Final Rule to Strengthen the $PM_{2.5}$ NAAQS

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MA DEP AQ Advisory Meeting

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Overview of Final Rule

- On February 7, 2024, EPA strengthened the $PM_{2.5}$ NAAQS to protect millions of Americans from harmful and costly health impacts (e.g., heart attacks, premature death).
- In Executive Order 13990, President Biden directed EPA to review previous decision to retain the 2012 PM standards.
- After considering scientific evidence and advice from CASAC, as well as ~700,000 public comments, EPA strengthened the annual primary $PM_{2.5}$ standard to 9.0 $\mu g/m^3$ (from 12 $\mu g/m^3$)
- This revised NAAQS will advance EJ by reducing $PM_{2.5}$ in communities of color and other vulnerable communities.
- Federal/state/tribal partnership: EPA works with states/Tribes to implement the NAAQS and will continue to help implement the stronger $PM_{2.5}$ standard.

(Note: EPA must designate areas as attainment/nonattainment within 2 years of final rule.)

More information: https://www.epa.gov/pm-pollution.

Key Information

- **Public health benefits** up to $46 billion in 2032, including ~4,500 avoided premature deaths, 800,000 avoided cases of asthma symptoms, and 290,000 avoided lost workdays.

- **Clean air supports economic growth & climate action:** This is in accord with Biden Administration's "Investing in America" agenda, Healthy workers/families critical to US prosperity.

- **Stronger $PM_{2.5}$ standard protects public health while advancing EJ goals:**
- Ensures that communities overburdened by pollution are not left behind. This aligns with Biden Administration commitment to advance EJ.

- **EPA will support states/tribes in implementing new standard.**

- **National clean-air rules will help states meet revised $PM_{2.5}$ standard.** Recent (and forthcoming) EPA rules across power sector, industrial sources, and transportation will help drive PM reductions, as will funding from Bipartisan Infrastructure Law and Inflation Reduction Act.

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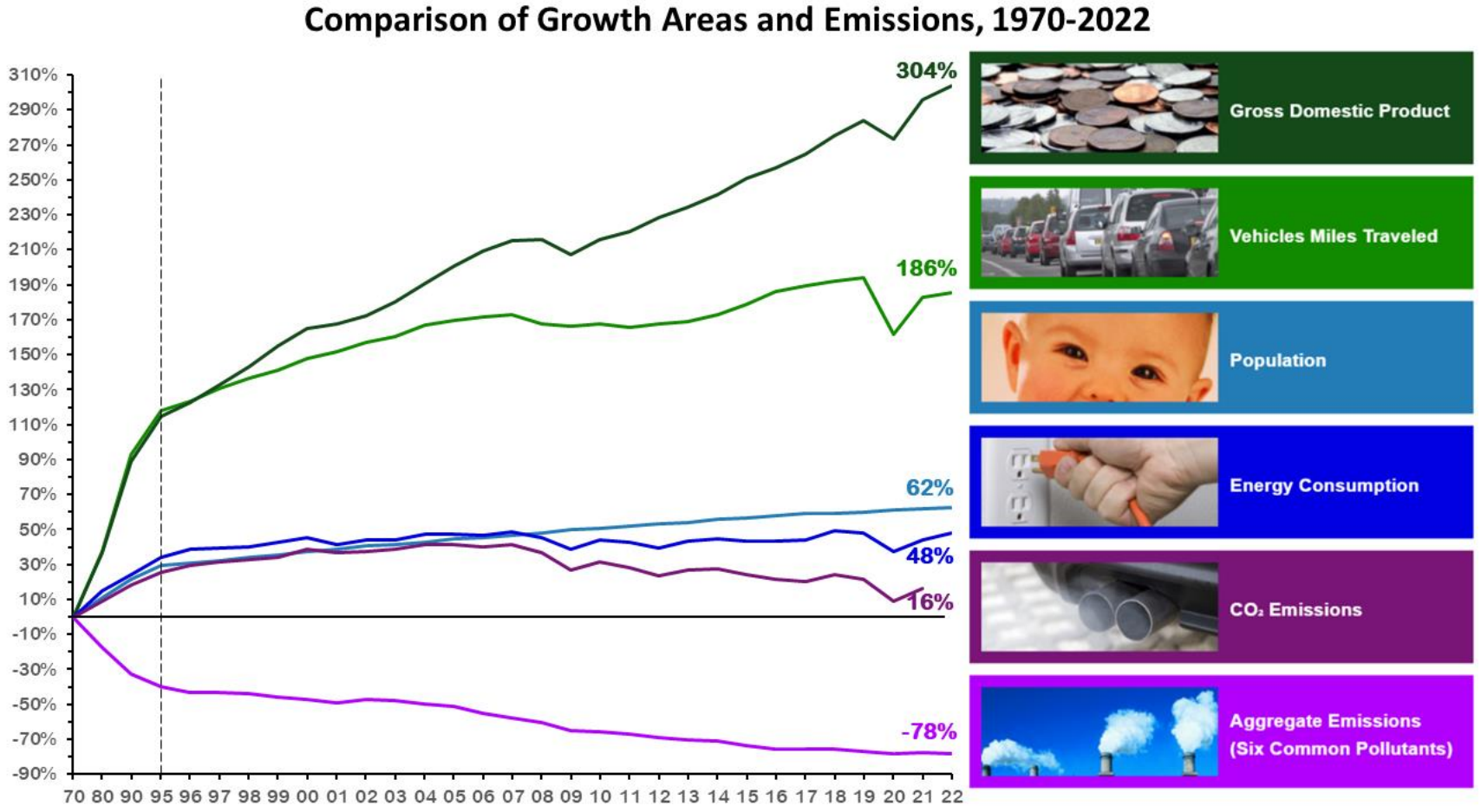
Clean Air and Economic Progress Go Hand-in-Hand

