Environmental Legislation

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Learning Outcomes

- Identify key pieces of environmental legislation passed to improve public health and safety.
- Understand the impact of specific laws such as the Clean Air Act, Clean Water Act, and RCRA on industrial practices.
- Summarize the role of the EPA and the importance of Superfund (CERCLA/SARA) in cleaning up hazardous sites.

Reading

- Foundations of Spiritual and Physical Safety: with Chemical Processes; Section X11.3

Severe smog in cities like New York and LA as well as the Cuyahoga river in Ohio catching fire in 1969 as well as scientific evidence of the hazards of air pollution such as Rachel Carson's Silent Spring (1962) motivated the US government to pass a series of environmental laws in the 1970s. These laws have been instrumental in cleaning up the environment and improving public health.

1 NEPA (National Environmental Policy Act, 1970)

It established the **EPA (Environmental Protection Agency)** and required environmental impact statements (EIS) for any project that received federal funding.

Without government oversight and regulation, it is unlikely that market forces would be sufficient to protect the environment. Why? Some examples:

- Catalytic converters
- Smokestack scrubbers
- Lead-free gasoline
- PCBs (polychlorinated biphenyls)
- DDT (dichlorodiphenyltrichloroethane)

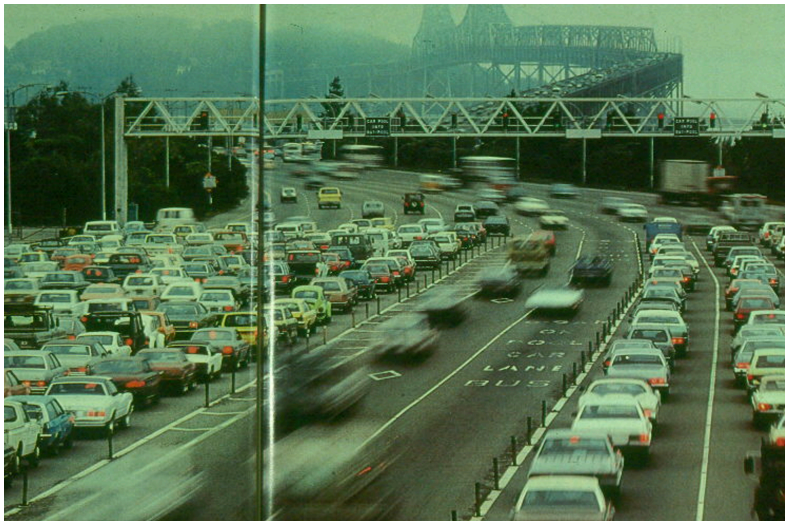

Figure 1: Image of smog in Los Angeles in the 1970s.

2 Toxic Substances Control Act (TSCA, 1976)

- Assesses risks before introduction into the environment
- Ensures production and use do not present unreasonable risks to human health or the environment
- Premanufacture notification required for new chemicals
  - Name and structure
  - Use
  - Amount
  - Byproducts
  - Health and environmental effects
- EPA has authority to ban or restrict production

3 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 1947)

- Requires registration of all pesticides
- EPA has authority to ban or restrict production
- Requires labeling of all pesticides
  - Active ingredients
  - Instructions for use
  - Limitations
- Will not cause unreasonable adverse effects on the environment

4 Clean Air Act, 1970

The Clean Air Act is a comprehensive federal law that

- regulates air emissions from stationary and mobile sources (vehicles had to have catalytic converters)

- authorizes the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment
- sets emission standards for hazardous air pollutants and
- establishes a cap-and-trade program for sulfur dioxide and nitrogen oxides.

Figure 2: EPA released plot of air quality trends from 1990 to 2022 showing significant reductions in key air pollutants.

https://www.epa.gov/air-trends/air-quality-national-summary

4.1 Catalytic Converters

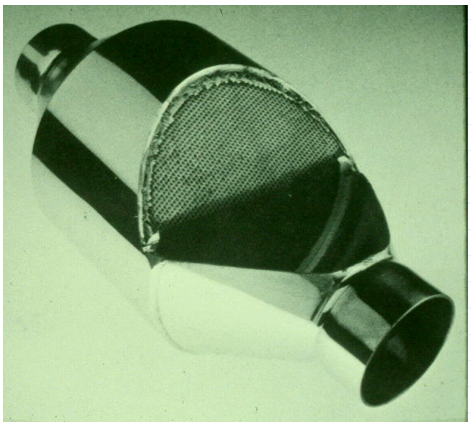

Figure 3: Image of a catalytic converter.

Hot gases from the engine are passed over a catalyst (platinum and rhodium) that causes the gases to react with each other and convert them to less harmful gases. CO and other unburned hydrocarbons are converted to CO2 and H2O. NOx is converted to N2 and O2.

What about SO2 and particulates? (DERA, diesel emissions reduction act)

5 Clean Water Act, 1972

The Clean Water Act is a federal law that

- regulates the discharge of pollutants into the nation's waters
- sets water quality standards for surface waters
- authorizes the EPA to establish effluent limitations for industrial discharges
- regulate stormwater runoff from industrial facilities
- provides funding for wastewater treatment facilities
- establishes a permit program for discharges into navigable waters.

