A Brief Introduction to The U.S. Clean Air Act

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What do you want to learn about the Clean Air Act?

MARAMA

• Mission: To strengthen the skills and capabilities of member agencies and help them work together to prevent and reduce air pollution impacts in the Mid-Atlantic Region.

Why is it important for you to understand the Clean Air Act?
• The benefits of avoiding early death, preventing heart attacks and asthma attacks, and reducing the number of sick days for employees far exceed costs of implementing clean air protections.
  
  --EPA “The Benefits and Costs of the Clean Air Act from 1990 to 2020”

• "In 1970 Congress amended the Clean Air Act …in response to the perceived failure of state and local governments to control pollution when aided by only the most minimal federal assistance.”
  
  --Wyman, Freeman & Skow, ALI-ABA Course, 1989

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Learning Objectives

 Demonstrate an understanding of:

• The basis for and purpose of the Clean Air Act
• How ambient and emissions standards complement each other
• The authority for emissions trading programs
• Provisions for regulating interstate pollution
• The status of efforts to strengthen ozone standards
• The basis for regulating greenhouse gas emissions under the Clean Air Act

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A Detailed Introduction

Introduction to the Clean Air Act

• On-Demand Video Series
  – Consists of 6 Modules
• Presented by Marcia Spink, EPA Region 3

http://www.epa.gov/apti/broadcast.html#caa1010

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Outline & Key Points

1. Motivation
   - Links to science & economics
   - Authority and purpose
   - History

   - Key Concepts
   - Regulatory tools

3. Current Issues
   - Interstate transport
   - Air quality standards
   - Climate change

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Sample of air pollution health effect study

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Externalities

“…in the early 20th century Pittsburgh could have reduced its smoke problem...or water quality could have been improved... The costs, however, would have been large compared to benefits and there was no incentive to generate such actions. From the perspective of the time, it was cheaper to burn smoky bituminous coal or dispose of raw sewage in streams than to invest in control technologies. In the economists’ terminology, air and water were regarded as free goods available to absorb the externalities of the industrial city.”

--Joel A. Tarr, The Search for the Ultimate Sink
Clean Air Act Purpose

- To protect & enhance air quality so as to protect public health & welfare & enhance the productive capacity of the population
- To initiate & accelerate national research & development to achieve prevention & control of air pollution
- To provide technical & financial assistance to state and local programs
- To encourage and assist the development and operation of regional programs
- To encourage and promote pollution prevention

Quick Review

What is a central underlying purpose of the Clean Air Act?

By What Authority?

“If men were virtuous there would be no need for government.”

--James Madison

“The powers not delegated to the US by the Constitution, nor prohibited by it to the States, are reserved to the States respectively or to the people.” (1791)

The 10th Amendment to the Constitution

Interpreting the Interstate Commerce Clause to include Police Powers

“Theoretically the national government has no general police power, the right to legislate for the health, morals, and welfare of the community being reserved to the states. Nonetheless Congress after 1900 proceeded to attack a variety of social and economic problems, using its powers to regulate commerce and to tax as instruments of social reform.”

--Kelly & Harbison, The American Constitution

Power delegated to Congress

Article 8 of the US Constitution:

“The Congress shall have power...to regulate commerce with foreign nations, and among the several states, and with the Indian tribes...”

Donora, PA 1948

The Clean Air Act – Findings

Congressional Findings:
- Metropolitan areas cross local/state lines
- Air pollution due to urbanization, industrial development, and motor vehicles causes mounting dangers to the public health & welfare
- Control & prevention of air pollution is the primary responsibility of state/local govt’s
- Federal assistance and leadership is essential for cooperative air pollution control programs
Quick Review

Why does the Clean Air Act say that states have the primary responsibility for air quality?

History of Air Pollution Control

1940s - Local Programs – Addressing public complaints
   - St Louis, Pittsburgh reduced smoke
1940s – 1960s - State Programs – The laboratories for new ideas, regulators, enforcement, research
   - California regulation of motor vehicles
   - US Public Health Service, HEW – research & assistance
   - Auto manufacturers argued against federal regulation until other states began to adopt standards

1930: 60 die in Belgium
1948: 20 die in Donora PA
1952: 4,000 die in London

1940s – 1960s
- California regulation of motor vehicles
- US Public Health Service, HEW – research & assistance
- Auto manufacturers argued against federal regulation until other states began to adopt standards

Clean Air Act Milestones

1955 – First Federal Clean Air Act – research, technical assistance to states
1963 – HEW to define air quality criteria (scientific information)
1965 – Motor vehicle Air Pollution Control Act
1967 – Air quality control regions defined

