

Final Rule to Strengthen the National Ambient Air Quality Standards for Particulate Matter

February 7, 2024

Key Information

- **Critical for public health:** Strengthened standards will result in significant public health net benefits that could be as high as \$46 billion in 2032. Health benefits will include up to 4,500 avoided premature deaths, 800,000 avoided cases of asthma symptoms, and 290,000 avoided lost workdays (in 2032).
- **Clean air supports economic growth & climate action:** The Biden-Harris Administration's Investing in America Agenda integrates investments with regulatory action to advance manufacturing and infrastructure improvements while furthering the nation's commitment to clean air, clean energy, and addressing climate change. Healthy workers and families are critical to American prosperity.
- **Stronger standard for particle pollution protects everyone's health while advancing environmental justice goals:** Strengthening the Clean Air Act standards for particle pollution improves air quality for everyone, ensuring that communities that are overburdened by pollution are not left behind and are able to experience the benefits of cleaner, healthier air. This action is aligned with the Biden-Harris Administrations commitment to advance environmental justice.
- **EPA will support states and tribes in implementing the new clean air standard,** building on repeated successful implementation of prior rules to strengthen standards for this pollution.
- **National clean air rules will help states meet the stronger standard.** For many areas, federal measures will help achieve the air quality improvements necessary to meet the new standard. Recent and forthcoming EPA rules across the power sector, industrial sources, and transportation will help drive additional PM reductions, as will continued deployment of funding from the Bipartisan Infrastructure Law and Inflation Reduction Act.

Overview of the Final Rule

- On February 7, 2024, EPA strengthened the National Ambient Air Quality Standards for Particulate Matter (“PM NAAQS”) to protect millions of Americans from harmful and costly health impacts, such as heart attacks and premature death.
- Particle or soot pollution is one of the most dangerous forms of air pollution, and an extensive body of science links it to a range of serious and sometimes deadly illnesses.
- In Executive Order 13990, President Biden directed EPA to review the previous administration’s decision to retain the 2012 standards to ensure that the standards are adequately protective of public health.
- After taking into consideration the available scientific evidence, advice from the Clean Air Scientific Advisory Committee (CASAC), and nearly 700,000 public comments, EPA is strengthening the annual health-based standard for fine particles to 9.0 micrograms per cubic meter.
- The stronger PM NAAQS will advance environmental justice by leading to reductions in particle pollution, which disproportionately burdens communities of color and other vulnerable communities.
- On-the-books regulations and available control measures can reduce particle pollution, leading to large net public health net benefits of as much as \$46 billion (in 2032).
- Implementing national standards for clean air is a federal, state, and tribal partnership. EPA has worked successfully with states and Tribes to implement past rules strengthening the NAAQS and will continue to do our part to assist with implementation of the stronger standard for particle pollution.
- For more information on particle pollution and to read the final rule, visit <https://www.epa.gov/pm-pollution>.

