

CLEAN AIR ACT AT 40

PROGRESS AND REMAINING CHALLENGES



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Today's Presentation

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- Why Do We Care About Air Pollution?
- The Clean Air Act: A Little Bit of History
- Success stories
- Current Priorities and Challenges Going Forward

Why Do We Care About Air Pollution?

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- Public health
 - ▣ The average adult breathes 3,000 gallons of air per day and can absorb toxics through skin and ingestion; children breathe more per pound of body weight
 - ▣ Exposure to air pollution can lead to respiratory and neurological effects, cancer, and birth defects
- Ecological damage
 - ▣ Impacts on lakes, streams, fish and other wildlife
- Economic impacts
 - ▣ Damage to crops, buildings, recreational vistas
- Quality of life
 - ▣ Urban smog, wood smoke and odor
- Future of the planet
 - ▣ Climate change



'Remember what I told you, no deep breaths
in the city.'

Major Sources of Air Pollution

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- ❑ Large industrial sources, including power plants, chemical manufacturers, petroleum refineries, cement plants
- ❑ Small industrial sources (including gasoline stations, autobody shops, drycleaners); activities such as painting; some personal products
- ❑ Mobile sources, including cars, trucks, buses, farm equipment, marine vessels
- ❑ Natural sources, including wildfires and volcanoes



The Way We Were – Before the Clean Act

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Typical smog in Los Angeles, California, in 1940s and 1950s



North Birmingham, Alabama, 1972

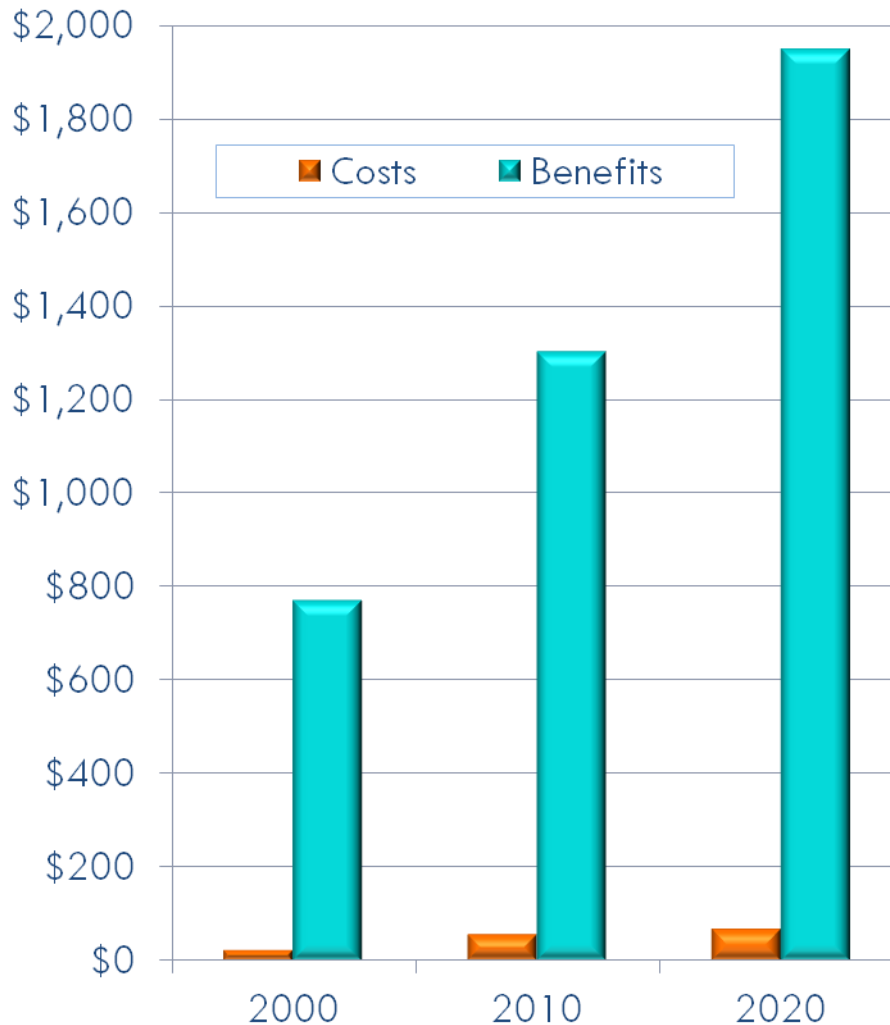


Aluminum plant (beside church) in New Orleans, Louisiana, 1973

Success Stories

Benefits of Clean Air Have Greatly Outweighed the Costs

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Primary Central
Estimates of Direct
Benefits and Direct Costs

(in billions of 2006 year
value dollars)

The Health Benefits are Huge

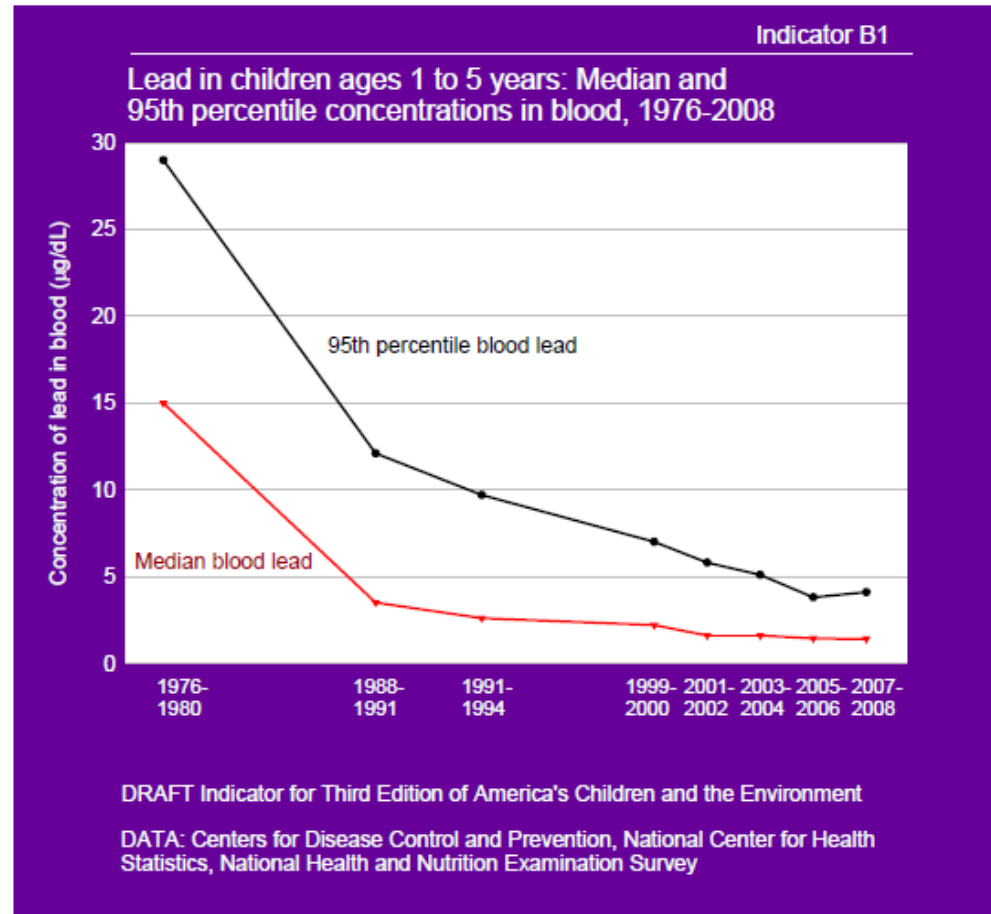
The benefits of the 1990 Clean Air Act Amendment programs include real improvements in the health of real people right now.

