

# Two Cheers for Air Pollution Control: Triumphs and Limits of the Mid-Century Fight for Air Quality

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Merlin Chowkwanyun, PhD, MPH<sup>1</sup>

## Abstract

This article analyzes the early years of 20th-century air pollution control in Los Angeles. In both scholarship and public memory, mid-century efforts at the regional level were overshadowed by major federal developments, namely the Clean Air Act and creation of the US Environmental Protection Agency in 1970. Yet the mid-century local experience was highly consequential and presaged many subsequent challenges that persist today. The article begins with an exploration of the existential, on-the-ground misery of smog in Los Angeles during the 1940s and 1950s. The article examines the role that scientific evidence on smog did and did not play in regulation, the reasons smog control galvanized support across various constituencies in the region, and, finally, some of mid-century air pollution's limits.

## Keywords

air pollution, environmental protection, history, public health, environmental health, environmental justice, smog, clean air

In the mid-1940s, Harold W. Kennedy, Los Angeles County's legal counsel, helped create the county's Air Pollution Control District (APCD), which passed and enforced new regulations during a remarkably active decade. In 1963, Kennedy analyzed the experience in a *Public Health Reports* article that assessed multiple regulatory instruments, including emissions caps (and mandatory equipment to cap emissions), prohibition of "nonessential" industrial processes (eg, unnecessary incineration), and permit systems.<sup>1</sup> Looking forward, Kennedy also anticipated various challenges that regulators would face: vague language, contestation over how "reasonable" adherence to a statute was or was not, and the limits of industry self-policing.<sup>1</sup> Most important, Kennedy elaborated on the county's embrace of a then-emerging interpretation of public nuisance law. To regulate air pollution, Los Angeles County held that a municipality such as itself did not need to prove air pollution's harms to singular identifiable parties. Rather, it needed only to demonstrate pollution's potential population-wide effects.<sup>2</sup>

This article analyzes the early days of Los Angeles County air pollution. It explores the misery that smog brought upon everyday residential life in Los Angeles and how, in response, the county acted rapidly, forming an air pollution control agency that imposed rules capping emissions on various substances thought to contribute to smog and air pollution more generally. This response was an aggressive new regulatory approach to the problem of air pollution control. Los Angeles County proceeded even as its

officials were aware that fuller scientific information about smog had yet to emerge. By the time scientists described the precise composition of smog, that scientific discovery was less consequential than one might have thought, given that an effective regulatory machine had already been in operation for years. This article also examines how air pollution control garnered wide political support not just from residents but also from businesses that had a stake in clean air quality, which in turn exerted pressure on industrial firms to cooperate. Despite the triumphs, the fight for clean air came with several limitations, many of which continue to constrain pollution control in the United States.

## Los Angeles in the Era of the Daylight Dimout

In 1940s and 1950s Los Angeles, the word "smog" came to denote air pollution, the chemical composition of which was initially mysterious. What was not mysterious was the effect these emissions had on everyday life. In September 1943,

<sup>1</sup> Mailman School of Public Health, Columbia University, New York, NY, USA

### Corresponding Author:

Merlin Chowkwanyun, PhD, MPH, Columbia University, Mailman School of Public Health, 722 West 168th St, New York, NY 10034, USA.  
Email: mc2028@columbia.edu

emissions blankets caused what the *Los Angeles Times* characterized as a “daylight dimout.”<sup>2</sup> “Thousands of eyes smarted. Many wept, sneezed and coughed. Throughout the downtown area and into the foothills the fumes spread their irritation,” the *Times* article reported.<sup>2</sup> The smog attacks grew even more frequent in the immediate post-World War II years. Los Angeles residents regularly expressed grief in passionate exchanges with government officials. Fred Mayer wrote about the “terrible pollution of the air which is blotting out the very sun, and making more than four out of five days a sort of mild hell.” The “L.A. ‘smog’ is intolerable,” he concluded, before suggesting again that he and his family were planning to leave.<sup>3</sup>

These complaints captured smog’s existential unpleasantness, but most went beyond merely expressing irritation. They framed smog explicitly in the language of health. In a letter to the county Board of Supervisors, Raymond Berg described the smog cover as a “death-dealing poison.”<sup>4</sup> L.S. Adams stated, “If you fellows think that [smog] is harmless to health you have another thought coming.”<sup>5</sup> The language of death and health used to describe smog is striking because it appeared a decade and a half before a popular language of toxicology exploded in the cultural zeitgeist, fueled by works such as Rachel Carson’s *Silent Spring* and late-20th-century environmental activism.<sup>6,7</sup>

