Air Pollution II

EVSS-PUBA 534: Environmental Law and Regulatory Policy

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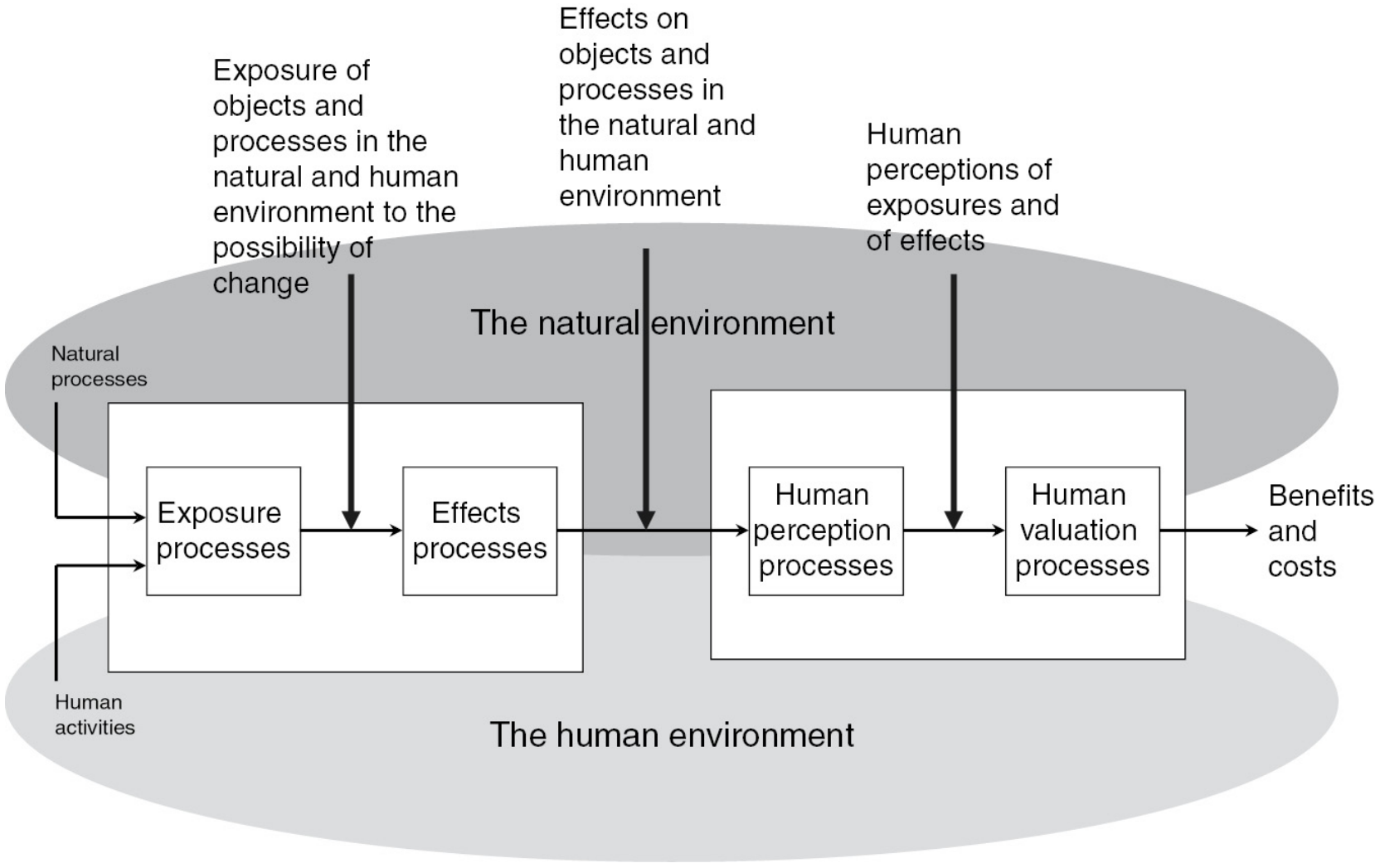
Quick refresher

