STATE AIR TRENDS & SUCCESSES

The StATS Report

2020 EDITION

AAPCA

THE ASSOCIATION OF AIR POLLUTION CONTROL AGENCIES

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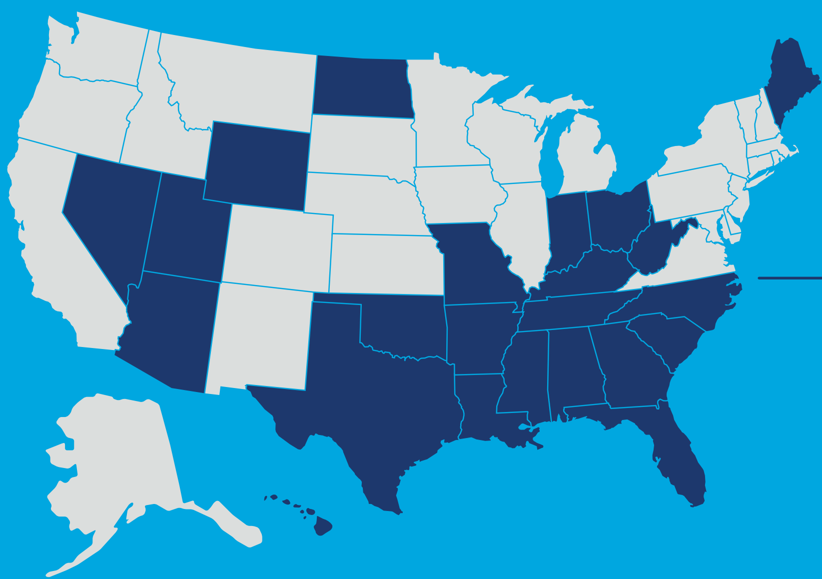
The Association of Air Pollution Control Agencies, or AAPCA, is a national, non-profit, consensus-driven organization focused on assisting state and local air quality agencies and personnel with implementation and technical issues associated with the federal Clean Air Act. Created in 2012, AAPCA represents 48 state and local air pollution control agencies, and senior officials from 23 state environmental agencies currently sit on the AAPCA Board of Directors. AAPCA is housed in Lexington, Kentucky as an affiliate of **The Council of State Governments**. More information about AAPCA may be found by visiting **www.cleanairact.org**.

State Environmental Agencies Currently Represented on the AAPCA Board of Directors



- Alabama
- Arizona
- Arkansas
- Florida
- Georgia
- Hawaii
- Indiana
- Kentucky
- Louisiana
- Maine
- Mississippi
- Missouri
- Nevada
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- South Carolina
- Tennessee
- Texas
- Utah
- West Virginia
- Wyoming

Footprint of AAPCA State Members

State members of the AAPCA Board of Directors have primary responsibility for protecting air quality for a significant portion of the country, as reflected in the following statistics:

— An estimated —
151.5 million
AMERICANS
– about **46%** of the –
total U.S. population

An average population growth from 2000–2019 of approximately **24%**, compared to national population growth of **17%**

$ NEARLY 40%
of U.S. Gross Domestic Product in 2018

Approximately **47% of U.S. Total Manufacturing Output**

& **5.9 million manufacturing jobs** as of October 2019

ABOUT **66%** of U.S. operable petroleum refining capacity in 2019

An estimated **48%** of Highway Vehicle-Miles Traveled

63% of total energy production
IN THE UNITED STATES IN 2017, INCLUDING:

- 58% of total net electricity generation
- 49% of wind generation
- 73% of coal production
- 75% of crude oil production
- 67% of natural gas production

Foreword

Dear Readers,

This year, the United States celebrates the 50th Earth Day and the importance of the natural environment. It is also a time to reflect on the tremendous environmental progress that has been made in the United States in the past half century. Americans today enjoy cleaner air than they did 50 years ago, and trends show the environment will continue to benefit from the protections provided by state, local and federal planning. We, the state and local members of the Association of Air Pollution Control Agencies (AAPCA), have dedicated our careers to improving air quality and we are proud of this progress.

AAPCA is a consensus-driven organization of 48 state and local air agencies focused on assisting members with implementation of technical issues associated with the Clean Air Act. AAPCA's Board of Directors is comprised of senior officials from 23 geographically diverse member states' environmental protection agencies. This diversity strengthens our members' ability to learn from new perspectives that help foster the development of innovative and effective strategies to address air quality. Consensus principles encourage and promote a focus on common issues as we work to implement the Clean Air Act, and work with federal co-regulator partners to address those issues.

As AAPCA's current president, I am pleased to present our annual publication, *State Air Trends & Successes: The StATS Report*. State and local air quality agencies are responsible for making complex planning decisions affecting air quality in their communities that have unique social and economic factors to consider, and *The StATS Report* highlights the progress in air quality made while accommodating these factors. That progress is evidenced in a variety of air quality measures and indicators, including:

- From 1990 to 2018 in AAPCA Member States, aggregate emissions of the six criteria air pollutants for which there are national ambient air quality standards (NAAQS) were reduced by 53 percent, while Gross Domestic Product rose 281 percent, vehicle miles traveled increased 68 percent, and population increased 48 percent.
- Over the 20-year period from 1997 to 2017, emissions of nitrogen oxides from electric utilities in AAPCA member states were reduced by more than 82 percent, while sulfur dioxide emissions in this sector were reduced 88 percent.
- Emissions of air toxics in AAPCA member states were reduced by 350 million pounds from 2008 to 2018.

These statistics, and other metrics cataloged in this report, convey the remarkable improvements in air quality that have been made. As Air Directors, we recognize that our work is not done. We will continue to engage with our federal partners and other stakeholders to continue this progress.

Karen Hays

KAREN HAYS
Chief, Air Protection Branch
Georgia Environmental Protection Division
President, AAPCA

Introduction

Environmental Milestones and *The StATS Report*

2020 is a year of environmental milestones for the United States, highlighted by the observation of the **50th year of the Environmental Protection Agency** (U.S. EPA) on December 2, which is marked by the swearing in of William Ruckelshaus in 1970 as the Agency's first Administrator. Earth Day, which has become an international event, also enters a fifth decade this year. With noteworthy accomplishments to laud at each of those half-century marks, the most significant achievements might be attributable to another 50th happening in 2020: the passage of the **Clean Air Act Amendments of 1970**. Over that span, the federal Clean Air Act—with further amendments in **1977** and **1993**—has been foundational to the nation's substantial environmental progress.

The 2020 edition of AAPCA's *State Air Trends & Successes: The StATS Report* documents the United States' success in improving air quality under the Clean Air Act and underscores the Act's vital framework of cooperative federalism that delegates regulatory and planning authority to state and local air agencies. In virtually every measure, the air in the United States is vastly cleaner and clearer today than it was in 1970—a period that has seen Gross Domestic Product **grow by nearly 300 percent**. This progress has been achieved through complex technical analyses, such as monitoring and modeling, that is undertaken by air agencies to guide planning efforts that accommodate social, geographic, and economic factors.

As the title alludes, *The StATS Report* relies on statistics and data analysis to catalogue long-term air quality trends. This report provides data from publicly available sources (see page 6 of this report, "Types of Air Quality Data and Metrics") to show the tremendous progress across several key air quality metrics. Among the trends highlighted are emissions and ambient levels of criteria air pollutants, greenhouse gases, visibility in national parks, air releases of toxic chemicals, enforcement activity, and, where applicable to provide context, the trend lines of economic and social growth indicators that could indicate an impact on air quality.

The 2020 edition of *State Air Trends & Successes* is presented in three sections: air quality trends in AAPCA Member States; the international context of air quality in the United States; and, long-term national air quality trends. Where comparable data is available, this report also spotlights areas where AAPCA Member States have demonstrated leadership in air pollution control.

Air Quality in 2020: Current Challenges, Emerging Issues, and Future Opportunities

Benchmark environmental achievements provide cause for celebration as well as an informational basis for meeting ever-more-difficult targets requiring ever-more-complex work. As jurisdictional and technical experts, state and local agencies not only continue to develop plans for maintaining and improving air quality across the United States, but also increasingly serve as critical checkpoints for emergent issues facing communities. These issues range broadly—from the regional impacts of wildfires to emerging compounds like per- and polyfluoroalkyl substances (PFAS) and ethylene oxide to background concentrations of air pollutants—and necessitate balancing limited financial, technological, and staff resources.

As resource priorities evolve, environmental agencies have strived to maximize funding through strict budgeting, creative programming, and best practices. In part, air agency budgets, to an extent reliant on emissions fees from permitted sources, have been impacted by the successes that characterize air pollution control work. State and local air agencies, for example, collect fees for pollutant emissions on a per-ton basis from major sources through the **Title V Operating Permit program**, established as part of the 1990 Clean Air Act Amendments, but have seen major decreases in revenue from the program as it meets its primary goal: driving emissions down to create better air quality. Coupled with these decreases is the difficulty in effecting further emissions reductions to meet national ambient air quality standards (NAAQS) and progress other air pollution control goals.

Despite emergent challenges and changing budget structures, the definable progress that has been made under the Clean Air Act underscores the core role of environmental agencies. Entering the third decade of this century, state and local agencies remain at the forefront of modern air pollution control efforts and are more experienced and technologically equipped than in 1970. Informed by process improvements in planning, permitting, training, rule development, and compliance and enforcement work, and with technological advancements, such as mobile monitoring labs or using meteorological and satellite observations, agencies are better able to understand air quality issues, engage communities, and provide the leadership that has resulted in the trends highlighted in this report.

Types of Air Quality Data and Metrics

This report primarily relies on data from the U.S. Environmental Protection Agency (EPA) and other federal agencies, such as the U.S. Energy Information Administration (EIA), to evaluate air quality trends. These include metrics for criteria air pollutants, hazardous air pollutants, visibility progress in national parks and wilderness areas, and greenhouse gases, with sources provided below each chart or graph and in the notes for each section. Also included in this report are case studies and short excerpts from other relevant analyses, which include direct links to the source and data.

Criteria Air Pollutant Data

An important set of indicators for measuring ambient air quality are the air pollutants that are regulated under the federal Clean Air Act. The Clean Air Act directs U.S. EPA to establish national ambient air quality standards (NAAQS) for air pollutants, the "attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health."[1] NAAQS have been set for six "criteria" pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), ground-level ozone (O_3), fine particulate matter ($PM_{2.5}$), lead (Pb), and nitrogen dioxide (NO_2).[2]

Section 109 of the Clean Air Act requires EPA to establish both primary and secondary NAAQS. Primary NAAQS are "standards the attainment and maintenance of which … are requisite to protect the public health," while secondary NAAQS "specify a level of air quality the attainment and maintenance of which … is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air."[3] U.S. EPA and the Clean Air Scientific Advisory Committee review the adequacy of the NAAQS according to the statute. Individual NAAQS may differ in form (for example, annual fourth-highest daily maximum 8-hour concentration average over three years, for ozone), level (often measured in parts per billion or micrograms per cubic meter), and averaging time (from one hour up to one year).

Nationally, ambient air pollution data from thousands of monitors across the United States is collected by U.S. EPA and state, local, and tribal air pollution control agencies and provided to the Air Quality System. These data are used to "assess air quality, assist in attainment/non-attainment designations, evaluate State Implementation Plans [SIPs] for non-attainment areas, perform modeling for permit review analysis, and prepare reports for Congress as mandated by the Clean Air Act."[4]

U.S. EPA reports on long-term air quality trends by preparing data analyses that show the overall trend lines for pollutant concentrations and emissions. Primary sources that inform this report include:

- Criteria air pollutant concentration data that are pulled from EPA's analysis of the Air Quality System that looks at long-term trends in air quality.[5]
- Data showing emissions trends of the criteria pollutants are pulled from U.S. EPA's Air Pollutant Emissions Trends Data,[6] which includes "all criteria pollutants National Tier 1" and relies on the National Emissions Inventory (NEI). The NEI is "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."[7]
- Design values, which are computed and published annually by U.S. EPA and defined 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."[8]

Other Air Quality Data

In addition to tracking criteria air pollutants, U.S. EPA also maintains data and develops analyses on multiple other air quality programs. The Toxic Release Inventory (TRI) provides a consistent set of data over time for hazardous air pollutants (or air toxics).[9] Visibility progress is tracked as part of the Regional Haze Program, with long-term trends available in U.S. EPA's yearly Air Quality Trends Report.[10] Greenhouse gas data are pulled primarily from U.S. EPA's annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks*[11] and U.S. EIA reports, such as the Annual Energy Outlook,[12] and analyses of greenhouse gas data.

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1 42 U.S.C. §7409(b)(1).
2 A chart of the primary and secondary NAAQS by pollutant can be found **here**.
3 42 U.S.C. §7409.
4 U.S. EPA, **Air Quality System**. EPA notes that the AQS "also contains meteorological data, descriptive information about each monitoring station (including its geographic location and its operator), and data quality assurance/quality control information."
5 Links to data summary files for national trends can be found **here**.
6 Data can be found **here**. EPA notes: "The latest version of the 1970 – 2017 data show the trends for Tier 1 categories which distinguish pollutant emission contributions among major source types … As inventory methods are improved over time, for some emission sources and improved estimation method may be applied 'backwards' to previous year trend estimates."
7 More information on the NEI can be found **here**. 2017 NEI data released February 2020.
8 U.S. EPA, **Air Quality Design Values**.
9 U.S. EPA, ***2018 Toxic Release Inventory National Analysis***, February 2020.
10 U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018*** (Visibility trends **here**), July 2019.
11 U.S. EPA, ***Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018***, April 2020.
12 U.S. EIA, ***Annual Energy Outlook 2020***, January 29, 2020.

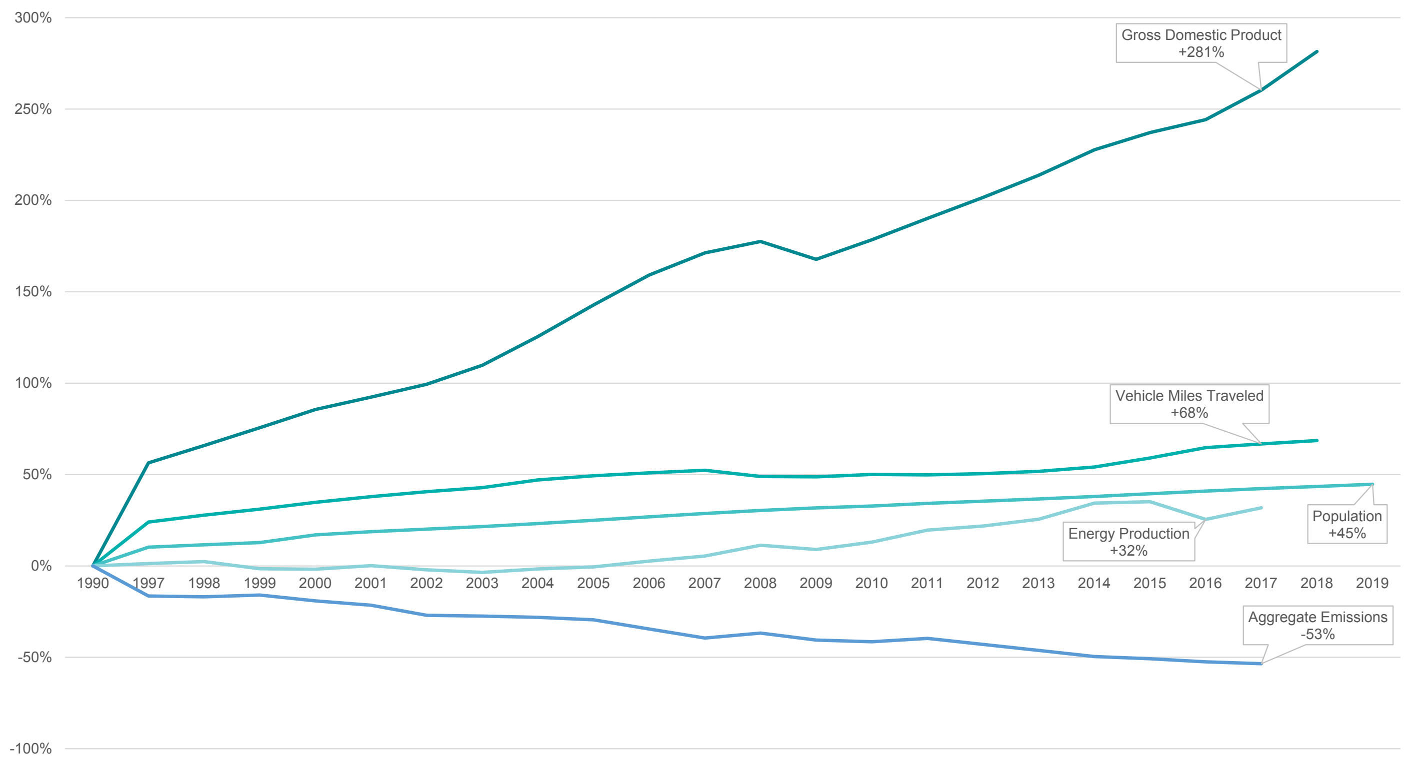
AIR QUALITY SUCCESSES IN AAPCA MEMBER STATES

AAPCA Member States | Growth Indicators and Emissions Reductions

Since 1990, AAPCA Member States have overseen substantial emissions reductions and air quality progress while experiencing significant growth. Through 2017, AAPCA Member States were responsible for a 53-percent reduction in the combined emissions of the six criteria air pollutants for which there are national ambient air quality standards, or NAAQS.[1] These emissions reductions were alongside the following economic and social indicators trends:

- Through 2018, a 281-percent increase in Gross Domestic Product (GDP), including accounting for nearly 40 percent of total U.S. GDP[2];
- An approximately 70-percent increase in vehicle miles traveled from 1990 to 2018[3];
- A nearly 45-percent increase in population, representing more than 46 percent of the total U.S. population in 2019[4]; and,
- A 32-percent increase in energy production from 1990 to 2017, while producing 63 percent of total U.S. energy in 2017.[5]

AAPCA Member States: Comparison of Growth Areas and Emissions (1990–2019)



Sources: Bureau of Economic Analysis, data available **here**; U.S. Office of Highway Policy Information, data available **here**; U.S. Census Bureau, data available **here**; U.S. Energy Information Administration, **State Energy Data System (SEDS): 1960-2017**; U.S. EPA, **Air Pollutant Emissions Trends** (Data file: "State Average Annual Emissions Trend").

