U.S. Clean Air Act: What Makes It Work

Richard Ayres

Ayres Law Group

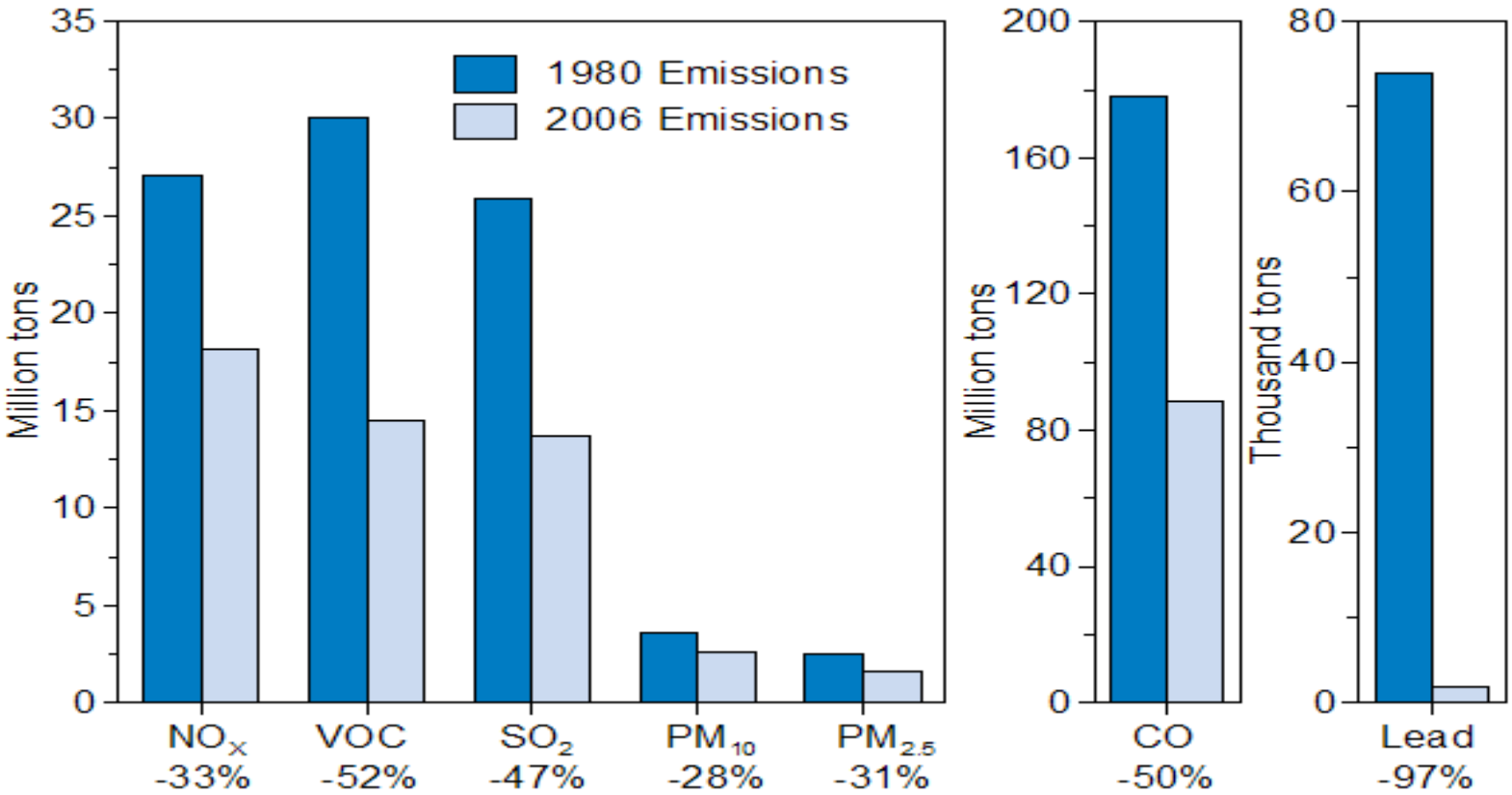
John Walke

Natural Resources Defense Council

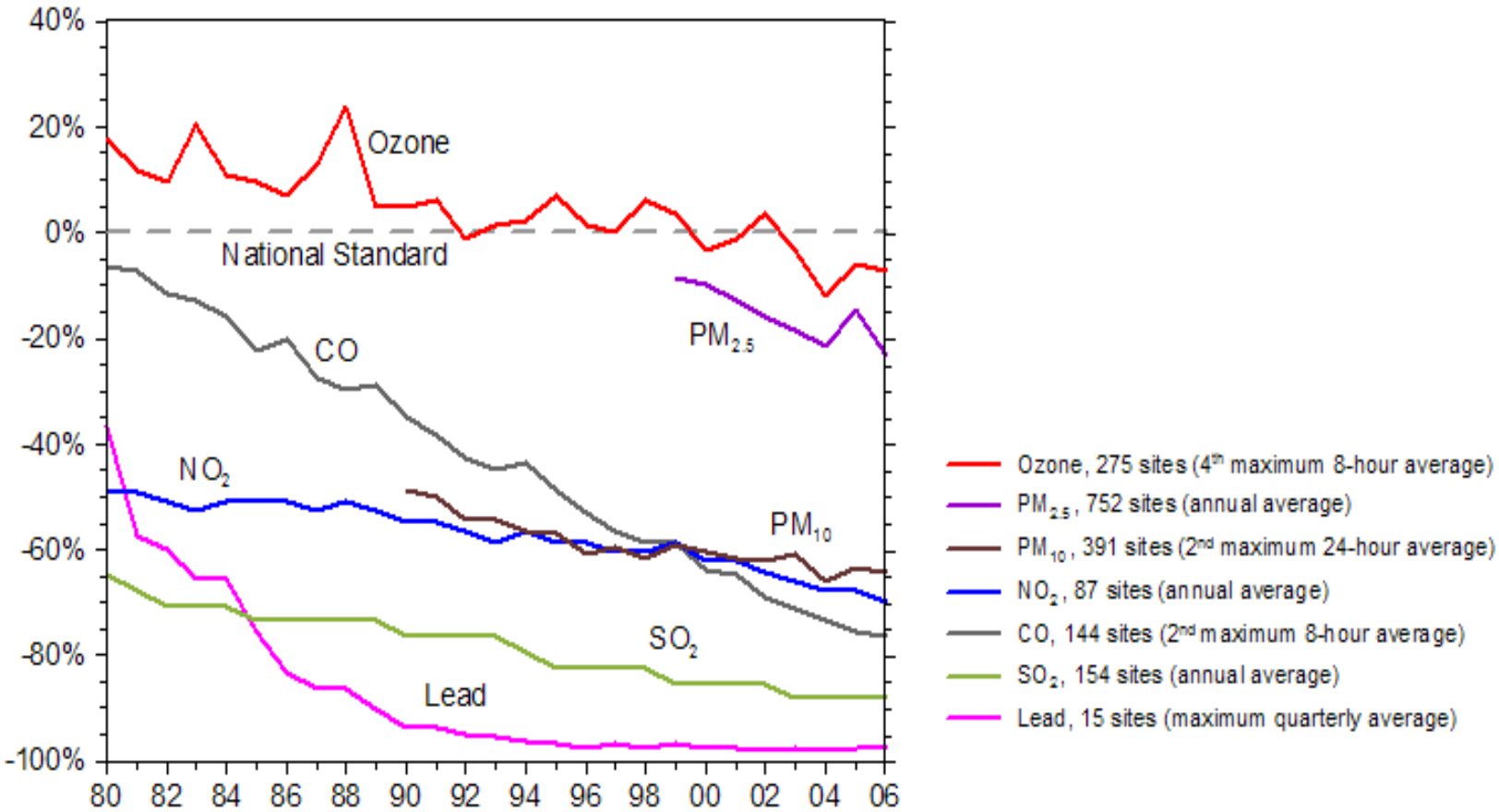
Accomplishments of U.S. CAA

- Major reductions in emissions despite substantial growth in population and economy since 1970
- Large improvements in air quality in all the pollutants that affect public health
- Significant drop in exposure of the natural environment and people to sulfates