6 Resource Conservation and Recovery Act (RCRA), 1976

RCRA is a federal law that

- regulates the management of hazardous waste
- requires the EPA to establish standards for the treatment, storage, and disposal of hazardous waste
- outlines waste characterization: ignitability, corrosivity, reactivity, and toxicity
- requires cradle-to-grave tracking of hazardous waste
- states that treatment, storage, and disposal facilities must have permits and documentation

6.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 1980 and Superfund Amendments and Reauthorization Act (SARA), 1986

- Identify and clean up hazardous waste sites
- Establishes a trust fund to pay for cleanups
- Requires responsible parties to pay for cleanups
- Sets priorities for cleanup (National Priorities List)

See https://www.epa.gov/superfund

7 Polution Prevention Act, 1990

- Reduce or eliminate pollution at the source
- Encourage source reduction over waste management
- Promote the use of non-toxic or less toxic substances, materials, and processes
- Encourage the use of innovative technologies

8 Energy Independence and Security Act (EISA), 2007

To move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government.

Provisions:

- Increase fleet gas mileage to 35 mpg by 2020
- Hybrid vehicle incentives
- Biofuels increase
- Greater efficiency required for light bulbs (25% by 2012; 200% by 2020)
- Initiatives for energy efficiency in buildings and industry
- Support for R&D in solar, geothermal, carbon sequestration, etc.

9 Inflation Reduction Act (IRA), 2022

The Inflation Reduction Act includes many provisions to help with increasing the energy efficiency of buildings and other infrastructure "to avoid, reduce, utilize, or sequester greenhouse gas emissions."

https://kw-engineering.com/

10 Short US Legislative Summary

Early Foundations

- The Homestead Act (1862): While primarily focused on Western expansion, this act encouraged the settlement and development of lands, sometimes leading to unsustainable resource use.
- Establishment of Yellowstone National Park (1872): The first national park in the world, setting a precedent for land preservation and marking a shift towards conservation.
- Forest Reserve Act (1891): Gave the President power to set aside public lands as forest reserves, paving the way for the National Forest System.
- Antiquities Act (1906): Empowered the President to designate National Monuments, protecting sites of historical, cultural, or scientific significance.

Pollution-Focused Legislation

- Rivers and Harbors Appropriation Act (1899): Prohibited dumping refuse into navigable waters, an initial step towards water pollution control.
- The Clean Air Acts (1963, major amendments in 1970, 1977, 1990): A series of laws establishing national air quality standards, regulating emissions from various sources (factories, cars, etc.), and setting a framework for cooperation between federal and state governments regarding air quality.
- The Clean Water Act (1972): The cornerstone of water pollution control efforts, aimed at making surface waters fishable and swimmable by regulating pollutant discharges and setting water quality standards.
- Safe Drinking Water Act (1974): Established national drinking water standards and regulations, with a focus on protecting public health from contaminants.
- Toxic Substances Control Act (1976): Regulates the manufacture, import, processing, distribution, and disposal of chemicals, with the goal of protecting human health and the environment.
- Oil Pollution Act (1990): Created in response to the Exxon Valdez oil spill, this law aims to prevent and respond to oil spills, holding responsible parties accountable for cleanup and damages.

Protecting Species & Habitats

- Lacey Act (1900): One of the first wildlife protection laws, combating illegal trade in wildlife and plants.
- Endangered Species Act (1973): Powerful conservation tool for identifying at-risk species and creating plans to prevent extinction and promote recovery.
- National Wildlife Refuge System Improvement Act (1997): Provides guidelines and comprehensive management framework for the US National Wildlife Refuge System.

Hazardous Substances and Waste

- Resource Conservation and Recovery Act (RCRA) (1976): Regulates the handling of hazardous waste, with a "cradle-to-grave" scope to promote responsible disposal and reduce environmental risk.
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (1980): Also known as "Superfund," established a program to fund the cleanup of contaminated hazardous waste sites, holding polluters accountable.
- Pollution Prevention Act (1990): Emphasizes source reduction and pollution prevention, aiming to reduce or eliminate waste at the source.

Broadening Environmental Policy

- National Environmental Policy Act (NEPA) (1970): Requires federal agencies to evaluate the environmental impacts of proposed projects with potential for significant effects, promoting informed decision-making.
- Establishment of the Environmental Protection Agency (EPA) (1970): Consolidation of federal environmental programs into a single agency, granting the EPA broad authority to implement and enforce environmental laws.

11 Unintended Consequences

For the most part, government regulation has been successful in helping to clean and protect the environment. However, some government policies on either a local or national level can have unintended consequences. For example, recently some cities or states have banned single-use plastic bags. Instead, constomers were given the option to reuse or purchase larger more massive plastic bags. This has led to an increase in the amount of plastic waste and some health risks with reusing bags.

https://www.foxnews.com/opinion/why-plastic-bag-bans-failing

Action Items

1. Without government oversight and regulation, it is unlikely that market forces would be sufficient to protect the environment. What should drive the government to take action on the environment and what limits should be in place to have a check and balance on that government action? Write a descriptive paragraph.