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The Clean Air Act and the National Environmental Policy Act

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The Clean Air Act is the fundamental statute that governs environmental policy in the United States. This statute has undergone numerous revisions since its inception in the 1950s with the US Public Health Service PHS examination of the Donora, Pennsylvania, areas air pollution occurrence. This study discovered that air pollutants from industrial sources become especially unpleasant during a cold air inversion, resulting in several dozen deaths directly attributable to air pollution. The PHS investigators in the United States linked mortality to air pollution both chronologically and etiologically, because the majority were cardiopulmonary deaths among the elderly. The initial air pollution laws primarily sponsored research for health studies, but these were eventually replaced by federal regulatory initiatives that included a distinct type of federalism in which states were required to carry out federal requirements in a somewhat cooperative manner. The ability to regulate interstate trade provided the federal government with its constitutional mandate, which has been routinely upheld in court following industry appeal [1], [2].

The London Fog and the Donora Fog

The Clean Air Act CAA, first passed in 1970, is a major public statute arising of public pressure to prevent smog and general air pollution. Prior to its implementation, the world faced several severe disasters caused by pollution. The London Fog event of 1952, in particular, which killed thousands of people owing to cardiovascular and pulmonary issues, was caused by cold air inversions that boosted atmospheric sulphur dioxide, SO2, and particle matter. PM. This disaster was preceded by the 1948 Donora, Pennsylvania, air pollution episode the Donora Fog, in which high concentrations of sulphur dioxide, combined with a temperature inversion and foggy weather, killed twenty people and caused approximately half of the towns 12,000 residents to suffer from cough, respiratory tract irritation, chest pain, headaches, nausea, and vomiting.1 The fog was caused by an anticyclone that formed over Donora on Tuesday, October 26, 1948. Based on eyewitness testimony, Berton Roueche recounted the occurrence as follows:

Early Policy Responses to Air Pollution

The Air Pollution Control Act of 1955 was the first legislation aimed at regulating air pollution. APCA. This was the first attempt by the federal government to control air pollution at its source. It provided $5 million per year for five years to the US Public Health Service for research [3]–[5]. The act did little to reduce air pollution, but it made the government aware that a national problem existed. It recognised the threats to public health and welfare, agriculture, livestock, and property deterioration, and reserved control of this developing problem for Congress. The measure, which was proposed by Californias senators and representatives in the House, was followed by a series of failed attempts. Air pollution had traditionally been considered a local issue, and the federal government was wary of interfering with states rights. As a result, the first APCA had a relatively limited reach and effect [6].

The First Clean Air Act and Its Amendments

Congress passed the Clean Air Act of 1963 eight years after the APCA.3 This act addressed air pollution by establishing emissions standards for stationary sources including power plants and steel mills. It did not consider mobile sources of air pollution, which had become the primary source of many harmful pollutants. Once these requirements were established, the government needed to set timeframes for corporations to meet them. The Clean Air Act was amended in 1965, 1966, 1967, and 1969. These amendments gave the Secretary of Health, Education, and Welfare HEW authority to set auto emissions standards, expand local air pollution control programs, establish air quality control regions AQCR, set air quality standards and compliance deadlines for stationary source emissions, and authorize research on low-emissions fuels and automobiles.

The CAA supported federalism by imposing requirements and providing assistance to states in implementing its provisions. Because air pollutants crossed state lines, the federal government was critical to the CAAs implementation and standardization. In addition, the CAA promoted public health by establishing health-based air pollutant limits. It also promoted public welfare because secondary regulations were in place to safeguard agriculture, forests, monuments, visibility, and water bodies from the negative effects of air pollution. Under the interstate commerce clause, the United States Supreme Court supported the federal governments power in regulating air pollution because of its regional and national context.