"It makes sense for state and local air pollution agencies to take the lead in carrying out the Clean Air Act. They are able to develop solutions for pollution problems that require special understanding of local industries, geography, housing, and travel patterns, as well as other factors ... State, local, and tribal governments also monitor air quality, inspect facilities under their jurisdictions and enforce Clean Air Act regulations."

Source: U.S. EPA, ***The Plain English Guide to the Clean Air Act***, April 2007.

Air Quality | Ozone

U.S. EPA's online *Green Book* indicates that there were 47 areas in the United States designated nonattainment or maintenance for the 2008 8-hour ozone national ambient air quality standard (NAAQS) of 0.075 parts per million (ppm), with 14 located partially or fully in AAPCA Member States.[6]

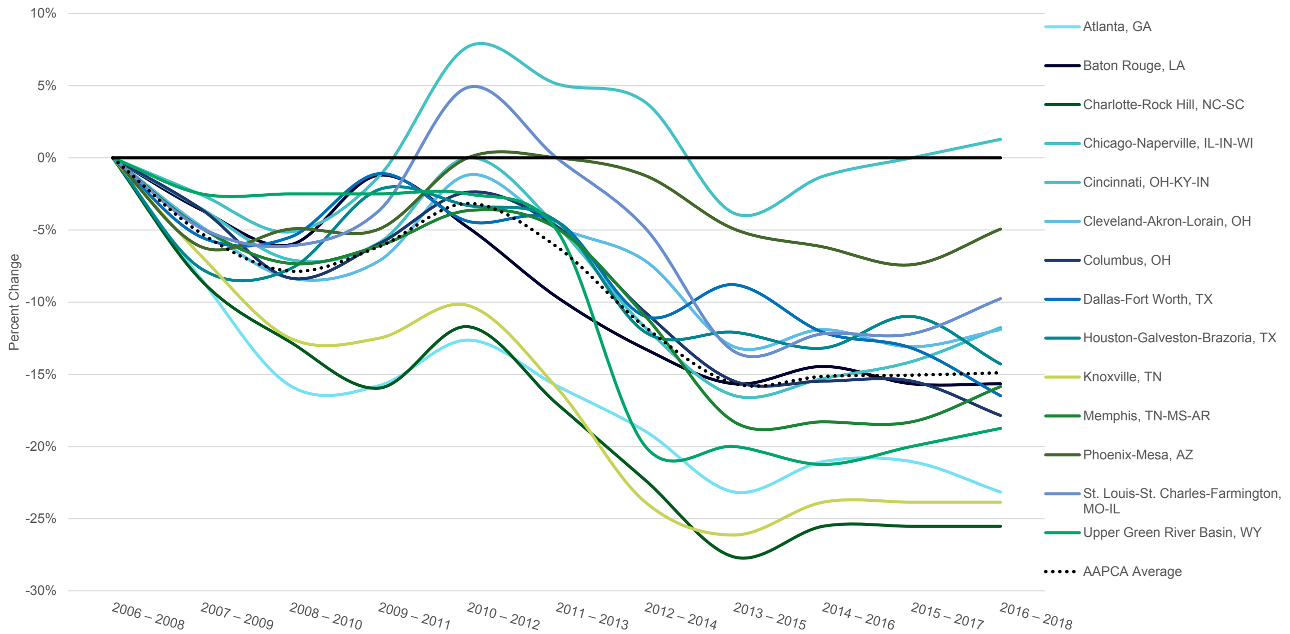
Design values[7] based on monitoring data from U.S. EPA's Air Quality System show that areas designated in AAPCA Member States averaged a 15-percent reduction in ambient concentrations of ozone from 2006 to 2018. The table below shows the percent change in design values for areas previously designated nonattainment in AAPCA Member States over this period.[8]

DESIGNATED AREA	PERCENT CHANGE IN OZONE CONCENTRATIONS 2006–2018
Atlanta, GA	-23.16%
Baton Rouge, LA	-15.66%
Charlotte-Rock Hill, NC-SC	-25.53%
Chicago-Naperville, IL-IN-WI	1.28%
Cincinnati, OH-KY-IN	-11.76%
Cleveland-Akron-Lorain, OH	-11.90%
Columbus, OH	-17.86%
Dallas-Fort Worth, TX	-16.48%
Houston-Galveston-Brazoria, TX	-14.29%
Knoxville, TN	-23.86%
Memphis, TN-MS-AR	-15.85%
Phoenix-Mesa, AZ	-4.94%
St. Louis-St. Charles-Farmington, MO-IL	-9.76%
Upper Green River Basin, WY	-18.75%

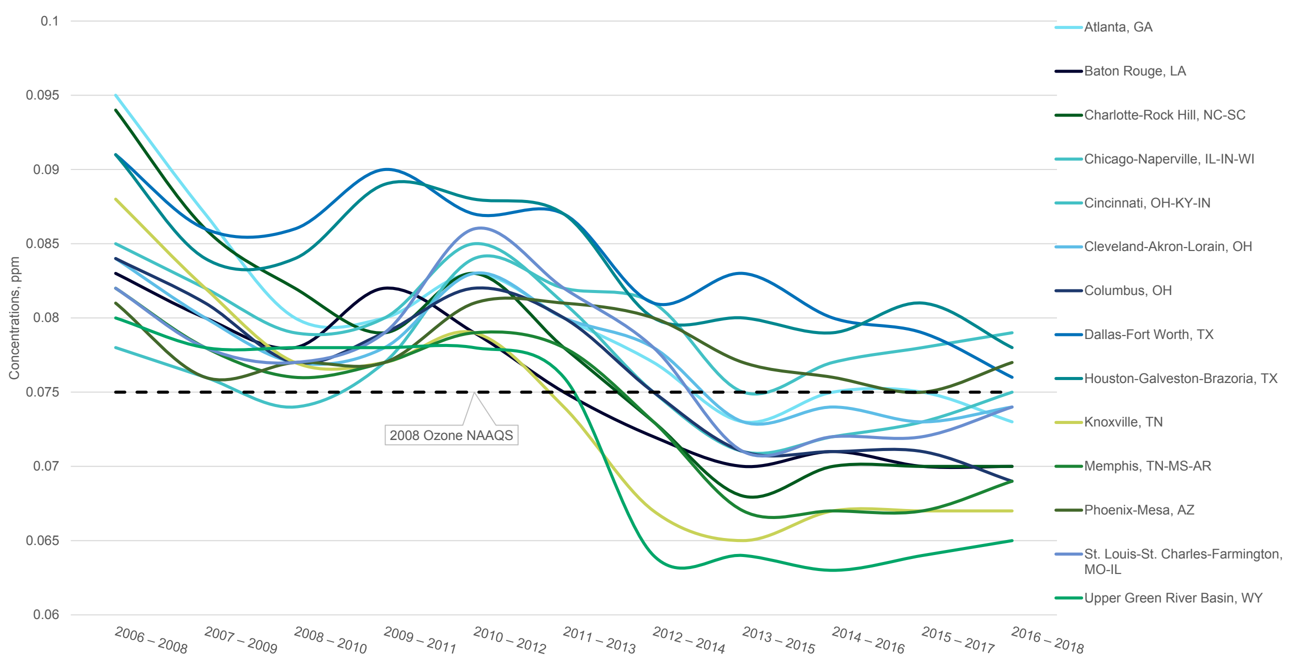
Source: U.S. EPA, **Air Quality Design Values** (Data file: "Ozone design values, 2018").

Air Quality | Ozone

AAPCA Member States: Percent Change in Design Value for Areas Previously Designated Nonattainment for the 2008 Ozone NAAQS (2006–2018)



AAPCA Member States: Design Value History for Areas Previously Designated Nonattainment for the 2008 Ozone NAAQS (2006–2018)



Source: U.S. EPA, **Air Quality Design Values** (Data file: "Ozone design values, 2018").

Air Quality | Fine Particulate Matter

U.S. EPA's *Green Book* indicates that a total of 39 areas in the United States were designated non-attainment for the 1997 fine particulate matter ($PM_{2.5}$) NAAQS of 15 micrograms per cubic meter (μg/m^3), measured by the three-year average annual mean concentration.[9]

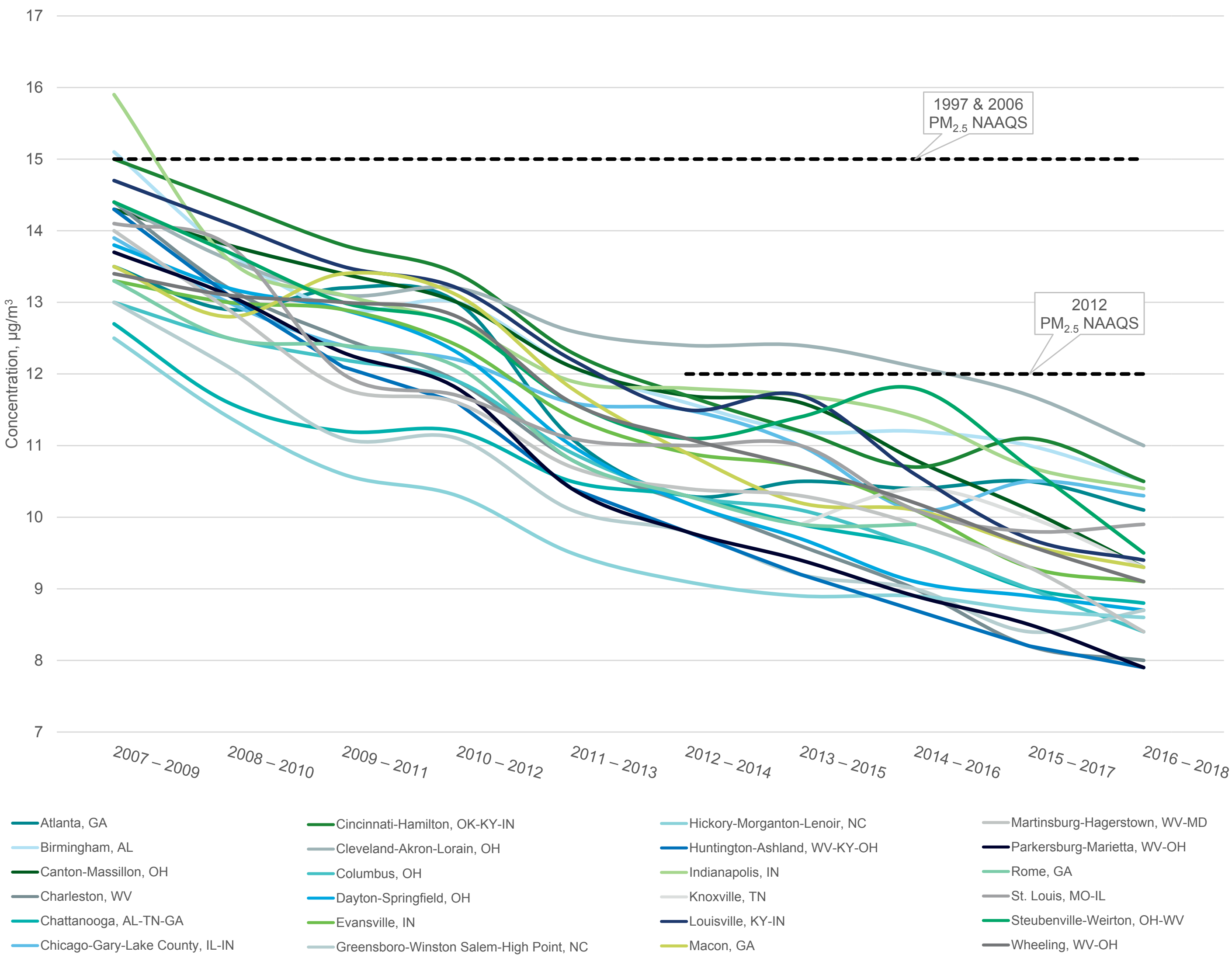
Of the designated nonattainment areas, 24 were partially or completely located within AAPCA Member States. The table below shows the percent change in design values for these locations from 2007 to 2018, with an average reduction in $PM_{2.5}$ concentration of more than 32 percent for AAPCA Member States.[10]

DESIGNATED AREA	PERCENT CHANGE IN $PM_{2.5}$ CONCENTRATIONS 2007–2018
Atlanta, GA	-25.19%
Birmingham, AL	-30.46%
Canton-Massillon, OH	-35.21%
Charleston, WV	-44.44%
Chattanooga, AL-TN-GA	-30.71%
Chicago-Gary-Lake County, IL-IN	-25.90%
Cincinnati-Hamilton, OK-KY-IN	-30.00%
Cleveland-Akron-Lorain, OH	-23.61%
Columbus, OH	-35.38%
Dayton-Springfield, OH	-36.96%
Evansville, IN	-31.58%
Greensboro-Winston Salem-High Point, NC	-33.08%
Hickory-Morganton-Lenoir, NC	-31.20%
Huntington-Ashland, WV-KY-OH	-44.76%
Indianapolis, IN	-34.59%
Knoxville, TN	-6.06%
Louisville, KY-IN	-36.05%
Macon, GA	-31.11%
Martinsburg-Hagerstown, WV-MD	-40.00%
Parkersburg-Marietta, WV-OH	-42.34%
Rome, GA	-25.56%
St. Louis, MO-IL	-29.79%
Steubenville-Weirton, OH-WV	-34.03%
Wheeling, WV-OH	-32.09%

Source: U.S. EPA, **Air Quality Design Values** (Data file: "$PM_{2.5}$ Design Values, 2018").

Air Quality | Fine Particulate Matter

AAPCA Member States: Design Value History for Areas Previously Designated Nonattainment for $PM_{2.5}$ (2007–2018)



Source: U.S. EPA, **Air Quality Design Values** (Data file: "$PM_{2.5}$ Design Values, 2018").

