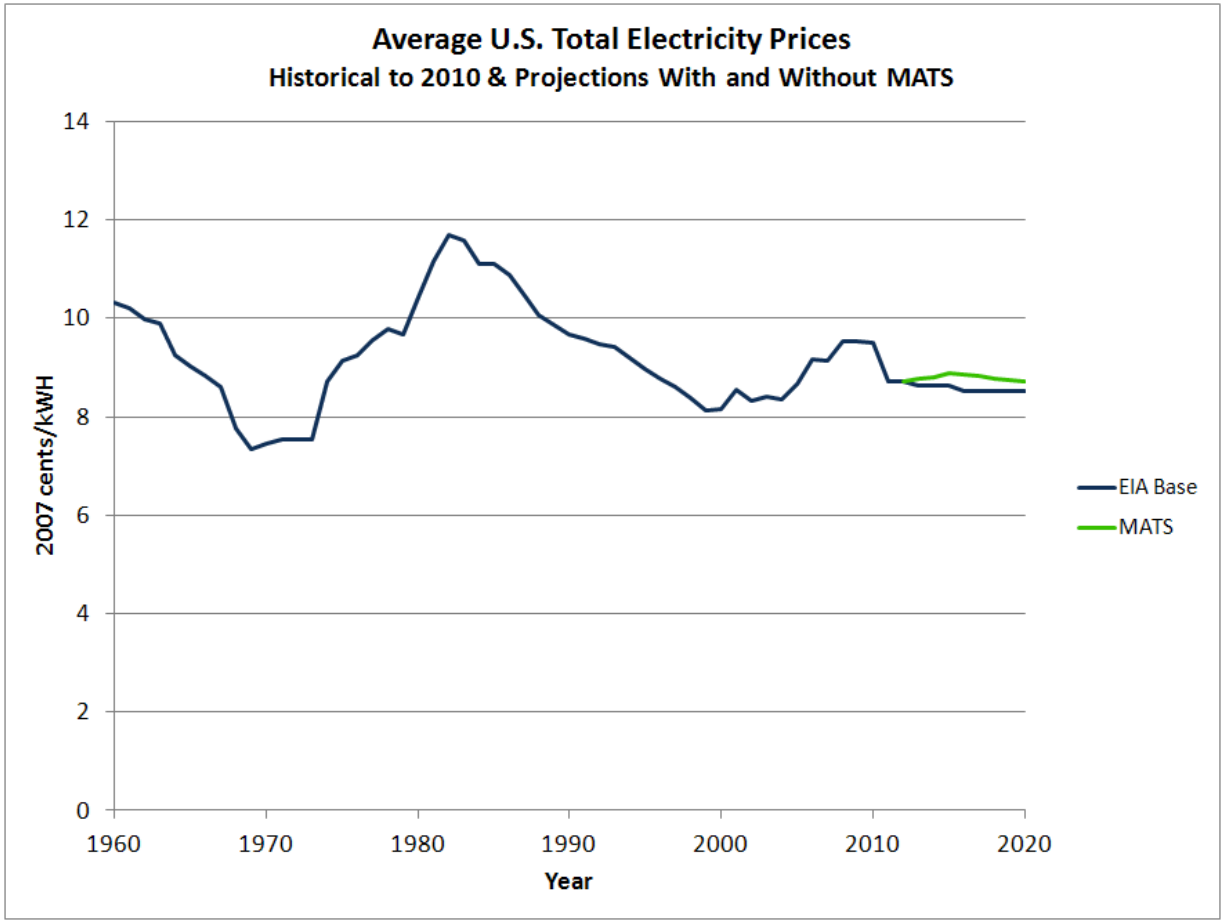
SCR: selective catalytic reduction

ACI: activated carbon injection

FF: fabric filter

MATS: 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: 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 SO_2, which will reduce fine particles in the air we breathe and prevent thousands of deaths and hundreds of thousands of illnesses each year

MATS: Benefits of MATS Are Significant

- The final rule will:
  - Prevent 90% of the mercury in coal burned in power plants from being emitted to the air
  - Reduce 88% of acid gas emissions from power plants
  - Cut 41% 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: MATS Health Benefits in Detail

- Value of improvements to health alone total $37 billion to $90 billion each year
- Estimated annual costs of this final rule are $9.6 billion, about a billion dollars less than the proposed standards
- 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:

Health Effect	Cases Avoided
Premature Death	4,200-11,000
Chronic Bronchitis	2,800
Heart Attacks	4,700
Asthma Attacks	130,000
Restricted Activity Days	3,200,000
Sick Days	540,000

- 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

MATS: Employment and Economic Impacts

- For MATS, EPA used two methods to estimate employment changes in the regulated sector and the pollution control industry
  - Analyses showed MATS would support:
    - 46,000 short-term construction jobs, including jobs for engineers, steelworkers, and boilermakers building and installing pollution control equipment
    - 8,000 long-term jobs, including jobs in the electric power industry associated with operating and maintaining the new pollution control technology.
- EPA used Bureau of Economic Analysis data to estimate the impact of an increase in electricity prices on various sectors of the economy
  - Analysis suggests MATS would increase production costs less than 1/10 of one percent.
    - Any actual increase would likely be lower because this estimate does not account for the ability of the real economy to adjust to minor fluctuations in price