



A Story Seldom Told

National Ambient Air Quality Standards and Success in Air Pollution Control

The Association of Air Pollution Control Agencies reports on trends in U.S. air quality control.

As a cornerstone of the U.S. Clean Air Act, the National Ambient Air Quality Standards (NAAQS) program has been a vital component in the significant progress that has been achieved in reducing air pollution in the United States. State and local air agencies, responsible for implementing the NAAQS through the Clean Air Act's framework of cooperative federalism, have helped lead this success by developing sensible, localized strategies that address air pollution and respond to unique social and economic factors. In April 2017, the Association of Air Pollution Control Agencies (AAPCA) published the inaugural edition of *The Greatest Story Seldom Told: Profiles and Success Stories in Air Pollution Control*,¹ an annual report that highlights air quality trends, both in the AAPCA footprint and nationally, and underscores the critical role of state and local air agencies in making complex regulatory decisions impacting their communities.

Seeking to catalogue long-term air quality trends through publicly available data from the U.S. Environmental Protection Agency (EPA) and other agencies, AAPCA's annual report includes key metrics on the emissions and ambient concentrations of the six criteria air pollutants for which EPA has set NAAQS: carbon monoxide (CO), sulfur dioxide (SO₂), ground-level ozone (O₃), fine particulate matter (PM_{2.5}), lead (Pb), and nitrogen dioxide (NO₂).² Annual reports and data analyses that are made available to the public by EPA provide important information on long-term air quality and criteria pollutant trends. These include:

- An analysis (<https://www.epa.gov/air-trends>) of the ambient air pollution data provided to the national air quality system from thousands of monitors across the United States, collected by EPA, state, local, and tribal air pollution control agencies;

- Air pollutant emissions trends data (<https://www.epa.gov/air-emissions-inventories/air-pollutantemissions-trends-data>), which provide nationwide estimates of emissions of criteria air pollutants based on the National Emissions Inventory (NEI);³ and
- Air quality design values (<https://www.epa.gov/air-trends/air-quality-design-values>), which EPA defines as "a statistic that describes the air quality status of a given location relative to the level of the NAAQS ... typically used to designate and classify nonattainment areas, as well as to assess progress towards meeting the NAAQS."⁴

Relying on these reports and analyses, AAPCA's *The Greatest Story Seldom Told* is able to spotlight some of the nation's important air quality successes. The 2018 edition of AAPCA's report, published July 2018, includes updated trends for criteria pollutant concentrations and emissions that show continued progress.

Air Quality Trends

Over the course of the past several decades, ambient concentrations of the six criteria air pollutants have declined substantially. According to EPA's analysis of 2017 monitoring data,⁵ there has been at least a 32-percent reduction in the ambient levels of CO, Pb, NO₂, O₃, and SO₂ since 1980, and available monitoring data for fine and coarse particulate matter (PM_{2.5} and PM₁₀) show similar trends. A decade-over-decade comparison demonstrates consistent and consequential changes in ambient air quality since 1980, 1990, and 2000 (see Table 1).

Emissions Trends

Reductions in the emissions of criteria pollutants or criteria

Table 1. A decade-over-decade comparison of ambient air quality since 1980.

Pollutant	1980 vs. 2017 (% change)	1990 vs. 2017 (% change)	2000 vs. 2017 (% change)
Carbon monoxide (CO)	-84	-77	-61
Lead (Pb)	-99	-98	-94
Nitrogen dioxide (NO ₂ ; annual)	-63	-56	-49
Nitrogen dioxide (NO ₂ ; 1-hr)	-60	-50	-35
Ozone (O ₃ ; 8-hr)	-32	-22	-17
PM ₁₀ (24-hr)	n/a	-34	-30
PM _{2.5} (annual)	n/a	n/a	-41
PM _{2.5} (24-hr)	n/a	n/a	-40
Sulfur dioxide (SO ₂ ; 1-hr)	-90	-885	-79

pollutant precursors have contributed to the considerable progress in air quality. Utilizing the NEI, EPA publishes air pollutant emissions trends data that provide annual estimates of criteria pollutant emissions and precursors, distinguished by major sources.

The trends data on emissions published by EPA for 2017 show that, nationally, criteria pollutant emissions and precursors continue to decline.⁶ When comparing 1990 to 2017, there has been at least a 29-percent reduction in the emissions of all criteria pollutants or precursors (see Table 2). EPA's 2018 air quality report, entitled Our Nation's Air: Status and Trends Through 2017, (<https://gispub.epa.gov/air/trendsreport/2018/>) and published as an interactive website, further highlights a 73-percent decrease overall in the combined emissions of criteria pollutants or precursors since 1970.

Social and Economic Growth

Planning for, implementing, and enforcing the NAAQS require that state and local air pollution control agencies not only find ways to reduce emissions and improve air quality, but accommodate the social and economic growth characteristics of their jurisdictions. A more complete profile of air quality nationally can be seen when accounting for the tremendous gains in population, gross domestic product, and other factors—all of which have the potential to impact pollution levels.

Importantly, the trend lines for these social and economic growth indicators are in sharp contrast to the trends of the criteria air pollutants. Using data from the U.S. Census Bureau, U.S. Bureau of Economic Analysis, and U.S. Energy Information Administration, AAPCA's 2017 report charted the significant increases since 1960 in U.S. Gross Domestic

Table 2. Emissions Trends, 1990–2017.

