Reducing Toxic Pollution from Power Plants

EPA's Proposed Mercury and Air Toxics Standards

March 16, 2011

Overview of Action

- On March 16, EPA proposed Mercury and Air Toxics Standards, ***the first national standards*** to reduce emissions of toxic air pollutants from new and existing coal- and oil-fired power plants – often the biggest contributors to air pollution
- Standards would reduce emissions of:
  - Metals, including mercury (Hg), arsenic, chromium, and nickel
  - Acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF)
  - Particulate matter
- These pollutants are linked to cancer, IQ loss, heart disease, lung disease and premature death
- Standards create uniform emissions-control requirements based on proven, currently in-use technologies and processes
- Compliance time line set by Clean Air Act: up to 4 years (3 years plus an additional year if granted by the permitting authority)
- EPA is also proposing a new source performance standard (NSPS) for particulate, sulfur dioxide (SO_2), and nitrogen oxide (NO_X) emissions from new sources

Toxic Emissions from Power Plants Are a Serious Public Health Concern

- Power plants release mercury, arsenic, other metals, acid gases, and particles that all harm people's health.
  - Uncontrolled releases of mercury from power plants damage children's developing brains, reducing their IQ and their ability to learn
  - Mercury and many of the other toxic pollutants also pollute our nation's lakes, streams, and 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 and a wide range of lung and heart diseases
- People who eat large amounts of fish from mercury-contaminated freshwater lakes and rivers in the U.S. are at the greatest risk of exposure
  - This includes Native American, Laotian, Vietnamese, African-American, Hispanic, and Caucasian subsistence fishers and their families
- The standards would also result in additional reductions of SO_2, preventing thousands of deaths and hundreds of thousands of illnesses each year

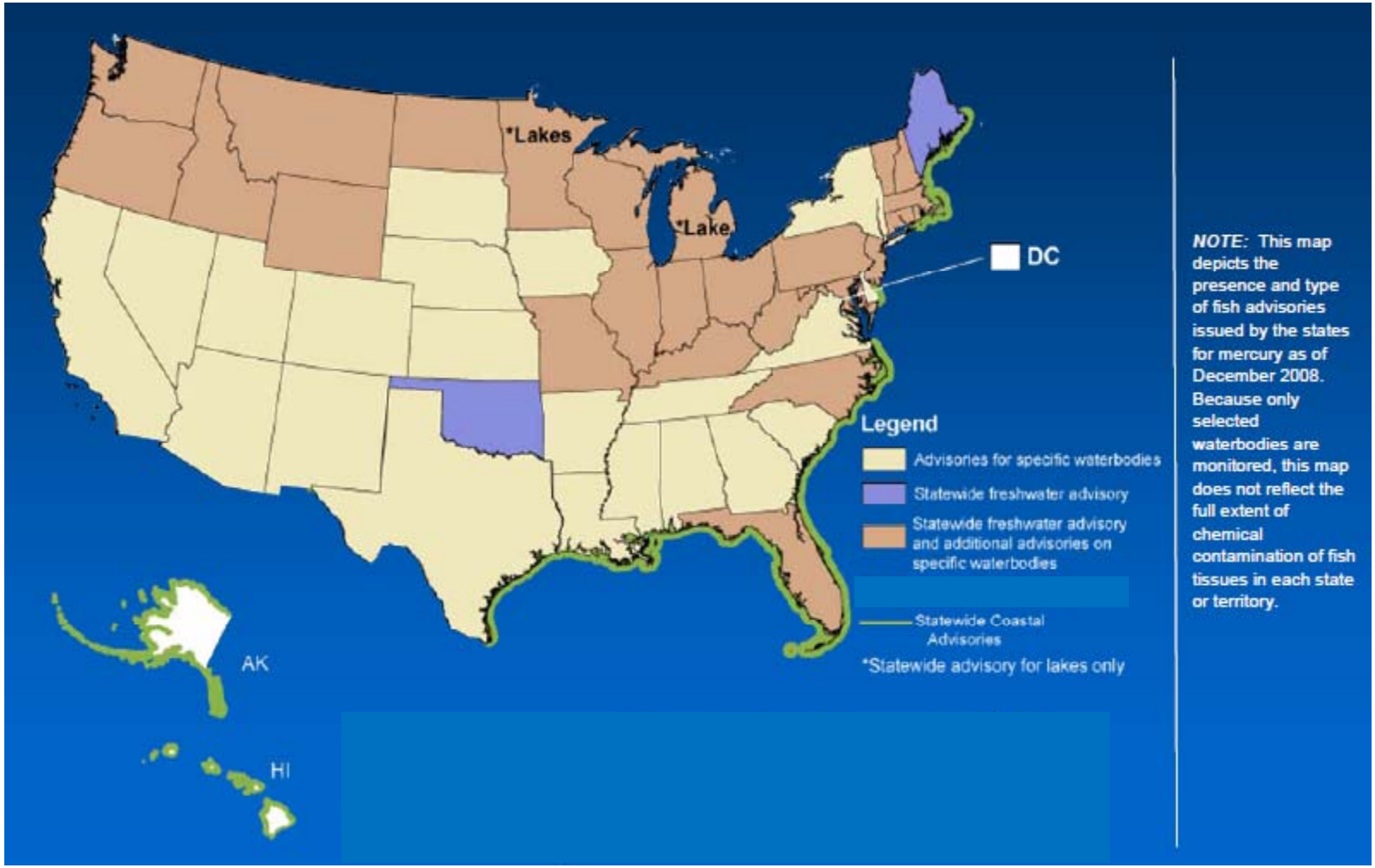
Power Plants Are the Largest Remaining Source of Mercury Emissions in the U.S.