Congress had addressed concerns under the CAA once again by 1970. By executive order, President Richard Nixon founded the Environmental Protection Agency EPA in 1970. Despite the fact that significant legislative precedents had been established, the current statute and changes were judged insufficient. The Clean Air Act of 1970, technically another amendment, was a substantial reform that imposed far higher criteria. It created new main and secondary criteria for ambient air quality, as well as new limitations on emissions from fixed and mobile sources, which would be enforced by both the state and federal governments, and boosted funding for air pollution research. The 1970 amendments mandated a 90% decrease in new automotive emissions by 1975, created a programme requiring the best available control technology for large new sources of air pollution, and established a programme to regulate air toxics. It was quickly apparent that the timelines set were much too aggressive. Especially those for auto emissions. To meet these criteria in such a short period of time, the car industry would have to overcome severe fiscal constraints as well as apparently insurmountable technical obstacles. These concerns prompted the 1977 CAA modifications, which revised car emission regulations, extended deadlines for meeting air quality requirements, and established the Prevention of Significant Deterioration programme [6]–[8].

According to Sen. Edmund Muskie ME-D, the act prioritized public health above technical and commercial considerations: Congress primary role is not to make technical or economic judgements or even to be bound by what seems to be technologically or economically possible. It is our job to determine what is necessary in the public interest to safeguard peoples health. This might imply that individuals and industries will be expected to perform what seems to be impossible at the moment. However, if health is to be safeguarded, these issues must be tackled.

This was a nonpartisan viewpoint at the time; Republicans supported the law despite its demands on business. Sen. Winston Prouty VT-R, for example, said of the 1970 amendments, For the first time, air quality requirements would take priority over arguments of economic impracticality and technological impossibility. During the 1980s, Congress did not modify the Clean Air Act, in part because President Ronald Reagans administration prioritized economic aims above environmental ones.

The 1990 CAA amendments also introduced measures to designate nonattainment regions or places where air pollution levels consistently exceed National Ambient Air Quality criteria Section 1.3 or contribute to ambient air quality in a neighboring area that does not satisfy criteria. The CAA tightened auto and other mobile source emissions standards, mandated reformulated and alternative fuels in the most polluted

areas, established a new programme of technology-based standards, mandated a state-run permit programme for the operation of major sources of air pollutants, and updated enforcement provisions, including authority for the EPA to levy administrative penalties.

The Clean Air Act is enabling legislation that may contain authorized funding for clean air programmes for a limited time before they must be reauthorized. House rules require the passage of an authorization measure before an appropriation bill can be considered, although this requirement may and regularly is waived. The legal authority granted by the legislation to develop and implement rules are regarded permanent and do not need reauthorization [6], [9], [10].

National Ambient Air Quality Standards

Title 1 of the 1970 amendments to the CAA established National Ambient Air Quality Standards NAAQS for pollutants deemed hazardous to public health and the environment. CO, NO2, SO2, total suspended particles that became PM10 in 1987 and PM2.5 in 1997, hydrocarbons removed in 1983, oxidants becoming O3 in 1979, and Pb were among the contaminants. The NAAQS were created with an acceptable margin of safety in mind to preserve public health and welfare.

The CAA mandates the EPA to examine the scientific facts on which the standards are based every five years and, if necessary, alter the requirements. Meeting this five-year evaluation has becoming more difficult for the EPA. The Office of study Development creates a criterion document that summarizes the study and its regulatory consequences using several standards. The EPA staff is used by the Office of Air Quality Planning and Standards to develop a staff paper outlining all of the health-related research articles that are important to the standard-setting process. These often exceed 2,000 words and result in a lengthy staff document. The staff paper is an evaluative document that examines the significance of information in the criterion document for standard establishment and gives staff recommendations for NAAQS decision making.

The National Institute for Environmental Sciences was authorized by the 1970 CAA amendments to perform air pollution research, including toxicity, air pollutant measurement and characterization, animal studies, clinical and translational investigations, and epidemiological studies. Furthermore, the EPA has financed air pollution research via its Science to Achieve Results STAR award programme and centres such as its Particulate Matter Center funding. The EPA also collaborates with companies involved in air pollution mitigation via the Health Effects Institute HEI, which is situated in Boston. A research committee analyses all applications, and a review committee reviews the findings and final reports before they are published as HEI documents. These funding bodies give resources for air pollution experts to perform research that informs the regulatory system. These funds assist scientists financially, develop a cadre of specialists, and educate future researchers via graduate programmes and postdoctoral fellowships. Federal regulatory bodies have significant latitude in creating and enforcing rules. Over the last eight years, standard development has slowed, and most of the NAAQS work has been done by court order, after environmental groups sued the EPA for missing deadlines or failing to regulate. The presidential budget may reduce or eliminate budget items, or Congress may enhance or decrease appropriation.