Health Effect Reductions (PM2.5 & Ozone Only)	Pollutant(s)	Year 2010	C A S E S A V O I D E D
PM2.5 Adult Mortality	PM	160,000	
PM2.5 Infant Mortality	PM	230	
Ozone Mortality	Ozone	4,300	
Chronic Bronchitis	PM	54,000	
Acute Bronchitis	PM	130,000	
Acute Myocardial Infarction	PM	130,000	
Asthma Exacerbation	PM	1,700,000	
Hospital Admissions	PM, Ozone	86,000	
Emergency Room Visits	PM, Ozone	86,000	
Restricted Activity Days	PM, Ozone	84,000,000	
School Loss Days	Ozone	3,200,000	
Lost Work Days	PM	13,000,000	

Success Story: Lead Out of Gasoline

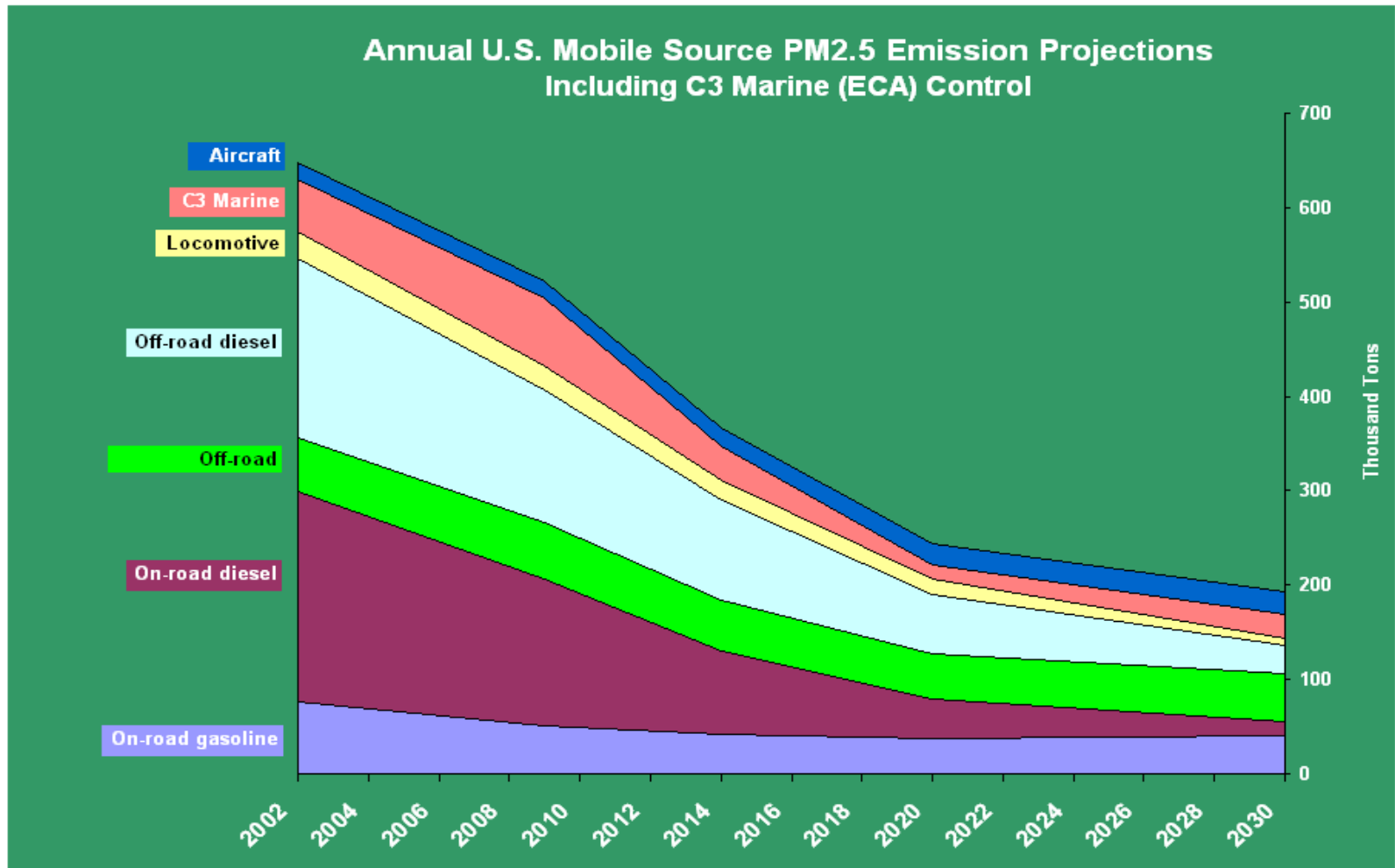
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- From 1980 to 2005, national average lead concentrations down **96%** because of EPA standards
- In 1978, about **88%** of children ages 1 to 5 years (about 13.5 million children) had blood lead levels at or greater than 10 $\mu\text{g}/\text{dL}$
- By 2007–2008, this number had declined to about **1%** (about 250,000 children)



Success Story: Cleaner Cars and Trucks (and Trains and Boats)

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Continuing Progress: Mobile Sources

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- ❑ Passenger vehicles:
77-95% cleaner by 2004
- ❑ Trucks & buses:
90-95% cleaner by 2007
- ❑ First standards for off-road sources
- ❑ Clean-burning reformulated gasoline and low sulfur diesel fuel
- ❑ National Clean Diesel Campaign focuses on reducing diesel emissions from school buses, ports, construction, agriculture, and freight