AAPCA BEST PRACTICES IN AIR POLLUTION CONTROL

Each year, AAPCA awards **Best Practices** that identify ground-breaking technology, innovative approaches, and exemplary operations in the field of air pollution control, with particular focus on activities that are directly transferable to the operation of an air pollution control agency. Below are recipients of AAPCA Best Practices since 2015:

2019

- **Data Verification Procedures**
  Georgia Environmental Protection Division
- **Ozone Design Value Predictor Tool**
  North Carolina Division of Air Quality
- **Louisville Community Workshop Series (Local Government Best Practice)**
  Louisville Metro Air Pollution Control District

2018

- **Georgia State Implementation Plan Processing Procedures**
  Georgia Environmental Protection Division, Air Protection Branch
- **Toxicity Factors Database**
  Texas Commission on Environmental Quality
- **Inventory, Monitoring, Permitting, and Compliance Tracking (IMPACT) Web-based Data System**
  Wyoming Department of Environmental Quality, Air Quality Division

2017

- **National Ambient Air Quality Standards (NAAQS) Exceedance Reports**
  Georgia Environmental Protection Division, Air Protection Branch
- **Pollutants of Concern Table Implementation**
  Kentucky Division for Air Quality
- **Standardization of an Engineer's Notebook for Title V Permitting**
  Wyoming Department of Environmental Quality, Air Quality Division

2016

- **Air Protection Branch 101 Training**
  Georgia Environmental Protection Division, Air Protection Branch

2015

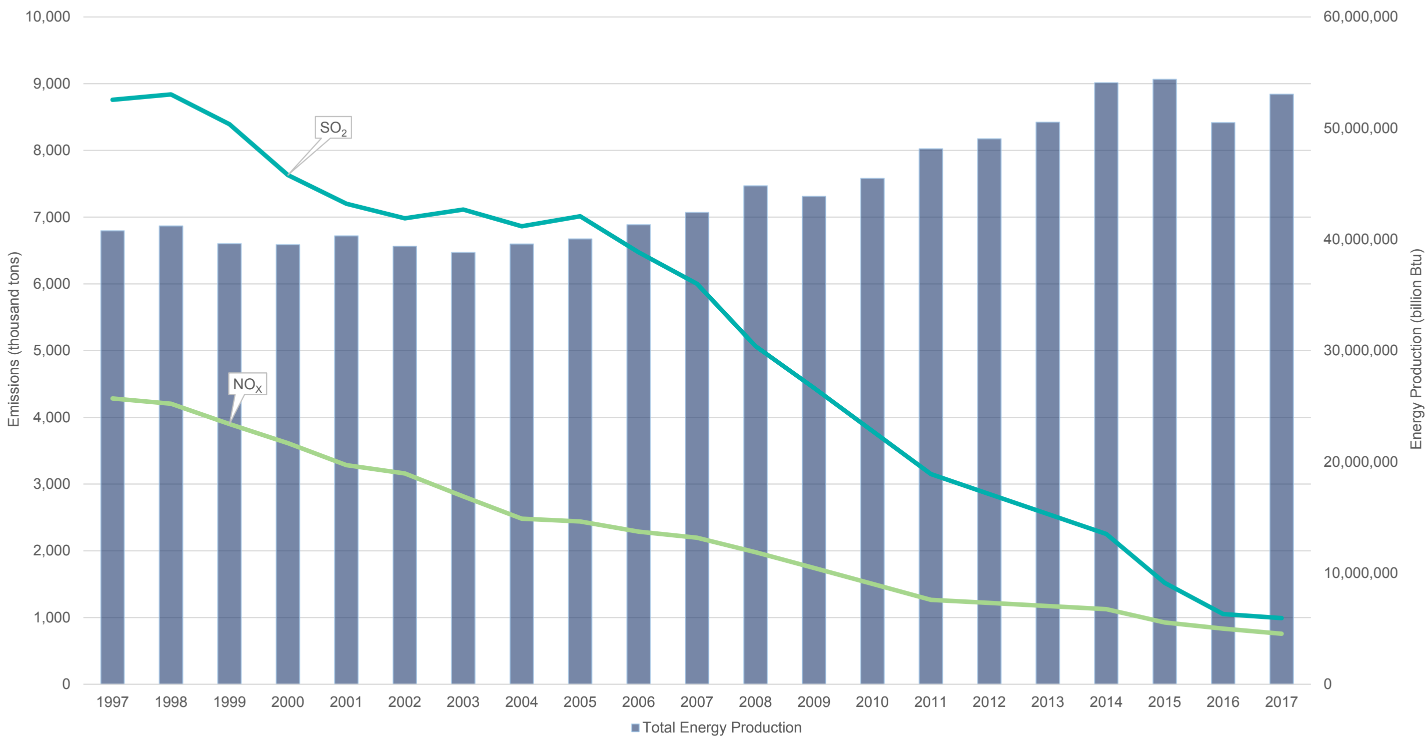
- **AirCom: Florida Division of Air Resource Management's New Compliance and Enforcement Database and Field Inspection Tool**
  Florida Department of Environmental Protection
- **FAIR: Florida Air Inspector Reference**
  Florida Department of Environmental Protection
- **Promoting Energy Efficiency at Commercial and Industrial Facilities in North Carolina**
  North Carolina Division of Air Quality

Electricity Sector Emissions Reductions

In the two decade period from 1997 to 2017, AAPCA Member States experienced above a 30-percent increase in energy production.[11] Over this same period, sulfur dioxide (SO_2) and oxides of nitrogen (NO_X) emissions declined substantially.

In the electricity sector, SO_2 emissions in AAPCA Member States decreased 88 percent, from 8,758,000 tons in 1997 to 991,000 tons in 2017, while NO_X emissions went from 4,243,000 tons in 1997 to 757,900 tons in 2017, a reduction of 82 percent.[12]

AAPCA Member States: Energy Production Compared to SO_2 and NO_X Emissions from the Electricity Sector (1997–2017)



Sources: U.S. Energy Information Administration, **State Energy Data System (SEDS): 1960-2017**; U.S. EPA, **Air Pollutant Emissions Trends Data** (Data file: "State Average Annual Emissions Trend").

Power Plant Emissions | SO_2 and NO_X Trends

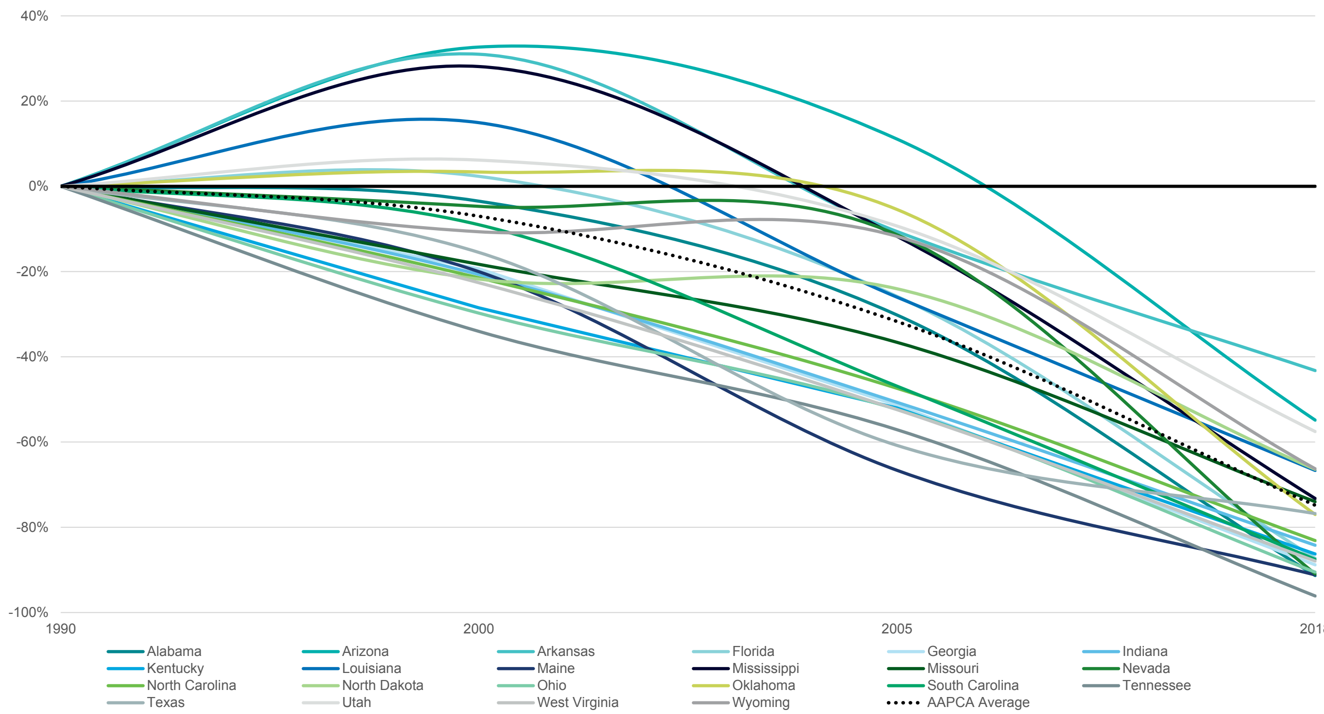
U.S. EPA's preliminary **2019 Power Plant Emissions Data** demonstrate that "For the first time since the start of the Acid Rain Program (ARP), annual emissions of SO_2 and NO_X emissions are both under a million tons," with a decline from 2018 of 23 percent for SO_2 emission and 14 percent for NO_X emissions.

Source: U.S. EPA, "**EPA's 2019 Power Plant Emissions Data Demonstrate Significant Progress**," February 19, 2020. Data available **here**.

Electricity Sector Emissions Reductions | Oxides of Nitrogen

Data from U.S. EPA's Clean Air Markets Programs[13] show that AAPCA Member States reduced electricity sector emissions of oxides of nitrogen (NO_x) by an average of nearly 75 percent from 1990 to 2018.[14]

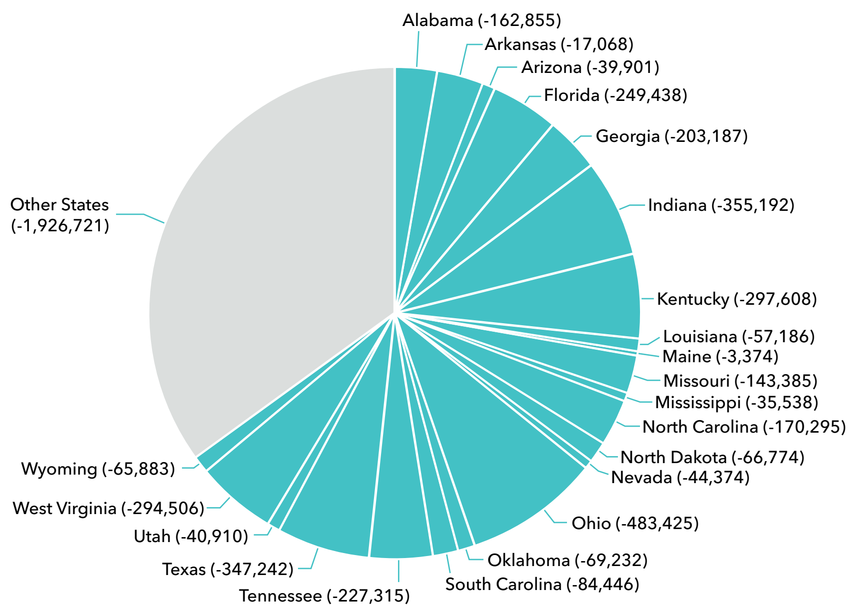
AAPCA Member States: Percent Reduction in NO_x Emissions from the Electricity Sector (1990–2018)



AAPCA Member States: Share of NO_x Emissions Reductions in the Electricity Sector (1990–2018)

(tons of NO_x reduced)

From 1990 to 2018, electricity sector NO_x emissions in the United States declined by 84 percent, from 6.4 million tons to 1.02 million tons. AAPCA Member States accounted for 64 percent of these reductions, or 3.45 million tons.[15]

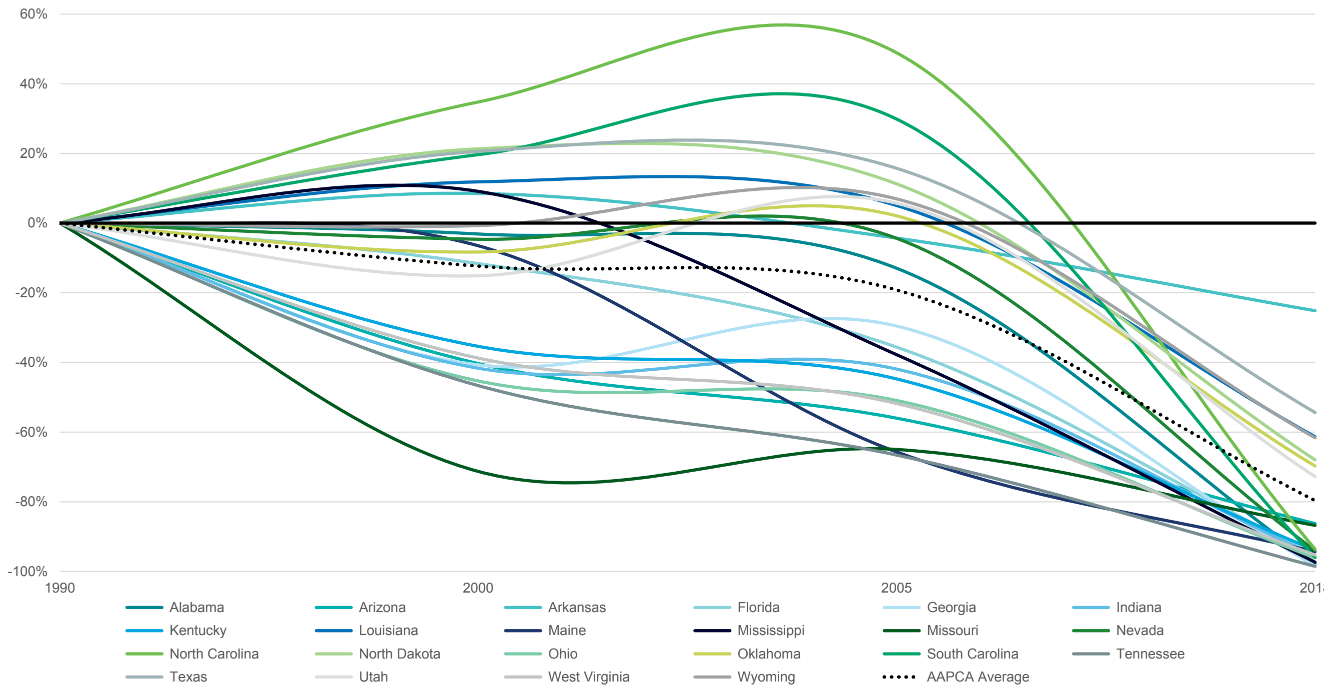


Source: U.S. EPA, "**Annual NO_x Emissions from CSAPR and ARP Sources, 1990 –2018**," December 2019.

Electricity Sector Emissions Reductions | Sulfur Dioxide

U.S. EPA's Clean Air Markets Programs data show that AAPCA member states decreased their emissions of sulfur dioxides (SO_2) from the electricity sector by an average of nearly 80 percent.[16]

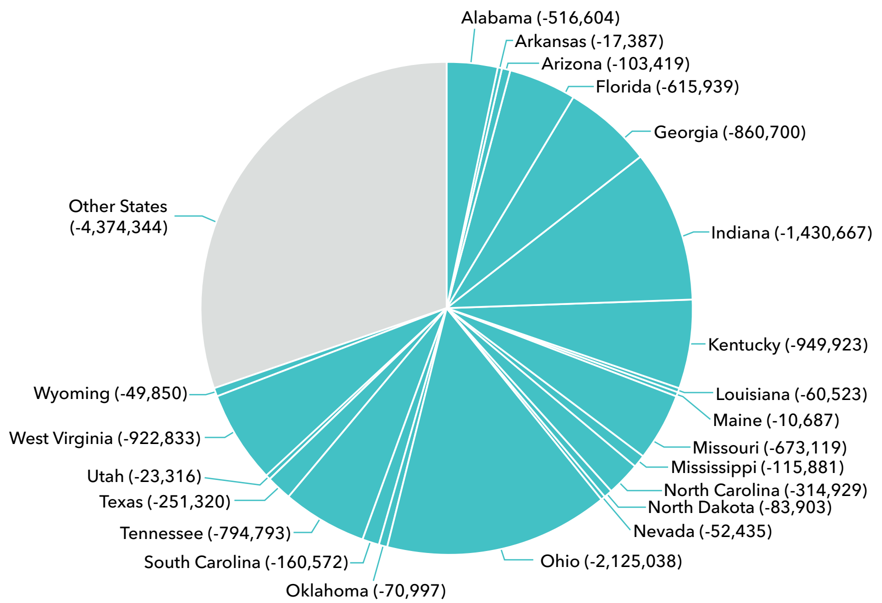
AAPCA Member States: Percent Reduction in SO_2 Emissions from the Electricity Sector (1990–2018)



AAPCA Member States: Share of SO_2 Emissions Reductions in the Electricity Sector (1990–2018)

(tons of SO_2 reduced)

Nationally, electricity sector SO_2 emissions went from 15.7 million tons in 1990 to 1.2 million tons in 2018 a 92-percent reduction. AAPCA Member States accounted for nearly 70 percent of these SO_2 emissions reductions, lowering SO_2 emissions from 10.9 million tons in 1990 to 888,600 tons in 2018.[17]



Source: U.S. EPA, "**State-by-State SO_2 Emissions from CAIR and ARP Sources, 1990-2018**," December 2019.

VISIBILITY PROGRESS | Then and Now in the Okefenokee Wilderness Area

The Okefenokee Wilderness Area (managed by the U.S. Fish and Wildlife Service) is one of three Federal Class I areas in Georgia. Located in the south-central part of Georgia, the Okefenokee Wilderness Area (Figure 1) covers 343,850 acres and is the headwaters of the Suwannee and St. Marys Rivers. It is one of the world's largest intact freshwater ecosystems and provides habitats for many threatened and endangered species. It is a wild and beautiful natural area where visitors can experience a level of solitude not often found in an increasingly technological society.

The Okefenokee Wilderness Area has benefitted from the collaborative effort of state, local, and federal stakeholders through the Regional Haze Program. Statewide SO_2 emissions in Georgia were reduced 93 percent between 2000 and 2017; NO_x emissions in Georgia were reduced by 60 percent during this same time period. As a result, visibility at the Okefenokee Wilderness Area increased from 19 miles to 44 miles on the 20 percent most impaired visibility days.