Risk Assessment

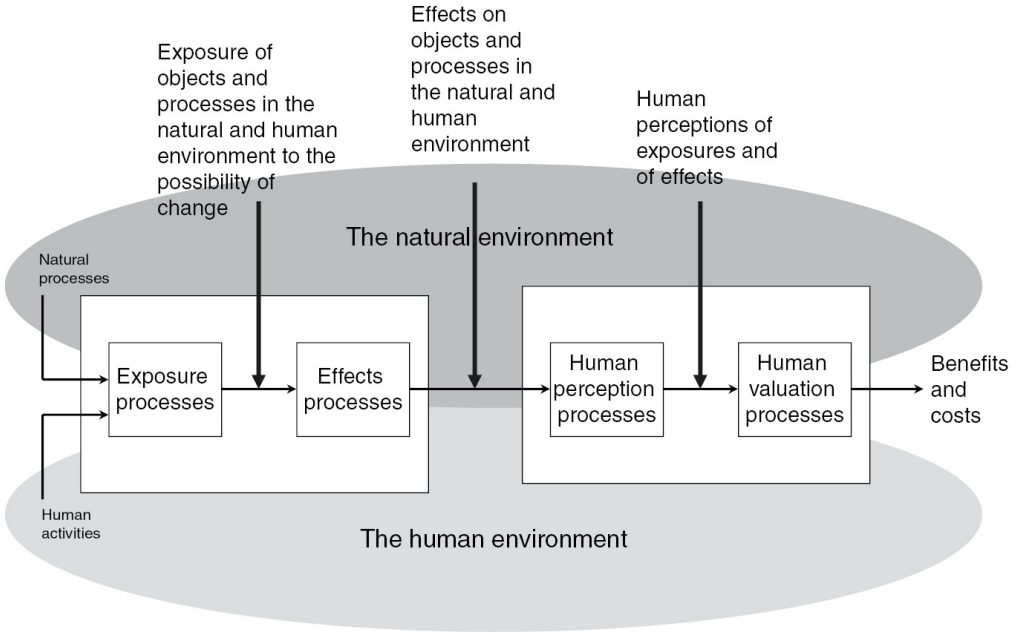
Four principal steps in the risk assessment process

- *Hazard identification*
- *Dose-response assessment*
- *Exposure assessment*
- *Risk characterization*

Risk Assessment



Risk Assessment



Human perception processes: the *psychology* of risk and uncertainty; subject to biases and heuristics

Human valuation processes: willingness-to-pay; value of a statistical life

Cost-Benefit Analysis

Major steps

1. Specify the set of alternatives
2. Catalog the costs and benefits and select measurement indicators
3. Monetize all costs and benefits
4. Discount benefits and costs to obtain *net present values*
5. Compute the net present value of each alternative
6. Based on net present values determine the most efficient alternative

Cost-Benefit Analysis

How are benefits measured?

Willingness-to-pay

A way to determine a person's value for a particular good; what they would willingly give up in exchange

- Travel-cost method
- Hedonic price method
- Contingent valuation

Value of a Statistical Life

Value of a Statistical Life

Estimates of how much people are willing to pay for small reductions in their risks of dying from adverse health conditions that may be caused by environmental pollution