- 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
- Today, 20 years after 1990 CAA Amendments passed, no federal limit for toxic emissions – including mercury – exists 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%

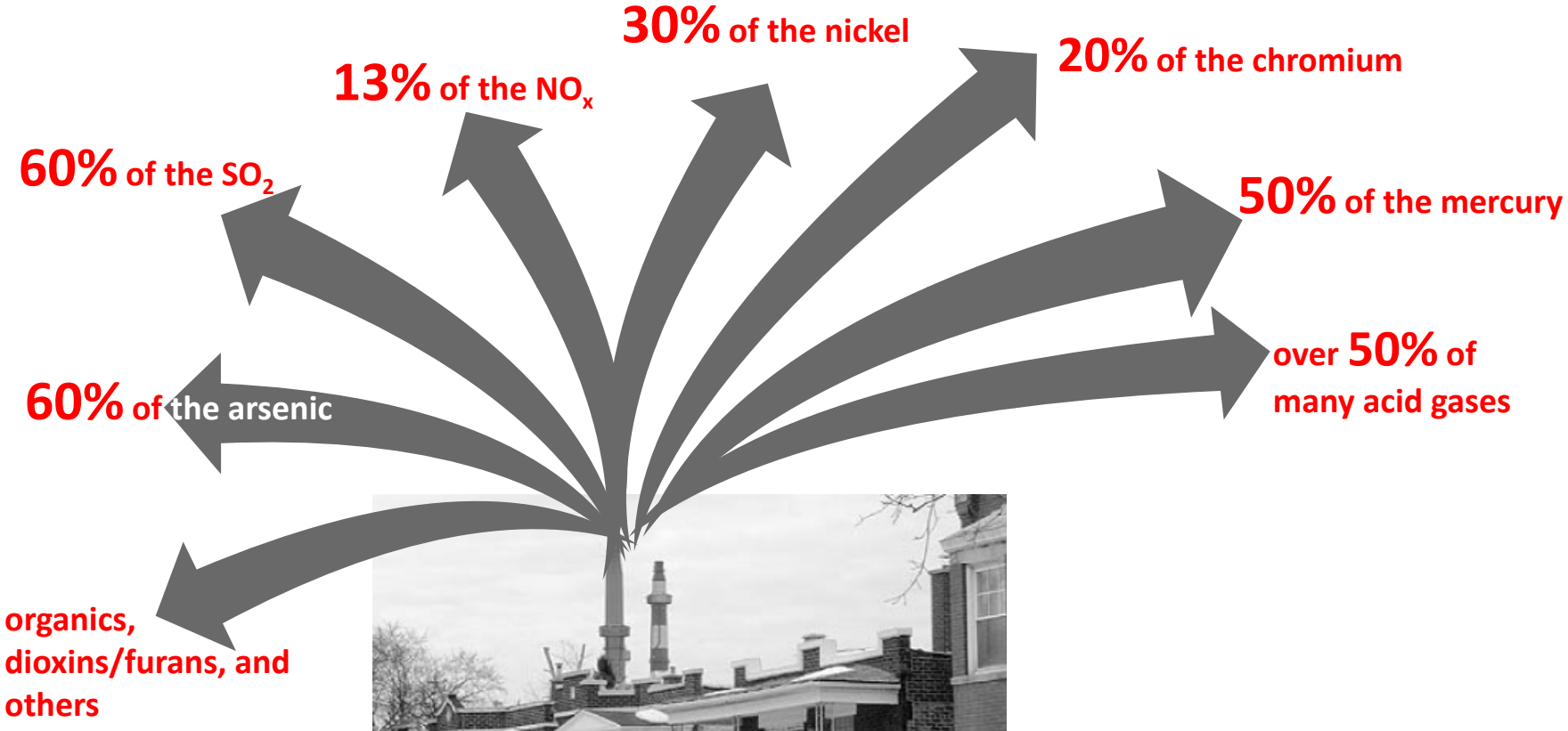
Source: EPA's 2005 NATA Inventory Modified for the Toxics Rule 2005 Base Year (2010)