U.S. EPA's Regional Haze Rule requires each Class I area to achieve natural conditions by the year 2064. Progress is measured by comparing the 5-year average haze index (dv) to the uniform rate of progress (URP) glide path at each Class I area. The monitoring data through 2017 indicates that the Okefenokee Wilderness Area is well below the 2018 URP glide slope target (Figure 2). In fact, the Okefenokee Wilderness Area is currently meeting the 2028 URP target. This is more than 10 years ahead of schedule!

Figure 1. Okefenokee Wilderness Area photo taken from ***https://www.fws.gov/refuge/Okefenokee***.

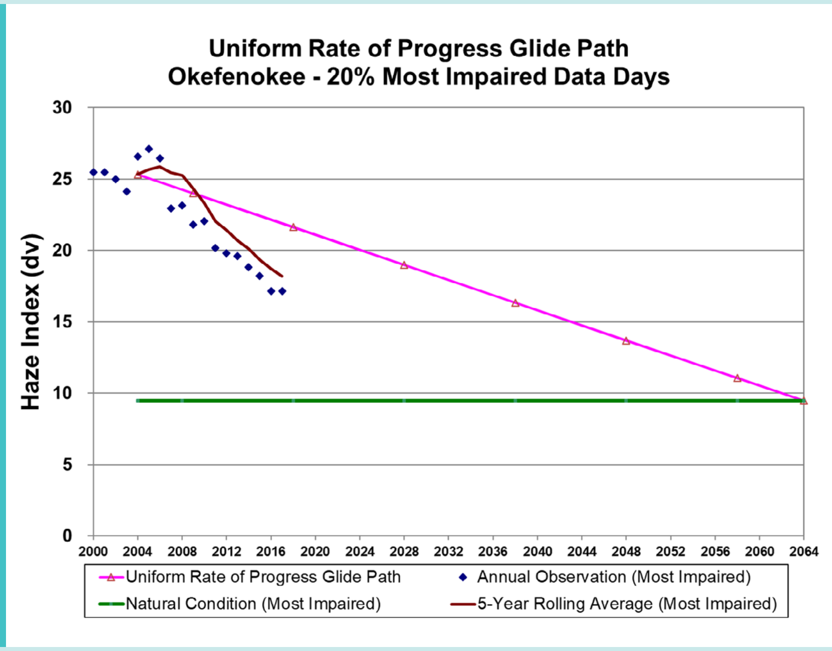
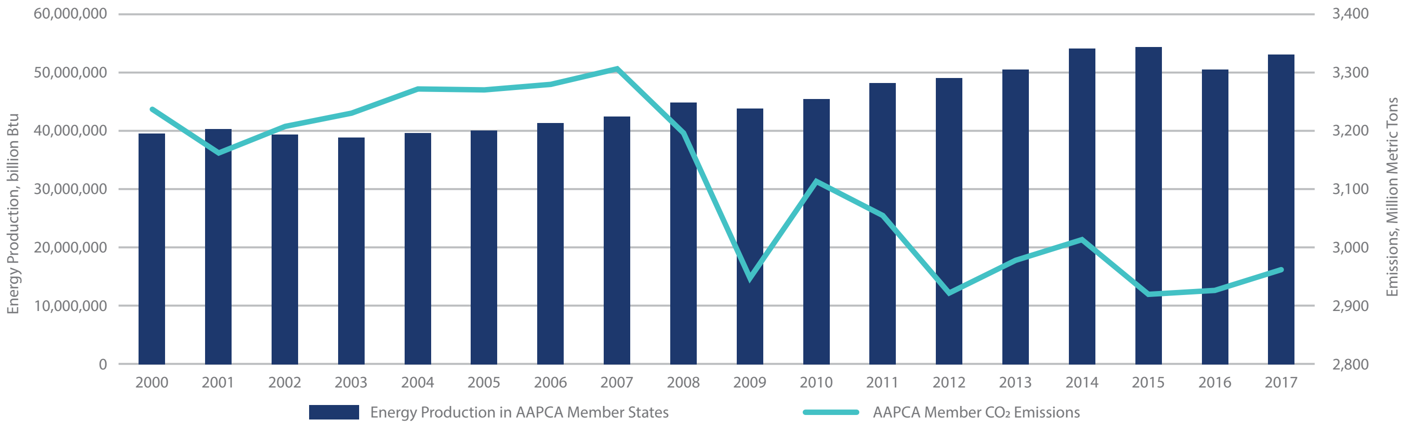


Figure 2. Annual and 5-year rolling average haze index (dv) on the 20% most impaired days compared against the uniform rate of progress glide path and natural conditions for the Okefenokee Wilderness Area.

Greenhouse Gases and Energy

From 2000 through 2017, energy production in AAPCA Member States increased nearly 35 percent. During this same time, AAPCA Member States decreased energy-related carbon dioxide (CO_2) by 278,500,000 metric tons, from 3,239 million metric tons in 2000 to 2,960 million metric tons in 2017.[18]

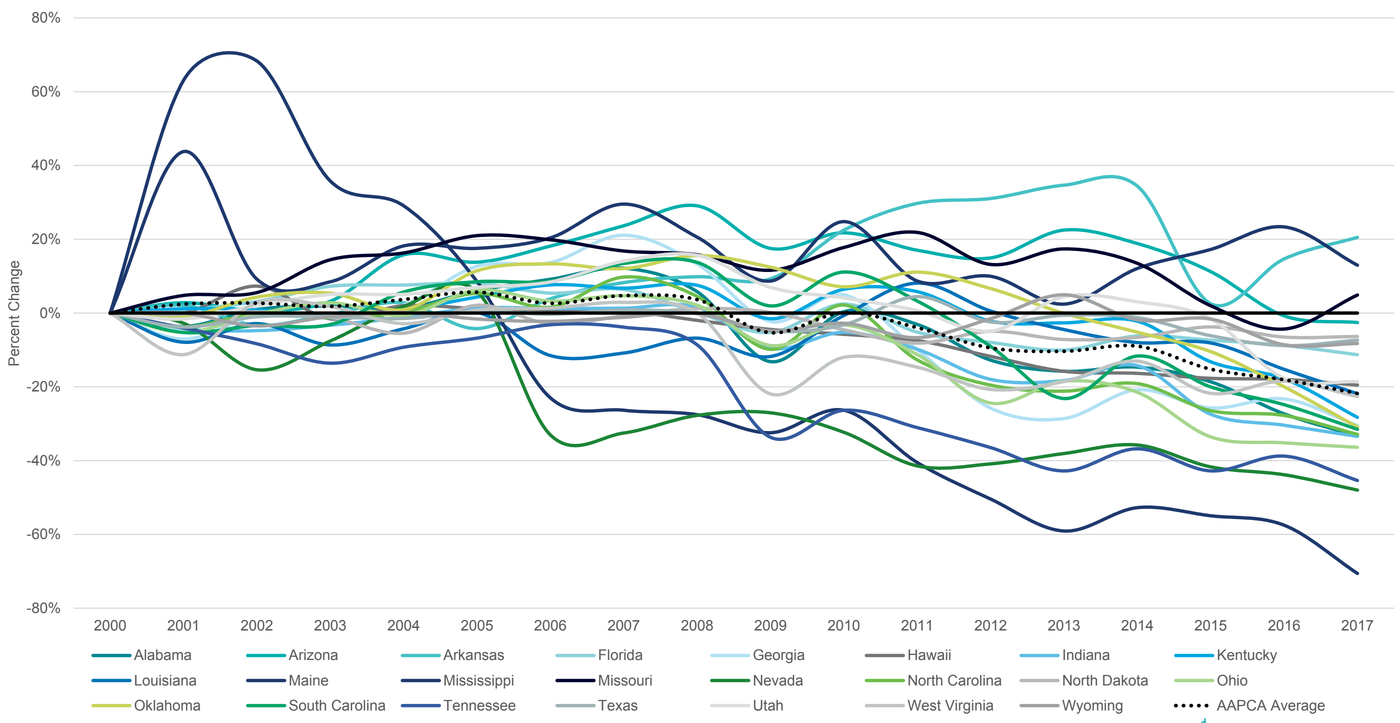
AAPCA Member States: Total Energy Production Compared to Energy-Related Carbon Dioxide Emissions (2000–2017)



Sources: U.S. Energy Information Administration (EIA), ***Energy-Related Carbon Dioxide Emissions by State, 2005-2016***, February 27, 2019; U.S. EIA, **State Carbon Dioxide Emissions Data**, October 23, 2019; U.S. EIA, **State Energy Data System (SEDS): 1960-2018**.

During the 20-year period from 1997 to 2017, U.S. EPA's data tracking of state CO_2 emissions from fossil fuel combustion show that AAPCA Member States averaged a 14-percent reduction.[19]

AAPCA Member States: Percent Change in Carbon Dioxide Emissions from Fossil Fuel Combustion (2000–2017)

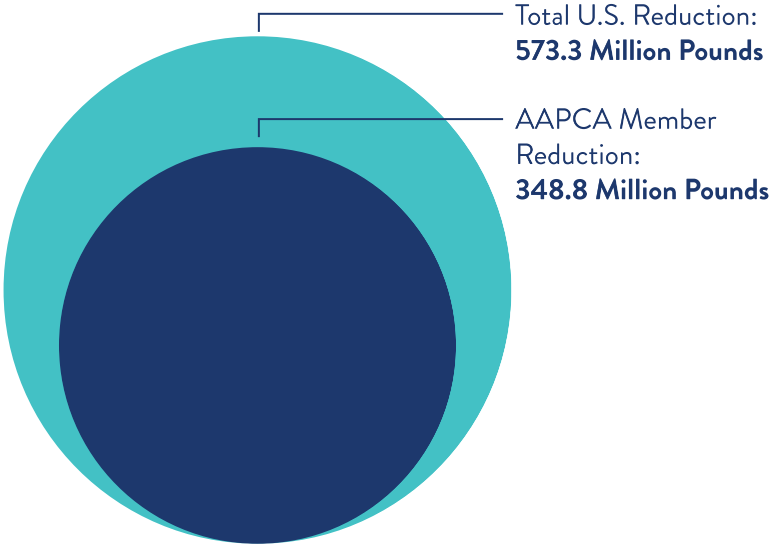


Source: U.S. EPA, "**State CO_2 Emissions from Fossil Fuel Combustion, 1990–2017**," November 2019.

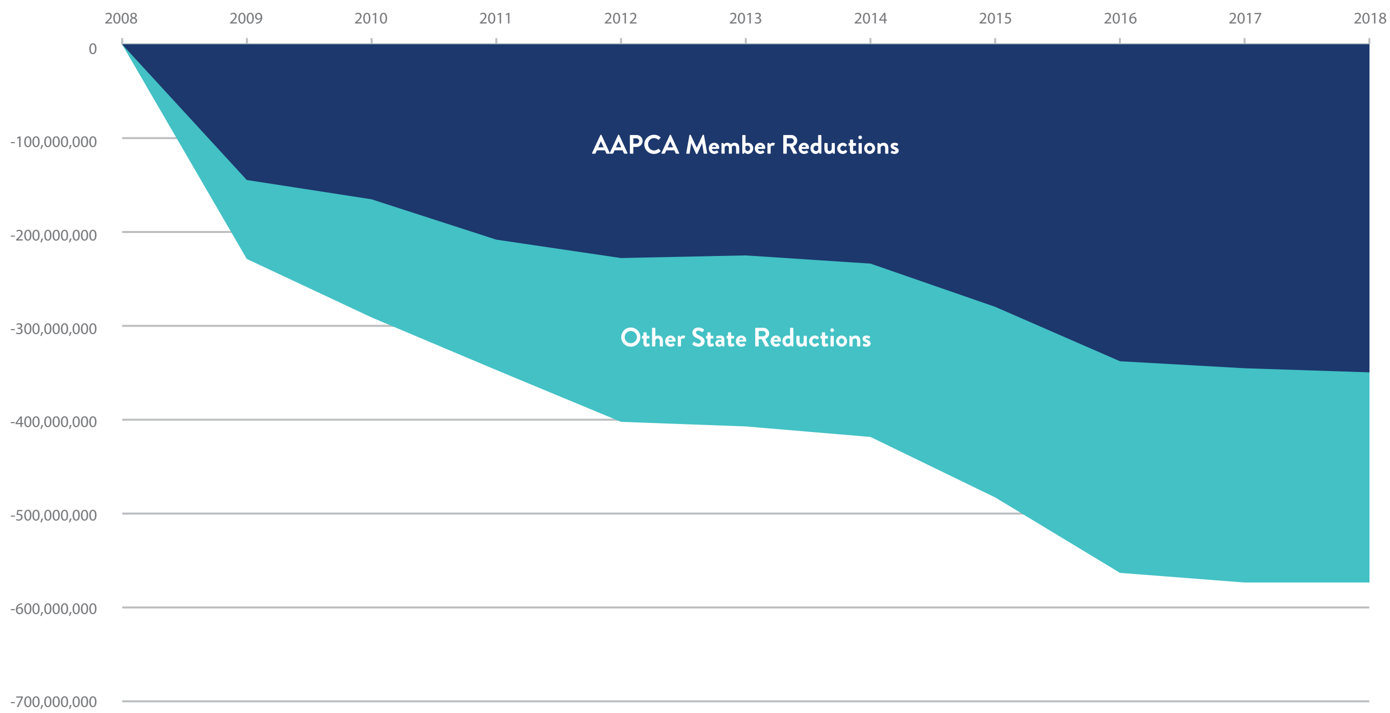
Toxic Air Releases

AAPCA Member States: Share of Total Reduction of Toxic Air Releases Reported to the Toxic Release Inventory (2008–2018)

U.S. EPA's *2018 Toxic Release Inventory (TRI) National Analysis* documents a 49.5-percent decrease in reported toxic air releases in the decade spanning from 2008 to 2018, from more than 1.15 billion pounds to 581 million pounds.[20] AAPCA Member States were responsible for nearly 350 million pounds of the 573-million-pound reduction, over 60 percent of the national total.[21]



AAPCA Member States: Annual Share of United States Reduction in Toxic Air Releases (2008–2018)



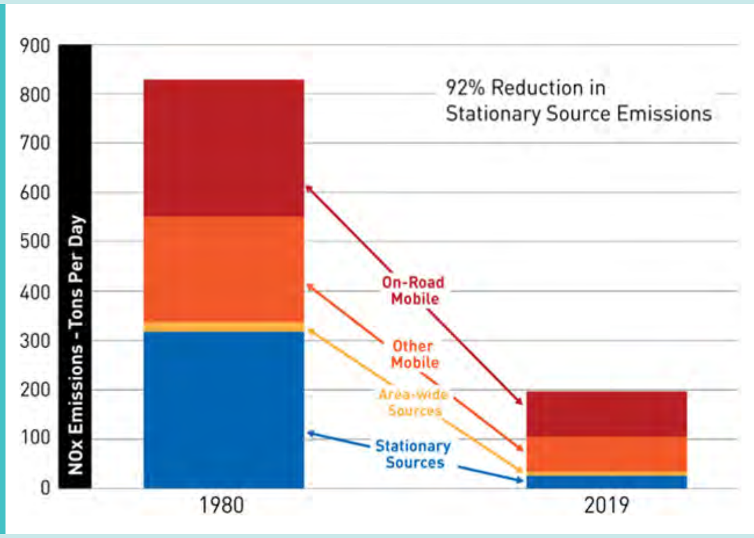
Source: U.S. EPA Toxic Release Inventory Explorer, **2019 TRI Factsheets**.

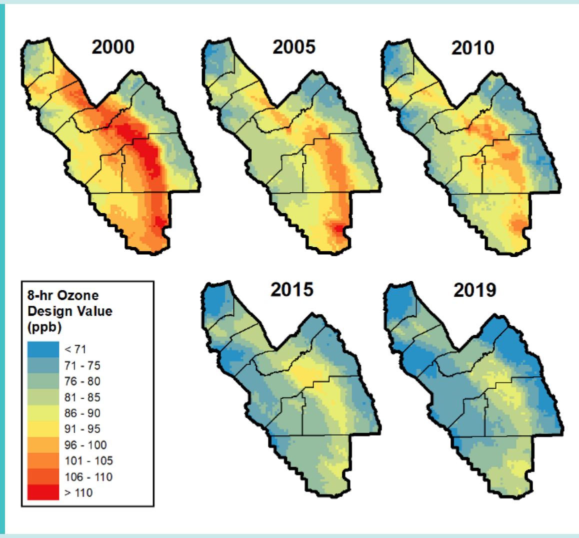
CASE STUDY | San Joaquin Valley Emission Reductions and Ozone Improvements

The San Joaquin Valley's challenges in meeting national ambient air quality standards are unmatched in the nation due to the region's unique combination of geography, meteorology, and topography.