From all these efforts:

- ❑ More than 25,000 premature deaths avoided annually by 2030
- ❑ Net benefit-to-cost ratio of 16:1 (\$197 billion benefits to \$12 billion costs)

Acid Raid: Damaging Lakes, Streams, Trees and Structures

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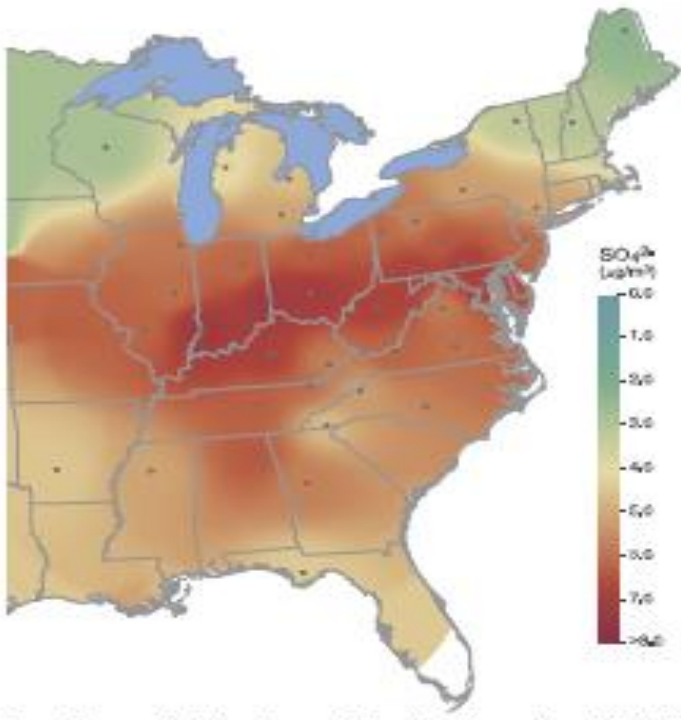


Success Story: Significant Reductions in Acid Rain

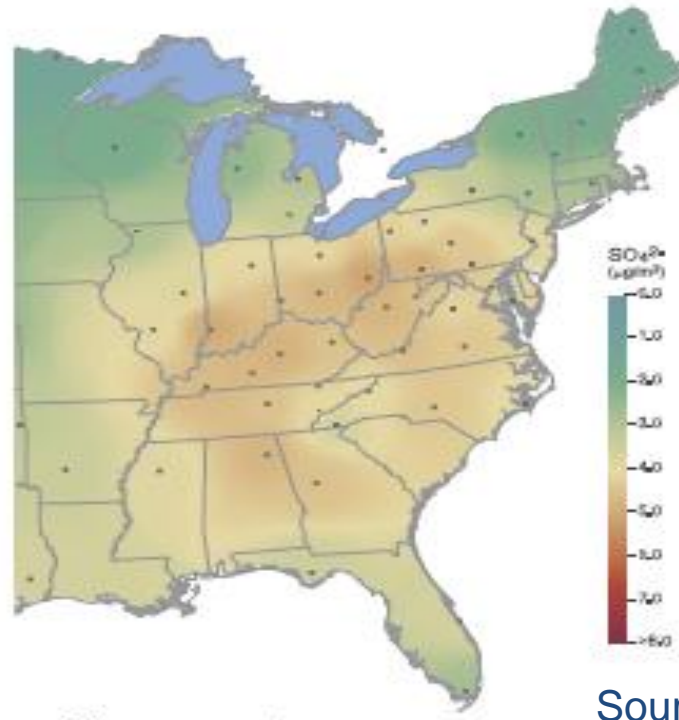
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- Sulfate concentrations primarily responsible for acid rain have decreased by ~30% on average in all regions of the East since 1989.

Annual Mean Ambient Sulfate Concentration, 1989-1991



Annual Mean Ambient Sulfate Concentration, 2005-2007



Source: CASTNET

Challenges Ahead

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Status and Schedule of Ongoing NAAQS Reviews

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MILESTONE	POLLUTANT						
	NO ₂ Primary	SO ₂ Primary	Ozone Reconsideration	CO	PM	NO ₂ /SO ₂ Secondary	Lead
Proposal	<u>Jun 26, 2009</u>	<u>Nov 16, 2009</u>	Jan 6, 2010	<u>Jan 28, 2011</u>	2011	<u>July 12, 2011</u>	Jan 2014
Final	<u>Jan 22, 2010</u>	<u>June 2, 2010</u>	July 2011	<u>Aug 12, 2011</u>	TBD	<u>Mar 20, 2012</u>	Nov 2014

NOTES:

Underlined dates indicate court-ordered or settlement agreement deadlines;

TBD – to be determined

Proposed Reconsidered Ozone Standards

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- On January 6, 2010, EPA proposed to set different National Ambient Air Quality Standards (NAAQS) for ground-level ozone than those set in 2008.
 - Proposed changes to both primary and secondary standards:
 - *Primary* standard to protect public health, including the health of at-risk populations such as children, people with asthma, and older adults.
 - *Secondary* standard to protect public welfare and the environment, including sensitive vegetation and ecosystems.
- Specifically, proposed to set the level of the *primary* 8-hour ozone standard to a level within the Clean Air Scientific Advisory Committee (CASAC) recommended range of 0.060-0.070 parts per million (ppm).
 - Proposed to establish a separate cumulative *secondary* standard within a range of 7-15 ppm-hours.
- As part of EPA's extensive review of the science, Administrator Jackson requested CASAC to provide further interpretation of the epidemiological and clinical studies used to make their recommendation.