U.S. Emission Reductions – 1980-2006

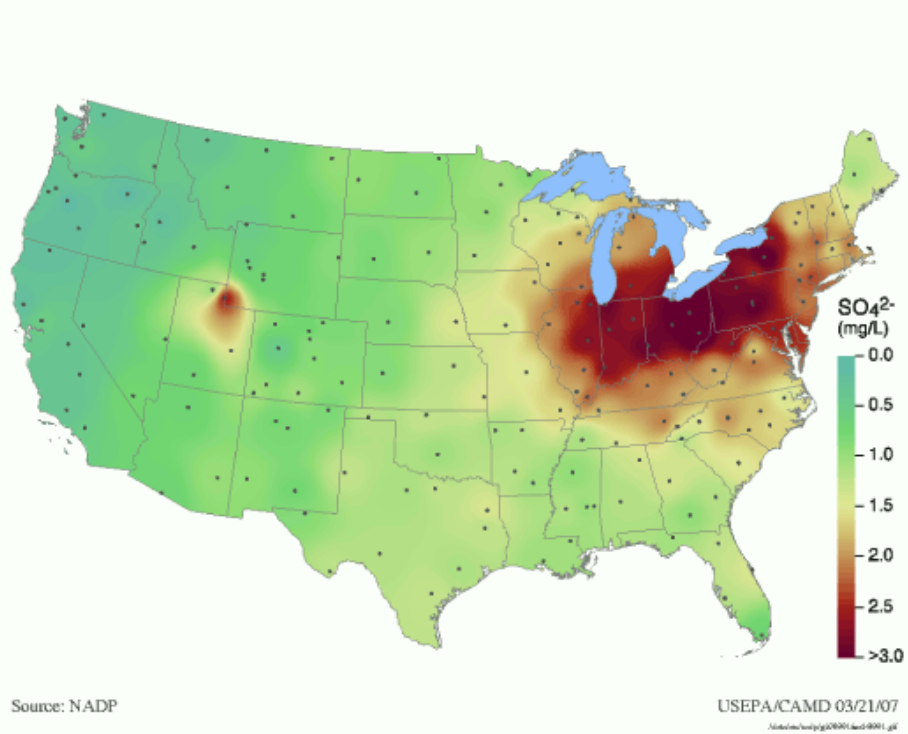


Greatly Reduced Concentrations of Pollutants in the Ambient Air

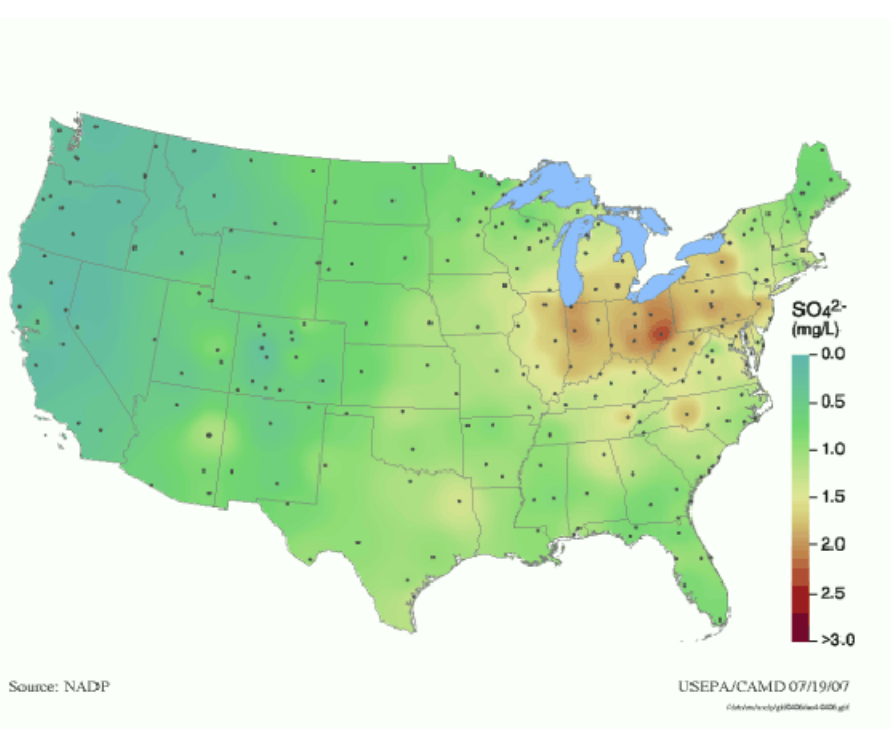


Major Reduction in Sulfate Exposure

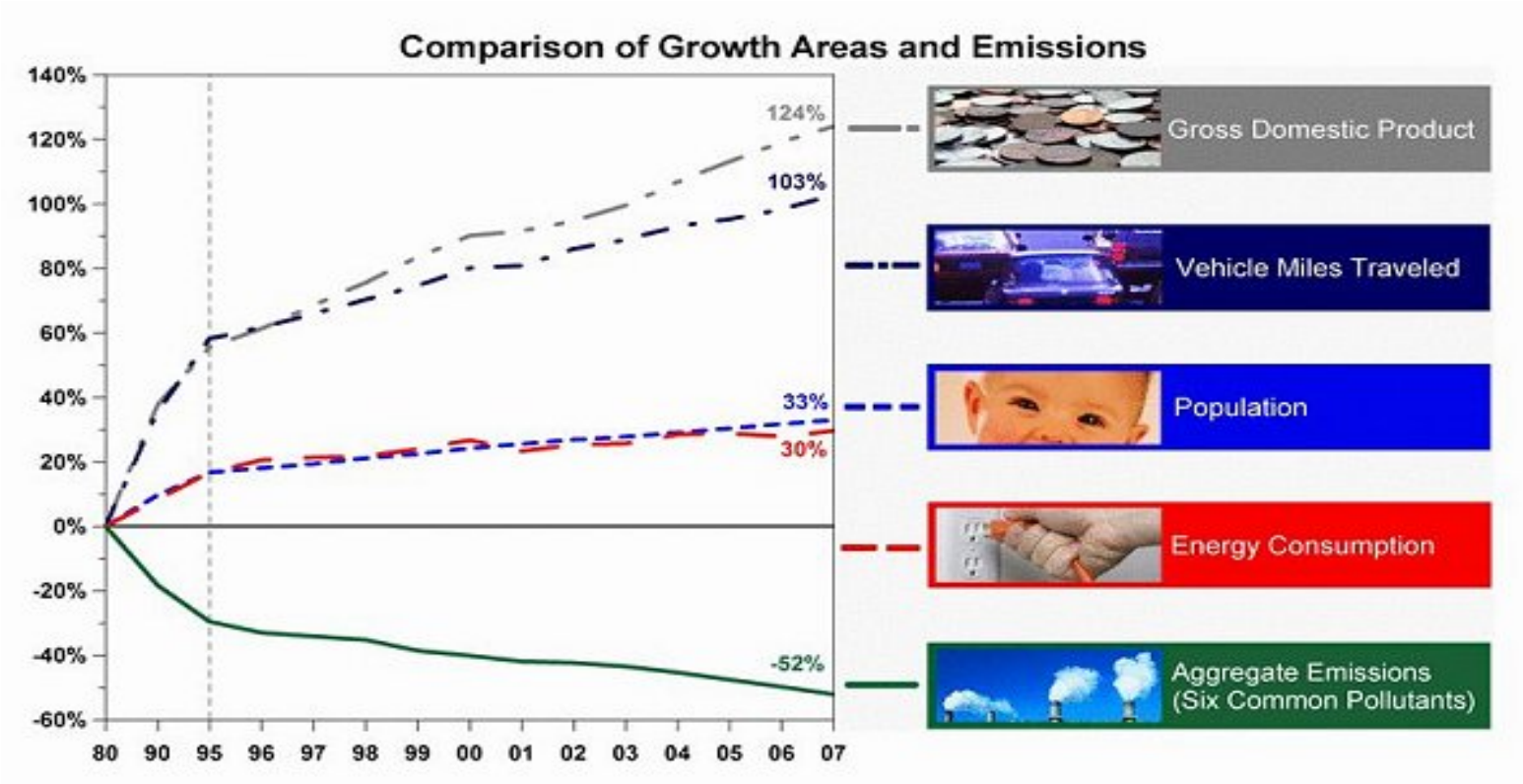
- 1980 Sulfate Concentrations



2006 Sulfate Concentrations



1980-2007 – Emissions Decrease Despite Growing Population, Economy



Regulatory Structure-Air Quality Management System

- Establish objective, science-based air quality standards
- Measure air quality to compare with standards
- Deduce how much emission reduction needed to attain air quality standards
- Establish regulatory programs to make reductions
- Permit, monitoring, reporting & enforcement systems to assure compliance