Clean Air and Economic Progress Go Hand-in-Hand

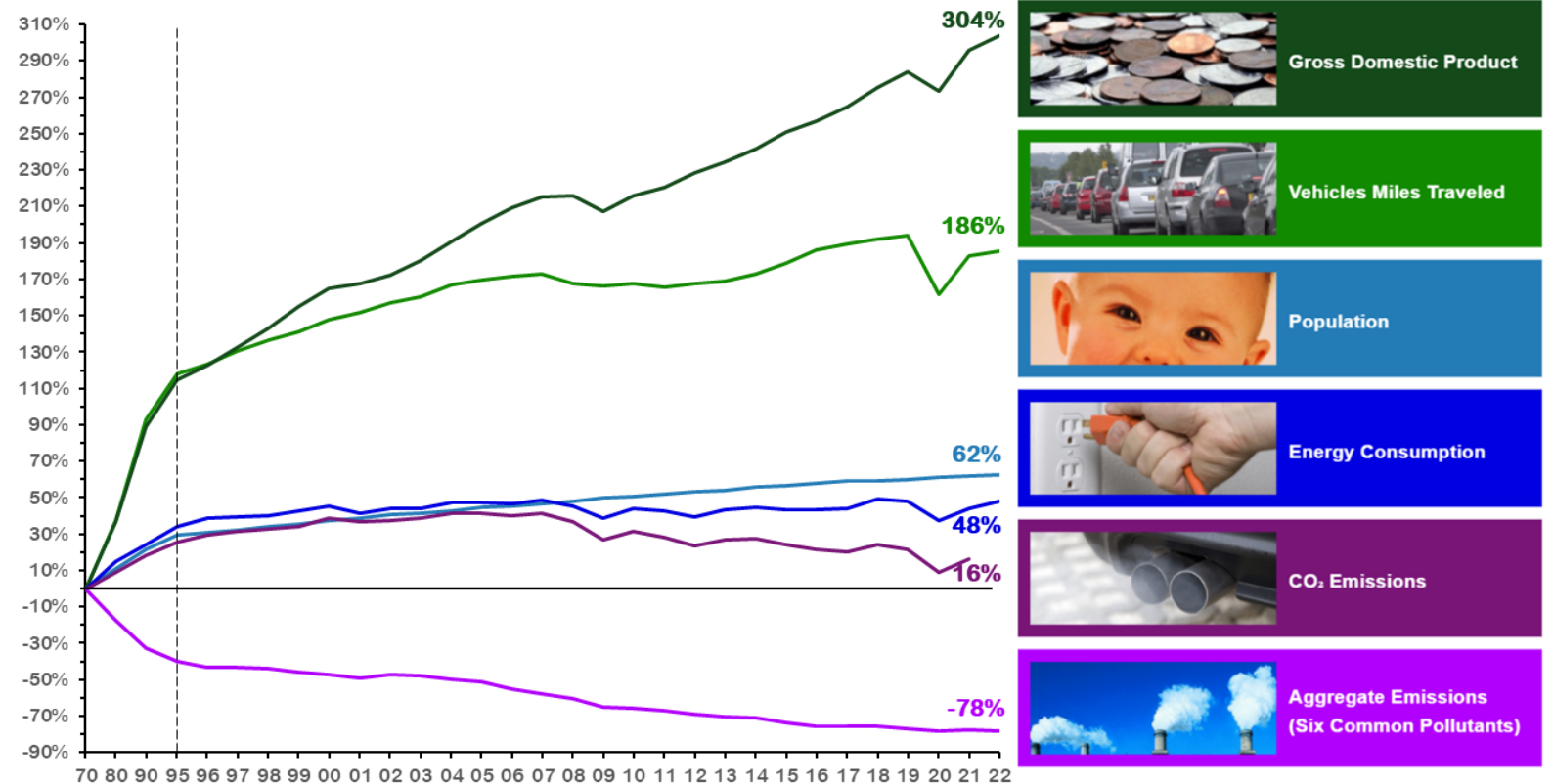
Emissions

- Since 1970, the Gross Domestic Product has increased more than 300%, while emissions of PM and 5 other common pollutants have dropped more than 75%.

PM concentrations

- Since 2000, federal regulations have helped lower PM_{2.5} concentrations in the outdoor air by 42%.
- This progress occurred while U.S. economic indicators remained strong, with the Gross Domestic Product increasing 52% during that time.

Comparison of Growth Areas and Emissions, 1970-2022



Source: [EPA Air Quality Trends](#)

Main Elements of the PM NAAQS Final Decision

- EPA is **strengthening the level of the primary (health-based) annual standard for fine particles** (PM_{2.5}) to 9.0 micrograms per cubic meter (µg/m³) to reflect the latest available health science.
- EPA is **not changing all other PM standards**:
 - The primary (health-based) and secondary (welfare-based) 24-hour PM_{2.5} standards stay at the level of 35 µg/m³
 - The primary and secondary 24-hour PM₁₀ standards stay at the level of 150 µg/m³
 - The secondary annual PM_{2.5} standard stays at the level of 15.0 µg/m³
- EPA is also:
 - Revising the Air Quality Index (AQI) to improve public communications about the risks from PM_{2.5} exposures
 - Making changes to the monitoring network to enhance protection of air quality in communities overburdened by air pollution

Public Health Benefits of Final PM NAAQS

- **Improve air quality and prevent thousands of premature deaths across the country**
 - Stronger standard will improve health for millions of people, including at-risk populations such as children, older adults, people with pre-existing respiratory and cardiovascular disease, communities of color and low-income communities.
- **Better protect overburdened communities**
 - EPA analyses show that in general more stringent fine particle standards are expected to reduce both exposure and mortality risk disparities for overburdened communities

Estimated Monetized Benefits, Costs, and Net Benefits Associated with the Final Standard Levels in 2032 for the U.S. (2017\$)

	9/35 $\mu\text{g}/\text{m}^3$
Benefits^a	\$22 billion to \$46 billion
Costs^b	\$590 million
Net Benefits	\$22 billion to \$46 billion

Notes: We focus results to provide a snapshot of costs and benefits in 2032, using the best available information to approximate social costs and social benefits recognizing uncertainties and limitations in those estimates.

^a The benefits are associated with two point estimates from two different epidemiologic studies, and we present the benefits calculated at a real discount rate of 3 percent.

^b The costs are annualized using a 7 percent interest rate.

EPA Actions will Further Reduce Particle Pollution – Helping Meet Standards and Fostering Clean Growth

- National programs help communities across the country breathe cleaner air.
- Federal rules and programs, in partnership with state, Tribal, and local partners, will help to improve air quality around the country and reduce particle pollution.

2011	2014	2021	2022	2023	Coming Soon	Inflation Reduction Act
<ul style="list-style-type: none"> ▪ Power Plant Reductions (MATS) 	<ul style="list-style-type: none"> ▪ Motor Vehicle Emission and Fuel Standards 	<ul style="list-style-type: none"> ▪ Power Plant Reductions (CSAPR) 	<ul style="list-style-type: none"> ▪ Heavy-Duty Engine and Vehicle Standards 	<ul style="list-style-type: none"> ▪ Oil and Gas Regulations ▪ Power Plant and Industrial Reductions (Good Neighbor Plan) 	<ul style="list-style-type: none"> ▪ Light and Medium Duty Vehicle Rules ▪ Power Plant Reductions (MATS RTR, Section III) 	<ul style="list-style-type: none"> ▪ Investments in ▪ Clean ports ▪ Clean trucks ▪ Climate Pollution Reduction Grants ▪ Clean Energy Tax Credits