Clean Air Act Milestones

1970 – Clean Air Act Amendments – NAAQS, NSPS, NESHAPS, motor vehicle standards
1977 – Clean Air Act Amendments
   - Nonattainment Areas, PSD, motor vehicle standards
1990 – Clean Air Act Amendments
   - Acid rain, motor vehicle & fuel standards, MACT, Title V permits, classes of nonattainment areas, phase out ozone-depleting chemicals, administrative penalties, Ozone Transport Commission

What state had motor vehicle standards before there were national standards?
Outline & Key Points

1. Motivation
   - Links to science & economics
   - Authority and purpose
   - History

   - Key Concepts
   - Regulatory tools

3. Current Issues
   - Interstate transport
   - Air quality standards
   - Climate change

Key Concepts

- Types of Pollutants
- Clean Air Act Major Provisions
- Types of Control Programs
  - Ambient Standards
  - Emissions Standards
  - Risk-based Limits
  - Cap and Trade Program
  - Prohibition of certain chemicals
- National v. State roles & responsibilities

Definition of Air Pollutant

“An air pollutant is generally defined as any substance in air that, in high enough concentrations, harms humans, ecosystems...or materials...and reduces visibility.”

Air Quality Management in the US (NRC, 2004)

“The Clean Air Act’s sweeping definition of ‘air pollutant’ includes ‘any air pollution agent or combination of such agents, including any physical, chemical...substance or matter which is emitted into or otherwise enters the ambient air...’”

Massachusetts v. EPA (2007)

Types of Air Pollutants

- “Criteria Pollutants” (Sections 108-109)
  - Reasonably anticipated to endanger public health or welfare
  - Emissions from numerous diverse sources
  - Areas failing to meet are designated nonattainment areas

Types of Air Pollutants

- Hazardous Air Pollutants (Section 112)
  - Pollutants which through inhalation or other routes of exposure present a threat of adverse human health effects (e.g., carcinogens, mutagens, neurotoxins, etc.) or which cause adverse environmental effects through ambient concentrations, bioaccumulation, deposition, or otherwise (but not including Criteria Pollutants or their precursors or Class I and II substances)
  - 188 specifically listed pollutants. EPA may add or delete pollutants
<table>
<thead>
<tr>
<th>Types of Air Pollutants</th>
<th>Clean Air Act – A Variety of Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Class I and II Substances (Section 602)</td>
<td>• Health-based ambient air quality standards</td>
</tr>
<tr>
<td>– Cause or contribute to harmful effects on the stratospheric ozone layer</td>
<td>• National emissions standards for certain sources – technology &amp; risk-based</td>
</tr>
<tr>
<td>– Specifically listed, but EPA may add others</td>
<td>• Acid rain control – cap and trade program</td>
</tr>
<tr>
<td>• Greenhouse Gasses (no specific section)</td>
<td>• Protections for air quality in major national parks and wilderness areas</td>
</tr>
<tr>
<td>– Supreme Court in 2007 confirmed status as air pollutants and directed EPA to</td>
<td>• Protection of stratospheric ozone layer</td>
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<tr>
<td>determine whether GHG endanger public health/welfare</td>
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<thead>
<tr>
<th>Types of Air Pollution Control Programs</th>
<th>Ambient Air Quality Standards</th>
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<tbody>
<tr>
<td>• Ambient air quality standards (criteria pollutants)</td>
<td>• “Criteria Pollutants” (Sections 108-109)</td>
</tr>
<tr>
<td>– To protect public health and welfare</td>
<td>– SO₂, Particulate Matter, NOₓ, CO, Ozone, Lead</td>
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<tr>
<td>• Emissions standards (criteria and hazardous)</td>
<td>• EPA reviews scientific literature on health effects, may not consider cost</td>
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<tr>
<td>– Technology-based for types/ages of sources</td>
<td>– States may set more stringent standards</td>
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<tr>
<td>• Risk-based limits (hazardous air pollutants)</td>
<td>• States must develop plans to implement</td>
</tr>
<tr>
<td>– To minimize risk, recognizing some risk remains</td>
<td>National Ambient Air Quality Standards</td>
</tr>
<tr>
<td>• Regional cap and trade program (acid rain)</td>
<td>(Sections 110, Part D)</td>
</tr>
<tr>
<td>– To reduce cost and pollution by allowing source owner to choose which sources to control</td>
<td>– Reduce emissions contributing to air pollution</td>
</tr>
</tbody>
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<thead>
<tr>
<th>State Implementation Plans (SIPs)</th>
<th>Ambient Air Quality Standards</th>
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<tr>
<td>State regulations to limit emissions sufficiently to allow the area to meet and</td>
<td>Process for Implementing NAAQS:</td>
</tr>
<tr>
<td>maintain National Ambient Air Quality Standards</td>
<td>• Nonattainment areas are designated – 2 years</td>
</tr>
<tr>
<td>State must demonstrate adequacy of plan</td>
<td>– States recommend, EPA finalizes</td>
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<td>Emissions inventory &amp; air quality modeling</td>
<td>• States prepare SIPs for EPA approval – 3 years</td>
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<td>Ambient air quality monitoring</td>
<td>– EPA may adopt FIP if state fails to meet obligations</td>
</tr>
<tr>
<td>With EPA approval, SIP is federally enforceable</td>
<td>• Regulations are enforced to reduce emissions</td>
</tr>
<tr>
<td>No backsliding is allowed</td>
<td>• Monitoring data is reviewed to determine result (generally at least 3 years of data)</td>
</tr>
</tbody>
</table>
### Quick Review