Emissions

- Since 1970, GDP has increased > 300%, while emissions of PM & other criteria pollutants have dropped > 75%

$PM_{2.5}$ levels

- Since 2000, federal regulations have helped lower $PM_{2.5}$ in outdoor air by about 42%
- This progress occurred while US economic indicators remained strong (GDP has increased 52% since 2000)



Source: EPA Air Quality Trends

Main Elements of the PM NAAQS Final Decision

- **EPA is strengthening the primary $PM_{2.5}$ NAAQS to 9.0 µg/m³** (from 12 µg/m³)
- **EPA is not changing other PM standards**:
  - Primary and secondary 24-hour $PM_{2.5}$ stay at 35 µg/m³
  - Primary and secondary 24-hour PM_{10} stay at 150 µg/m³
  - Secondary annual $PM_{2.5}$ stays at 15.0 µg/m³
- **EPA is revising the AQI** to better communicate risk from $PM_{2.5}$ exposure
- **EPA is modifying monitoring network** to better protect air quality in EJ communities.

Public Health Benefits of Final PM NAAQS

- **Improve air quality for millions and prevent 1000s of premature deaths across US**
- **Better protect overburdened communities**

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

	9/35 µg/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 snapshot of costs/benefits in 2032, using best available information to estimate social costs/social benefits recognizing uncertainties and limitations.

[a] Benefits are associated with two-point estimates from two different epidemiologic studies, and we present benefits calculated at a real discount rate of 3%.

[b] The costs are annualized using a 7% interest rate.

Modification of $PM_{2.5}$ Monitoring Network

- EPA is modifying $PM_{2.5}$ monitoring-network design criteria to include an EJ factor.
- This factor will account for proximity of EJ populations to $PM_{2.5}$ sources.
- Areas with State or Local Air Monitoring Stations (SLAMS), need to have a monitoring station in an EJ community that may be affected by $PM_{2.5}$ sources (e.g., major port, rail yard, airport, industrial area).
- This **does not add a requirement for new monitors**. Instead, it uses existing sites and ensures that at-risk communities are considered if sites need to move.

(Note that any new or moved monitors resulting from revised $PM_{2.5}$ NAAQS will not affect upcoming $PM_{2.5}$ designations.)