Angelenos also did not hesitate to speculate on air pollution’s sources. After characterizing the “acrid fumes” as a “menace [to] public health,” Dean Beckwith focused on common methods of garbage disposal, specifically the burning of waste.<sup>8</sup> The most frequent culprit named, however, was the region’s booming petrochemical and manufacturing sectors. Residents depicted these sectors as examples of economic growth prized over people’s welfare. Florence Aberle angrily wrote: “Property is valuable and must be saved—but human health is expendable,” before asking county officials about their stance toward oil refineries.<sup>9</sup> Lynne Swaim wrote about “the blue-gray choking fumes [that] are pressed unhealthily down on the people” and the “DAILY HORROR of having [her] eyes burn” to the point where she could “scarcely keep them open and am forced to rub them constantly and bathe them with eye drops.” “Since when,” she asked, “has the ill-health and utter discomfort of people been subordinated for the ‘GREED’ of industry?”<sup>10</sup>

## Early Regulation: Navigating Conflict and Cooperation

Los Angeles County officials in fact had been wasting no time since the mid-1940s. At a 1946 conference of county mayors, Kennedy outlined plans for an Air Pollution Control District (APCD) undergirded by constitutional police power and joint powers contracts signed between the county and cities. Relations with Los Angeles polluters veered between cooperation and conflict. One example of an early ethos of cooperation was the APCD’s permit system, which was up and running by 1948. With APCD oversight, facilities

voluntarily installed emissions control equipment, such as fume and dust collectors or gas absorbers.<sup>11</sup> With potential violators, the APCD took swift action. It launched some of the most aggressive actions against 57 dumps found to be “burning rubbish in the open,” of which 42 were closed.<sup>11</sup>

The APCD soon focused on sulfur emissions. In 1948, it passed its most powerful measure to date, Rule 53a, which required refineries to limit sulfur emissions to 0.2% by volume of emissions from any single source.<sup>12</sup> The Western Oil and Gas Association’s response was twofold. On the one hand, the Association wrote, the area’s petroleum facilities would be “able to operate within reasonable tolerances of smoke and gas emissions.” But what “reasonable” constituted exactly was another matter altogether, and the Association invoked scientific uncertainty about smog to criticize Rule 53a. It argued that there was “no indication that setting the limit of sulphur compound emissions at 0.2% will contribute toward the solution of the smog problem.”<sup>13</sup> Another response came from the American Smelting and Refining Company. Despite its unease, it ultimately concluded on a cooperative note, stating that it was “in sympathy with [the] objective to make Los Angeles County a better and more healthful place to live.”<sup>14</sup> Whatever skittishness it encountered from industry, by the end of 1950, the APCD reported a 50% overall reduction in sulfur emissions since it had passed the Rule 53a standards.<sup>15,16</sup>

## The Haagen-Smit Discovery: The Ambiguous Role of Science

In 1952, the chemist Arie Haagen-Smit, based at the California Institute of Technology, shook up the scientific debate over what constituted “smog.” Through experiments in fumigation rooms, Haagen-Smit’s team focused on hydrocarbons, which the APCD of late had suspected of contributing to smog. The presence of hydrocarbons, the scientists learned, resulted in “further development of the symptoms” on plants to the point where the symptoms were “indistinguishable from that noticed on plants exposed to smog” outside the laboratory.<sup>17,18</sup> The team delved further by redoing the fumigation experiments and identifying size-effect variation when hydrocarbon volume was altered.<sup>17</sup>

However, hydrocarbons were not the full story. Another important compound at play was nitrogen dioxide. Haagen-Smit found that nitrogen dioxide could act as an oxidizing agent for hydrocarbons with sufficient sunlight.<sup>17</sup> That reaction generated 2 by-products: one intermediate (peroxides) and another final (aldehydes and acids). By measuring concentrations of these by-products at various levels, Haagen-Smit determined that *final* by-products had only minor effects on plants. Instead, the bulk of the problems stemmed from contact with the *intermediate* by-products of oxidation: peroxides. Oxidation of hydrocarbons, the researchers found, also resulted in a visibility-obscuring haze. During one experiment, visibility was reduced to 8 feet within only a few minutes, a consequence of aerosol formation. In the

process of researching nitrogen dioxide and hydrocarbons, Haagen-Smit's team also identified ozone as another by-product of oxidation that contributed to the cracking of rubber tires in the region. And this ozone, in turn, could serve as another oxidizing agent.<sup>16</sup>

Haagen-Smit's work yielded a fuller understanding of what constituted smog and its observable consequences. In focusing on sulfur, specifically sulfur dioxide, earlier APCD action had been too narrow, as argued by a 1952 report on pollution headed by California Assemblyman Randal Dickey.<sup>19</sup> That report had noted that while sulfur dioxide and by-products of its oxidation played a strong role in obscuring visibility, they did not react with hydrocarbons in the same way as nitrogen dioxide.