Fish Advisories for Mercury are Everywhere



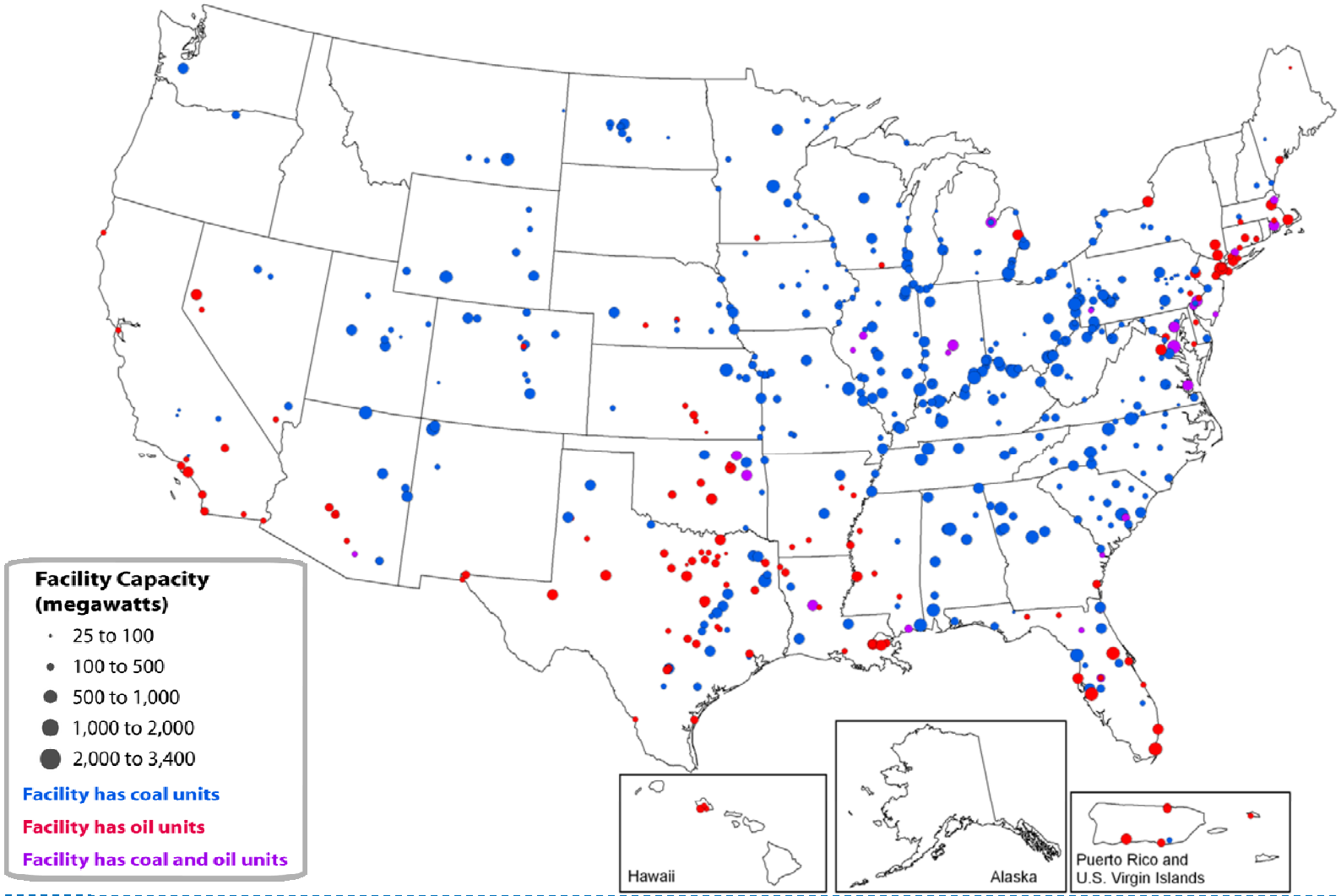
Source: EPA website http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/upload/2009_09_22_fish_advisories_nlfaslides.pdf