Revisions to AQI

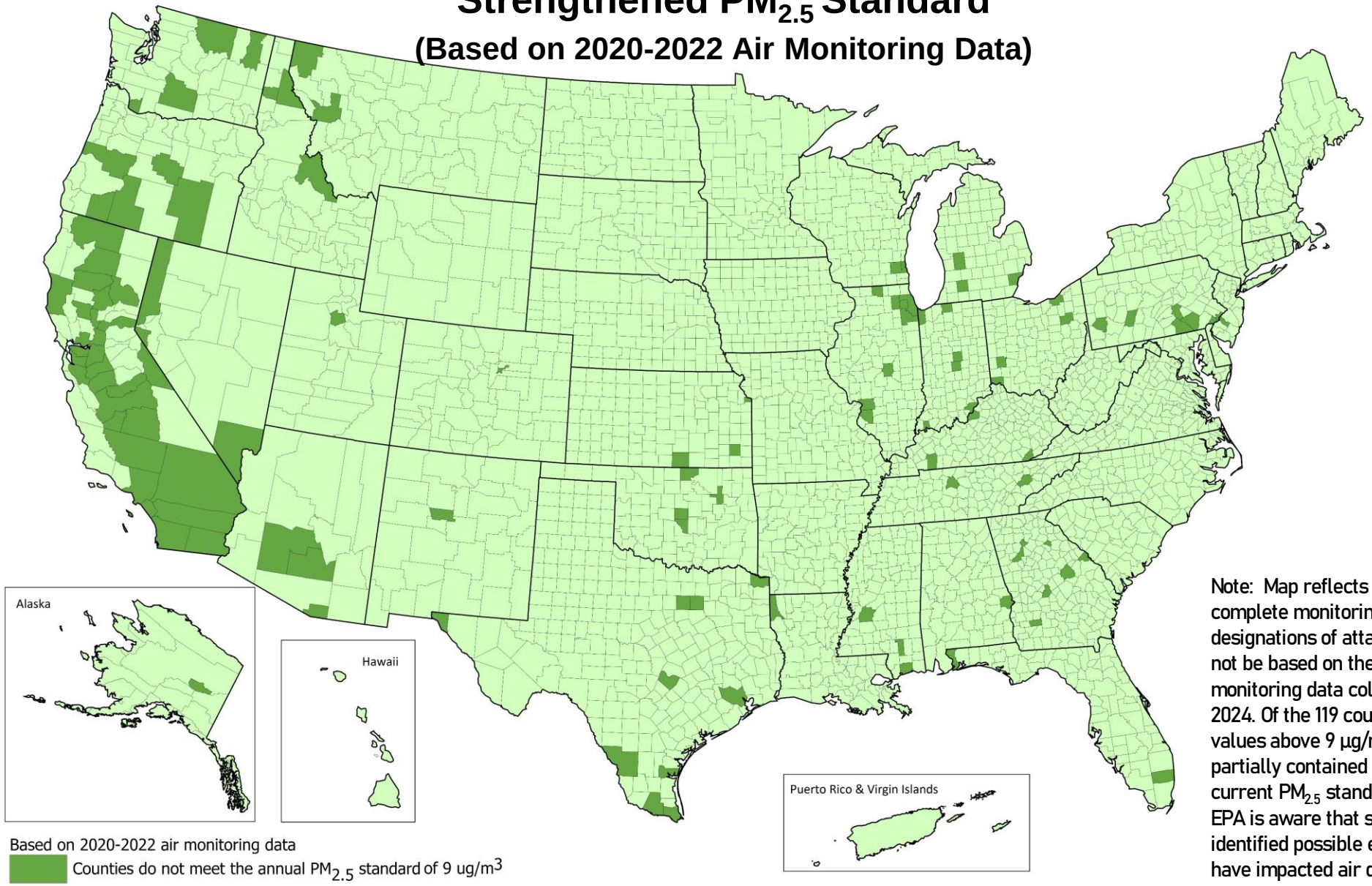
- **EPA is updating the $PM_{2.5}$ AQI**
  - AQI helps state/local governments inform public about current and daily AQ.
  - AQI converts $PM_{2.5}$ concentrations to number from 0 to 500
  - updating breakpoints to reflect new annual $PM_{2.5}$ of 9.0 µg/m^3

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 with the 300 breakpoint to calculate AQI values in hazardous category. 500 breakpoint is not used to determine other breakpoints.