The regulatory method to justify not regulating is more intriguing. The EPA determined that CO2 was not covered by the CAA under the George W. Bush administration, and after losing suit on this interpretation at the Supreme Court, opted to issue a long-Advanced Notice of Proposed Rule-Making to explain not regulating. It was plainly noted that the CAA was not the appropriate statute for this. It employed the CAA NAAQS, which required any emitter of more than 250 tonnes of main pollutant to be controlled. According to this view, most structures would be required to conform, causing every conservative organisation to lament the rise of big government. The government, on the other hand, may adopt a more focused strategy, focusing on coal-fired power stations, for example, where there would be a significant gain at a lower cost. Citizens and organisations may use the regulatory process to submit letters about draught rules, present data at CASAC meetings, or even petition the government.

Clean Air Scientific Advisory Committee

The Clean Air Scientific Advisory Committee CASAC evaluates both the criterion document and the staff report and offers its own criticism. The CASAC considers public testimony from these papers, as well as source literature, before suggesting a set of guidelines for the EPA administrator to consider. The administrator of the EPA has the discretion to reject or accept their suggestions. The CASAC must include a physician, an expert in air pollution monitoring, and a representative from state air pollution bureaus. Executive Order 12866 mandates that the EPA conduct regulatory effect evaluations. NAAQS cannot be established based on cost or technical feasibility; however, costs and benefits may be addressed while creating control techniques. The EPA must submit regulatory impact evaluations for consideration to the Office of Management and Budget.

State Implementation Plans

While the CAA empowers the EPA to establish NAAQS, states are responsible for developing processes to achieve and maintain the requirements. State Implementation Plans SIPs are developed by the states and submitted to the EPA to verify that they satisfy legislative criteria. SIPs use emission inventories and computer models to predict whether or not air quality violations will occur. States must design air pollution monitoring strategies, which may be financed by the EPA. If the SIP reveals that requirements are likely to be breached, the state may be forced to impose further limitations on current sources. New and modified sources must seek state building licenses, which require the applicant to demonstrate that estimated emissions will not exceed permissible limits. Three years after the EPA imposes final NAAQS rule designations, states must submit SIPs to the EPA outlining how regions will be brought into compliance. The EPA examines the SIPs to assess their sufficiency in meeting legislative criteria and meeting the standards.

If states fail to achieve NAAQS regulations, the federal government pursues compliance in a variety of methods. First, emissions from new or modified sources must be offset by reductions in emissions from existing sources in nonattainment regions. Second, in states where the SIP is insufficient, the EPA may impose a 2-to-1 emissions offset within eighteen months for the construction for novel polluting sources, followed by a six-month embargo on most federal highway subsidies. An extra prohibition on air quality funding is optional, and if the state fails to submit or execute an appropriate SIP, a Federal Implementation Plan may be imposed.

SIPs and Transportation

In nonattainment regions, demonstrating conformance of transportation plans and SIPs is needed at least every three years. Nonattainment plans must include provisions for implementing all reasonably available control measures. SIPs may allocate HOV high occupancy vehicle lanes on highways to promote carpooling, or SIPs may increase the frequency of vehicle inspections to monitor air pollution. Title II on mobile sources includes methods for establishing emissions limits for automobiles, trucks, off-road vehicles, lawn mowers, chain saws, construction equipment, locomotives, and marine motors in order to reduce CO, VOCs volatile organic compounds, NOx NO and NO2, and O3. The 1990 CAA changes cut the hydrocarbon and NOx standards for automobiles by 40% and 50%, respectively. A 2001 EPA regulation for heavy-duty vehicles mandated a 90% reduction in PM10 by 2007 and a 10% decrease in NOx by 2010. Nonattainment criteria for ozone were evaluated to 97 regions, with only Los Angeles classified as Extreme, with targets set to achieve a one-hour level of 0.12 ppm by 2010. The 0.08 threshold for ozone over eight hours, the amended standard of 0.075, and the upcoming review of this level by the EPA administrator have all modified these aims. Furthermore, numerous rounds of standards for gasoline formulation were established: first, methyl tert butyl ether MTBE was preferred, but when this ingredient was found to damage ground water, this high oxygen norm was replaced with ethanol, a sustainable fuel. Lead was eliminated from gasoline in 1990, and by 2004, Sulphur content had been reduced by more than 90%. Section 209 b of the CAA empowered California to create its own automobile requirements as long

as they are at least as strict as federal standards. Section 177 authorizes other states, including New York, Maine, Massachusetts, and Vermont, to adopt California's higher rules.