The Haagen-Smit discovery rightfully deserves a central place in any retelling of the Los Angeles smog-control story. But truthfully, the APCD had already begun moving on the regulatory front half a decade before, even though many enigmas remained about smog science.<sup>20,21</sup> The identification of sulfuric compounds as potential smog components had already generated momentum that resulted in Rule 53a. And it existed alongside the unpleasant everyday experience of smog, which galvanized constituents and pressured public officials to act. After Haagen-Smit's findings, Rule 56 required installation of equipment controlling vapor losses, a major source of hydrocarbons. Haagen-Smit's discovery of hydrocarbons' role in smog was certainly crucial for more targeted regulation. But, in fact, the regulatory foundation for it had already been laid several years before.

## Cultivating Support

How did officials drum up support for air pollution control? One way was to emphasize that an unpleasant natural environment was also a poor one for business. They reignited long-standing tensions in the private sector in Los Angeles, identified by the historian Paul Sabin, and made particular appeals to firms outside the petroleum sector and other heavy industrial sectors.<sup>22</sup> "We recognize," said one Los Angeles politician, "that our tourist industry is in very real jeopardy and that the attractions of our distinctive climate, of our seashore and mountains each of priceless worth to all Californians—are at times completely obliterated by this unforeseen by-product of war-time and post-war development."<sup>23</sup>

Even sectors not directly tied to the landscape questioned the consequences of the smog threat. The Los Angeles Coat and Suit Manufacturers Association noted that "if the workers' eyes are so tear-filled as to prevent their doing accurate work, the manufacturers' only recourse is to move elsewhere."<sup>24</sup> Private-sector support of air pollution control resulted in the support of other organizations typically opposed to expanded state intervention, including the Los Angeles County Medical Association and the Los Angeles Chamber of Commerce, the latter of which saw, as historian Sarah Elkind has argued, smog attacks as a threat to the area as a business magnet.<sup>25</sup>

The County stimulated a rhetoric of civic duty, casting air pollution control as an obligation of all in the region. The response of regional industry suggests that it paid attention to these county appeals, ultimately adhering to the pollution control district's ongoing new rules. In 1954, the Western Oil and Gas Association issued a statement that exemplified the surprising position of many Los Angeles industrial firms: "We expect that this country will grow, but it certainly is not going to improve in its growth if we have an undesirable and uncomfortable situation that is caused by smog."<sup>26</sup> When it came to air pollution, a momentary consensus between industrial capital and the state fed into a civic nationalism—but in Los Angeles—that mollified much of the potential resistance to air pollution control.

Finally, the daily diffusion of smog throughout the Los Angeles region also explains the widespread mid-century support for air pollution control. First identified in the mid-1940s by using data from weather stations, wind patterns in Los Angeles dispersed components of smog. Scientists identified wind patterns that typically began at the ocean; moved inland by the afternoon; reversed course in the evening, away from the range of mountains surrounding the region; and once again moved inland by daytime, all while new winds entered from the ocean.<sup>27</sup> Thus, whether one was in the industrial suburb of Vernon or Inglewood; in a tree-lined, leafy, affluent suburb such as Pasadena; in downtown Los Angeles; or along the beaches, it was hard to escape smog's effects. The unique topography of Los Angeles made smog everybody's issue.

## Limits of Mid-Century Air Pollution Control

Mid-century air pollution control in Los Angeles had many limits. One was the ambiguous position of human health as a goal. Although Los Angeles residents had framed smog as a health hazard, the APCD and California State did not always do so. Members of Governor Goodwin Knight's 1953 Committee on Air Pollution called for "an all-out effort to get rid of smog." But they also urged that officials not allocate resources "into channels which, however interesting, will not assist in reducing air pollution." By characterizing medical research on smog as a detour, it reaffirmed the approach of the county, which had moved on smog preemptively, without waiting for evidence on human health effects to accumulate. The Knight Committee pushed that approach further. "With the elimination of pollution, associated health hazards automatically vanish," it wrote.<sup>28</sup>

Such pronouncements came a year before Paul Kotin, a professor of medicine at the University of Southern California, began publishing articles provisionally exploring the potential relationship between exposure to hydrocarbons and cancer.<sup>29,30</sup> But because the etiological connections in humans were never fully clear, human health did not assume as central a place in air pollution control policy debates, to the frustration of some. Indeed, in 1958, John Goldsmith and Lester Breslow, the latter the chief of the California