CAA Regulatory Scheme: Air Quality Management System

- Why air quality standards ("NAAQS")
  - Establish public health/environmental objectives of program
  - Basis for managing air quality
  - Allow public & government to assess progress
  - Prevent "Pollution Competition"

Air Quality Management System

- Air quality standards should be based on public health & environmental science
- Should not be balanced against economic cost; economic balancing occurs during implementation, not standard-setting
- Expressed as national numerical limits on pollutants in ambient air

Air Resource Management Objectives

- Attainment of air quality standards where air resource already overused
- In areas where air quality better than air quality standards, management to –
  - Protect special resources (Grand Canyon)
  - Slow/prevent worsening air quality
  - Maximize potential for economic growth

Regulatory Structure – Air Quality Management System Programs

- “Command and control”
  - Motor vehicles
  - Large factories
  - Land use
- Pollution trading -- “cap & trade”
  - Acid rain control
- Emission taxes
- Government benefits, privileges (e.g., access to HOV lanes)

Cooperative Federal-State Control

- Federal regulation of –
  - Motor vehicles - Consumer products
  - New large industrial facilities
  - Existing/new sources of acid rain pollution
  - Toxic air pollution
  - Ozone depleting chemicals
- Federal approval of state programs
- Federal & citizen enforcement of approved state requirements
- Federal emergency authority

Cooperative Federal-State Control

- State regulation of existing industrial sources
- States regulate land use, vehicle use, inspection/maintenance programs
- States may adopt more stringent requirements than federal; but states must follow stronger federal laws
- States, citizens may sue EPA for nondiscretionary duties and statutory violations
- California receives special treatment due to severe air pollution problems

Market-Based Systems

- First used for acid rain pollution from power plants
- Complements direct regulatory air quality management system
- Congress determined acceptable emission levels in 1990 for 2 phased in “caps”
  - National cap (2010) = 8.9 million tons of SO_2, down from $\approx$ 17.3 mt in 1980
  - Active trading market
  - Emissions now at about 8.9 mt
  - Implementation & enforcement relatively easy
  - Apparently economically efficient
- Cap set too high to force technology development

Market-Based Systems: One Tool in the Tool Box of Pollution Controls

- Caps not directly connected to public health standards
- Not appropriate where localized effects important – e.g., highly toxic emissions
- Economic efficiency largely evaporates when greater emission reduction required
  - Acid rain reduction only about 50%
  - If reduction 95%, every unit must have scrubber
- Continuous monitoring essential to integrity

Technology-based standards

- Federal standards for new and many existing ("modified") industrial sources
- Adoption of "Best Available Control Technology" required if source upgrades production equipment ("New Source Review")
- State control over technology standards for existing unmodified industrial sources

Technology-based Controls

- Type of direct regulation – used to supplement air quality management
  - Identify industrial source category
  - Determine achievable emissions reductions with BACT, considering cost and technical feasibility
  - Establish regulations requiring BACT
  - Compliance assurance requirements (monitoring, recordkeeping, reporting)

Technology-Based Controls

- Widely used in US –
  - Motor vehicle emissions standards
  - “New Source Performance Standards”
  - Case-by-cast BACT
  - Toxic air pollution standards
  - Ozone-depleting chemicals

Technology-Based Controls

- Benefits of technology-based controls
  - Established without regard to air quality standards, ambient air quality monitoring, or demonstrated relationship between source & air quality
- Problems with technology-based controls
  - Not good at forcing technology development
  - Economically inefficient
  - No direct connection with air quality management objectives

Technology-Forcing Standards

- Used to regulate ozone depleting chemicals under Montreal Protocol and U.S. CAA
- Statutory deadlines for end of production & consumption of ODP products
- Has driven manufacturers to develop new products with low or zero ODP

Construction Permits

- Permits to construct new facilities/equipment, or upgrade existing facilities/equipment, are required for 28 large industrial categories that emit or have the “potential to emit” 100 tons per year or more of regulated pollutants. These include power plants; cement, and iron and steel plants; oil refineries; and chemical plants.
- Construction permits also are required for other industrial facilities that emit or have the potential to emit 250 tons per year or more of regulated pollutants.

Construction Permits

- Regulated air pollutants requiring construction permits include sulfur dioxide, nitrogen oxides, PM_{10}, $PM_{2.5}$, volatile organic compounds, lead and carbon monoxide.
- Construction permits for *existing* facilities are required for emissions increases ranging from 40 tons per year (SO_2, NO_x & VOCs) to 15 tons per year (PM_{10}) to 0.6 (lead).