In light of these challenges, and to achieve the Valley Air District's mission of improving air quality and public health for all Valley residents, the Valley Air District, working with the California Air Resources Board, has developed and implemented numerous air quality plans to reduce emissions from stationary and mobile sources. These air quality plans have led to the adoption of nearly 650 of the most stringent rules in the nation, as well as the development and implementation of strong voluntary incentive programs that have invested more than $2.8 billion of combined funds in clean-air projects. Over the past several decades, these air quality improvement efforts have reduced NO_X emissions (a primary precursor for the formation of both ozone and $PM_{2.5}$ in the San Joaquin Valley) from mobile and stationary sources by over 75 percent, including a greater than 90 percent reduction from stationary sources under the Valley Air District's jurisdiction. These emissions reductions have resulted in significant air quality progress towards meeting the health-based federal ozone and $PM_{2.5}$ standards.

With respect to addressing ozone, Valley residents have experienced measurable and sustained ozone air quality progress. The San Joaquin Valley is the only region to attain an ozone standard after having been classified as Extreme Nonattainment (1-hour standard), and is now on the verge of attaining the 1997 ozone standard (also after classified as Extreme). Building on these improvements, the San Joaquin Valley continues to make significant progress towards attaining the 2008 and 2015 ozone standards.



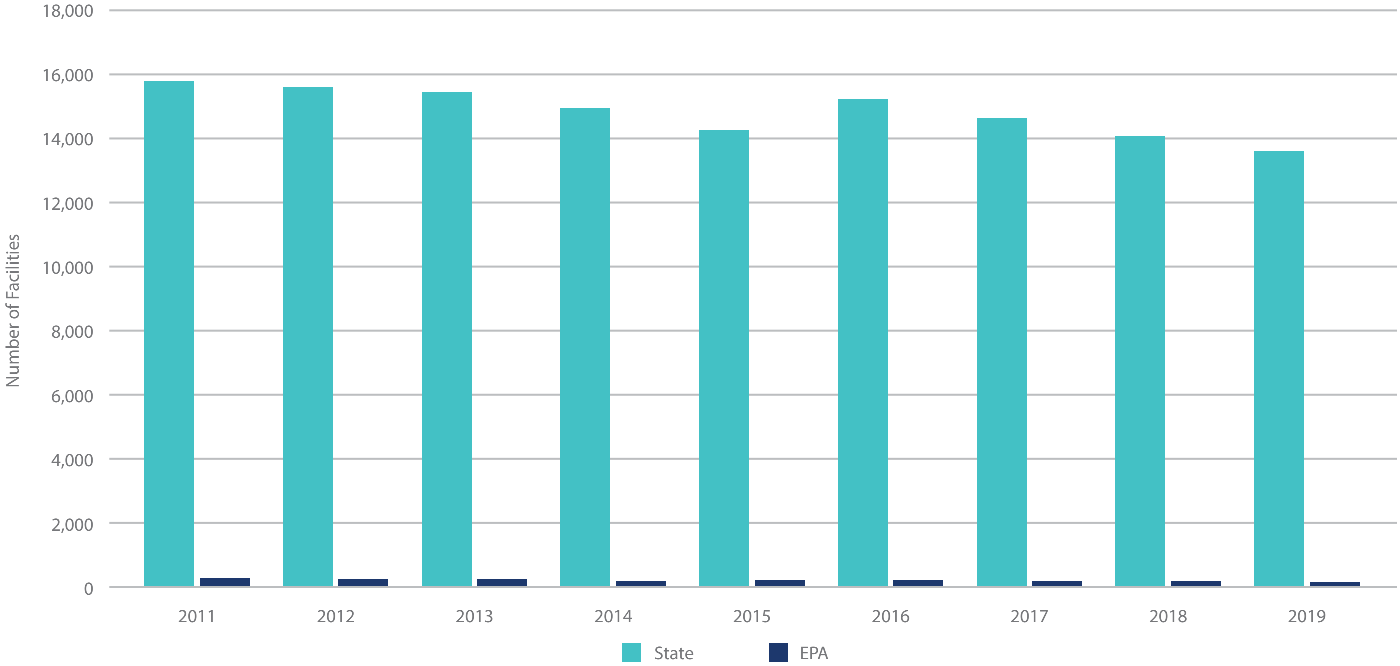


More information: San Joaquin Valley Air Pollution Control District **report to SJVUAPCD Governing Board** on air quality in the San Joaquin Valley during the 2019 summer ozone season (December 19, 2019).

State Compliance and Enforcement Activity

According to U.S. EPA's Enforcement and Compliance History Online (ECHO), state air quality agencies are the leaders in full compliance evaluations related to the federal Clean Air Act, conducting full compliance evaluations for nearly 14,000 facilities in 2019.[22] U.S. EPA states that a full compliance evaluation "is a comprehensive evaluation of the compliance status of the facility. It looks for all regulated pollutants at all regulated emission units, and it addresses the compliance status of each unit, as well as the facility's continuing ability to maintain compliance at each emission unit.[23]

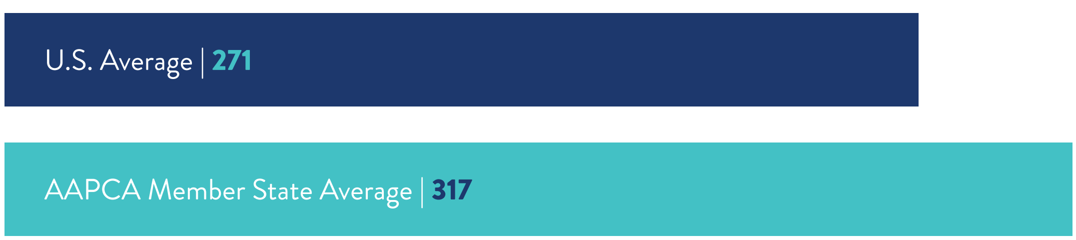
Number of Facilities with a Full Compliance Evaluation (2011–2019)



Source: U.S. EPA's **National Air Activity Dashboard**, part of ECHO.

Further, AAPCA Member States averaged a total of 317 full compliance evaluations per state in 2019, whereas the national average was 271.

Average Number of Facilities with a Full Compliance Evaluation (2019)



Source: U.S. EPA's **National Air Activity Dashboard**, part of ECHO.

Section Notes | Air Quality Successes in AAPCA Member States

[1] U.S. EPA, **Air Pollutant Emissions Trends Data**. Data file: "State Annual Emissions Trend."

[2] U.S. Bureau of Economic Analysis, data available **here**.

[3] U.S. Office of Highway Policy Information, data available **here**.

[4] U.S. Census Bureau, Population estimates **1990–2000**; **2000–2010**; **2010–2019**.

[5] U.S. Energy Information Administration, **State Energy Data Systems (SEDS): 1960–2017**.

[6] U.S. EPA's *Green Book* contains a history of areas designated nonattainment or maintenance under the NAAQS. EPA's listing of areas designated nonattainment or maintenance for the 2008 ozone NAAQS can be found **here**.

[7] EPA **defines a design value** as "a statistic that describes the air quality status of a given location relative to the level of the [NAAQS]." More information is available **here**.

[8] U.S. EPA, **Air Quality Design Values** (Data file: "Ozone Design Values, 2018"). Data for this chart is based on overlapping three-year averages beginning with 2006–2008 and ending with 2016–2018.

[9] U.S. EPA's listing of areas designated nonattainment or maintenance for the 1997 annual $PM_{2.5}$ NAAQS can be found **here**. In 2012, the NAAQS for $PM_{2.5}$ was lowered to 12 µg/m^3, based on an annual arithmetic mean averaged over three years (the 2006 review maintained the 1997 NAAQS).

[10] U.S. EPA, **Air Quality Design Values** (Data file: "$PM_{2.5}$ Design Values, 2018"). Data for this chart is based on overlapping three-year averages beginning with 2007–2009 and ending with 2016–2018.

[11] U.S. Energy Information Administration, **State Energy Data System (SEDS): 1960–2017**.

[12] U.S. EPA, **Air Pollutant Emissions Trends Data** (Data file: "State Annual Emissions Trend").

[13] More information on U.S. EPA Clean Air Markets Programs can be found **here**, and include the **Acid Rain Program** (ARP), the **Cross-State Air Pollution Rule** (CSAPR), and the **CSAPR Update**.

[14] U.S. EPA, "**Annual NO_x Emissions from CSAPR and ARP Sources, 1990–2018**," December 2019.

[15] U.S. EPA, "**State-by-State NO_x Emissions from CAIR and ARP Sources, 1990–2018**," December 2019.

[16] U.S. EPA Air Markets Division, **Progress Report: Emissions Reductions** (Sulfur Dioxide (SO_2) Figures).

[17] U.S. EPA, "**State-by-State SO_2 Emissions from CAIR and ARP Sources, 1990–2018**," December 2019.

[18] U.S. Energy Information Administration (EIA), ***Energy-Related Carbon Dioxide Emissions by State, 2005–2016***, February 27, 2019 (Table 1. State energy-related carbon dioxide emissions by year, unadjusted (2005–2017)); U.S. EIA, **State Carbon Dioxide Emissions Data**, October 23, 2019 (Data file: "Summary"); U.S. EIA, **State Energy Data System (SEDS): 1960–2017** (Data file: "Primary energy production in Btu").

[19] U.S. EPA, "**State CO_2 Emissions from Fossil Fuel Combustion, 1990–2017**," November 2019.

[20] U.S. EPA, ***2018 Toxic Release Inventory (TRI) National Analysis***, February 2020.

[21] U.S. EPA Toxic Release Inventory Explorer, **2019 TRI Factsheets.**

[22] Data from **U.S. EPA's National Air Activity Dashboard**, part of Enforcement and Compliance History Online (**ECHO**).

[23] U.S. EPA, **How We Monitor Compliance** (section: "What is a Clean Air Act Evaluation?"). EPA indicates that a full compliance evaluation includes: "a review of all required reports and the underlying records; an assessment of air pollution control devices and operating conditions; observing visible emissions; a review of facility records and operating logs; an assessment of process parameters, such as feed rates, raw material compositions, and process rates; and a stack test if there is no other way to determine compliance with the emission limits.

AMERICAN LEADERSHIP IN AIR QUALITY

America's Footprint

Internationally, the United States ranks as a leading nation in population, Gross Domestic Product (GDP), and energy production:

- In 2018, U.S. GDP represented nearly a quarter of the gross world product,[1] and has risen steadily over the past half-decade, from $1.012 trillion in 1970 to $20.58 trillion in 2018.[2]
- In terms of total energy production, the U.S. ranks second only to China, according to the International Energy Agency (IEA).[3] Energy production in the U.S. increased approximately 107 percent from 1960 to 2017.[4] Further, from 2000 to 2017, the nation became 19 percent more energy self-sufficient—up to 92 percent, the highest percentage of energy self-sufficiency the United States has obtained.[5]
- The U.S. ranks third in total population, behind only China and India.[6] Since 1960, the U.S. has experienced an 81-percent growth in population, including a 46-millon-person increase in the years ranging from 2000 to 2019.[7]

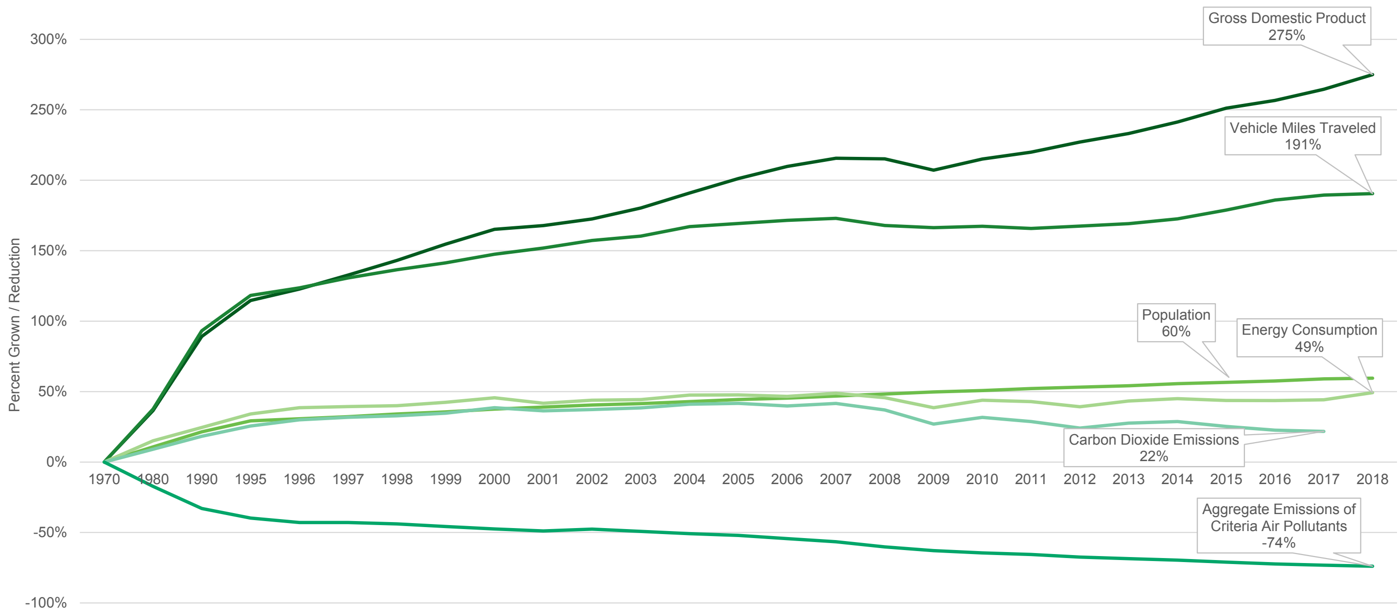
America's 2019 Air Trends Report

U.S. EPA's 2019 report, *Our Nation's Air: Status and Trends Through 2018*, charts the emission trends of criteria air pollutants and carbon dioxide (CO_2) in the United States since 1970, as compared to several economic and social growth indicators, including GDP, population, vehicle miles traveled (VMT), and energy consumption, including the following trends[8]:

- An increase in GDP of 275-percent, ranking first in the world by nearly $6.9 trillion[9];
- A 60-percent increase in population, from 203 million people in 1970 to 331 million in 2018[10];
- Energy consumption grew 44 percent, from 67.7 thousand trillion Btu in 1970 to 97.6 thousand trillion Btu in 2017[11]; and,
- A 191-percent increase in VMT, from approximately 1.1 trillion miles in 1970 to 3.25 trillion miles in 2018.[12]

Over the same period, from 1970 to 2018, the United States reduced aggregate emissions of the six criteria air pollutants by 74 percent.[13]

United States: Comparison of Growth Areas and Emissions (1970–2018)

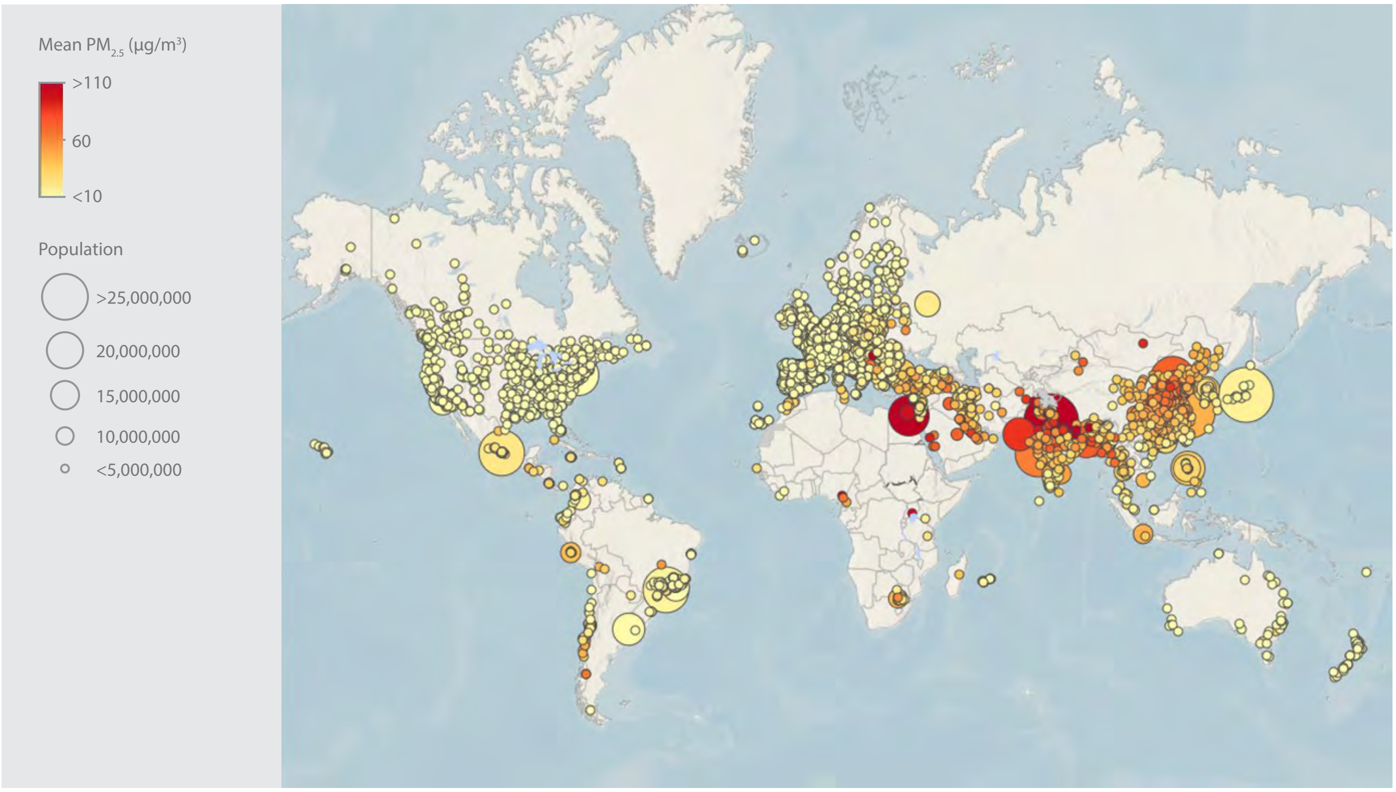


Source: U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019 (Section: "**Economic Growth with Cleaner Air**").