What is an area called when it fails to meet air quality standards?

### National Emissions Standards

- Emissions Standards for Mobile Sources
  - (Title II)
  - NOx and VOC standards for cars, trucks, boats, equipment
  - Fuels standards
  - Implemented by EPA
    - Only California has authority to set alternative motor vehicle standards
    - Other states may adopt California standards

### Emissions Standards, cont.

- New Source Performance Standards (Section 111)
  - Apply to new or modified sources
  - Technology-based—may consider costs
  - Defining what constitutes a major modification can be contentious
  - Implemented by states through permit programs
  - EPA may provide guidance for states to control existing sources built before the NSPS was adopted

### Emissions & Risk-Based Standards for HAPs

- Maximum Available Control Technology Standards (Section 112)
  - Apply to sources of 188 listed pollutants
  - Technology based, consider cost
  - Apply to both new and existing sources, but standards for new sources may be stricter
  - Implemented by states through permit programs
- Risk Based MACT Standards
  - EPA must adopt if "lifetime" risk of cancer calculated after application of MACT exceeds 1 in a million for "most exposed individual"

### Why are there no nonattainment areas for hazardous air pollutions?

**Quick Review**

What type of standards does EPA adopt for hazardous air pollutants?
Regional Cap and Trade Program

- Establishes a system of emissions allowances which plants may buy and sell.
  - Requires plant to hold allowances to balance its annual emissions or to pay a fine to EPA.
- Title IV of the Clean Air Act – 1990
  - Purpose: To address national and international problem of acid deposition.
  - By reducing emissions of SO₂ and NOₓ from specifically listed power plants.
  - Monitoring programs established to track progress — both deposition and emissions.

Prevention of Significant Deterioration

Sections 160-169
  - Protect air quality in attainment areas
  - Protect & improve visibility in Class I areas

Pre-construction Review in Attainment Areas

Prevention of Significant Deterioration of Air Quality (PSD)
- Requires Best Available Control Technology (BACT)
- Defines allowed increments of additional pollution
- Protection of air quality related values
- Implemented through state permit programs

Visibility in Parks and Wilderness Areas

States with Class I areas must establish goals to improve visibility in those areas by 2064
  - Emissions from any state affecting the Class I Area must be reduced to meet reasonable progress goals
  - 10-year SIPs required to make progress
  - Visibility monitoring program established to track progress
  - States must report emissions every 5 years

Summary - Ambient v. Emissions

Ambient standards
- Criteria pollutants, health-based (not cost)
- Assumes there is a threshold, standard can protect health with adequate margin of safety

Emissions standards
- Technology & cost based
- Assumes there may be residual risk
  - HAP - Risk reduction required if >10⁻⁶

Is a reasonable progress goal for improving visibility more like an ambient air quality standard or an emission standard?
What type of program was established to control acid rain?

Quick Review

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3. Current Issues
   - Interstate transport
   - Air quality standards
   - Climate change

Air quality problems can be regional

www.airnow.gov

Interstate transport: the problem

Pollutants may be transported by wind across state lines. Ozone and particulate matter are formed downwind of precursor emissions. It takes time for chemical reactions to occur.