PM Standards: Conclusions from the science review

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Primary (health-based) PM_{2.5} Standards

- It is appropriate to consider revising the standards to provide increased public health protection
- Consider revising annual standard level within a range of 13-11 $\mu\text{g}/\text{m}^3$ (current standard is 15 $\mu\text{g}/\text{m}^3$)
- Consider retaining or revising 24-hour standard level within a range of 35-30 $\mu\text{g}/\text{m}^3$ (current standard is 35 $\mu\text{g}/\text{m}^3$)

Primary (health-based) PM₁₀ standards

- Scientific evidence and associated uncertainties could provide support for either retaining or revising the current primary 24-hour PM₁₀ standard

Secondary (welfare-based) PM standards

- It is appropriate to consider setting a distinct secondary PM_{2.5} standard to address visibility impairment primarily in urban areas

No decisions have been made at this time

- EPA anticipates issuing a proposal for public review and comment later this year

Mobile Sources

- EPA sets Federal standards for new cars, trucks, buses, aircraft, locomotives, marine vessels, and construction, and agricultural equipment
- EPA implements the Renewable Fuel Standards, established by Congress, by requiring increasing amounts of renewable fuels, such as ethanol and biodiesel, to be used in motor vehicles
- EPA has banned the use of lead in gasoline and dramatically reduced sulfur contamination of gasoline and diesel fuel
- EPA vehicle and fuel standards help states get emission reductions they need

EPA's Clean Diesel Program

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Targeting Key Sectors

- ✓ Clean School Bus USA, Ports, Construction and Agriculture
- ✓ Diesel engines are used in goods movement and often disproportionately impact minority and economically disadvantaged populations living near ports and rail yards

The Future of DERA

- ✓ Tremendous interest across the country to reduce diesel emissions
 - DERA's FY11 applications requested \$312 million in EPA funding
- ✓ DERA was reauthorized for 2012-2016
- ✓ States need diesel emissions reductions to assist with NAAQS attainment
- ✓ DERA funding helps small and medium-sized trucking and construction companies, who could not otherwise afford clean diesel technologies, purchase these technologies that not only reduce air pollution but also save on fuel costs



First GHG Standards for Passenger Vehicles

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- ❑ Issued April 2010 by U.S. EPA/U.S. DOT
- ❑ Result of cooperation between automakers, federal government and states
- ❑ Applies to model year 2012-2016 cars and light trucks
- ❑ Increases fuel economy by approximately five percent every year
- ❑ Sets an average emissions level of 250 grams of CO₂ per mile in model year 2016—equivalent to 35.5 mpg, if met solely through fuel economy
- ❑ Save consumers more than \$3,000 over the lifetime of a model year 2016 vehicle
- ❑ Reduces greenhouse gas emissions by nearly 950 million metric tons
- ❑ Conserves 1.8 billion barrels of oil
- ❑ EPA working with U.S. DOT and California on next phase of GHG standards for passenger vehicles for 2017-2025 model years



First GHG Standards for Heavy- and Medium-Duty Trucks

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- Proposed October 2010; 75 FR 74152
- Applies to model year 2014-2018
- Would achieve up to a 20 percent reduction in GHG emissions
- Projected to reduce GHG emissions by about 250 million metric tons and save 500 million barrels of oil
- Would provide \$41 billion in net benefits over the lifetime of model year 2014 to 2018 vehicles
- With an up to 20% improvement in efficiency, EPA estimates that the operator of a semi truck would save \$74,000 over the useful life of the rig
- Reduces other pollutants such as particle pollution
- Standards will be finalized by end of July 2011



Transport Rule Overview

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Scope: Addresses nonattainment and regional transport of air emissions across State borders (SO_2 and NO_x)

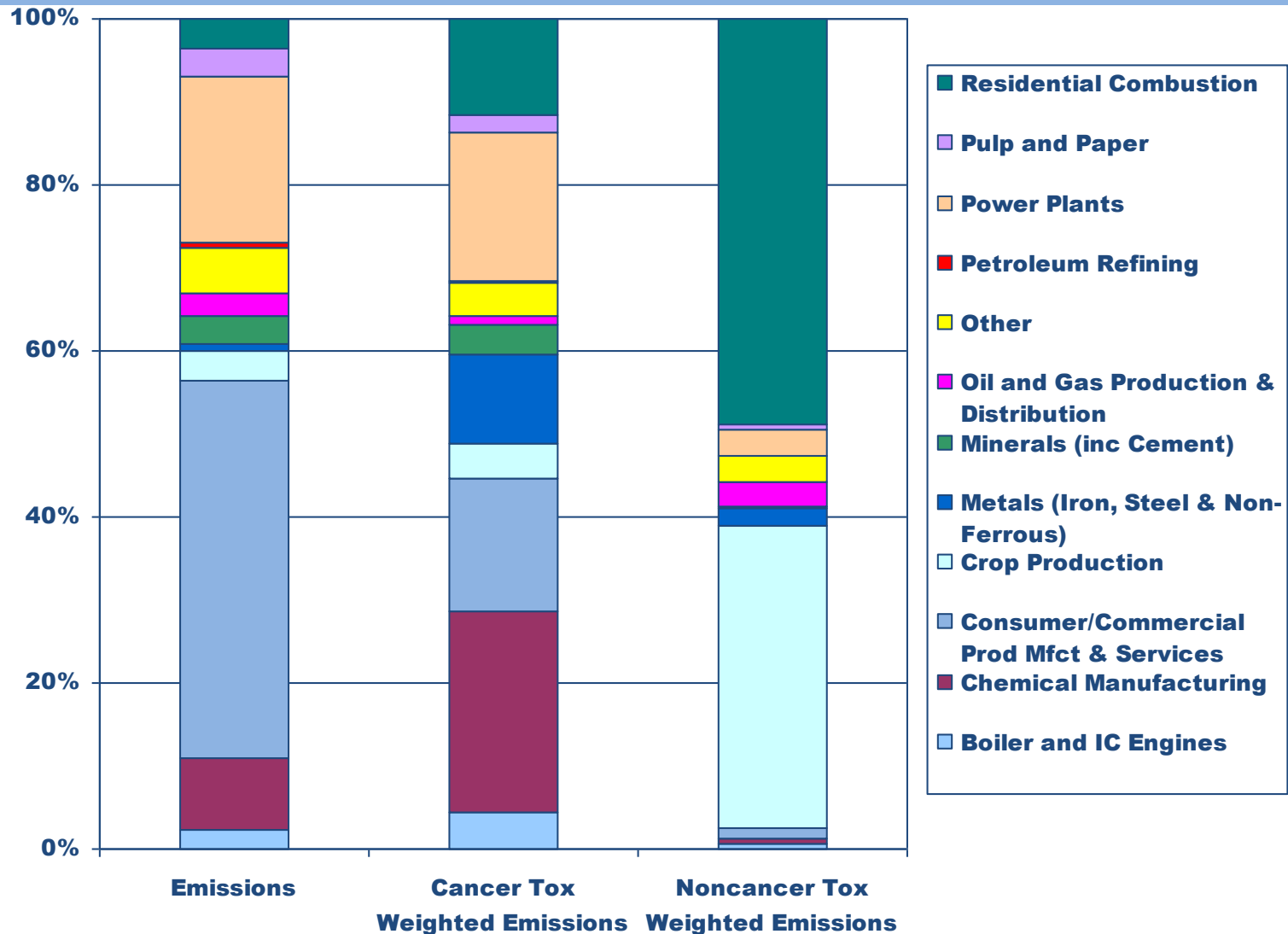
Coverage: Fossil-fuel fired units > 25 MW in Eastern half of the U.S.