Revisions to the Primary Annual PM_{2.5} Standard

- EPA is revising the level of the primary (health-based) **annual** PM_{2.5} standard to 9.0 µg/m³ to meet the Clean Air Act requirement that primary standards be “requisite to protect public health with an adequate margin of safety,” including the health of at-risk populations
- In the final rule, EPA concludes that the available scientific information supports strengthening the primary annual PM_{2.5} standard to ensure it adequately protects public health:
 - Recent studies suggest adverse health effects from exposure to PM_{2.5} are occurring at concentrations allowed by the previous standard of 12 µg/m³ (set in 2012), with additional studies demonstrating improvements in public health, including reductions in mortality, following reductions in PM_{2.5} in areas with air quality below 12 µg/m³
 - EPA’s quantitative risk assessment estimates that the previous standard of 12 µg/m³ could allow thousands of PM_{2.5}-associated deaths per year
- Decision reflects Clean Air Scientific Advisory Committee (CASAC) advice and public input
 - The CASAC reached consensus that the primary annual PM_{2.5} standard should be revised, with the majority recommending revision to a level between 8-10 µg/m³

Decision to Retain Other PM Standards

- EPA is retaining the current primary (health-based) **24-hour** PM_{2.5} standard because the currently available scientific evidence indicates this standard already provides appropriate supplemental protection against elevated peak concentrations of fine particles
- Decisions on public health protection focus on whether **together** the suite of standards provide public health protection against the full distribution of short- and long-term PM_{2.5} exposures
- Air quality analyses suggest that the annual standard is controlling across most areas of the country and an annual standard of 9.0 µg/m³ will continue to effectively limit peak daily concentrations in conjunction with the existing 24-hour standard
- CASAC did not reach consensus on whether EPA should revise the level of the primary 24-hour PM_{2.5} standard, with the majority of CASAC members recommending revising the level to 25-30 µg/m³ and the minority recommending retaining the standard

Primary PM₁₀ Standard

- EPA is retaining the current primary PM₁₀ standard
- The PM₁₀ standard is set to protect against PM_{10-2.5} exposures (the “coarse fraction”)
- While the scientific evidence continues to generally suggest that a range of health effects are linked to PM_{10-2.5} exposures, the available evidence, including uncertainties, does not call into question the adequacy of the protection provided by the primary PM₁₀ standard
- CASAC did not advise EPA to revise the primary PM₁₀ standard

Secondary PM Standards

- EPA is not changing the current secondary PM standards at this time
- The available evidence continues to support that PM contributes to visibility impairment, climate effects, and damage to materials
- In assessing the scientific evidence and quantitative information, including uncertainties, EPA found that the current secondary PM standards continue to provide adequate protection against these effects
- CASAC did not advise EPA to revise the secondary PM standards

Modification of PM_{2.5} Monitoring Network

- To enhance protection of air quality in communities subject to disproportionate air pollution risk, EPA is modifying the PM_{2.5} monitoring network design criteria to include an environmental justice factor.
- This factor will account for proximity of populations at increased risk of PM_{2.5}-related health effects to air pollution sources of concern.
- Specifically, for areas with additional required State or Local Air Monitoring Stations (SLAMS), a monitoring station is to be sited in an at-risk community where there are anticipated effects from sources in the area (for example: a major port, rail yard, airport, or industrial area).
- The network design change does not add a requirement for new monitors, rather it utilizes existing sites and ensures at risk communities are considered if sites need to move
- Note: Any new or moved monitors as a result of the modification in the PM NAAQS rule revision would not be in effect for the upcoming PM_{2.5} designations

Revisions to the Air Quality Index (AQI)

- EPA is updating to the **Air Quality Index (AQI)** for PM_{2.5}
 - The AQI is EPA’s color-coded tool used by state and local governments to help inform the public about current and daily air quality and recommends steps that individuals can take to reduce their exposure to air pollution
 - The AQI converts PM_{2.5} concentrations to a number on a scale from 0 to 500
- EPA is updating some of the breakpoints to reflect the change to the annual standard and the newest scientific information

Final Revision to AQI for PM_{2.5}

AQI Value	Current [µg/m ³]	Revisions [µg/m ³]
0, Good	0	0
50, Moderate	12	9
100, USG	35	35
150, Unhealthy	55	55
200, Very Unhealthy	150	125
300, Hazardous	250	225
500, Hazardous*	500	325

*The 500 breakpoint is used in conjunction with the 300 breakpoint to calculate AQI values within the hazardous category. The approach does not use the 500 breakpoint to determine other breakpoints values.