A state cannot impose controls on emissions outside its boundaries

Interstate transport: CAA Provisions

Section 107: Air Quality Control Regions
- Nonattainment areas may cross state lines

Section 176(A): Interstate Transport Commissions
- May be formed by EPA or on petition by Governors
- Shall recommend controls necessary to meet NAAQS
Interstate transport: CAA Provisions

Section 184: Ozone Transport Commission
- Northern Virginia through Maine
- Act requires certain minimum regulatory actions as part of each OTC state’s SIP
  - OTC may petition EPA for additional controls or states agree to adopt on their own
- Achievements include California new car standards, regional NOx cap and trade program, stronger emission standards for many source categories
- Does not include all states whose emissions affect air quality in the Ozone Transport Region

Interstate transport: EPA Actions

NOx Budget Trading Program (1998)
- Based on OTC NOx cap and trade program
- Adopted after informal consultation - OTAG

Clean Air Interstate Rule (CAIR) (2005)
- Included NOx and PM emissions caps and trading program.
- Supreme Court ruled CAA did not provide authority for a cap and trade program to address ozone and fine particle pollution in the eastern US. Directed EPA to revise.

Interstate transport: EPA Actions

Transport Rule or Cross State Air Pollution Rule (CSAPR)
- Adopted EPA rule to set state level caps on NOx and PM to prevent transport across state lines.
- Only addresses emissions from electric utilities.
- Doesn’t address current ozone standard (75 ppb).
- Relies on Section 110 – SIPs must prevent interference with attainment in another state

Quick Review

What authority is EPA relying on to adopt CSAPR?

Ambient air quality standards

Act requires EPA to review ambient standards every 5 years to determine if still protective.
- EPA has rarely been able to meet the 5-year deadline
- Often action is initiated only after environmental groups sue and court establishes deadline.

Ambient Air Quality Standards

2008: EPA adopted tighter ozone standards (75 ppb)
- Standards were not as strict as recommended by EPA’s Clean Air Science Advisory Committee
- Suits were filed – EPA agreed to reconsider
2010: EPA proposed revised standards
- Comments requested on a range of values
- In the mean time, the standards remain at pre-2008 levels (85 ppb)
Ambient Air Quality Standards

2011: President Obama decided to retain the 75 ppb standard
- EPA recently finalized the 75 ppb standard and has designated nonattainment areas
- EPA reviews the NAAQS every 5 years
- The current review includes new information developed since 2008

Quick Review...

What was the result of EPA’s agreement to reconsider the ozone standard that was alleged to be inadequate to protect health?

Tracking CO₂ and Climate Change

Are green house gases regulated?

Section 202 (a) – Endangerment Finding
The EPA Administrator shall adopt “…standards applicable to the emission of any air pollutant from any class …of new motor vehicles or new motor vehicle engines which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

EPA refused to regulate

- A group of private organizations petitioned the Environmental Protection Agency (EPA) to begin regulating the emissions of four greenhouse gases as air pollutants
- EPA denied the petition, reasoning that
  1. the Act does not authorize it to issue mandatory regulations to address global climate change, and
  2. even if it had the authority to set greenhouse gas emission standards, it would have been unwise to do so at that time because a causal link between greenhouse gases and the increase in global surface air temperatures was not unequivocally established.
- Massachusetts and other states joined the petitioners to sue EPA.

Supreme Court Rules EPA must follow CAA

- On April 2, 2007, in Massachusetts v. EPA, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act.
- The Court held that the Administrator must determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.
- The Supreme Court decision resulted from a petition for rulemaking under section 202(a) filed by more than a dozen environmental, renewable energy, and other organizations.
EPA finding December 2009

- **Endangerment Finding:** The current and projected concentrations of six key well-mixed greenhouse gases in the atmosphere threaten the public health and welfare of current and future generations.
  - carbon dioxide (CO2)
  - methane (CH4)
  - nitrous oxide (N2O)
  - hydrofluorocarbons (HFCs)
  - perfluorocarbons (PFCs)
  - sulfur hexafluoride (SF6)
- **Cause or Contribute Finding:** The combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

EPA Actions on GHG 2010-2012

- Adopted emissions standards for new motor vehicles
  - Harmonized with standards already adopted by California
- Coordinated with fuel economy standards
  - Adopted by National Highway Traffic Safety Administration
- Adopted requirements to report emissions of GHG
- Proposed "Tailoring Rule" to limit applicability of permit requirements to large sources
- Proposed New Source Performance Standards for EGUs

State Role in Climate Issues

Mitigation and adaptation:
- Regional cap and trade programs by interstate agreement.
- Adoption of local and state plans to encourage energy conservation and energy efficiency as well as land use policies to minimize VMT.
- Planning for sea level rise and other effects of warmer climate.