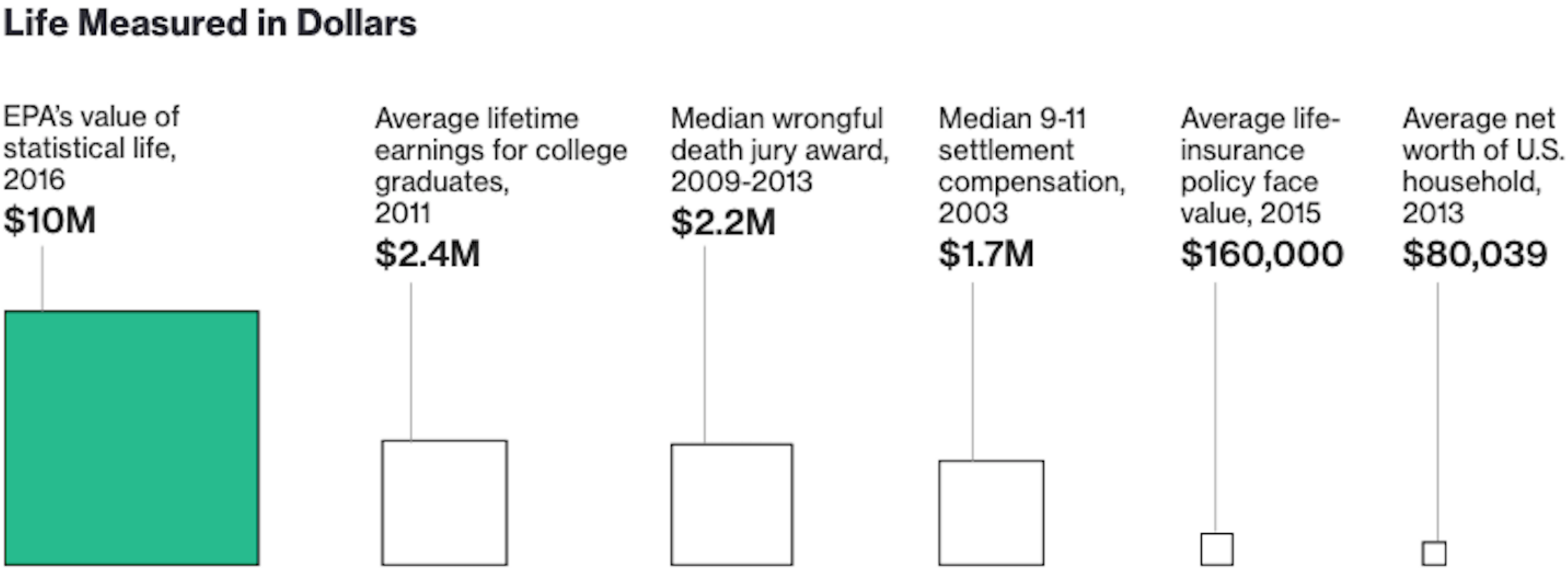
Environmental Protection Agency

EPA value: $10 million

Value of Mortality Risk Reduction: *reported in units such as dollars per micro-risk per person per year, where a "micro-risk" represents a one in a million chance of dying*

See: https://www.epa.gov/environmental-economics/mortality-risk-valuation

Value of a Statistical Life



Sources: Bloomberg research; Census Bureau; American Council of Life Insurers; What is Life Worth?, Kenneth R. Feinberg; North Carolina state case-study, 2009-2013, Campbell Law Review; Sept. 2015 Regulatory Impact Analysis, VSL accounts for income growth to 2024, EPA