In the U.S., Power Plants Emit:



Sources: NEI Trends Data (2009) and IPM (2010) (SO_2, NO_X); Proposed toxics rule modeling platform, based on inventory used for 2005 NATA (Hg); Inventory used for 2005 NATA (other toxics)

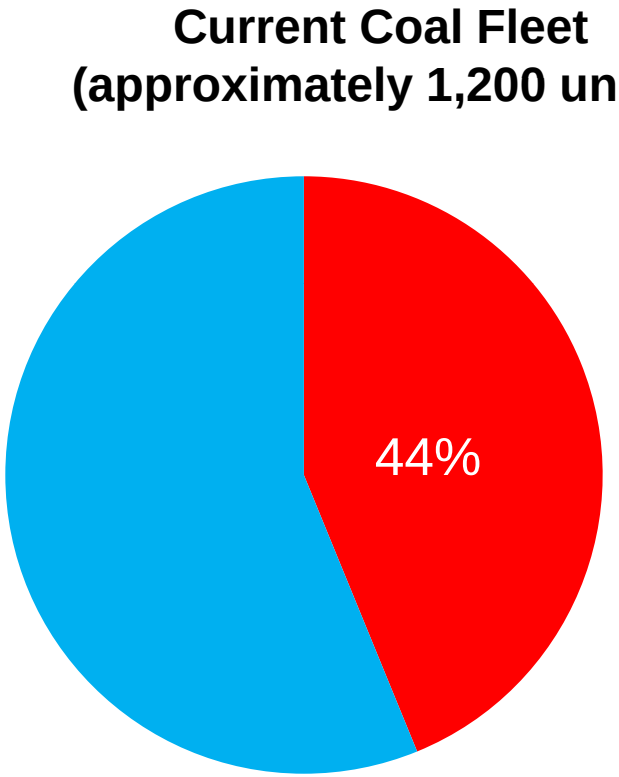
Location of Coal and Oil Power Plants



Source: National Electric Energy Data System (NEEDS 4.10) (EPA, December 2010)

Many Existing Coal Units Lack Advanced Controls

- Percentage of existing units still without advanced SO_2 and/or NO_X controls



Data sources: EPA Base Case v.4.10 PTR

What the Toxics Rule Proposes

- Coal- and oil-fired power plants are covered by this rule
- All hazardous air pollutants must have standards
- EPA must set emission standards for existing sources in the category that are at least as stringent as the emission reductions achieved by the average of the top 12% best controlled sources for source categories with 30 or more sources.