Compliance: Phase I in 2012, Phase II in 2014

Other:

- Designed to replace the Clean Air Interstate Rule (CAIR)
- Preferred option is a flexible market-based mechanism
- 2012 compliance builds largely off controls already in place and under construction

The Greatest Risk for Exposure to Air Toxics from Stationary Sources Occurs Near Large Combustion Sources and Chemical Facilities



Priority Sectors

- ❑ Chemical Manufacturing
- ❑ Iron & Steel
- ❑ Mobile Sources
- ❑ Non-utility Boilers
- ❑ Oil & Gas
- ❑ Petroleum Refining
- ❑ Portland Cement
- ❑ Utilities



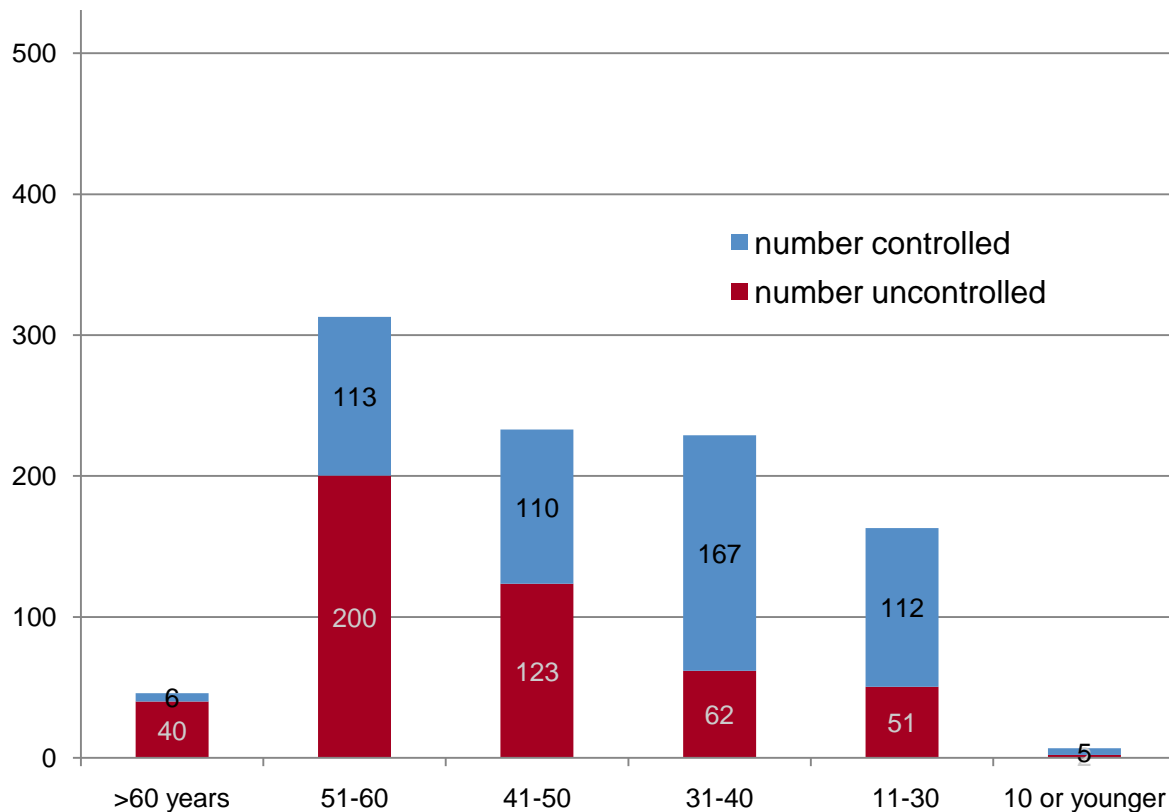
Overview of the Mercury and Air Toxics Standards

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- On March 16, EPA proposed the first national standards to reduce toxic air pollutants from new and existing coal- and oil-fired power plants
- 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
- Linked to cancer, IQ loss, heart disease, lung disease and premature death
- Uniform emissions-control requirements based on proven, currently in-use technologies and processes
- Compliance time line: 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 (SO₂), and nitrogen oxide (NO_x) emissions from new sources

Many Plants Lack Controls

- 60% of the uncontrolled units are 31 years or older
- These units lack advanced controls for SO₂ and NO_x
- ~100 GW out of total of 300+ GW of coal are without SO₂ scrubbers

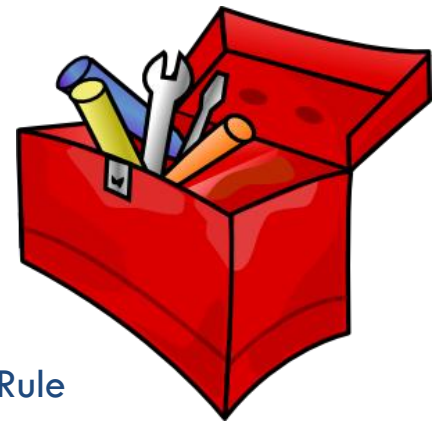


Tool Box of Pollution Control Technologies

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Pollution reduction controls at utilities are well-understood and available now