Quick Review

Did the Supreme Court require EPA to regulate greenhouse gas emissions from motor vehicles?

Learning Objectives

Demonstrate an understanding of:
- The basis for and purpose of the Clean Air Act
- How ambient and emissions standards complement each other
- The authority for emissions trading programs
- Provisions for regulating interstate pollution
- The status of efforts to strengthen ozone standards
- The basis for regulating greenhouse gas emissions under the Clean Air Act
### The basis for and purpose of the Clean Air Act

- **Scientific Basis:** Air pollution causes damage to human health and the environment
- **Economic Basis:** Externalities won’t be addressed without enforcing legal requirements
- **Legal Basis:** The Constitution gives Congress the power to regulate interstate commerce
- **Purpose:** To prevent and reduce air pollution that harms human health or the environment
- **Purpose:** To support state air pollution control programs
- **Purpose:** To initiate & accelerate national R&D

### How ambient and emissions standards complement each other

- Ambient air is outdoor air to which the public has access (not including some private property)
- Emissions are what comes out of the smoke stack or tail pipe or other pollution source
- Pollutants that are emitted contribute to ambient air concentrations
- Emissions standards help achieve ambient standards

### The authority for emissions trading programs

- The Clean Air Act Amendments of 1990 established the Acid Rain Control Program
- EPA issued a SIP Call for states to reduce emissions of nitrogen oxide to prevent transport that interfered with other states attaining the ozone standard
- Later, EPA was rebuffed by the Supreme Court when it tried to enact CAIR
- Replacement - Transport Rule/Cross State Air Pollution Rule (CSAPR) - being reviewed by court

### Provisions for regulating interstate pollution

**Section 110(a)(2)(d):** 
SIP must contain provisions to prohibit any source in a state from interfering with attainment of NAAQS in another state

**Section 126(b):** 
Any state or group of states may petition EPA to find that a source or sources in other states are in violation of 110(a)(2)(d)

### Provisions for regulating interstate pollution

**Section 182(j): Interstate Ozone Nonattainment.**
- Requires coordination
  - MD-DC-VA example of good coordination
  - Does not address emissions from other states

**Section 176(A): Interstate Transport Commissions.**
- May be formed by EPA or on petition by Governors
- Shall recommend controls necessary to meet NAAQS

### The status of efforts to strengthen ozone standards

**2008:** EPA adopted tighter ozone standards (75 ppb)
- Standards were not as strict as recommended by EPA’s Clean Air Science Advisory Committee
- Suits were filed – EPA agreed to reconsider

**2010:** Revised standards were proposed
- Comments requested on a range of values
- In the mean time, the standards remained at pre-2008 levels (85 ppb)

**2012:** 75 ppb standard retained.
- Next review underway.
The basis for regulating greenhouse gas emissions under the Clean Air Act

- On April 2, 2007, in Massachusetts v. EPA, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act
- On December 15, 2009 EPA issued findings that GHG endanger the public health and welfare of current and future generations

Suggested Reading

Congressional Research Service, “Clean Air Issues in the 112th Congress” (2011)

Suggested Reading

The Benefits and Costs of the Clean Air Act from 1990 to 2010, EPA (2011)
The Plain English Guide to the Clean Air Act, EPA (2007)

Interesting Links

- The Smog Blog [http://alg.umbc.edu/usaq/], a daily diary of air quality in the U.S. prepared using information from satellites, ground-based measurements, and models. Interpretation and analysis are provided by the staff of the University of Maryland, Baltimore County Atmospheric Ladar Group.
- Calculating your Carbon Footprint (instructional outline) [http://www.ie.unc.edu/erp/resources/Calculating_Your_Carbon_Footprint.pdf]

Regional Reading

A Guide to Mid-Atlantic Regional Air Quality, Mid-Atlantic Regional Air Management Association, 2005
Contributions to Regional Haze in the Northeast and Mid-Atlantic United States, NESCAUM (2006)
Maryland Healthy Air Act
http://michie.lexisnexis.com/maryland/lpext.dll?f=templates&fn=main-h.htm&cp

MARAMA Reports

- www.marama.org/publications

Next Steps

- Introduction to the Clean Air Act
  – On-Demand Video Series – 6 modules
  – Presented by Marcia Spink, EPA Region 3
  [http://www.epa.gov/apti/broadcast.html#caa1010]

- Air Pollution Control Orientation Course
  – Self-instructional web course
  [http://www.epa.gov/apti/course422/index.html]
Thank you!

Any questions?