Requirements for Coal-Fired Units

- Mercury: numeric emission limit would prevent 91% of mercury in coal from being released to the air
- Acid gases: HCl numeric emission limit as a surrogate, with an alternate surrogate of SO_2
- Non-mercury metallic toxic pollutants such as arsenic and chromium: numeric emission limit for total PM as a surrogate, with alternate surrogate of total metal air toxics
- Organic air toxics (including dioxin): Work practice standards, instead of numeric standards, due to low-detected emission levels. Would ensure optimal combustion, preventing dioxin/furan emissions

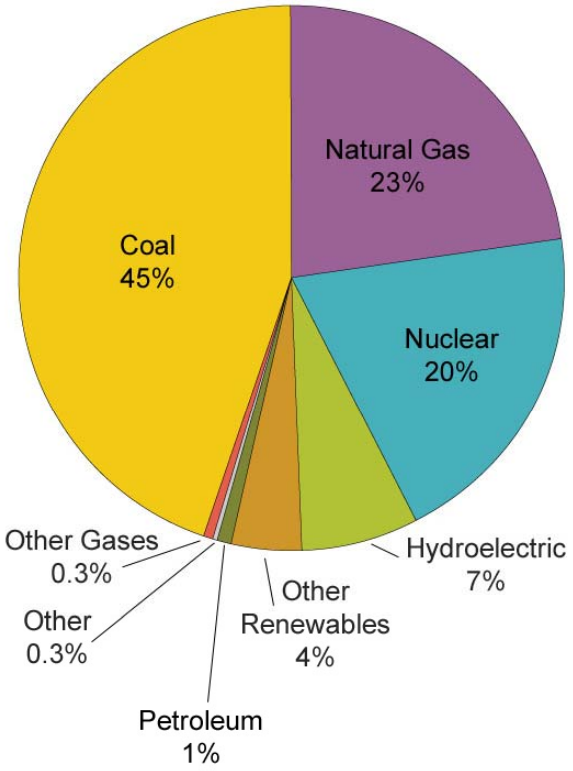
What the Toxics Rule Proposes (cont.)

- **Requirements for Oil-Fired Units**
  - Acid gases: Numerical HCl and HF emission limits
  - Metal air toxics: Numerical emission limits for total metal air toxics (including Hg) with individual metal air toxics as alternate.
  - Organic air toxics (including dioxin): Work practice standards, instead of numeric standards, due to low-detected emission levels. Would ensure optimal combustion, preventing dioxin/furan emissions.

Affected Facilities: 1,350 Coal and Oil-Fired Units at 525 Power Plants

- Approximately 1,200 coal-fired units
  - 45% percent of nationwide electricity generation
    - Bituminous coal ~ 50% of coal generation
    - Subbituminous ~45% of coal generation
    - Lignite ~ 5% of coal generation
  - Includes units that burn coal, coal refuse, or a synthetic gas derived from coal or solid oil (e.g. petroleum coke) either exclusively, in any combination together, or in any combination with other supplemental fuels (e.g., tire-derived fuels)
- Approximately 150 oil-fired units
  - 1% of nationwide electricity generation
- Natural gas power plants are not affected by this rule
- EPA expects most facilities would install technologies to comply with this rule

U.S. Electric Power Industry Net Generation by Fuel, 2009



Source: U.S. Energy Information Administration, *Annual Energy Review 2009* (August 2010).