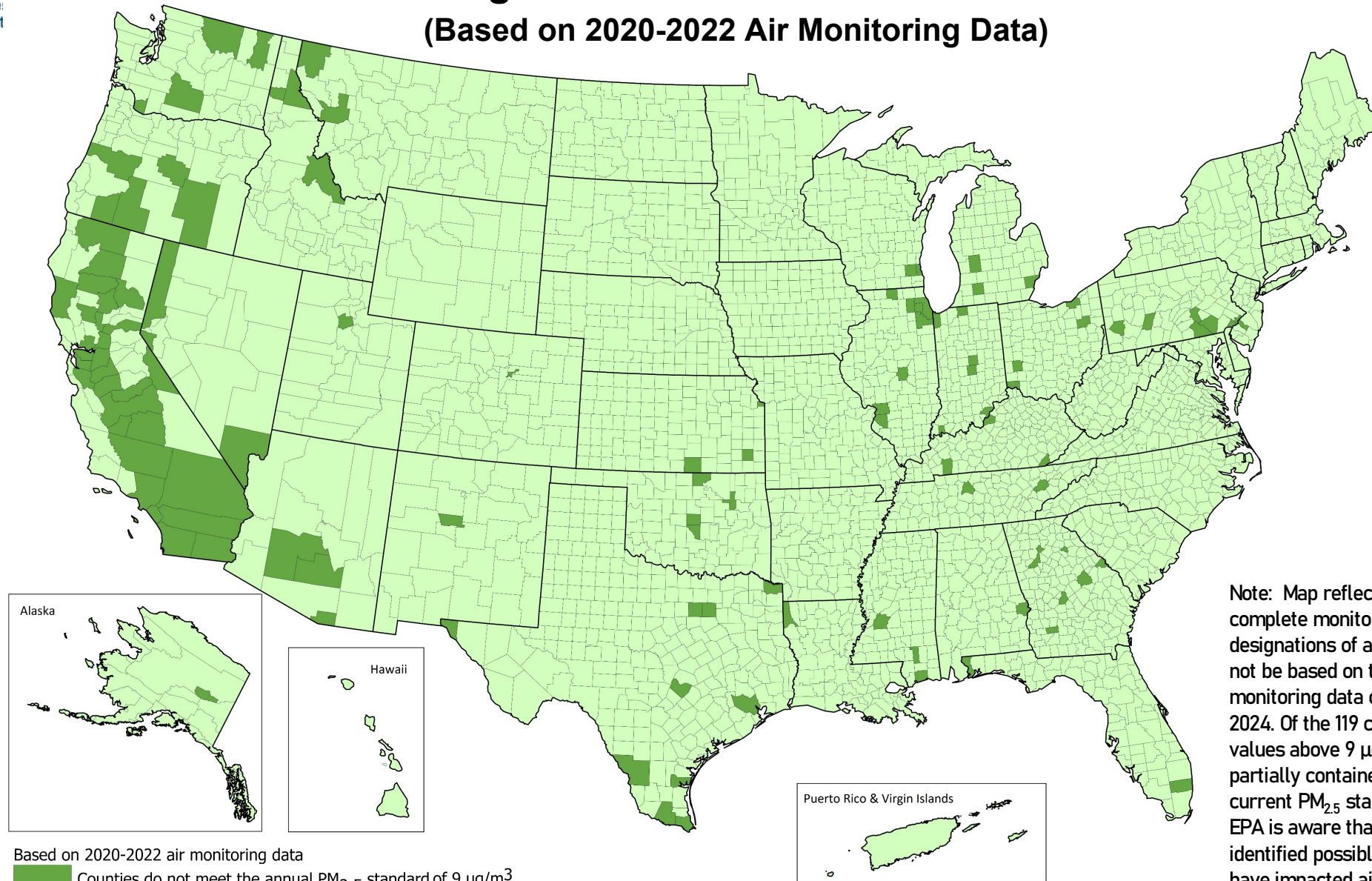
Establishing and Meeting a NAAQS

A 2-Step Process:

- Step 1: ***Setting the standards*** - Requires EPA to conduct an extensive scientific review to determine whether new standards are necessary to protect public health and welfare.
 - The Clean Air Act bars EPA from considering cost or attainability in setting the NAAQS.
- Step 2: ***Implementing the standards*** - Requires states, and tribes where appropriate, to reduce harmful pollution to meet the standards.
 - The Clean Air Act specifies that cost, technical feasibility and the time needed to meet the standards are all factors that should be taken into account in this phase.
 - State and federal programs have a proven record of improving air quality while the economy grows. EPA will use long-standing provisions in the law to work with state, tribal and local partners to make sure any revised standards are implemented in a flexible and cost-effective way.

This final rule does not make any air quality attainment/nonattainment designations. Consistent with Clean Air Act timelines, EPA is required to designate areas as attainment or nonattainment within 2 years of the final rule.

Most Counties with Monitors Already Meet the Strengthened Particle Pollution Standard (Based on 2020-2022 Air Monitoring Data)