Permit Requirements

Title V of the CAA amendments of 1990 require states to operate a comprehensive permit programme for the operation of sources generating air pollutants. The permit requirements normally applied to sources that emit 100 tonnes per year of any regulated pollution; but, in nonattainment zones, the permit requirements may apply to sources emitting as little as 10 tonnes per year. Annual fees are collected by states to fund the expenses of permits and air pollution control programmes. The permit specifies how much of particular air pollutants a source may release. A source must create a compliance strategy and confirm compliance as part of the permission procedure. The CAA is enforced by state and municipal governments. They issue the bulk of permits, oversee compliance, and perform the majority of inspections. The CAA also allows for citizen litigation against individuals and businesses accused of violating emissions guidelines or permit requirements. There may also be lawsuits against EPA if the administrator fails to take an action that is not discretionary under the CAA. The EPA has the jurisdiction to levy administrative fines, prosecute offenders with crimes rather than misdemeanors in specific cases, and grant $10,000 prizes to those who provide information that leads to convictions under the CAA.

Hazardous Air Pollutants

Section 112 of the 1990 amendments created a programme to safeguard human health and the environment against hazardous air pollution. The EPA was obliged under this provision to develop Maximum Achievable Control Technology MACT limits for 188 pollutants as well as designate categories of sources subject to regulations. The second important component required the EPA to develop health-based criteria to handle instances in which there was a considerable residual risk of adverse health impacts following MACT installation. Third, the EPA was to create criteria for stationary area sources, which were responsible for 90% of hazardous air pollutant emissions. HAPs. Finally, the EPA was to create a Chemical Safety and Hazard Investigation Board to examine mishaps involving hazardous material discharges. Owners and operators were required to develop risk management plans that included hazard assessments, preventive measures, and response programmes. 3.7 metric tonnes of air toxics were released in the United States in 1993, with 41% originating from mobile sources, 35% from area sources, and 24% from local stationary sources.

EPA assessed twenty-one mobile source air toxics, taking into consideration health and risk information, as well as the degree of human exposure and toxicity. MSATs. These include acetaldehyde, benzene, formaldehyde, 1,3-Butadiene, acrolein, polycyclic aromatic hydrocarbons, diesel, arsenic, chromium, dioxin/furan, ethyl benzene, n-hexane, lead, manganese, mercury, MTBE, naphthalene, nickel, styrene, toluene, and xylene. Funding for the HAPS programme has been insufficient, with the EPA having minimal resources to implement a HAPS regulation program, culminating in a negative assessment by the EPAs inspector general in 2010. The Inspector General Act of 1978 establishes executive monitoring of the performance of federal agencies, particularly those subject to legal constraints imposed by congressional authorizing legislation.

Prevention of Significant Deterioration

The Prevention of major Deterioration programme is based on the premise that places with higher air quality than needed by NAAQS should be safeguarded against major new air pollution even if NAAQS are not breached. Class I locations include wilderness regions and national parks, where permissible increments of additional pollutants are relatively modest. Class II areas are all attainment zones regions with air quality equal to or greater than the NAAQS, whereas Class III areas are designated for development but not to exceed the NAAQS. Ozone, NOx, and PM predominantly influence visibility, which is referred to as regional haze, particularly in the Grand Canyon and Great Smoky Mountains national parks. The CAA amendments of 1990 created a Grand Canyon Visibility Transport Commission

comprised of governors from each impacted state, an EPA designee, and a representative from each of the regions national parks or wilderness areas. The changes clearly indicate that governments must apply the best available retrofit technology on existing sources of pollution that impede visibility. The EPA issued the Regional Haze Rule in 1999, establishing a 65-year programme to restore natural visibility conditions in 156 national parks and wilderness areas.