Benefits of the Proposed Toxic Rule Are Significant

- This proposed rule would help reduce the risk of damage to children's developing brains, which results in IQ loss and diminished ability to learn
- Protects Americans from cancer and other health risks from exposure to metals such as arsenic, chromium, and nickel
- Saves thousands of lives each year by reducing the amount of dangerous particulates 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 – from mercury and acid rain pollution
- Provides employment for tens of thousands of American workers building, installing, and operating the equipment to reduce emissions of mercury, acid gases, and other toxic air pollutants

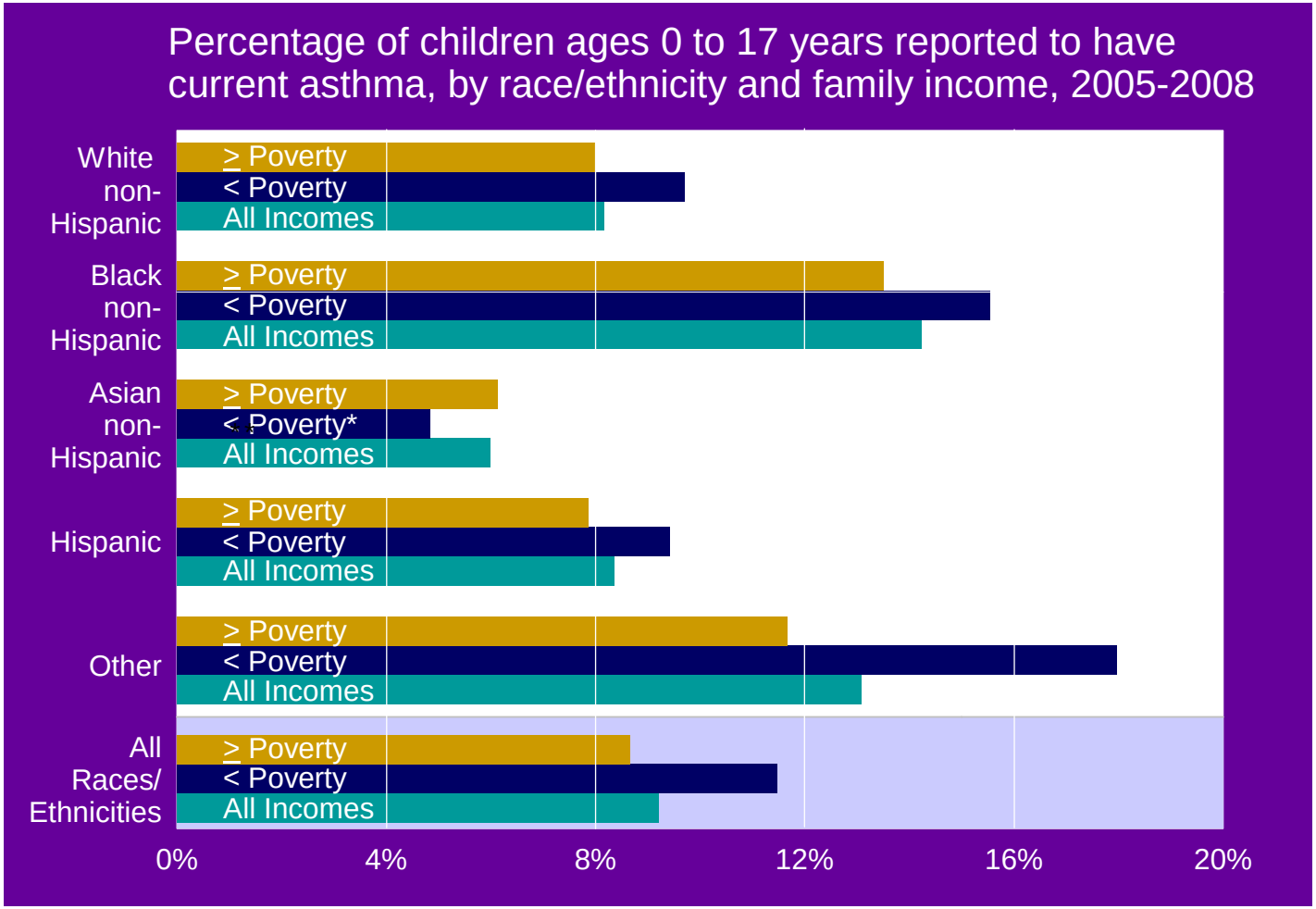
Proposed Toxic Rule Health Benefits in Detail