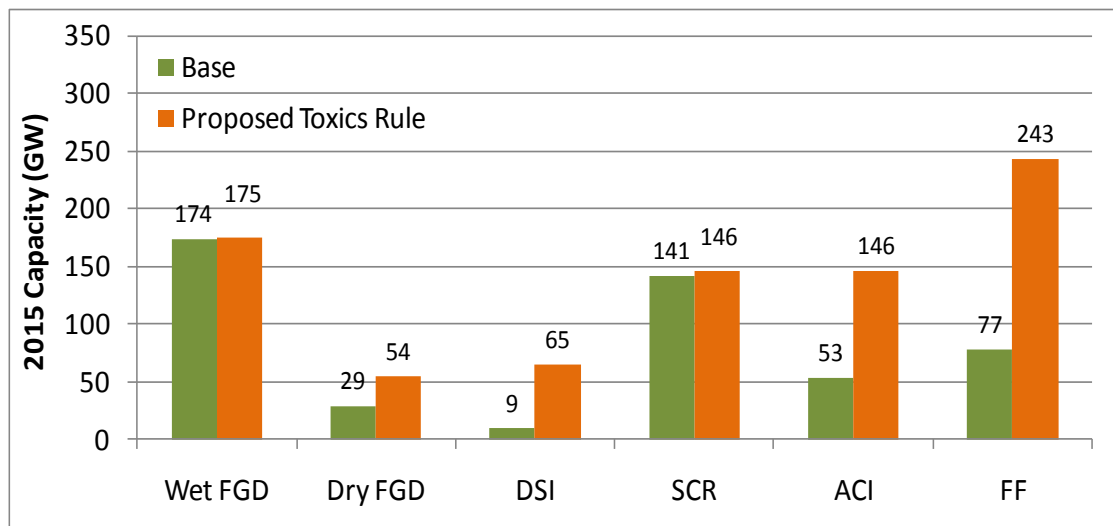
- SO₂ reduction technologies
 - Reduce HAPs to meet requirements of upcoming Toxics Rule
 - Help in-state areas attain the existing and upcoming PM_{2.5} NAAQS and 2010 SO₂ NAAQS
 - Help downwind states attain PM_{2.5} NAAQS
 - Address visibility (regional haze) improvement goals
- NO_x reduction technologies
 - Help in-state areas attain the existing and new ozone NAAQS
 - Help downwind states attain the existing and new ozone NAAQS
 - Address visibility (regional haze) improvement goals
- Mercury reduction technologies
 - Reduce mercury emissions to meet requirements of upcoming Toxics Rule
- Direct PM reduction technologies:
 - Help attain PM_{2.5} NAAQS and visibility program requirements
 - Reduce HAP emissions to meet requirements of upcoming Toxics Rule



Sources Can Achieve The Standards in the Proposed Rule

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- 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

Boiler and Incinerator Rule Highlights

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- **On February 21, 2011, EPA issued four rules that will reduce emissions of air pollutants from:**
 - Boilers at large sources of air toxics (“major sources”)
 - Boilers at small sources of air toxics (“area sources”)
 - Incinerators that burn solid waste at industrial and commercial facilities (CISWI)
 - Incinerators that burn sewage sludge at wastewater treatment facilities (SSI)

- **These rules will protect the health of American families by cutting emissions of mercury, particle pollution, dioxin, lead, and nitrogen dioxide.**

- **EPA received significant new information during the comment period (4,800 public comments) and made necessary changes to the proposed standards**
 - Final standards achieve significant health benefits while being more practical and less costly to implement.
 - However, in order to assure that the rules are legally defensible and public health protections will be achieved, EPA has initiated a reconsideration process for the two boiler rules and the solid waste incinerator rule.

- **EPA also issued a final rule that defines “solid waste”**
 - Necessary to determine whether a facility has to meet a boiler standard or an incinerator standard

Air Emissions from AFOs

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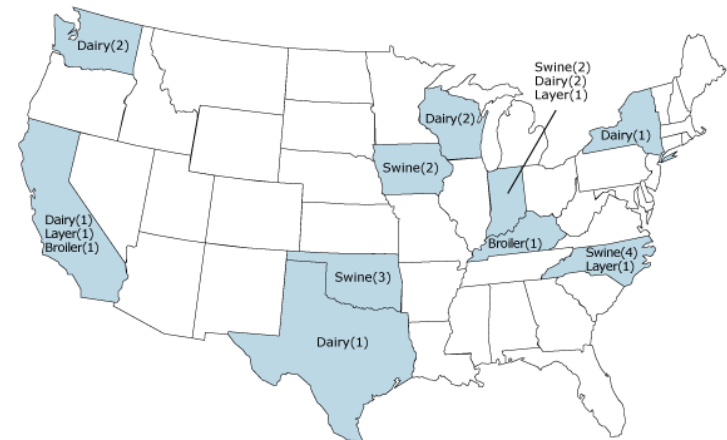
- Rising concern from public and environmental groups
- Enforcement cases
 - Buckeye Eggs, Premium Standard Farms, Excel Dairy, Seaboard Farms
- There are several requests and petitions under different sections of the Clean Air Act
- In 2001, EPA and USDA commissioned the National Academy of Sciences to assess the available scientific information regarding air emissions from AFOs
- EPA entered into the Air Compliance Agreement with the Ag industry to collect information through the National Air Emissions Monitoring Study in 2005
 - To view the data;
<http://www.epa.gov/agriculture/airmonitoringstudy.html#data>