Value of a Statistical Life

Clean Air Act: Mobile sources

Key Concepts

Federalism

- Cooperative federalism
- *Leveraged federalism*

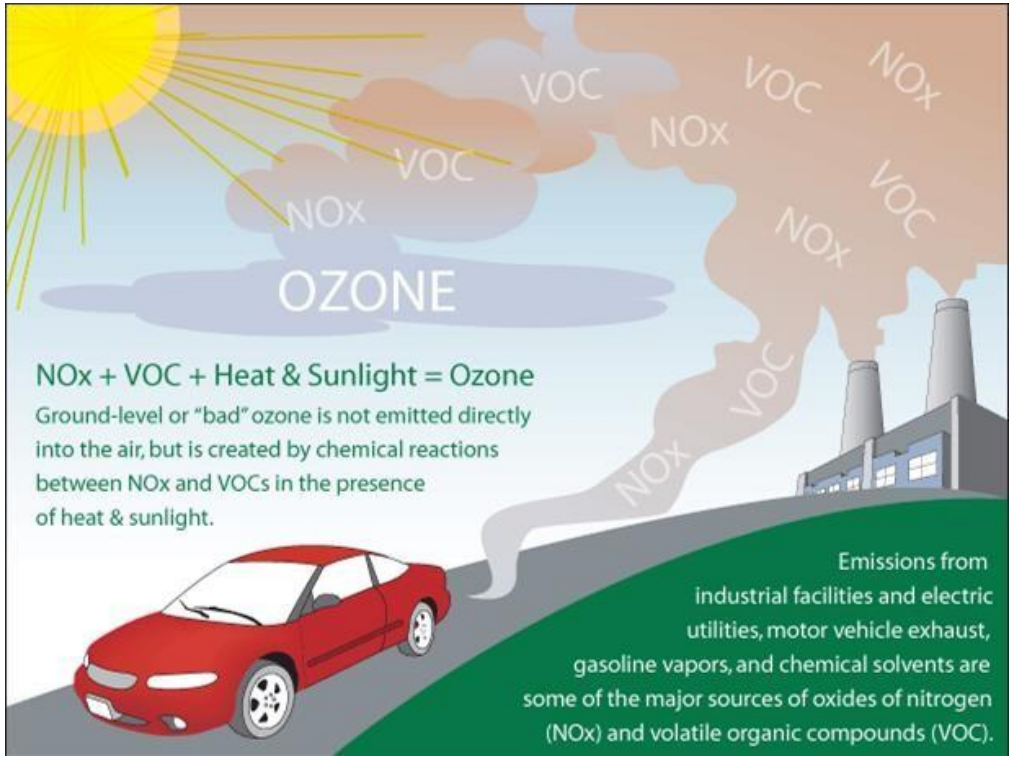
Policy diffusion

- Horizontal and vertical

Market-based approaches

Pollutants from Mobile Sources

- Carbon Monoxide
- Particulate matter
- Nitrogen oxides
- Hydrocarbons
- Volatile Organic Compounds (VOCs)
- Ground Level Ozone
  - Smog: mix of smoke and fog



Pollutants from Mobile Sources

Leading problem indicators

- America's "car culture"
- Rapid expansion of highway system in the 1950s
- Los Angeles County "five day siege of smog" in 1953
- Mounting evidence in the 1950s and 1960s of health risks

Clean Air Act: Mobile Sources

Title II - Emission Standards for Moving Sources

- Part A - Motor Vehicle Emission and Fuel Standards (CAA § 201-219; USC § 7521-7554)
- Part B - Aircraft Emission Standards (CAA § 231-234; USC § 7571-7574)
- Part C - Clean Fuel Vehicles (CAA § 241-250; USC § 7581-7590)

Clean Air Act: Mobile Sources

Section 202: Performance standards for new vehicles

Standards for any class of vehicle or engine with emissions that cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare

1970 Amendments

Called for 90 percent reduction in HC, CO, and NOx by 1975 (HC, CO) - 1976 (NOx) model years

- Technology-forcing

Clean Air Act: Mobile Sources

Table 2
Timetable of delays

December 31, 1970	Clean Air Act Amendments direct EPA to set standards and federal test procedure
June 23, 1971	EPA sets standards for 1975 Model Year
January 1, 1972	NAS issues report suggesting technology to meet standards is not yet available
March 13, 1972	Volvo requests delay of standards. Other automakers follow suit, including the Big Three on April 5
May 12, 1972	EPA denies extension
December 18–19, 1972	D.C. Court of Appeals hears automakers appeal and remands the case back to EPA for further investigation (*International Harvester v. Ruckelshaus*)
December 30, 1972	EPA issues supplement to Decision of the Administrator
February, 1973	D.C. Court of Appeals again remands (*I.H. v. Ruckelshaus*)
April, 1973	EPA delays in HC, CO standards
June, 1973	EPA delays NOx standards
June, 1974	Congress extends interim HC, CO standards to 1977 and NOx to 1978
February, March 1975	EPA extends interim HC, CO standards to 1978 in response to concerns about sulfate levels
August, 1977	Clean Air Act Amendments push interim HC to 1980 and CO, NOx standards to 1981

Clean Air Act: Mobile Sources

1990 Amendment: Stricter tailpipe standards for light-duty cars and trucks

- Tier I: phased in from 1994-1998
- Tier II: phased in from 2004-2008

The Energy Policy and Conservation Act (1975)