World Trends | Fine Particulate Matter

In 2018, the World Health Organization (WHO) mapped the annual mean ambient fine particulate matter concentrations by city population, based on data from 2016 to 2018. The map demonstrates that the majority of the United States has lower fine particulate matter levels than most of the rest of the world.[14]

Annual mean ambient $PM_{2.5}$ ($\mu g/m^3$)—from measurements (2018 Update)



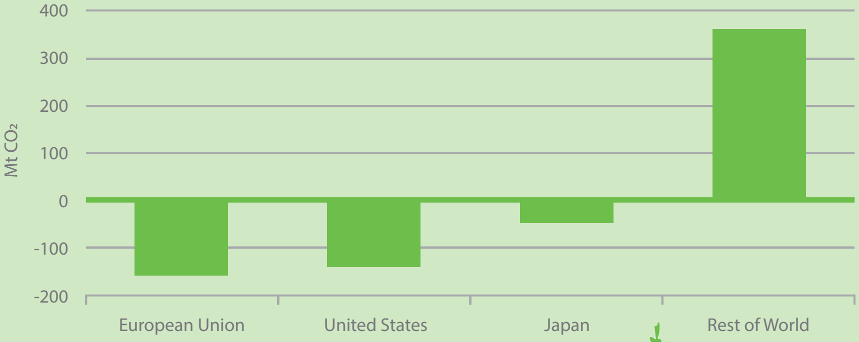
Source: World Health Organization, "**Annual mean ambient $PM_{2.5}$ (μ/m^3)—from measurements**," 2018 update.

Energy-Related Carbon Dioxide Emissions | International Trends

"The United States saw the largest decline in energy-related CO_2 emissions in 2019 on a country basis—a fall of 140 Mt, or 2.9%, to 4.8 Gt. US emissions are now down almost 1 Gt from their peak in the year 2000, the largest absolute decline by any country over that period."

Source: U.S. International Energy Agency, "**Global CO_2 emissions in 2019**," February 11, 2020.

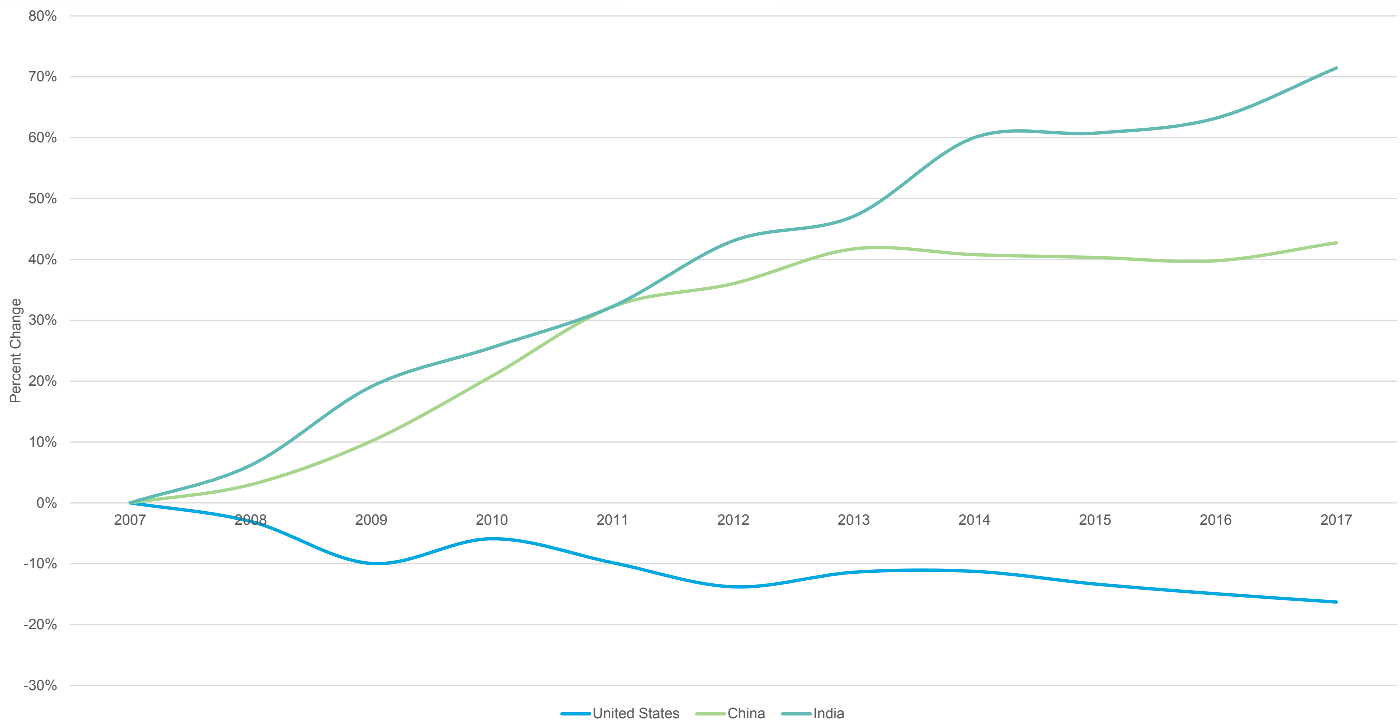
Change in energy related CO_2 emissions by region, 2018-2019



World Trends | Carbon Dioxide Emissions

Using data from the International Energy Agency (IEA), the chart below highlights carbon dioxide (CO_2) emissions from the world's three most populated nations—China, India, and the United States. Between 2007 and 2017, the U.S. reduced CO_2 emissions by 926 million metric tons (16 percent) while China increased emissions by 2.8 billion metric tons (43 percent) and India increased emissions by 901 million metric tons (71 percent).[15] Over that period, the U.S. also decreased CO_2 emissions per capita by nearly 23 percent, while both China and India experienced significant per-person increases.[16]

Carbon Dioxide Emissions Change by Country (Baseline 2007)



Source: International Energy Agency, **Data and Statistics** (Total CO_2 Emissions per Country).

Section Notes | American Leadership in Air Quality

[1] World Bank, **GDP Listings by Country**, February 2020.

[2] U.S. Bureau of Economic Analysis, data available **here**.

[3] International Energy Agency, **IEA Energy Atlas**, 2017. Also see the following reports: **World Energy Statistics 2018** (August 2018) and **World Energy Balances 2018** (August 2018).

[4] U.S. Energy Information Administration, **State Energy Data System (SEDS): 1960–2017**, June 2019.

[5] International Energy Agency, **IEA Energy Atlas**, 2017. Also see the following reports: **World Energy Statistics 2018** (August 2018) and **World Energy Balances 2018** (August 2018).

[6] U.S. Census Bureau, **U.S. and World Population Clock**, February 2020.

[7] U.S. Census Bureau, Population estimates **2000–2010**; **2010–2019**, **1960 Census of Population: Supplementary Reports**.

[8] U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019.

[9] World Bank, **GDP Listings by Country**, February 2020.

[10] U.S. Census Bureau, **Current Population** (as of March 4, 2020).

[11] U.S. Energy Information Administration, **State Energy Data System (SEDS): 1960–2017**.

[12] U.S. Office of Highway Policy Information, data available **here**.

[13] U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019.

[14] World Health Organization, "**Annual mean ambient $PM_{2.5}$ ($\mu g/m^3$)—from measurements**," 2018 update.

[15] International Energy Agency, **World Energy Balances** (March 2020).

[16] International Energy Agency, **World Energy Balances** (March 2020).`

AIR QUALITY TRENDS IN THE UNITED STATES

Criteria Air Pollutants | Concentration Trends

U.S. EPA's most recent analysis of monitoring data shows that ambient concentrations of the six criteria air pollutants for which there are national ambient air quality standards (NAAQS) continue to decline nationally. These air quality improvements have proven substantial over the past several decades. Compared to 1980, data for 2018 indicate at least a 31-percent reduction in the ambient levels of carbon monoxide, lead, nitrogen dioxide, ozone, and sulfur dioxide, and available monitoring data for fine and coarse particulate matter ($PM_{2.5}$ and PM_{10}) show similar trends. A decade-over-decade comparison demonstrates consistent progress in ambient air quality levels since 1980, 1990, 2000, and 2010.[1]

CRITERIA POLLUTANT	1980 vs 2018	1990 vs 2018	2000 vs 2018	2010 vs 2018
Carbon Monoxide	-83%	-74%	-59%	-15%
Lead	-99%	-97%	-93%	-82%
Nitrogen Dioxide (annual)	-65%	-57%	-49%	-22%
Nitrogen Dioxide (1-hour)	-61%	-50%	-35%	-15%
Ozone (8-hour)	-31%	-21%	-16%	-4%
PM_{10} (24-hour)	---	-26%	-31%	-2%
$PM_{2.5}$ (annual)	---	---	-39%	-16%
$PM_{2.5}$ (24-hour)	---	---	-34%	-3%
Sulfur Dioxide (1-hour)	-91%	-89%	-80%	-68%

Criteria Air Pollutants | Emissions Trends

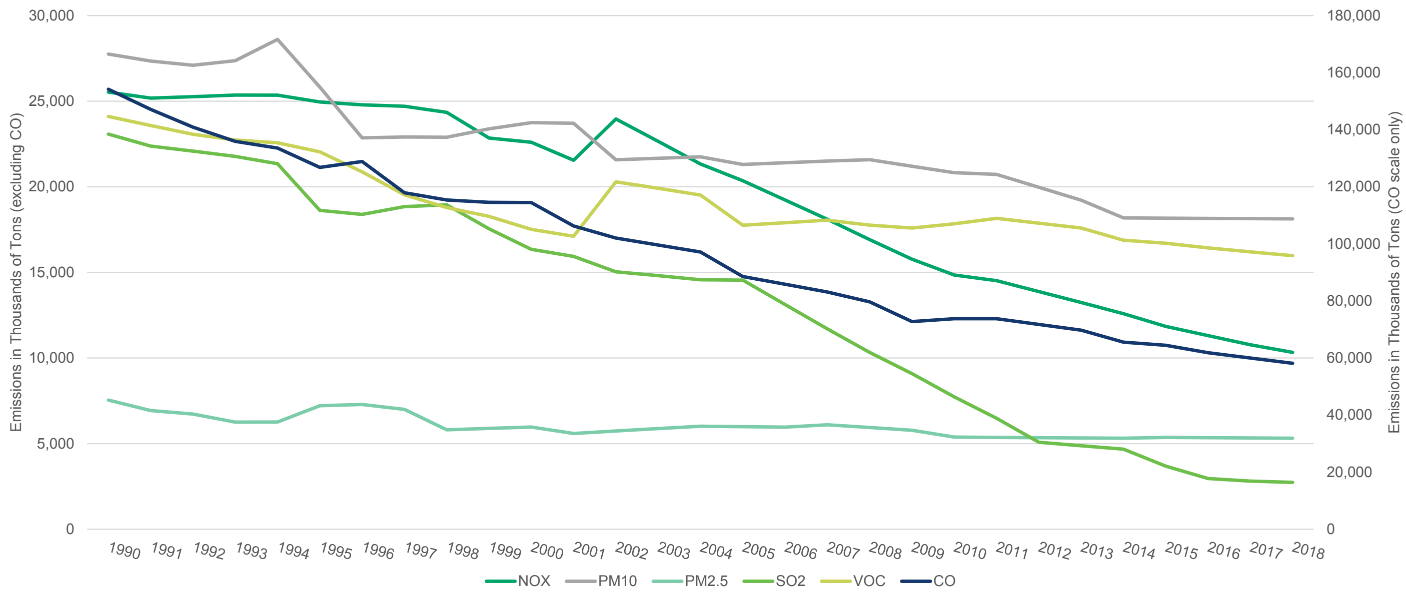
U.S. EPA estimates the national trends of criteria pollutant emissions and precursors based on monitoring data.[2] The trends data published by EPA for 2018 demonstrate emissions continuing to decline nationally. When comparing 1990 to 2018, there has been at least a 25 percent reduction in the emissions of all criteria pollutants or precursors, and the last decade has seen at least a 10-percent decrease.

CRITERIA POLLUTANT	1980 vs 2018	1990 vs 2018	2000 vs 2018	2010 vs 2018
Carbon Monoxide	-73%	-67%	-53%	-23%
Lead	-99%	-80%	-50%	-23%
Nitrogen Oxides (NO_X)	-62%	-59%	-54%	-31%
Volatile Organic Compounds (VOC)	-55%	-42%	-20%	-10%
Direct PM_{10}	-61%	-25%	-22%	-12%
Direct $PM_{2.5}$	---	-30%	-37%	-12%
Sulfur Dioxide	-90%	-88%	-84%	-65%

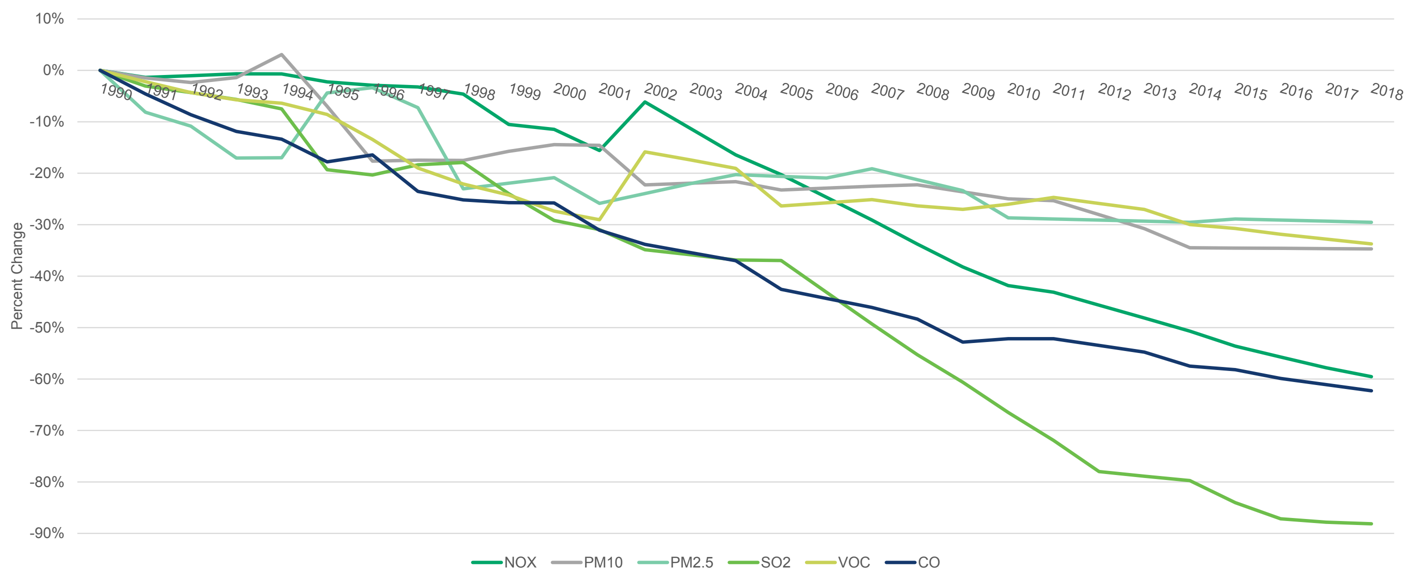
Criteria Air Pollutants | Emissions Trends

Criteria Air Pollutant Emissions (1990–2018)

(thousands of tons)