National Air Emissions Monitoring Study

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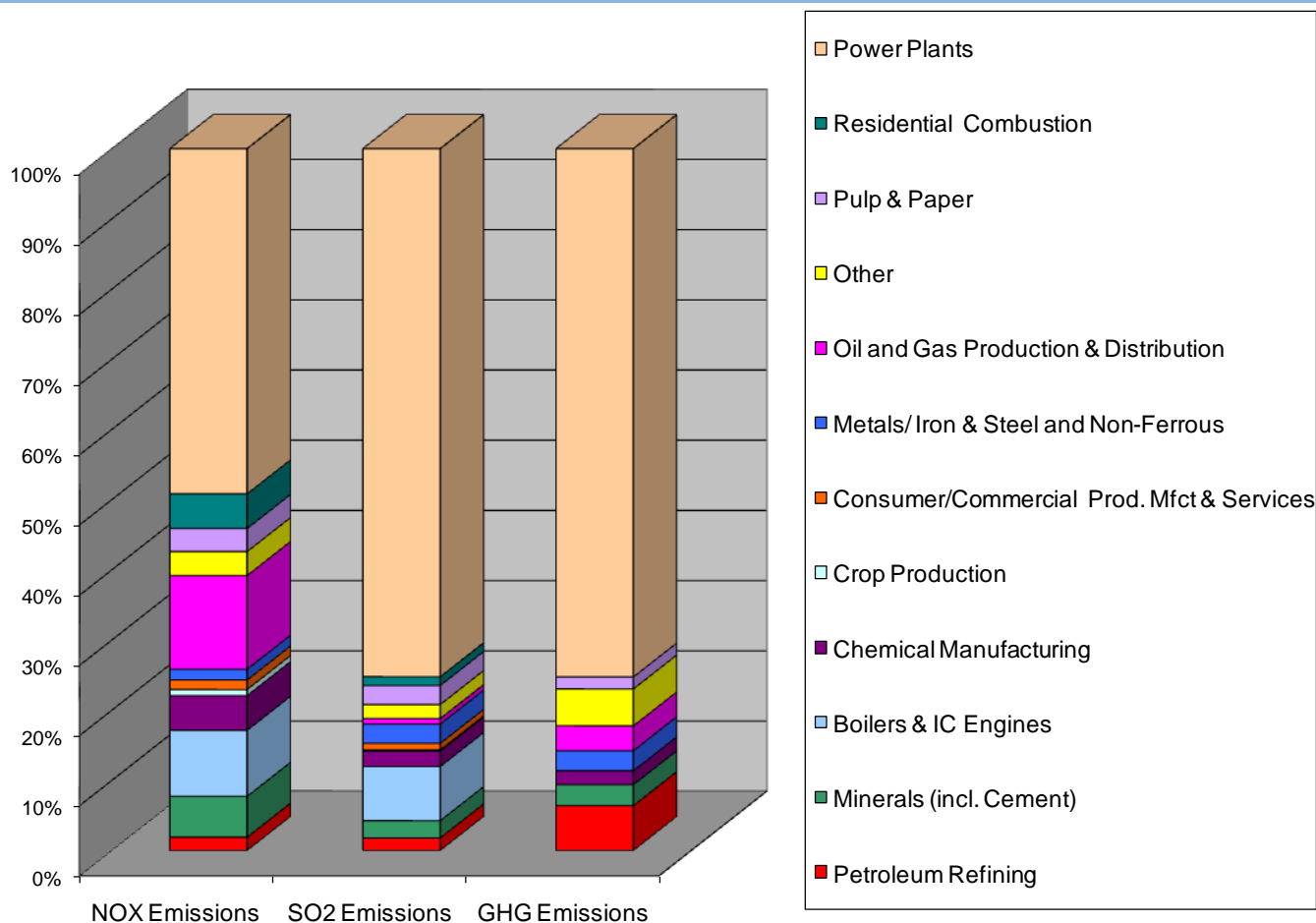
- 2-year, industry-funded study coordinated by Purdue University with EPA oversight
- Monitored 21 AFOs in 10 states
 - Animal sectors: poultry (broilers and egg layers), swine, and dairy
 - Pollutants: VOCs, PM ($PM_{2.5}$, PM_{10} , TSP), NH_3 , H_2S
- Data will be used to develop emissions estimating methodologies (EEMs)
 - Draft EEMs will be released for public review and comment on a rolling basis
 - Broiler draft anticipated to be released end of June 2011
 - All EEMs are scheduled to be finalized by June 2012
 - Extensive outreach to all stakeholders during public review process
 - Webinars, conference calls, face-to-face meetings
- USDA collaboration
 - Members from Natural Resources Conservation Service (NRCS) and Agricultural Research Service (ARS) are involved in the development of the methodologies

Monitoring Site Locations



Sources of GHG Emissions and other Pollutants

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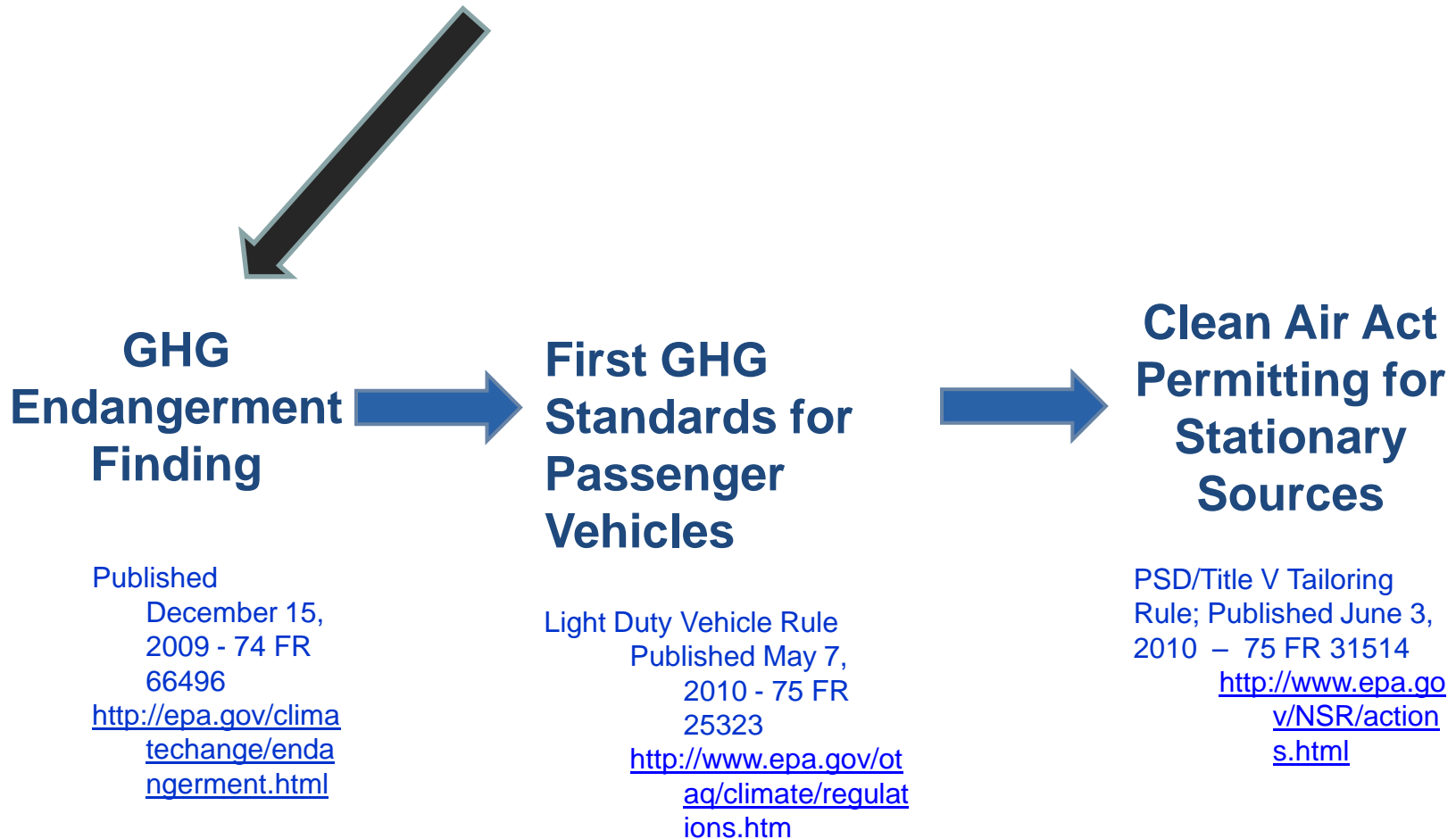


† For GHG bar, boilers are within each industry sector.