Construction Permits

- Prior to construction, a company must permit and install advanced pollution control technology, e.g., “Best Available Control Technology.”
- The company and government officials also must: analyze the facility’s impact on ambient air quality; its impact on soils, vegetation and visibility; and its impacts on national parks.
- All permits also must undergo opportunity for public comment and opportunity for challenge in state courts.

Recent “Best Available Control Technology” Examples

- New 585 MW power plant in Virginia, with 2 circulating fluidized bed boilers, burning bituminous coal and waste coal.
- Emission limits for each boiler:
  - PM_{10} & $PM_{2.5}$: 37 lb/hr; 329 tons/yr combined total
  - SO_2: 91 lb/hr (24-hr average); 603 tons/yr total
  - NO_2: 219 lb/hr (30-day rolling average); 1,920 tons/yr
  - Mercury: 0.090 lb/TBtu (0.00000088 lb/MWhr)
  - No CO_2 limits

Recent “Best Available Control Technology” Examples (cont.)

Emission controls:

- $PM/PM_{10}/PM_{2.5}$, hazardous air pollutants: fabric filter baghouse
- SO_2 & sulfuric acid mist: flue gas desulfurization (scrubber)
- NO_x: selective non-catalytic reduction with ammonia injection
- Mercury: flue gas desulfurization (scrubber); fabric filter baghouse; & activated carbon injection

- Continuous emission monitoring for SO_2, NO_x, PM, CO, CO_2, mercury & opacity.

Operating Permits

- Primary compliance assurance mechanism of daily operation
- States issue 5-year permits that must contain all emissions limits, testing, monitoring, recordkeeping & reporting requirements
- Companies pay fees per ton of air pollution to run state operating permit programs

Operating Permits

- Public comment & hearing opportunities for permit issuance, certain revisions & renewal
- State judicial review opportunities of final permit actions by applicants and commenting public
- Federal EPA may block state permits
- Citizens may petition federal EPA to block state permits, and citizens may challenge EPA refusals to object in federal courts. Both these actions are rare.

Operating Permits & Compliance Assurance

- Permits must contain reliable, timely information for monitoring & assuring compliance with all emission limits
- Companies must submit semi-annual monitoring reports & reports detailing deviations from all permit conditions
- A responsible company official must submit annual compliance certifications, subject to personal criminal liability
- Applications, permits, monitoring & compliance reports are all publicly available

Compliance Assurance: Enforcement

- Government audits of emission reports
- Sufficient enforcement staff to do audits and bring enforcement cases
- Provide for enforcement by
  - States/Provinces
  - Citizens
- Administrative, civil & criminal enforcement

Assuring Compliance: Penalties

- Correct the problem – injunction ordering clean up of pollution
- Punishment
  - U.S.: $27,500/day of violation
  - “Supplemental Environmental Projects” (SEP)
- Additional penalties related to financial benefits of noncompliance

Assuring Compliance: Citizen Suits

- Citizen may sue –
  - Against violator of emission limitation or permits
  - Against EPA to force action required by law
- Critics question –
  - Standing
  - Encourage plaintiffs' lawyers
  - Encourage frivolous litigation harassing business
- Assessment of value of citizens' suits

Compliance Assurance: Role of States/Provinces

- States have own authority to enforce
  - Against violation of regulatory requirement
  - Common law action (N.C. v. TVA)
- States may also bring citizen suit
  - Against violator of regulatory requirement
  - Against EPA for failure to perform a nondiscretionary duty or a statutory violation when EPA issues regulations

Enforcement Case Example: AEP

- American Electric Power utility company sued by EPA, 8 states, 13 citizen groups for multiple air pollution violations due to significant pollution increases & failure to install pollution controls
- Settlement agreement covered 16 coal-fired power plants including 46 units, generating over 20,000 MW in 5 states

Enforcement Case Example: AEP

- NO_x from 16 plants reduced from 231,000 tons/yr to 72,000 tons/yr by 2016
- SO_2 from 16 plants reduced from 828,000 tons/yr to 174,000 tons/yr by 2018
- Required pollution controls estimated to cost more than $4.6 billion
- $15 million penalty to U.S. Treasury; $60 million to pay for environmental mitigation