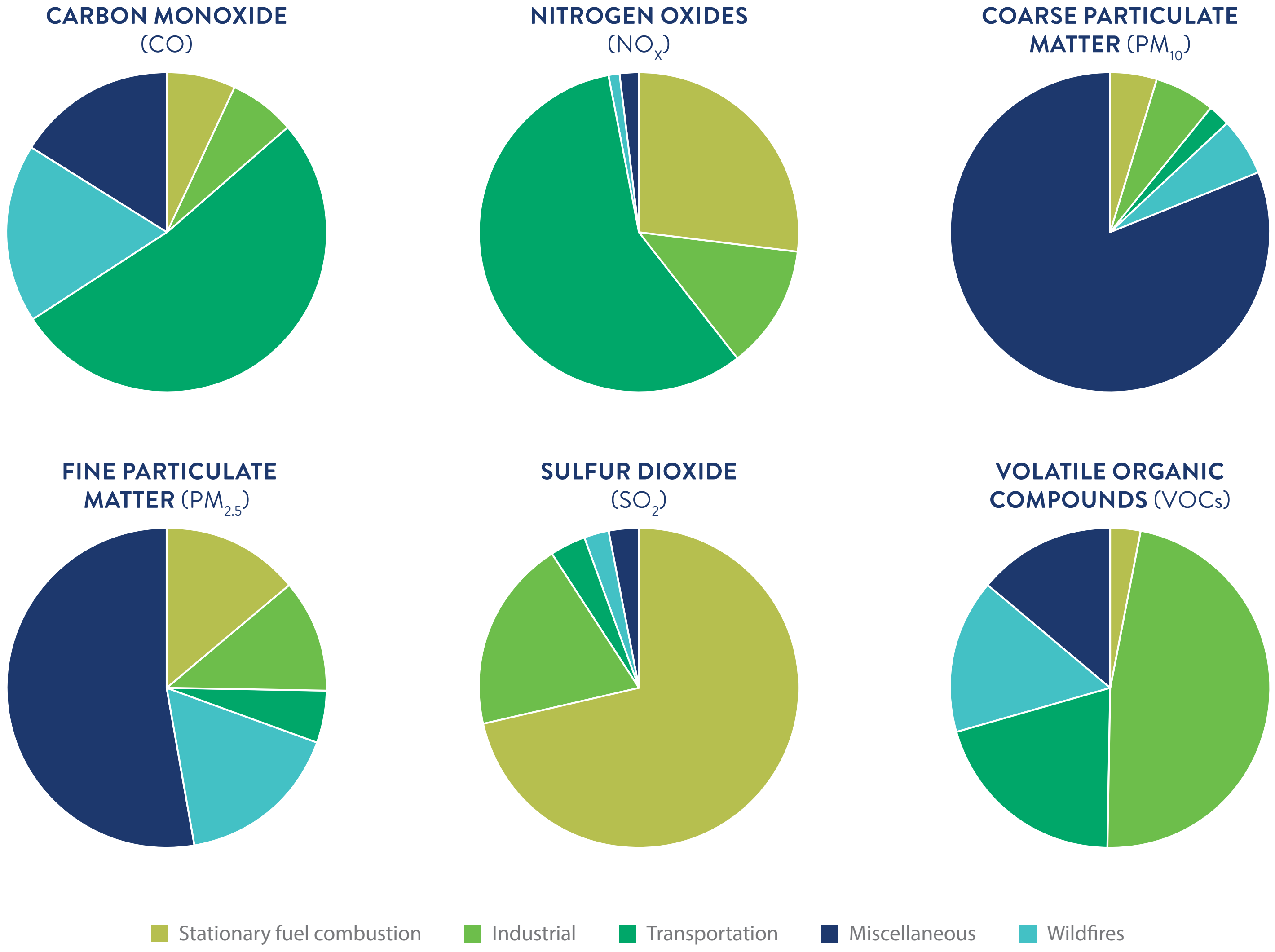
Percent Change in Criteria Air Pollutant Emissions (1990–2018)



Source: U.S. EPA, **Air Pollutant Emissions Trends** (Data file: "National Annual Emissions Trend, Criteria pollutants National Tier 1 for 1970–2018").
EPA's data for lead emissions trends can be found **here**.

Criteria Air Pollutants | Emissions Sources

U.S. EPA tracks emissions from the following source categories: Stationary Fuel Combustion, Industrial, Transportation, Wildfires, and Miscellaneous. Included below are the sources of criteria air pollutant and precursor emissions for the year 2018.[3]

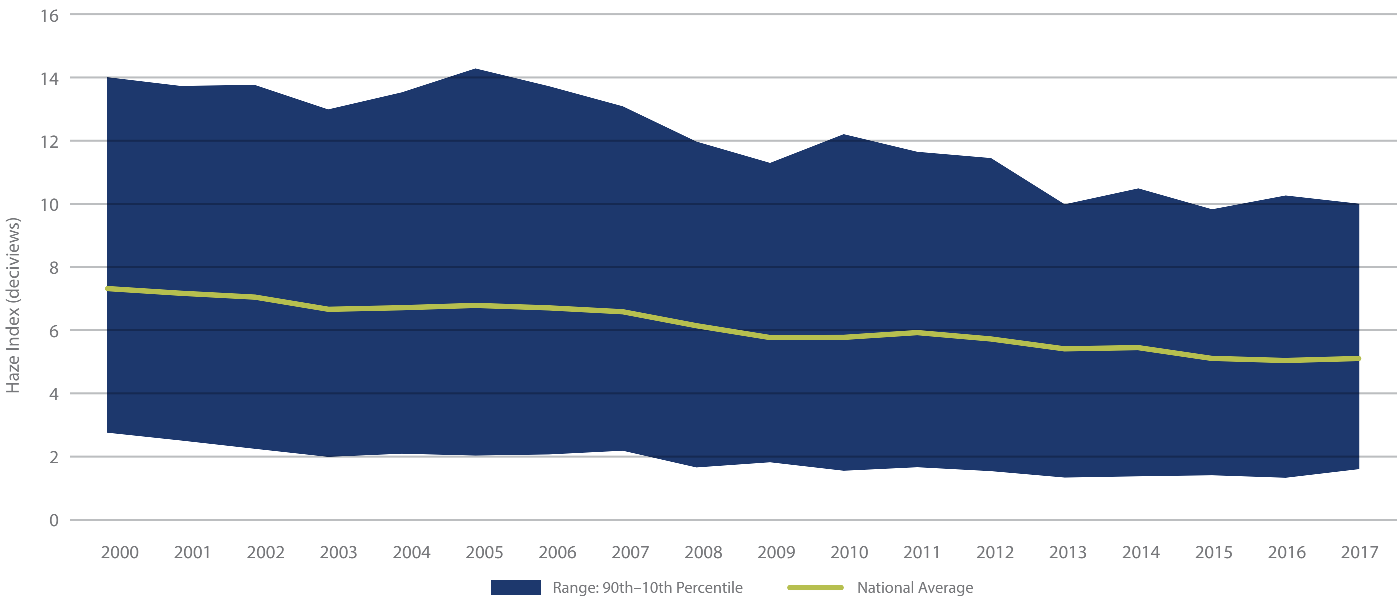


Source: U.S. EPA, **Air Pollutant Emissions Trends** (Data file: "Average Annual Emissions, Criteria pollutants National Tier 1 for 1970 – 2018").

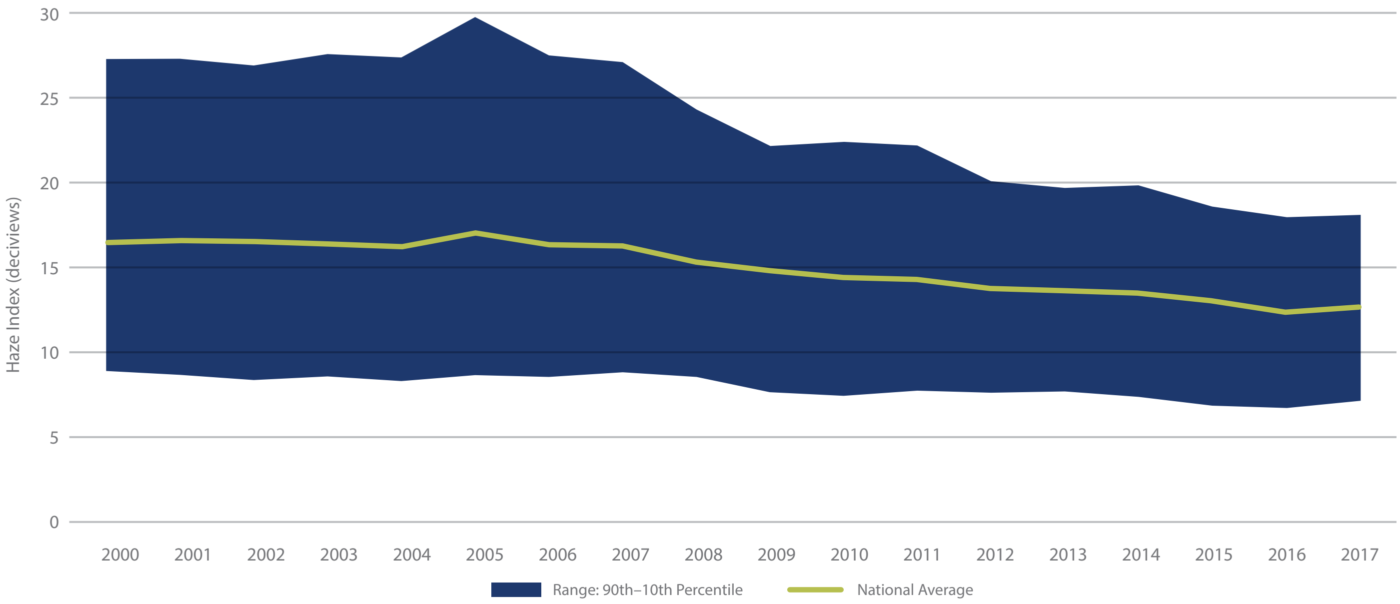
Visibility Progress

U.S. EPA's 2019 air trends report also shows improving visibility (or decreasing haze) in national parks and wilderness areas (Class I Areas) through the year 2017. Since 2000, visibility on the 20-percent-clearest days has improved by 34 percent, while there has been a 27-percent improvement in visibility during the 20-percent-most-impaired days.[4]

National Visibility Trends on Clearest Days (2000–2017)



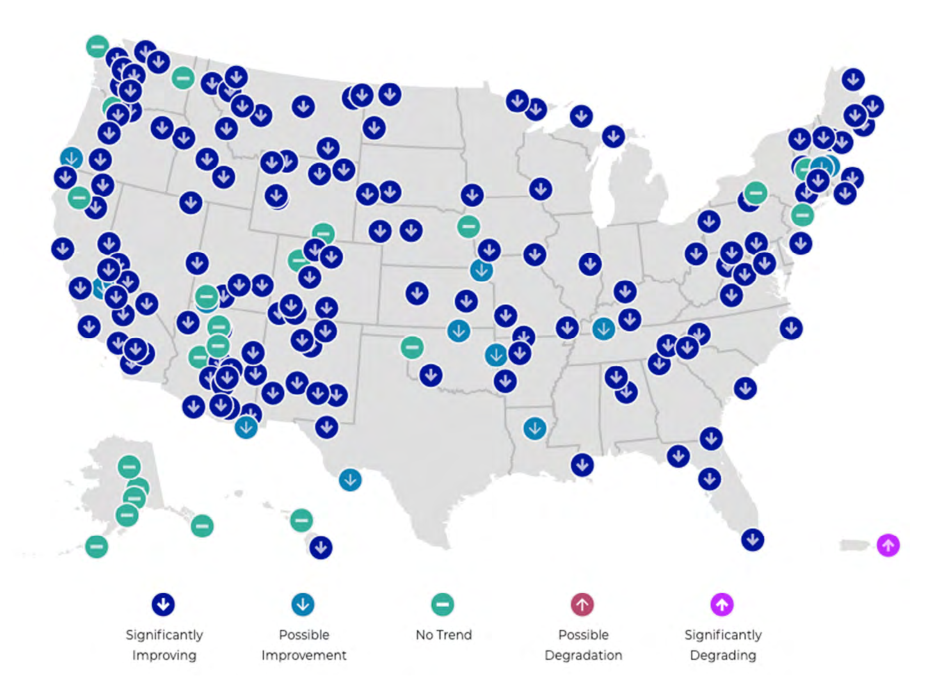
National Visibility Trends on Most Impaired Days (2000–2017)



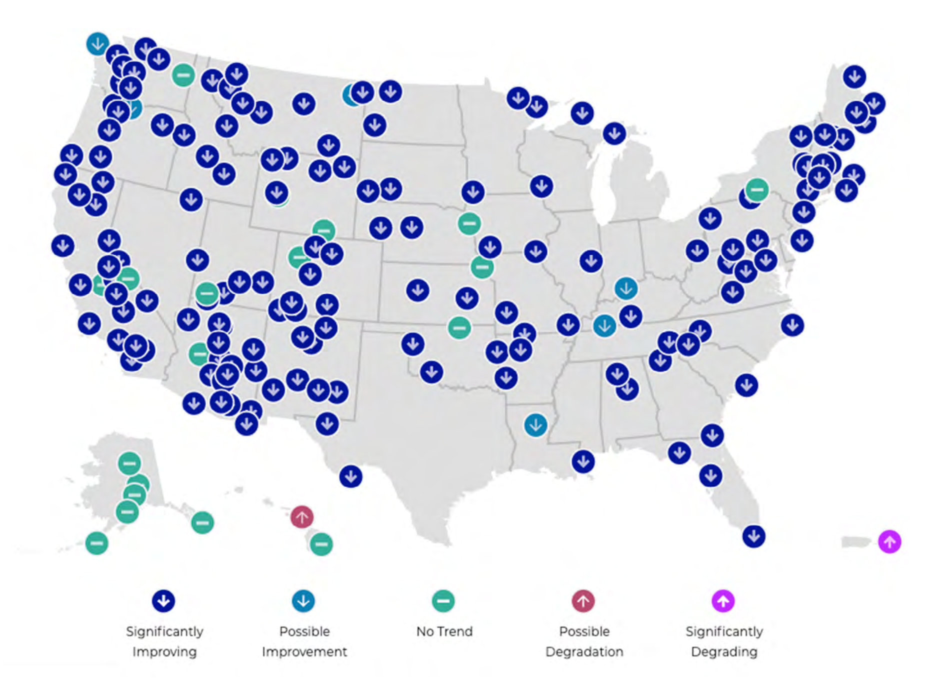
Source: U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019 (Section: "**Visibility Improves in Scenic Areas**").

Mapping Visibility Trends

Visibility is tracked at 156 national parks and wilderness areas in the United States. U.S. EPA's 2019 report, *Our Nation's Air: Status and Trends Through 2018*, maps the visibility trends from 2000 to 2017 for these Class I Areas on the clearest and most impaired days.



Visibility Trend on Clearest Days



Visibility Trend on Most Impaired Days

Source: U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019 (Section: "**Visibility Improves in Scenic Areas**").

Note: U.S. EPA's maps also include visibility trends for sites that are not Class I Areas and a number of areas mapped that show "Possible Improvement" or "No Trend" do not contain a complete monitoring dataset between 2000 and 2017.

Greenhouse Gas Trends | Carbon Dioxide and Methane

U.S. EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks* provides "an annual comprehensive accounting of total greenhouse gas emissions from all man-made sources in the United States." U.S. EPA's most recent report, providing data for 1990 to 2018, documents that U.S. greenhouse gas emissions totaled 6,676.65 million metric tons of carbon dioxide equivalents (mmt CO_2 eq.) in 2018.[5]

According to U.S. EPA's analysis, CO_2 emissions have been reduced by 297 mmt CO_2 eq. (6 percent) and methane emissions have fallen 140 mmt CO_2 eq. (18 percent) over the past two decades. The graph below displays the trend lines for both CO_2 and methane, with the green plotting CO_2 emissions along the left axis and the light blue tracking methane emissions along the right axis.[6]

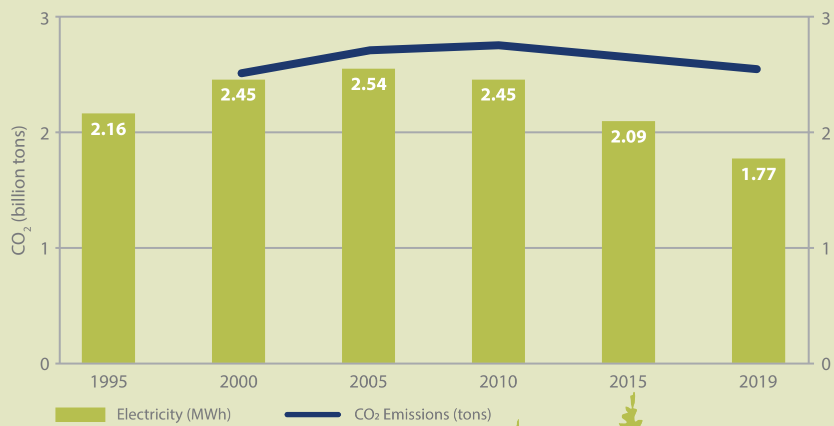
U.S. Emissions of Carbon Dioxide and Methane (1998–2018)
(Million Metric Tons of Carbon Dioxide Equivalents)

Sources: U.S. EPA, ***Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018***, April 2020

Power Plant Emissions | Carbon Dioxide Trends

U.S. EPA's preliminary **2019 Power Plant Emissions Data** show an 8-percent decline in power plant CO_2 emissions from 2018 to 2019. Additionally, CO_2 emissions went from 2.16 million tons in 1995 to 1.77 million tons in 2019, while electricity usage rose from 2.23 billion MWh in 1997 to 2.51 billion MWh in 2019.