Pollutant	1990 Emissions (in thousands of tons)	2017 Emissions (in thousands of tons)	% Reduction
Carbon monoxide (CO)	154,188	60,109	-61
Oxides of nitrogen (NO _x)	25,527	10,776	-58
PM _{2.5}	7,560	5,345	-29
Sulfur dioxide (SO ₂)	23,077	2,815	-88
Volatile organic compounds (VOCs)	24,108	16,232	-33

Product (436 percent from 1960 to 2016), population (72 percent from 1960 to 2010), and energy production (105 percent from 1960 to 2014). EPA's 2018 air quality report details similar trends since 1970: U.S. Gross Domestic Product has increased by 262 percent, population has grown 59 percent, vehicle miles traveled are up 189 percent, and energy consumption has risen 44 percent.

Opportunities for Continued Air Quality Success

While significant progress has been achieved in controlling air pollution at both the state and national level, challenges still exist as state and local agencies work toward attaining national standards and seek to appropriately characterize air quality in their areas.

For example, AAPCA-conducted surveys of state environmental agency comments on EPA's proposed 2015 O₃ standard—the most recent standard to be revised downward—recognized several common concerns when it comes to establishing compliance with new NAAQS.⁷

Of the 44 state environmental agencies that filed individual comments, AAPCA found that:

- 26 state agencies raised background O₃ as an achievability or implementation challenge, including both naturally occurring and internationally transported contributions to ground-level O₃;
- Roughly three-quarters of state agencies raised concerns about the need for timely implementation rules and guidance from EPA under a revised standard; and
- 22 states commented on limitations to activating Clean Air Act tools for excluding data effected by “exceptional events.”

Recognizing these vital on-the-ground issues, which are outside of state and local air agency control, highlights the need to establish methods that provide regulatory and other assistance for attaining air quality standards.

On April 12, 2018, a Presidential Memorandum was issued on “Promoting Domestic Manufacturing and Job Creation—Policies and Procedures Relating to Implementation of Air Quality Standards.”⁸ This memorandum included directives for EPA that may accommodate some of these environmental agency concerns, as well as better characterize air quality in terms of background concentrations and exceptional events. Other recent policies, such as EPA’s October 2017 directive on “Strengthening and Improving Membership on EPA Federal Advisory Committees,”⁹ have sought to broaden input earlier in scientific and regulatory processes by increasing state, tribal, and local membership, as well as enhancing geographic diversity. Engaging state and local air agencies is critical as these policies are carried out, especially as EPA begins to implement recently announced policy changes to the NAAQS standard-setting process and works to complete reviews of the current O₃ and PM_{2.5} standards by 2020.¹⁰

Continued success reflective of the long-term trend in air quality is dependent on informed collaboration at the federal, state, and local levels. As the Environmental Council of States indicates in its Cooperative Federalism 2.0 paper, “States are a critical part of achieving our nation’s environmental and public health goals and mandated responsibilities in an effective and efficient way.”¹¹ Further, as AAPCA indicated in comments on EPA’s *Draft FY 2018–2022 EPA Strategic Plan*, “State and local agencies are often the first point of contact for community air quality concerns.”¹² Involving the agencies directly responsible for implementing air quality standards and responding to public concerns early in the regulatory and decision-making process can provide opportunities to better define, understand, and, ultimately, find solutions to the complex issues facing the nation’s air quality—and continue the positive trends the nation has witnessed in air quality over the past 40 years. **em**

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AAPCA is a national, nonprofit, consensus-driven organization focused on assisting state and local air quality agencies and personnel with implementation and technical issues associated with the U.S. Clean Air Act. AAPCA represents more than 40 state and local air agencies, and senior officials from 20 state environmental agencies currently sit on the AAPCA Board of Directors. AAPCA is housed in Lexington, KY, as an affiliate of The Council of State Governments.

References

1. 2018 Edition available at <https://cleanairact.org/news/documents/AAPCA2018GreatestStory-July2018.pdf> and 2017 Edition available at <https://cleanairact.org/documents/GreatestStory4-17-17.pdf>.
2. EPA NAAQS Table. See <https://www.epa.gov/criteria-air-pollutants/naaq-table>.
3. EPA defines the NEI as “a comprehensive and detailed estimate of air emissions of criteria pollutants, criteria precursors, and hazardous air pollutants from air emissions sources ... released every three years based primarily upon data provided [to the Emissions Inventory System] by State, Local, and Tribal air agencies for sources in their jurisdictions and supplemented by data developed by the US EPA.” See <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>.
4. EPA Air Quality Design Values. See <https://www.epa.gov/air-trends/air-quality-design-values>.
5. EPA Air Quality – National Summary. See: <https://www.epa.gov/air-trends/air-quality-national-summary#air-quality-trends>.
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7. See “State Environmental Agency Perspectives on Timely NAAQS Implementation”; AAPCA, September 2015 (<https://cleanairact.org/documents/AAPCA-StateEnvironmentalAgencyPerspectivesonTimelyNAAQSImplementation9-2015.pdf>); and “State Environmental Agency Perspectives on Background Ozone & Regulatory Relief”; AAPCA, June 2015 (<https://cleanairact.org/documents/AAPCASurvey-StateEnvironmentalAgencyPerspectivesonBackgroundOzoneandRegulatoryRelief-June2015.pdf>).
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