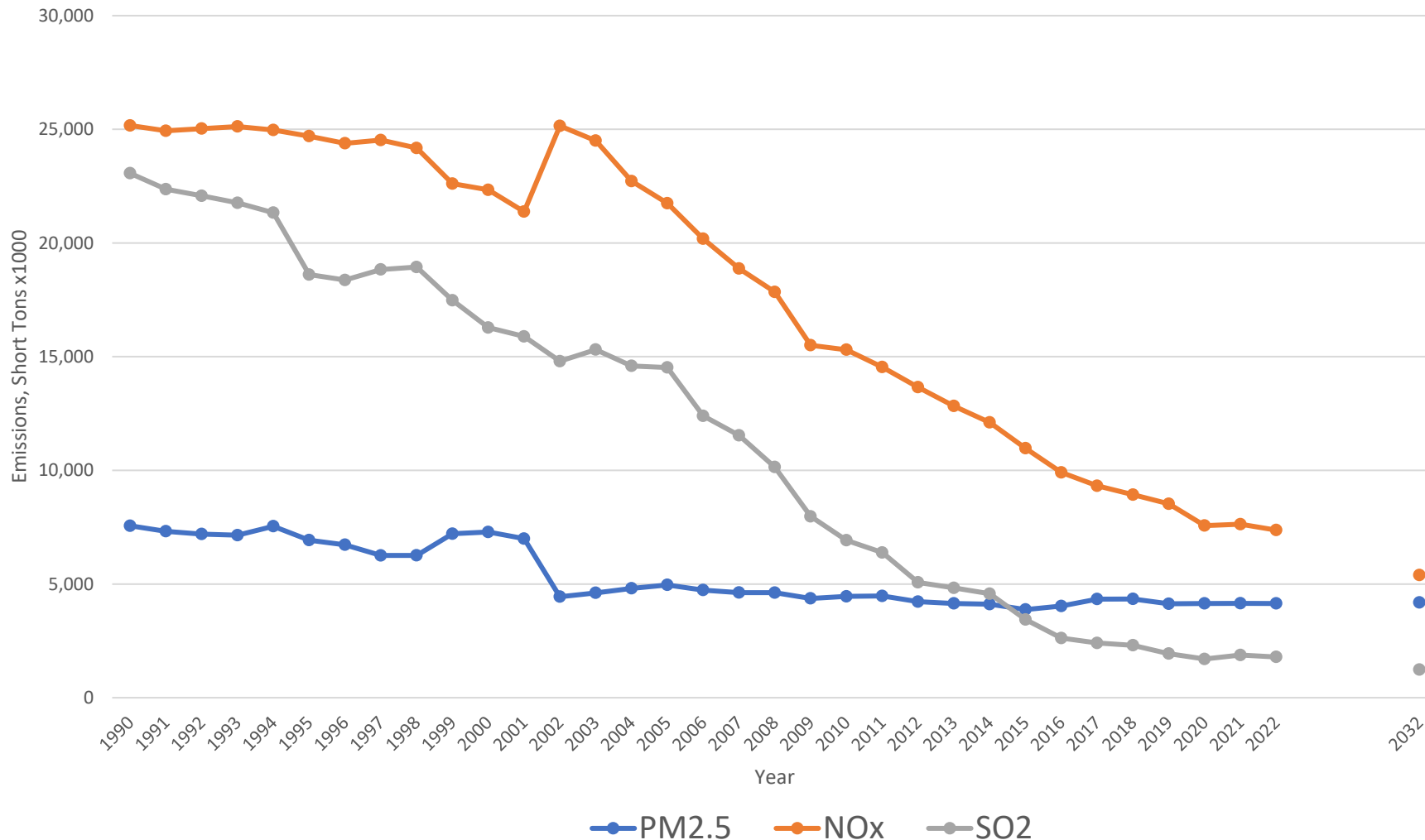
Note: Map reflects monitored counties with complete monitoring data. Future final designations of attainment/nonattainment will not be based on these data, but likely on monitoring data collected between 2022 and 2024. Of the 119 counties with 2020-2022 design values above $9 \mu\text{g}/\text{m}^3$, 59 counties are totally or partially contained in nonattainment areas for current $\text{PM}_{2.5}$ standards. In years 2021 and 2022, EPA is aware that some states have already identified possible exceptional events that may have impacted air quality in the US and may be relevant to designations decisions.

Based on 2020-2022 air monitoring data
Counties do not meet the annual $\text{PM}_{2.5}$ standard of $9 \mu\text{g}/\text{m}^3$

This information is provided for illustrative purposes only and is not intended to predict the outcome of any forthcoming designations process.

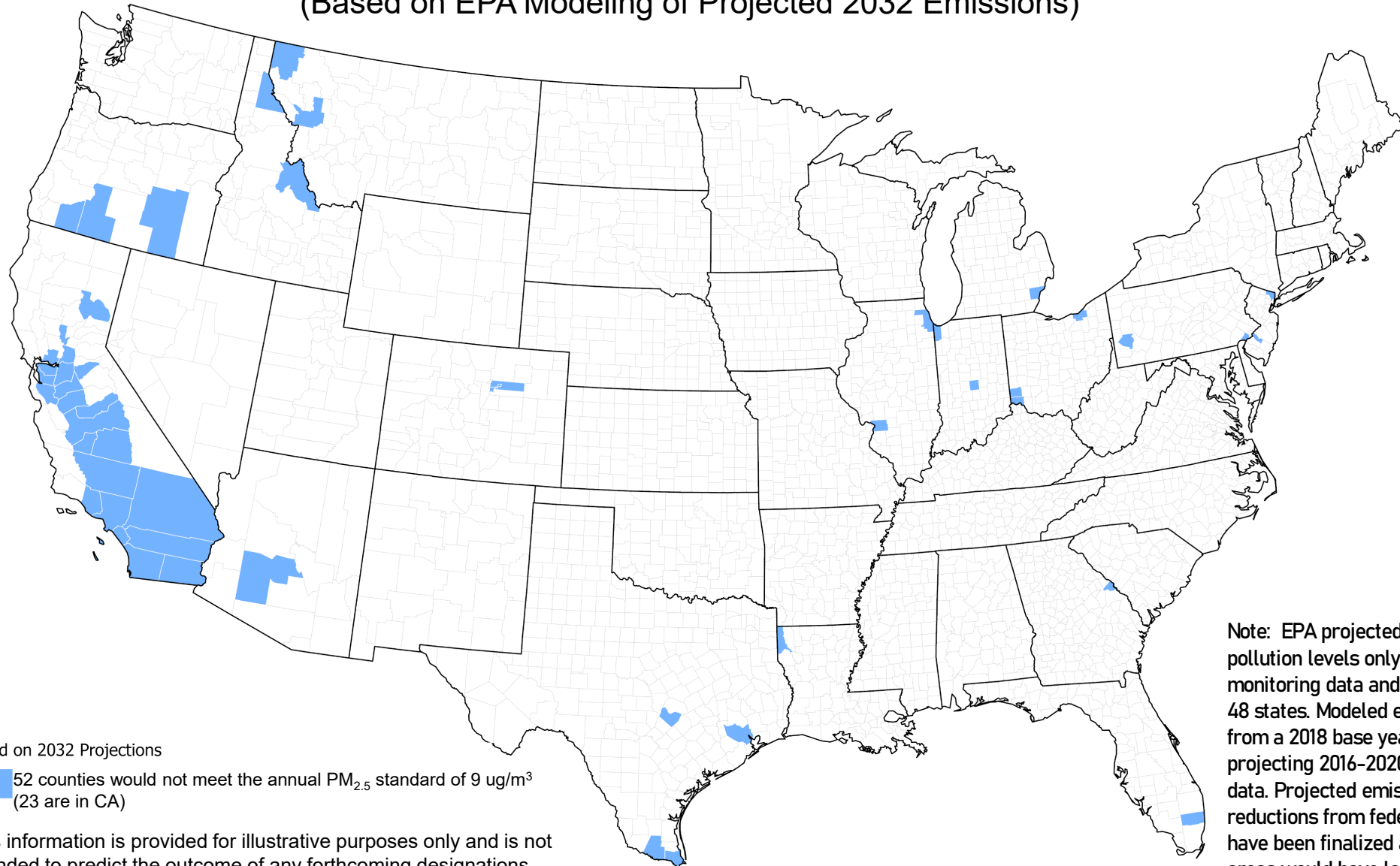
EPA Projects Continued Reduction of Emissions that Cause Fine Particle Pollution