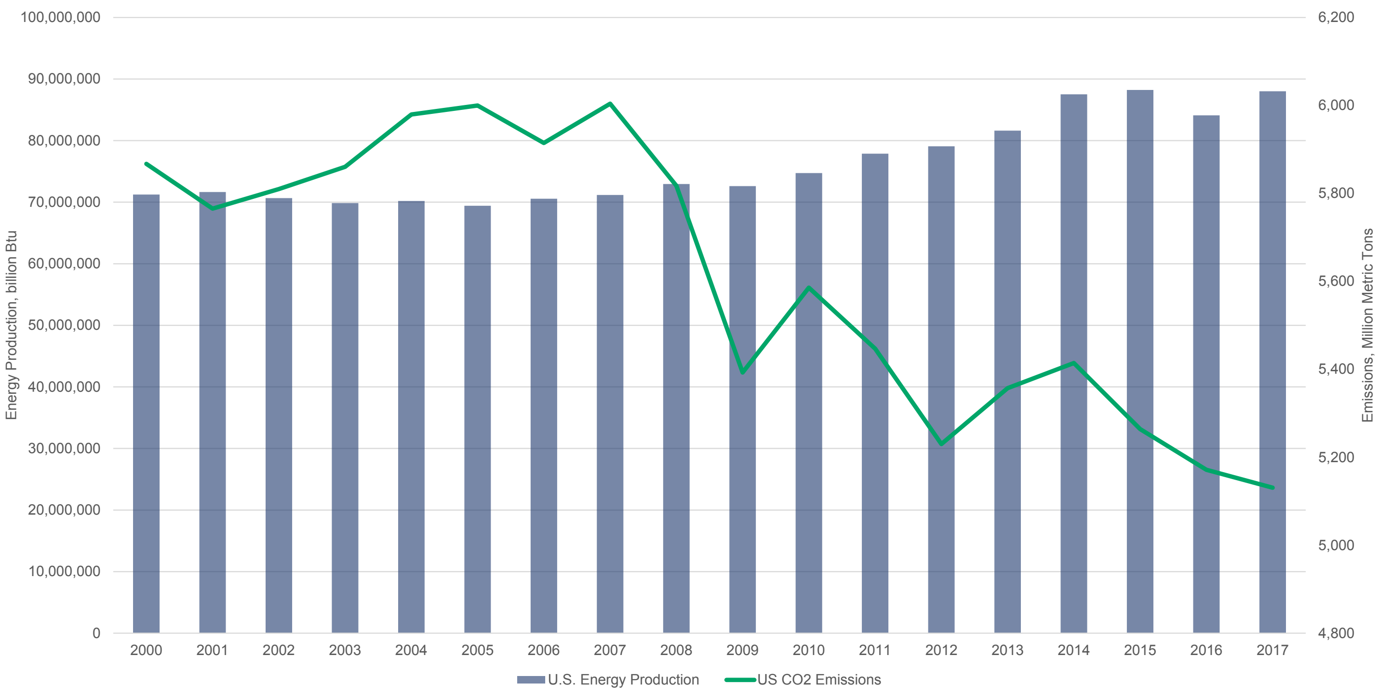
Source: U.S. EPA, **Power Plant Emission Trends: Carbon Dioxide**, February 2020.



Greenhouse Gas Trends | Energy-Related Carbon Dioxide Emissions

Data from the U.S. Energy Information Administration (EIA) shows a 23-percent increase in total U.S. energy production from 2000 to 2017.[7] During that same time period, energy-related carbon dioxide (CO_2) emissions went down nearly 11 percent, from 5,867 million metric tons in 2000 to 5,130 million metric tons in 2017.[8]

United States: Total Energy Production Compared to Energy-Related Carbon Dioxide Emissions (2000–2017)



Sources: U.S. Energy Information Administration (EIA), ***Annual Energy Outlook 2020***, January 2020 (Section: "Emissions"); ***U.S. EIA, State Energy Data System (SEDS): 1960-2017.***

Recent Headlines from the U.S. Energy Information Administration

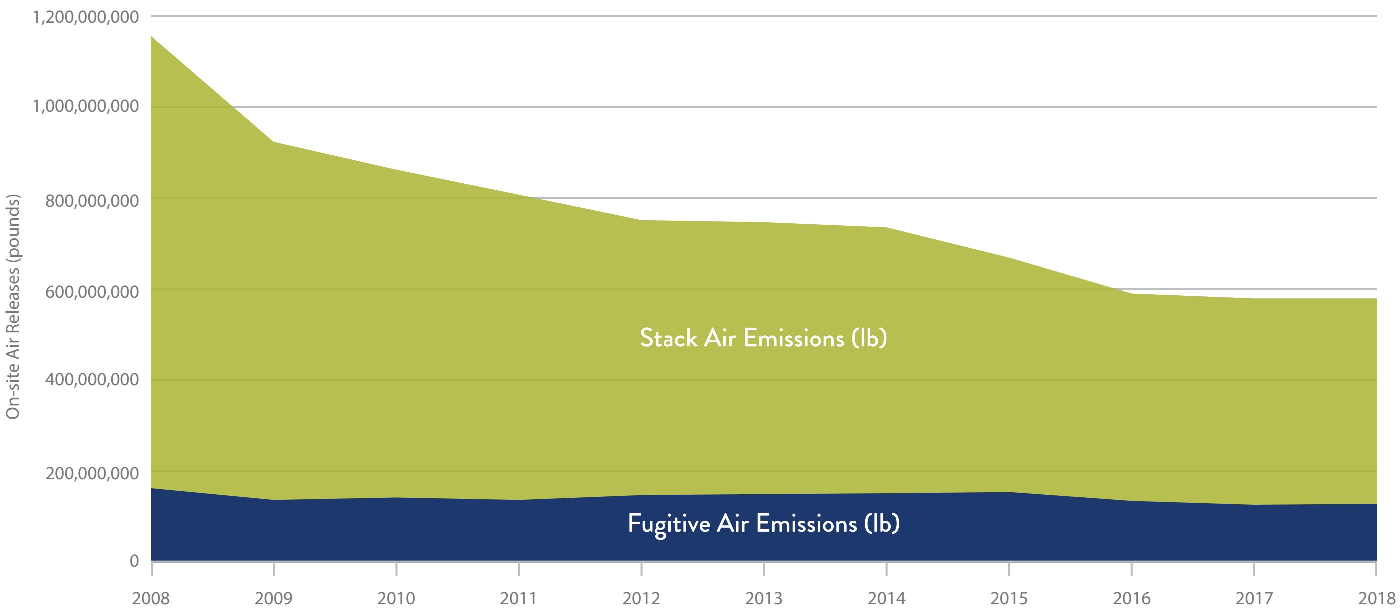
- **EIA projects U.S. energy intensity to continue declining, but at a slower rate**, February 20, 2020
- **EIA projects total U.S. energy-related CO_2 emissions to be relatively flat through 2050**, February 10, 2020
- **EIA projects generation from coal and nuclear power plants will plateau after 2025**, February 7, 2020
- **EIA expects U.S. energy-related CO_2 emissions to decrease annually through 2021**, January 17, 2020
- **EIA expects U.S. energy-related CO_2 emissions to fall in 2019**, December 30, 2019
- **In 2018, the United States consumed more energy than ever before**, December 23, 2019
- **U.S. energy-related CO_2 emissions rose in 2018 for the first year since 2014**, November 26, 2019
- **EIA projects energy consumption in air transportation to increase through 2050**, November 6, 2019
- **EIA projects global energy-related CO_2 emissions will increase through 2050**, September 30, 2019
- **EIA projects nearly 50% increase in world energy usage by 2050**, led by growth in Asia, September 24, 2019
- **Fossil fuels continue to account for the largest share of U.S. energy**, September 18, 2019
- **Energy-related carbon dioxide emission profiles differ dramatically from state to state**, April 1, 2019

Hazardous Air Pollutant Trends

U.S. EPA reports annually on hazardous air pollutants, or air toxics, trends in the *Toxic Release Inventory National Analysis*. EPA's analysis of 2018 data, released in February 2020, documents a 49.5-percent reduction in reported toxic air releases over the past decade, from more than 1.15 billion pounds in 2008 to 581 million pounds in 2018.[9]

The Toxic Release Inventory (TRI) tracks by point source and fugitive air emissions,[10] which are reported by industry to EPA as required by the Emergency Planning and Community Right-to-Know Act (EPCRA). Over 21,000 facilities reported to the Toxic Release Inventory in 2018.[11]

National Air Toxics Releases (2008–2018)



Source: U.S. EPA, ***2018 Toxic Release Inventory National Analysis***, February 2020.

Additionally, air toxics trends included in U.S. EPA's 2019 report shows a steady decline in the national median ambient concentrations for several individual pollutants.

Pollutant	Trend Period	Number of Trend Sites	Percent Change in National Median Concentrations Over Trend Period
Acetaldehyde	2003–2016	80	6.17% decrease
Arsenic (in PM_{10})	2003–2016	20	29.03% decrease
Benzene	2003–2016	150	47.89% decrease
1,3-Butadiene	2003–2016	98	55.56% decrease
Ethylbenzene	2003–2016	119	57.44% decrease
Formaldehyde	2003–2016	79	0.35% decrease
Lead (in PM_{10})	2003–2016	21	59.17% decrease
Nickel (in PM_{10})	2003–2016	19	56.08% decrease
Tetrachloroethylene	2003–2016	125	43.75% decrease
Toluene	2003–2016	139	54.11% decrease
Trichloroethylene	2003–2016	41	56.21% decrease

Source: U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019 (Section: "**Air Toxics Levels Trending Down**").

Section Notes | Air Quality Trends in the United States

[1] U.S. EPA, **Air Quality—National Summary: Air Quality Trends**.

[2] U.S. EPA, **Air Quality—National Summary: Emissions Trends**. EPA states that "These estimates are based on actual monitored readings or engineering calculations of the amounts and types of pollutants emitted by vehicles, factories, and other sources. Emission estimates are based on many factors, including levels of industrial activity, technological developments, fuel consumption, vehicle miles traveled, and other activities that cause air pollution."

[3] U.S. EPA, **Air Pollutant Emissions Trends Data** (Data file: "Average Annual Emissions, Criteria pollutants National Tier 1 for 1970–2018").

[4] U.S. EPA, ***Our Nation's Air: Status and Trends Through 2018***, July 2019 (Section: "**Visibility Improves in Scenic Areas**"). A full listing of Class I Areas under U.S. EPA's Regional Haze Program can be found **here**.

[5] U.S. EPA, ***Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018***, April 2020.

[6] U.S. EPA, ***Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018***, April 2020.

[7] U.S. Energy Information Administration, **State Energy Data System (SEDS): 1960–2017**.

[8] U.S. Energy Information Administration, ***Annual Energy Outlook 2020***, January 2020 (Section: "Emissions").

[9] U.S. EPA, ***2018 Toxic Release Inventory National Analysis***, February 2020. Note: EPA tracks 187 hazardous air pollutants in the Toxic Release Inventory.

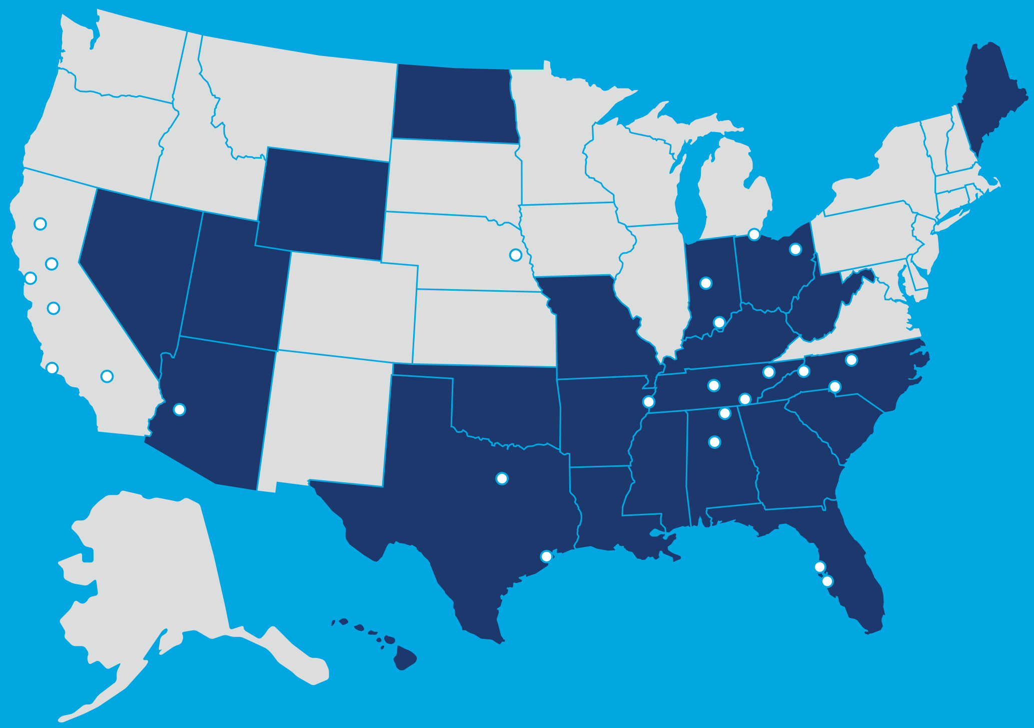
[10] **According to U.S. EPA**: "Fugitive air emissions are all releases to air that don't occur through a confined air stream, such as equipment leaks, releases from building ventilation systems and evaporative losses from surface impoundments and spills. Point source air emissions, also called stack emissions, are releases to air that occur through confined air streams, such as stacks, ducts or pipes."

[11] More information about EPCRA can be found at: ***https://www.epa.gov/epcra***. EPA also notes that the Pollution Prevention Act "requires facilities to submit information on pollution prevention and other waste management activities of Toxic Release Inventory chemicals."

Other Air Quality Resources

AAPCA
THE ASSOCIATION OF AIR POLLUTION CONTROL AGENCIES

If you are interested in finding out more about air quality in your area, state and local air agencies are an outstanding resource. Below are links to AAPCA Member Agencies:



AAPCA STATE AGENCIES

- Alabama Department of Environmental Management
- Arizona Department of Environmental Quality
- Arkansas Department of Environmental Quality
- Florida Department of Environmental Protection
- Georgia Environmental Protection Division
- Hawaii Department of Health
- Indiana Department of Environmental Management
- Kentucky Department for Environmental Protection
- Louisiana Department of Environmental Quality
- Maine Department of Environmental Protection
- Mississippi Department of Environmental Quality
- Missouri Department of Natural Resources
- Nevada Division of Environmental Protection
- North Carolina Department of Environmental Quality
- North Dakota Department of Environmental Quality
- Ohio Environmental Protection Agency
- Oklahoma Department of Environmental Quality
- South Carolina Department of Health and Environmental Control
- Tennessee Department of Environment & Conservation
- Texas Commission on Environmental Quality
- Utah Department of Environmental Quality
- West Virginia Department of Environmental Protection
- Wyoming Department of Environmental Quality

AAPCA LOCAL AGENCIES

- Butte County Air Quality Management District (California)
- Canton City Health Department (Ohio)
- Chattanooga-Hamilton County Air Pollution Control (Tennessee)
- El Dorado County Air Quality Management District (California)
- Forsyth County Office of Environmental Assistance and Protection (North Carolina)
- Fort Worth Environmental Management Department (Texas)
- Environmental Protection Commission of Hillsborough County (Florida)
- Galveston County Health District (Texas)
- Huntsville Division of Natural Resources and Environmental Management (Alabama)
- City of Indianapolis (Indiana)
- Jefferson County Department of Health (Alabama)
- Knox County Air Quality Management Division (Tennessee)
- Louisville Metro Air Pollution Control District (Kentucky)
- Manatee County Environmental Management Department (Florida)
- Maricopa Air Quality Department (Arizona)
- Mecklenburg County Air Quality (North Carolina)
- Mojave Desert Air Quality Management District (California)
- Nashville/Davidson Metro Public Health Department (Tennessee)
- Omaha Air Quality Control (Nebraska)
- San Joaquin Valley Air Pollution Control District (California)
- Shelby County Health Department (Tennessee)
- Toledo Division of Environmental Services (Ohio)
- Ventura County Air Pollution Control District (California)
- Western North Carolina Regional Air Quality Agency (North Carolina)
- Yolo-Solano Air Quality Management District (California)

ADDITIONAL AIR QUALITY RESOURCES

- U.S. EPA's Air Quality Trends website
- U.S. EPA's Nonattainment Areas for Criteria Pollutants (Green Book)
- U.S. EPA's Report on the Environment (ROE) website
- U.S. EPA's Air Quality Index (AQI)
- Western Regional Air Partnership's (WRAP) Regional Haze Storyboard