- Established *Corporate Average Fuel Economy* (CAFE) standards for fuel efficiency
  - Set by the *DOT* and *EPA*

Clean Air Act: Mobile Sources

Policy diffusion: California as a policy pioneer

- California Air Pollution Control Act of 1947
- Air Quality Control Act of 1967 preempted other states, but left a waiver (carve out) for California
- California standards adopted by 12 other states and became defacto national standard
- Rescinded by Trump Administration in 2019
- Being put back in place by Biden Administration

Market-based instruments

CAA: Market-Based Instruments

Incorporate market principles into government policies

Markets provide gains from trade

Markets promote efficiency

Efficiency

- **Maximizing net benefits**
- **Pareto efficiency**
- **Output/input**
- **Everyone is happy**

CAA: Market-Based Instruments

Market rules

- Medium of exchange
- Way to communicate price
- *Property rights*

Property rights: Rights to own or control property including the right to use, transfer, or *exclude*

CAA: Market-Based Instruments

Getting the prices right: Using markets

- Tax an externality

Creating property rights: Creating markets

- Fishing quotas
- Cap-and-trade

Coase Theorem

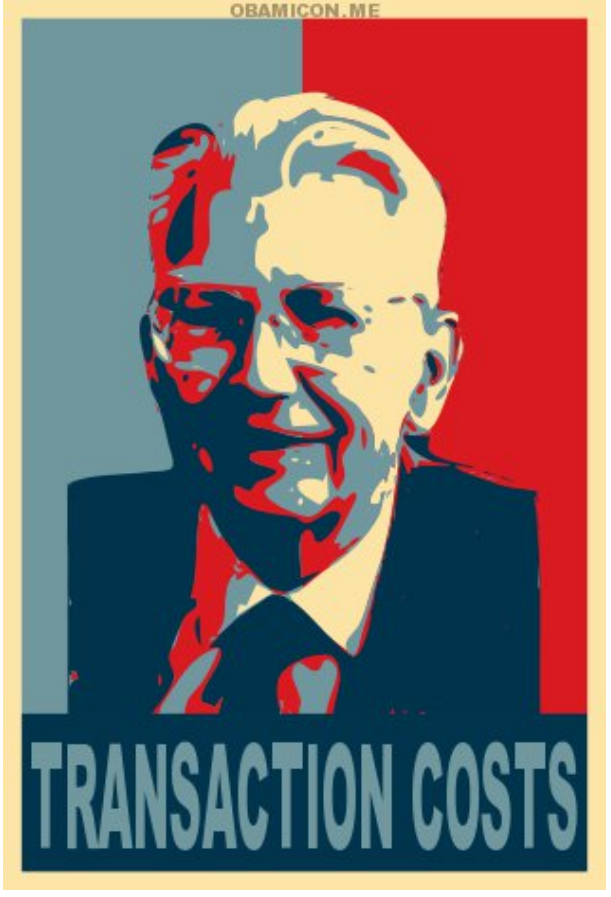
Private bargaining will result in the efficient resolution of negative externalities, without the need for government intervention, as long as property rights are fully allocated

Coase Theorem

Works when *transaction costs* are low

Transaction costs: The costs associated with a transaction

- Monitoring and enforcement



Coase Theorem

What can we take from Coase?

- Importance of *property rights* and *transaction costs*
- Self-organization among users can address common-pool resource problems
- Markets don't *fail*, rather markets are *missing*
  - Government policy should address property rights and lessen transaction costs

CAA: Market-Based Instruments

Advantages

- Compliance flexibility
- Innovation
- Diffusion of technology

Challenges

- Political durability
- Policy durability
- Adaptability

CAA: Market-Based Instruments

Leaded gasoline phase-down

- Lasted from 1982 to 1988
- EPA set tiered standards, which larger refineries met
- Differences in compliance costs
- *Gains from trade*
- Lead credits and constructive allocation
- Banking

Acid Rain

CAA: Market-Based Instruments

Sulfur dioxide allowance trading

Title IV-A - Acid Deposition Control (CAA § 401-416; USC § 7651-7651o)

To introduce some flexibility in the distribution and timing of reductions, the act creates a comprehensive permit and emissions allowance system.