Emissions Trends for PM_{2.5}, SO₂, and NO_x from 1990-2022 and 2032 (projected)




EPA Projects More than 99% of Counties would Meet the Revised Fine Particle Pollution Standard

Projection of Counties with Monitors that would not Meet in 2032 (Based on EPA Modeling of Projected 2032 Emissions)



Based on 2032 Projections

 52 counties would not meet the annual PM_{2.5} standard of 9 ug/m³
(23 are in CA)

This information is provided for illustrative purposes only and is not intended to predict the outcome of any forthcoming designations process.

Note: EPA projected future fine particle pollution levels only for counties with monitoring data and within the contiguous 48 states. Modeled emissions are developed from a 2018 base year and used in projecting 2016–2020 monitoring data. Projected emissions reflect expected reductions from federal regulations that have been finalized as of March 2023. Some areas would have longer than 2032 to attain the revised PM_{2.5} standard.

Designations/Implementation Timeline

The Clean Air Act directs EPA and states to take the following actions to deliver public health benefits following promulgation of a new/revised PM_{2.5} NAAQS:

- **Stationary source permitting.**
 - Prevention of Significant Deterioration (attainment area permitting) applies with respect to a new standard in all areas of the U.S. designated attainment for the pollutant upon the effective date of the new standard.
 - Nonattainment New Source Review applies in areas designated nonattainment for the pollutant, which includes any areas newly designated nonattainment at/after the effective date of nonattainment designations.
- **Within 2 years after a final NAAQS:** For areas with available information, EPA must "designate" areas as meeting (attainment areas) or not meeting (nonattainment areas) the final NAAQS considering the most recent air quality monitoring data and input from states and tribes. All PM_{2.5} nonattainment areas are initially designated as "Moderate."
- **Within 3 years after a final NAAQS:** Clean Air Act section 110 requires all states to submit state implementation plan revisions to show they have the basic air quality management program components in place to implement the final NAAQS.
- **Within 18 months after the effective date of designations:** Nonattainment area PM_{2.5} state implementation plans are due.
- **End of the 6th calendar year after the effective date of designations:** "Moderate" area attainment date.

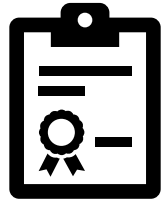
Clean Air Act Permitting Basics – Who needs a Permit and Why?

- Clean Air Act permits protect air quality while allowing economic growth.
- States issue almost all permits.
- An industry with high emissions must apply for a permit before they build or if they are going to expand their operations in a way that increases air pollution. EPA estimates that each year there are 100-200 major source permits issued.
- Once issued, permits are not often changed or adjusted.
- The permitting requirement applies only to a large new facility that emits particle pollution, or a facility that would increase the amount of particle pollution they emit. Mobile sources and many categories of industrial activity never need a permit.

How do industrial facilities get air permits under a new standard?

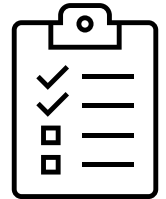
- Clean Air Act construction permits are issued by state and local air agencies and, in rare cases, by EPA.
- Process offers a menu of choices and options to ensure that we have both clean air and economic growth:
 - How to plan, construct and modify facilities;
 - What types of controls to install; and
 - How to manage emissions.
- Air permitting is conducted on a case-by-case basis and considers many project-specific variables.

Hypothetical Scenarios



A facility has a final permit in hand before the effective date of new standard

- Project moves ahead
- No new air permitting requirements
- Permit issued



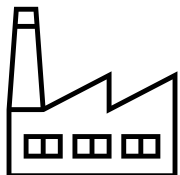
A facility has a permit in process when new standard takes effect – likely to be issued by a state or local air agency

- Compare current air quality modeling results to the new standard level, working with permitting agency
- Evaluate if additional air pollution emissions reductions are needed
- Permit issued



Plans for building new facility or expanding an existing one

- Work with permitting agency to estimate how much particle pollution will be emitted and choose best available air pollution control technology
- Demonstrate compliance with Clean Air Act requirements
- Permit issued



Plans for building new facility or expanding one in an area not meeting the new standard (permit needed after EPA designations process is completed – likely in or after 2026)

- Work with permitting agency to estimate how much particle pollution will be emitted and choose pollution controls with lowest achievable emission rate
- Demonstrate compliance with Clean Air Act requirements
- Permit issued

Moving Permits Forward

EPA will work with permit applicants and states (or other permitting authorities) to:

- **Identify where flexibilities and discretion exist** under the existing regulations and policies,
- **Clarify the best ways to use key tools** and guidance, and
- **Engage early** in the permitting process to ensure solution-based approaches.