Most Counties with Monitors Already Meet Strengthened $PM_{2.5}$ Standard

(Based on 2020-2022 Air Monitoring Data)

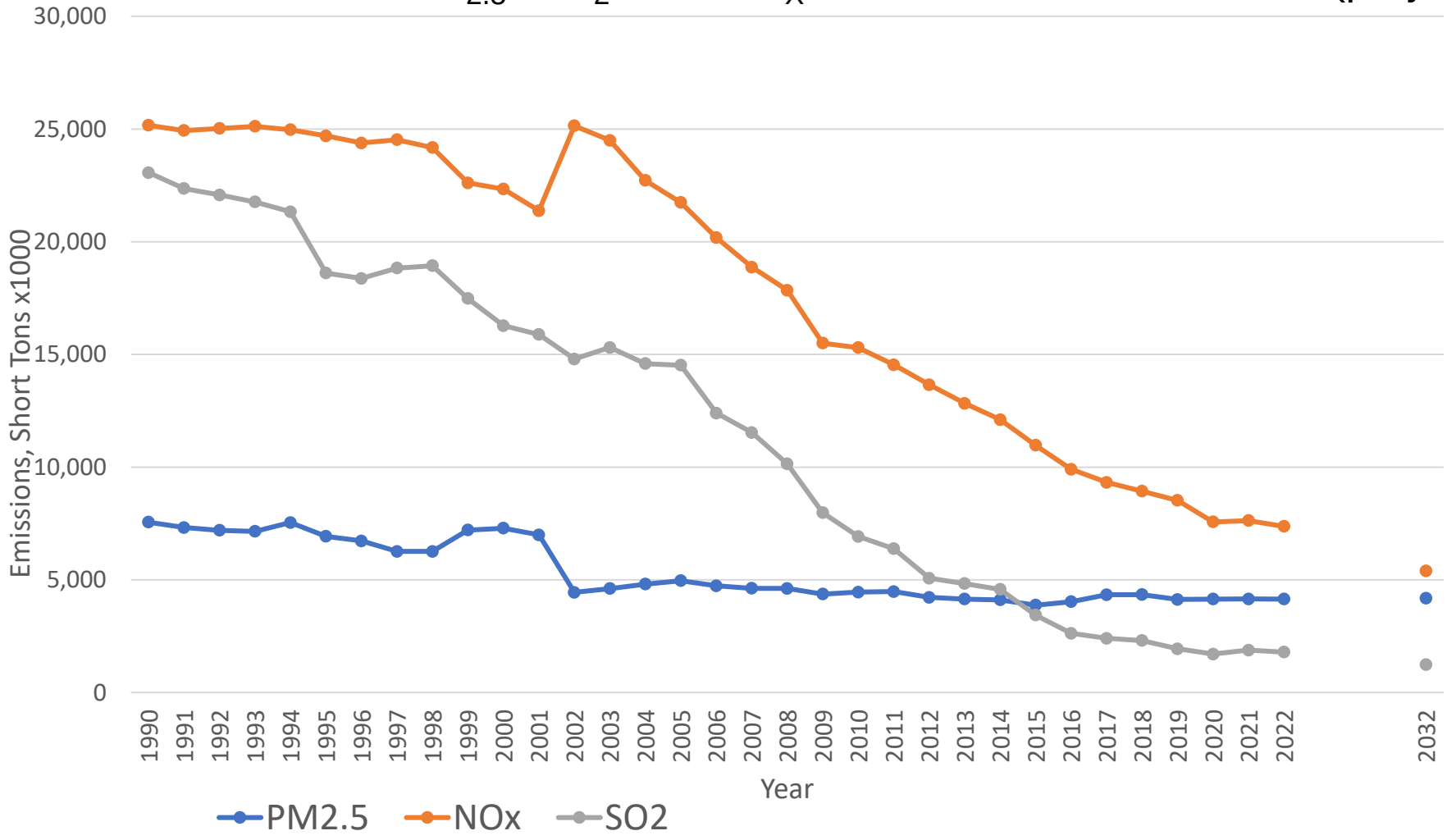


This information is provided for illustrative purposes only and is not intended to predict the outcome of any forthcoming designations process.