CAA: Market-Based Instruments

Sulfur dioxide allowance trading

Two phases

- Phase 1: went into effect in 1995 for 110 plants
- Phase 2: went into effect in 2000 and required further reductions from over 3000 plants

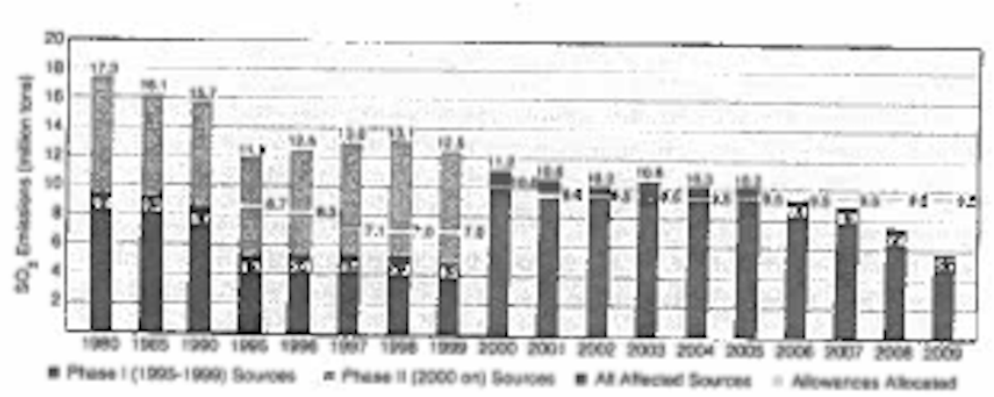


FIGURE 6.1 SO_2 emissions from Acid Rain Program sources, 1980–2009
Source: www.epa.gov/airmarkets/documents/progressreports/ARP_2009_Highlights.pdf.

CAA: Market-Based Instruments

Sulfur dioxide allowance trading

Reasons for success

- Lower than expected cost with switching to low-sulfur coal
- Lower costs of scrubbing SO2
- Banking allowances lead to over compliance during phase 1
- Technological improvements (scrubbers above regulatory standards)
- Efficient allowance trading market

CAA: Market-Based Instruments

Sulfur dioxide allowance trading

Falling apart

- 2005 the EPA promulgated the Clean Air Interstate Rule (CAIR)
- 2011 EPA promulgated the Cross-State Air Pollution Rule (CSAPR)
  - The value of allowances dropped

CAA: Market-Based Instruments

Nitrogen oxide interstate emission program

- Existed from 2003-2008
- **1977 Amendment**: Section 110 and interstate air pollution
- **1990 Amendment**: Congress created the Ozone Transport Commission (OTC)
- In 2003 EPA EPA created the NOx Budget Program
- *Progressive Flow Control*: unused allowances could be used in the future but at a discount rate

CAA: Market-Based Instruments

Conclusions

- Market-based approaches can improve environmental quality by providing economic incentives to reduce pollution
- Policymakers must design, monitor, and enforce market rules
- Volatility in cap-and-trade markets occur when allowances fall below expected value
- Adaptability through periodic updating and revision in response to new scientific information

For Next Time

Climate Change

- *Readings*:
  - Crystal, Howard M., Kassie Siegel, Maya Golden-Krasner, and Clare Lakewood. 2019. “Returning to Clean Air Act Fundamentals: A Renewed Call to Regulate Greenhouse Gases Under the National Ambient Air Quality Standards (NAAQS) Program.” *The Georgetown Environmental Law Review* 31(2): 233–84.
  - A new Supreme Court case could gut the government’s power to fight climate change
  - SCOTUSblog: West Virginia v. Environmental Protection Agency

In-Class Assignment

Case briefs. See instructions on OAKS

Group 1: *International Harvester Co., et al., v. Environmental Protection Agency (1973)*

Group 2: *Natural Resources Defense Council v. Environmental Protection Agency 655 F.2d 318 (D.C. Cir. 1981)*

Group 3: *North Carolina v. Environmental Protection Agency (2008)*