Addressing Wildland Fire and Air Quality

- On November 9, 2023, **EPA, DOI, USDA and CDC signed an updated Memorandum of Understanding on Wildland Fire and Air Quality.**
- Joint workplan to:
 - Protect communities from the impacts of wildfire smoke, while scaling-up prescribed fire to reduce the risk of large, severe fires.
 - Ensure pathways under the Clean Air Act allow for increased prescribed fire.
 - Resolve challenges through on-the-ground “tabletop” exercises to support prescribed fire and public health protection.
- EPA is already working to ensure there is an **efficient, user-friendly pathway for excluding data impacted by prescribed fire and wildfire smoke**, including developing tools for and helping states with the Exceptional Events process.

MEMORANDUM OF UNDERSTANDING BETWEEN THE
UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE
AND THE
UNITED STATES DEPARTMENT OF THE INTERIOR
AND THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AND THE
UNITED STATES CENTERS FOR DISEASE CONTROL AND
PREVENTION

Wildland Fire and Air Quality Coordination

I. BACKGROUND

Wildfires have been growing in size, duration, and destructivity, with millions of people at risk from wildfire and wildfire smoke. This risk is expected to grow due to a combination of accumulating fuels, a warming climate, and expanding development in fire-prone landscapes.

Building for a Cleaner Future

- Reducing particle pollution protects everyone.
 - Advancing environmental justice, and
 - Building a healthy workforce, while
 - Allowing a clean economy to innovate and thrive.

- Clean industries support President Biden’s Investing in America Agenda.
 - Clean energy infrastructure and cutting-edge clean energy technologies
 - Advanced domestic manufacturing
 - Modernized public infrastructure and clean transportation
 - Increased resilience to climate change

Additional Resources

- Information on particulate matter (PM) pollution: <https://www.epa.gov/pm-pollution>
- Information on the Final PM NAAQS, including the fact sheets and a copy of this presentation: <https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm>
- Information on the PM NAAQS review process and other related documents: <https://www.epa.gov/naaqs/particulate-matter-pm-air-quality-standards>

Appendix

What is Particulate Matter (PM)?

- Mixture of solid and liquid droplets
 - Primary particles emitted directly from a source (e.g., smokestacks, fires, construction sites)
 - Secondary particles produced through complex atmospheric reactions of chemicals (e.g., NO_2 , SO_2) emitted by sources such as power plants, automobiles, etc.
- Particles defined by aerodynamic diameter
 - Coarse particles (PM_{10}), aerodynamic diameter $\leq 10 \mu\text{m}$
 - Fine particles ($\text{PM}_{2.5}$), aerodynamic diameter $\leq 2.5 \mu\text{m}$
 - Ultrafine particles (UFPs), aerodynamic diameter $\leq 0.1 \mu\text{m}$