- The value of the improvements to health alone total $59 billion to $140 billion each year
- This means that for every dollar spent to reduce this pollution, we would get $5-$13 in health benefits
- Each year, the proposed rule would prevent serious health effects including:
  - 6,800-17,000 premature deaths
  - 11,000 heart attacks
  - 120,000 asthma attacks
  - 850,000 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 proposed rule would also prevent 12,200 hospital admissions and emergency room visits; 4,500 cases of chronic bronchitis; and 5,100,000 days when people must restrict their activities each year

Source: EPA Regulatory Impact Analysis

These Health Benefits Are Widely Distributed

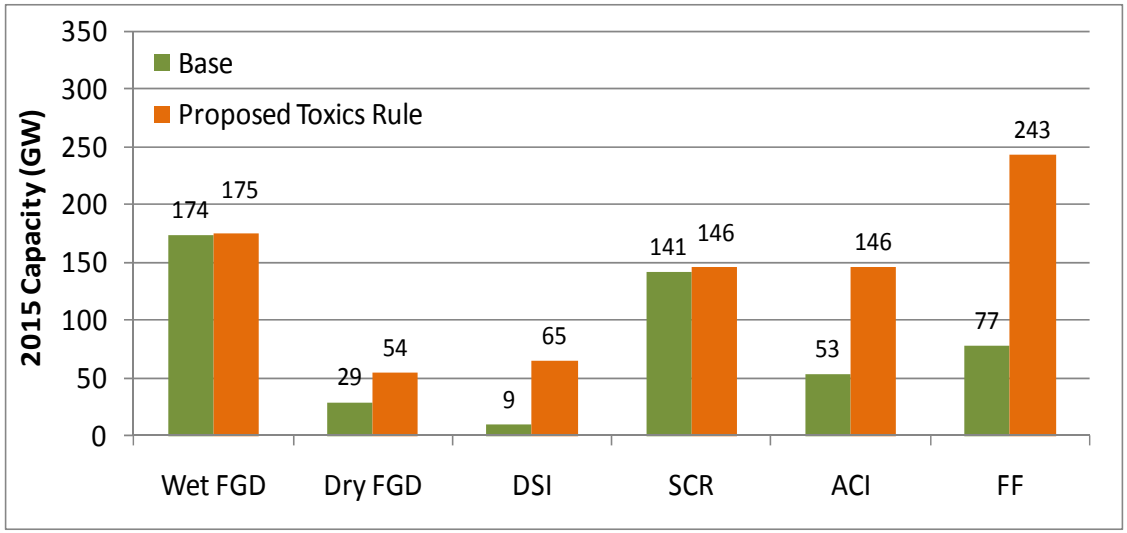
- For example, asthma is a significant public health concern and affects people of all racial and ethnic groups and income levels



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey

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 proposed Toxics Rule, 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

Key Power Plant Rules Overdue

1990: Clean Air Act Amendments required EPA to issue standards to reduce toxic air emissions 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 – except power plants

1998: EPA released the Utility Toxics Study Report to Congress

2000: EPA listed power plants for regulation under the Clean Air Act (CAA) air toxics provisions

- EPA determined it was “appropriate and necessary” to regulate emissions of hazardous air pollutants (HAP) from 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 finding

- EPA determined it was neither “appropriate nor necessary” to regulate HAP emissions 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 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 November 16, 2011

The Proposed Toxics Rule Doesn't Only Save Lives, It Also Creates 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 31,000 short-term construction jobs and 9,000 long-term utility jobs

Source: EPA Regulatory Impact Analysis

Public Hearings and Comment

- The public is encouraged to provide EPA with comments on this proposed Toxics Rule
  - The agency will seek comments for 60 days following publication in the Federal Register and the proposed rule will be available on the website before publication
- Public Hearings
  - Locations
    - Philadelphia
    - Atlanta
    - Chicago
  - For more information on how to attend these public hearings, please visit: http://www.epa.gov/airquality/powerplanttoxics