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 $\mu g/m^3$, 59 counties are totally or partially contained in nonattainment areas for current $PM_{2.5}$ 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.

EPA Projects Continued Reduction of Emissions that Cause Fine Particle Pollution

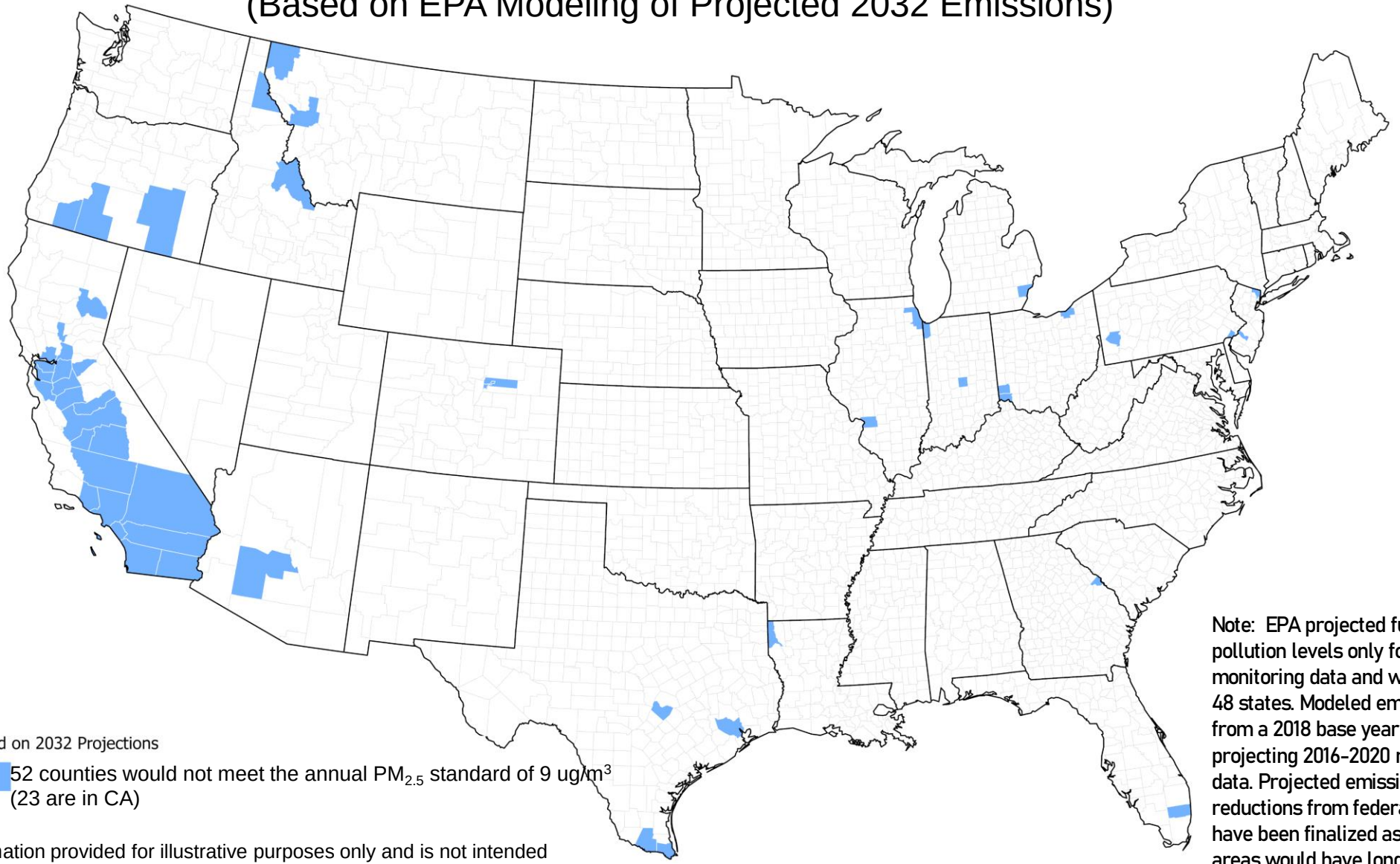
Emissions Trends for $PM_{2.5}$, SO_2, and NO_X from 1990-2022 and 2032 (projected)