Department of Public Health's Bureau of Chronic Disease, criticized persons who would "derogate study of the health effects in favor of control efforts alone."<sup>31</sup> A few years earlier, in 1954, the 2 had launched and overseen epidemiological studies and surveys on the health effects of air pollution and had actively pushed for emphasis on health consequences.<sup>32</sup>

A second limit concerned the efficacy of early automobile regulation. At a 1955 meeting with car manufacturers, county officials were briefed on a device designed to reduce emissions by limiting air flow that was a major source of hydrocarbon loss. The Automobile Manufacturers Association planned for the 1958 release of the device.<sup>33-35</sup> But within a year, the APCD questioned the manufacturers' commitment. Although manufacturers had sent some pilot devices to the APCD, it looked doubtful that they would meet the 1958 release date. Whether that was because of a lack of collective commitment or a genuine engineering challenge, it left a large hole in Los Angeles's air pollution strategy, which had yet to address the most rapidly growing pollution source in the region via a rule.

Automobiles point to another limit: the delayed control of tetraethyl lead. In 1957, the APCD's Smith Griswold referred to lead as not present "in sufficient quantity to constitute hazards in their initial form."<sup>36</sup> This notion reflected a long-standing position that the human body could tolerate low levels of lead, a position pushed by Robert Kehoe, a leading industrial hygienist funded by the Ethyl Corporation, a major manufacturer of leaded gasoline. For decades, most public health practitioners, however enlightened, accepted this industry-backed consensus until it was challenged in the mid-1960s by Clair Patterson, a California Institute of Technology geochemist.<sup>37-39</sup> In 1970, California adopted a lead threshold of 1.5  $\mu\text{g}/\text{m}^3$ , which became the federal standard in 1978.<sup>40</sup> By then, manufacturers were phasing out lead anyway because of the damage it caused to new catalytic converters.<sup>37</sup> Lack of earlier regulation over airborne lead was a lost opportunity, although one less of the APCD's or Los Angeles County's doing than the petrochemical industry's own obfuscation of the risks of leaded products.

Another constraint was the unfolding of air pollution control in concert with polluting industries themselves. Although the APCD was no pushover agency, the voluntary approach for some rules hinged on the good faith of industry. So, too, did cooperative ventures with automobile manufacturers on developing emissions-capping devices. Vapor covers and hydrocarbon-reducing equipment, meanwhile, were ameliorative measures in the environment of perpetual industrial growth in Los Angeles. This industrial growth raised questions on the cost of the economic boom to air quality, human health, and livability.

A final limit was the APCD's almost exclusive focus on air pollution control in the aggregate with little attention paid to the unequal distribution of the burden of environmental hazards, now the chief interest of the environmental justice movement. Waste sites, airports, the burgeoning ports of Los

Angeles and Long Beach, and outdated zoning that concentrated industrial sites in certain areas but not in others were and still are environmental burdens most frequently felt by residents of low-income neighborhoods—the Inglewoods, Wattses, Wilmingtons, Commerce, and others. Amid the successes of the mid-century years, these residents of Los Angeles remained largely invisible.<sup>41</sup>

## Conclusion

An extended passage in Kennedy's 1963 article demonstrates a keen awareness of the contradictions in air pollution control. "Almost everyone," he wrote, "from the homeowner to the steel manufacturer, has a reason for emitting pollutants into the air. Powerful groups will attempt to gain exemptions or favorable treatment for themselves. Some will suggest that self-regulation be encouraged. Others will recommend more studies and research. If the responsible members of the community yield to these arguments, one result can be predicted with certainty—the people of the community will continue to breathe contaminated air for a long time."<sup>1</sup>

Kennedy identified dilemmas of environmental health that persist. But these dilemmas exist in a challenging new regulatory milieu. Innovation in public nuisance law, long a fulcrum of environmental health regulation, has recently been stymied and reversed. These legal challenges, most recently in a successful \$1 billion California lead case, question the expansive authority of nuisance laws and reassert the need to prove injuries to plaintiffs.<sup>42</sup> And then there is climate change. Its consequences surface in ever-visceral ways and with an urgency—and on a scale—that far exceeds the mid-century days when Los Angeles was enveloped in darkness. Strikingly, amid federal indifference, it is a handful of US cities and states that have been most proactive when it comes to meeting the goals of the 2015 Paris Agreement. Society now faces a choice: to take inspiration from the aggressiveness of the Los Angeles fight or to ignore it.

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