Clean Air Interstate Quality Rule

The EPA proposed the Clean Air Interstate Quality Rule CAIR to minimize interstate movement of fine particulate matter and ozone by concentrating on the twenty-eight states and the District of Columbia that contributed to downwind states failing to meet these NAAQS. The EPA suggested a model cap-and-trade programme for SO2 and NOx, which contribute to PM and ozone levels. These initiatives were directed at power stations that will undergo progressive reductions between 2010 and 2015. EPA monitoring revealed that multiple counties in the eastern United States were in violation of PM2.5 and ozone yearly levels owing to regional contributions from distant sources. The EPA suggested a regional SO2 emissions limit of 3.9 million tonnes by 2010, as well as a NOx emissions cap of 1.6 million tonnes by 2010 by and 2.7 million tonnes for SO2 and 1.3 million tonnes for NOx by 2015 70% and 60% reductions from 2003. This regulation was overturned in 2008 by the United States Court of Appeals for the District of Columbia Circuit, which deemed it fatally defective owing to regional limitations rather than a state-by-state approach. The court maintained the regulation at the end of 2008, despite appeals from environmentalists, the EPA, several utilities, and state air regulators, with the understanding that it would be changed to address the courts concerns. The EPA issued a transportation regulation in 2010 that would target power plant emissions in thirty-one eastern states and the District of Columbia.

The EPA projected that the regulation would cost $2.8 billion to implement and would result in $120-$290 billion in benefits, the majority of which would come from improved respiratory health. When fully implemented in 2014, the rule would improve public health by preventing 14,000 to 36,000 premature deaths, 21,000 cases of acute bronchitis, 23,000 nonfatal heart attacks, 26,000 hospital and emergency room visits, 1.9 million days missed at work or school, 240,000 cases of aggravated asthma, and 440,000 cases of worsening upper and lower respiratory symptoms. After several years, the EPAs primary conference space was renamed the Rachel Carson Great Room. Senator Gaylord Nelson launched Earth Day events on April 22, 1970, emphasising the looming environmental concerns and disasters. The National Environmental Policy Act was enacted in 1969 with the following goals in mind:

1. To establish a national policy that promotes productive and joyful harmony between man and his environment.
2. To encourage efforts to avoid or eradicate environmental and biosphere harm, as well as to improve human health and well-being.
3. to improve knowledge of the nation’s ecological systems and natural resources, and
4. Creating an Environmental Quality Council

NEPA established the environmental impact statement EIS, in which the responsible official must report on the environmental impact of the proposed action, any adverse environmental effects that cannot be avoided, alternatives to the proposed action, as well as the relationship between local short-term human environmental uses and long-term productivity, as well as any irreversible resource commitments. This was a significant shift in bringing environmental damage up to the level of cost-benefit ratios for moving forward with government initiatives. It established the federal Council on Environmental Quality CEQ to apparently coordinate environmental initiatives among federal departments. The CEQ was tasked with developing rules for the EIS, compiling an annual report, and coordinating federal environmental operations. The yearly report was an outstanding collection of environmental data and initiatives, but it was ended with the Republican control of Congress in 1997, when Newt Gingrich arranged the adoption of the Federal Reports Sunset Act. After 1997, no more yearly reports on the operations of federal environmental authorities were released.

If the government action is minor, an environmental assessment EA rather than a complete EIS may be produced. In 2006, there were 542 EISs, with the US Forest Service having the highest 144, owing to logging and road construction. The United States Army Corps of Engineers had 56, the Federal Energy Regulatory Commission had 32, the Bureau of Land Management had 42, the National Park Service had 34, and the Federal Highway Administration had 66.

The use of health impact assessments HIA to investigate the consequences that a policy, program, or project may have on the health of a population is a natural extension of the EIS.4 HIAs have the ability to significantly improve health by encouraging actions that protect and improve health and health equality. Major transportation projects may take into account the health implications of air pollution or injury prevention, but the impact of road design on physical activity and obesity is often overlooked. A bike lane might so be considered. Educational HIAs might encourage students to walk to school and avoid locations with high levels of pollution or noise. In revamping its EIS for the Northeast National Petroleum Reserve in Alaska, the Bureau of territory Management examined the health of Native inhabitants, withholding some territory from leasing for oil and gas production, and imposing additional pollution monitoring procedures. Local and state governments also utilise HIAs to encourage proactive choices and planning to promote public health.

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