Greenhouse Gas Regulations

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U.S. Supreme Court Decision (*Massachusetts vs. EPA* (2007);



Progress on Addressing Climate Change

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EPA has:

- ▣ Set Greenhouse Gas (GHG) standards for passenger vehicles
- ▣ Proposed GHG standards for medium and heavy truck tailpipes
- ▣ Established GHG permitting requirements for smokestacks
- ▣ Collected the first year of emissions data under the Mandatory GHG Reporting Program
- ▣ Increased use of renewable fuels in motor vehicles
- ▣ Launched Global Alliance for Clean Cookstoves launched with UN Foundation and other partners

Greenhouse Gases from Stationary Sources

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- EPA determination of health and public welfare risks related to GHG emissions from vehicles leads to implementation of Clean Air Act for stationary sources
 - Began January 2, 2011
- Clean Air Act recognizes that there will be continual improvement in environmental control technology, the need for national consistency, and provisions for case-by-case determinations.
- Tailoring Rule: Phasing in permitting requirements for the largest sources



Status of GHG Permitting Program

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- 5 months after GHGs becoming a regulated pollutant (Jan 2, 2011), there is a permitting authority for GHGs in every state.
- 4 Clean Air Act permits for greenhouse gases have been issued:
 - NUCOR Corporation, for an iron production plant in St. James Parish, Louisiana;
 - Calpine Company for the Russell City Energy Center, a natural gas power plant in Hayward, California;
 - We Energies, for a biomass boiler built to provide both electricity and steam at a paper mill in Rothschild, Wisconsin.
 - PacifiCorp Lake Side Power Plant, in Utah County, Utah, for the installation of a new natural gas-fired combined cycle power block at an existing power plant.
- Energy efficiency is the main approach to reducing emissions of greenhouse gasses

New Source Performance Standards (NSPS)

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Proposed Greenhouse Gas NSPS for
Utility Boilers: July 26, 2011



Proposed Greenhouse Gas NSPS for
Refineries: December 15, 2011



Biomass and GHG Permitting

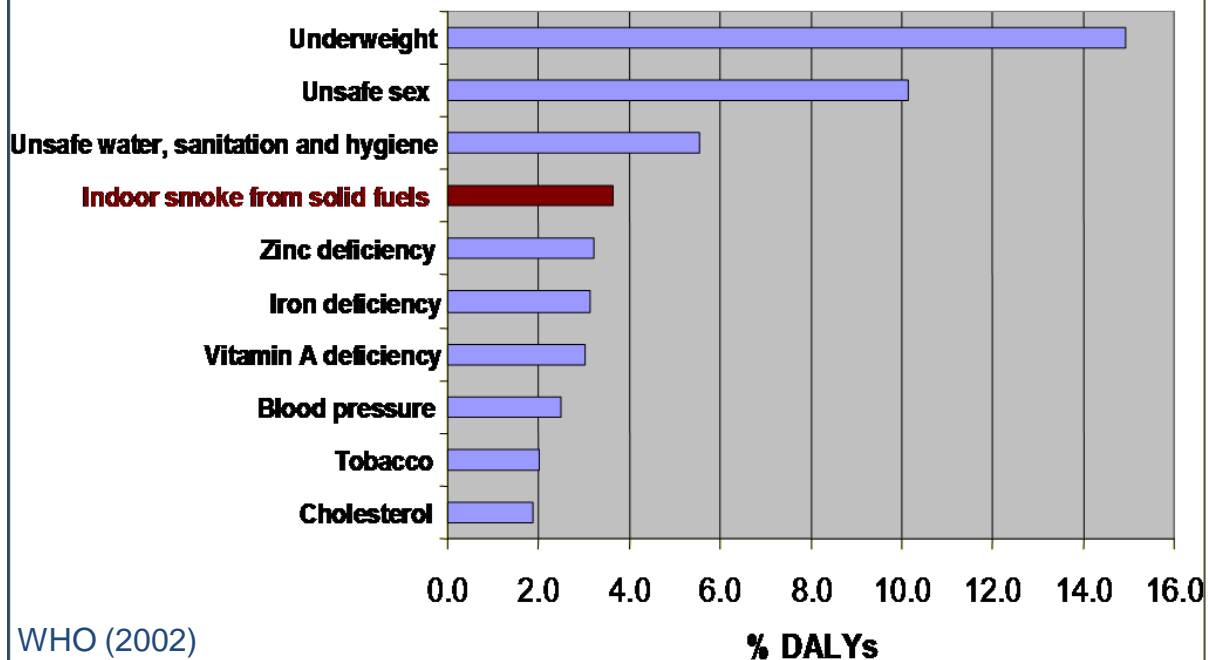
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- Scientific debate about how to treat GHG emissions from biomass combustion – are they carbon neutral?
- EPA will initiate a **scientific examination** with partners from other federal agencies and scientists outside the government with relevant expertise to assist the agency in determining how CO2 emissions from biomass should be handled under PSD.
- EPA has issued **interim guidance** to help permitting authorities establish a basis for concluding that BACT for GHG at such sources is combustion of biomass fuels alone.
 - Guidance available at <http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf>

Indoor Smoke from Solid Fuel Use is the 4th Worst Health Risk Factor in Poor, Developing Countries

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Major Burden of Disease -- 10 Leading Risk Factors in Poor Developing Countries



Indoor Smoke from cookstoves leads to 1.5-2.0 million premature deaths each year – nearly all among young children and women.



EPA is Part of Effort to Upgrade 100 Million Cookstoves by 2020

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EPA' Partnership for Clean Indoor Air. At the 2002 World Summit on Sustainable Development (Johannesburg), EPA led effort to increase the use of clean, reliable, affordable, efficient, and safe home cooking and heating practices that reduce exposure to indoor air pollution.

Global Alliance for Clean Cookstoves. In September 2010 EPA along with other countries, the U.N. Foundation, Shell Foundation, and others launched effort with goal of adopting 100 million clean and efficient cookstoves by 2020

“By upgrading these stoves, millions of lives could be saved and improved. This could be as transformative as bed nets or even vaccines.” --
Secretary of State
Hillary Clinton,
9/21/2010

"I am proud to stand with Secretary Clinton to work to reduce the senseless and preventable deaths from unsafe cooking conditions in the developing world and I look forward to contributing to the important work of the Global Alliance for Clean Cookstoves" – Julia Roberts



The work continues....

- Over 40 years, EPA has made significant progress to protect public health and the environment
- Additional steps must be taken to protect public health even further
- Additional progress will be achieved through continued collaborative efforts by state and local, and public and private stakeholders

Thank you!

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