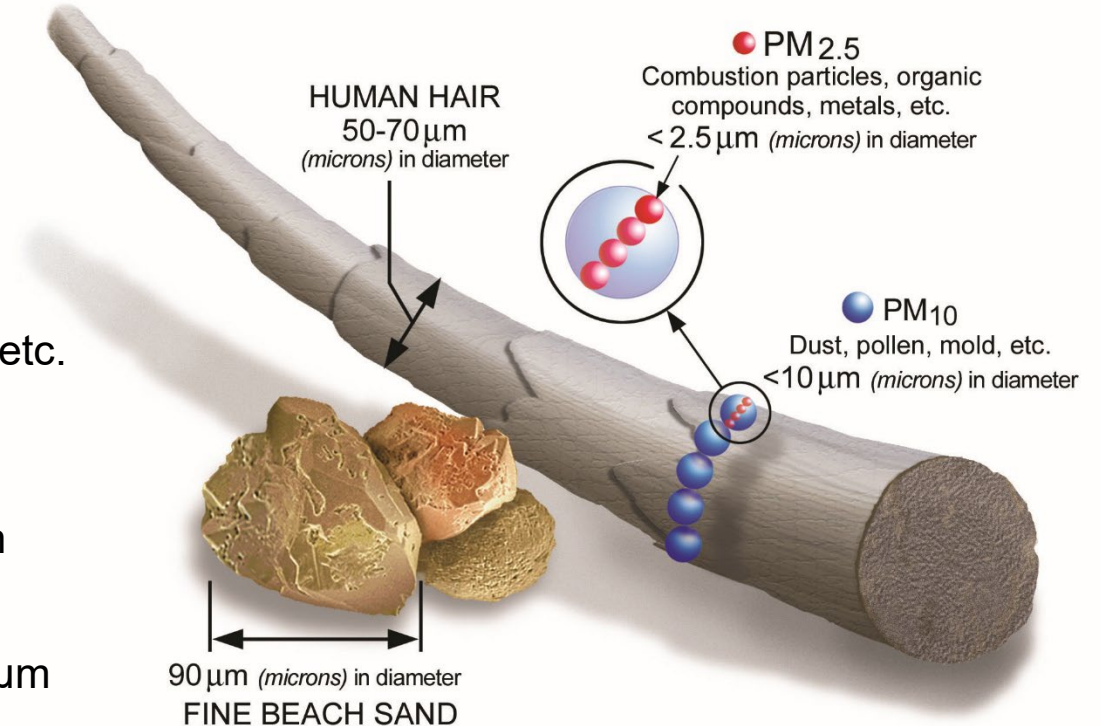
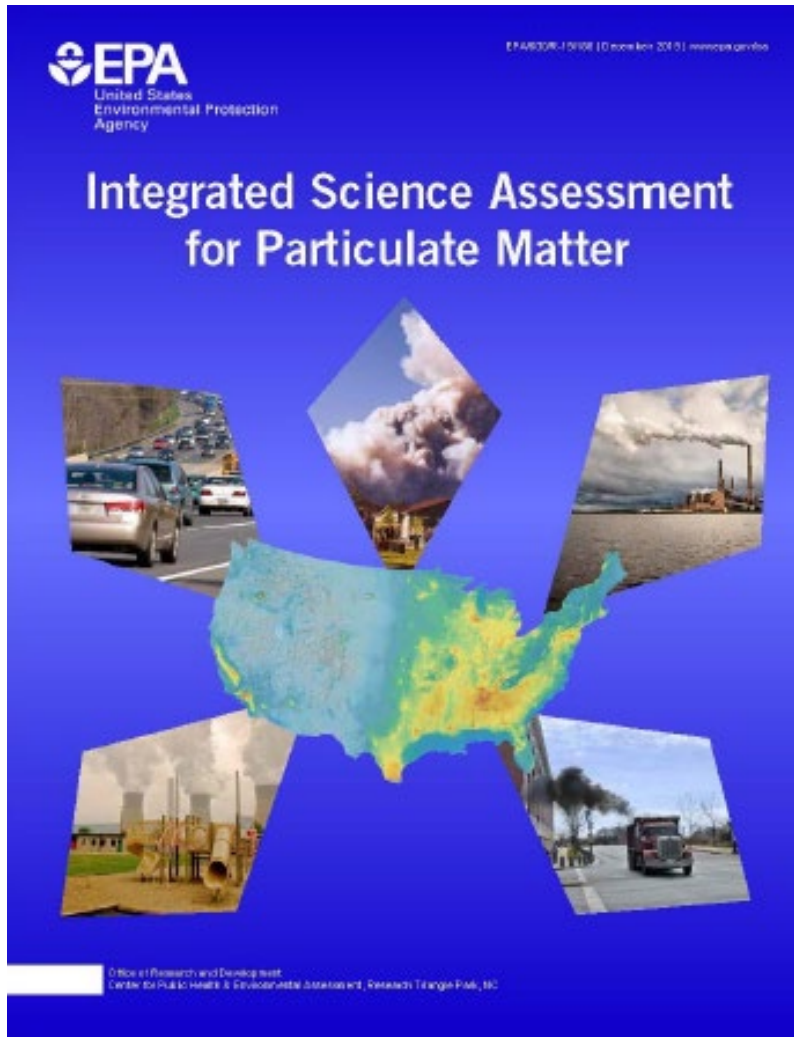


Image courtesy of the U.S. EPA

Source: <https://www.epa.gov/pm-pollution>

Why is PM a Public Health Concern?



<https://www.epa.gov/isa/integrated-science-assessment-isa-particulate-matter>

- Fine particles (PM_{2.5}) are of greatest health concern
 - PM_{2.5} can enter the respiratory tract and make its way into the lower parts of the lungs
 - Some particles can move out of the respiratory system and affect other organ systems
- EPA's 2019 Integrated Science Assessment (ISA) and ISA Supplement links exposure to PM_{2.5} to adverse health effects, including:
 - Premature death
 - Cardiovascular effects like irregular heartbeat and heart attacks
 - Respiratory effects like aggravated asthma, decreased lung function, coughing and difficulty breathing
 - Cancer
 - Nervous system effects
- At-risk populations include children, older adults, people with pre-existing respiratory or cardiovascular disease, minority populations, and low socioeconomic status (SES) populations

Summary of Previous Standards and 2024 Final Decision

Standards – Last Revised in the 2012 Review*					Decisions in 2020 Review	2024 Final Decision
Indicator	Averaging Time	Primary/Secondary	Level	Form		
PM _{2.5}	Annual	Primary	12.0 µg/m ³	Annual arithmetic mean, averaged over 3 years	Retained	Revise level to 9.0 µg/m ³
		Secondary	15.0 µg/m ³		Retained	Retain
	24-hour	Primary and Secondary	35 µg/m ³	98th percentile, averaged over 3 years	Retained	Retain
PM ₁₀	24-hour	Primary and Secondary	150 µg/m ³	Not to be exceeded more than once per year on average over a 3-year period	Retained	Retain

* Prior to 2012, PM NAAQS were reviewed and revised several times – established in 1971 (total suspended particulate – TSP) and revised in 1987 (set PM₁₀), 1997 (set PM_{2.5}), 2006 (revised PM_{2.5}, PM₁₀)

Health Benefits of the Stronger PM Standard

- EPA estimates health benefits of strengthening the primary (health-based) annual standard for fine particles to 9.0 micrograms per cubic meter could be as high as \$46 billion in 2032 (2017\$, 3% discount rate).
- In 2032 alone, the health benefits include avoiding:
 - Up to 4,500 premature deaths
 - 2,000 emergency room visits
 - 5,700 cases of asthma onset
 - 800,000 cases of asthma symptoms
 - 290,000 lost workdays
 - 1,000 hospital admissions for Alzheimer's/Parkinson's diseases
 - 300 incidences of stroke/lung cancer
 - 38,000 hay fever symptoms