EPA Projects More than 99% of Counties would Meet the Revised $PM_{2.5}$ 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/m^3 (23 are in CA)

Information provided for illustrative purposes only and is not intended to predict 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

- **Stationary source permitting.**
  - Prevention of Significant Deterioration (PSD) applies in all US attainment areas for pollutant upon effective date of new standard.
  - Nonattainment New Source Review (NNSR) applies in nonattainment (NA) areas, including newly designated NA areas on effective date of NA designations.

- **Within 2 years of final NAAQS:** EPA must designate areas as meeting or not meeting the NAAQS considering most recent AQ data and input from states/tribes. All $PM_{2.5}$ NA areas are initially designated "Moderate."

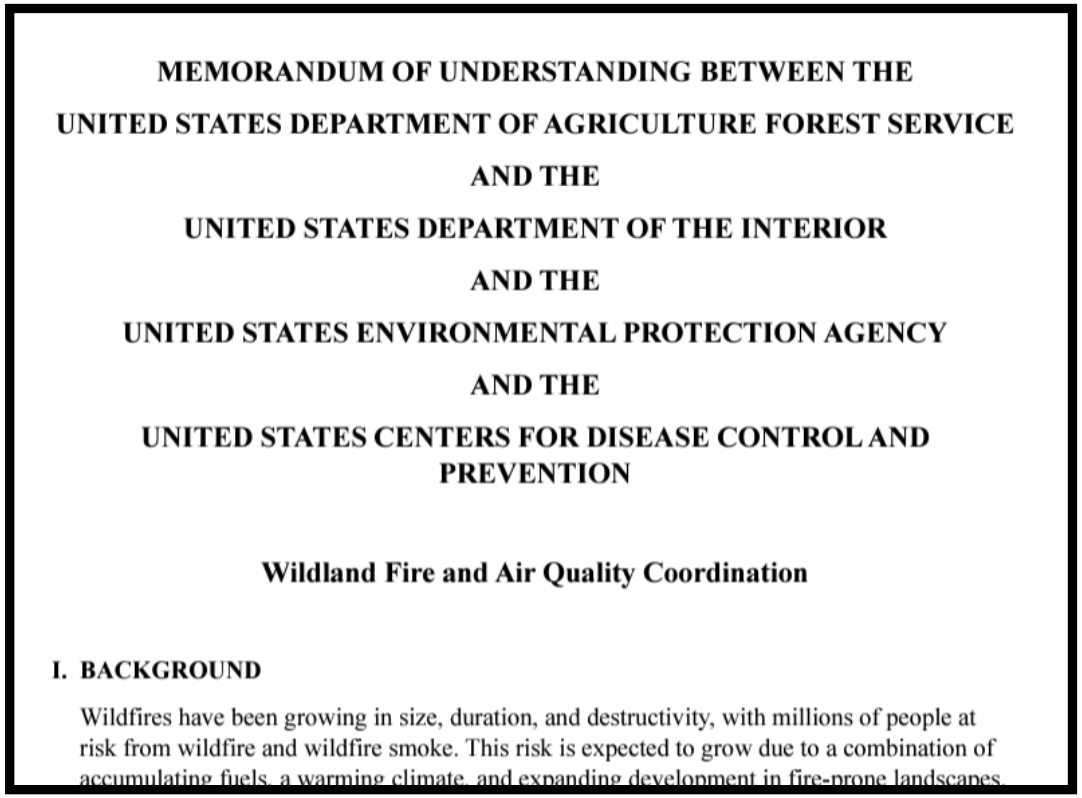
- **Within 3 years of final NAAQS:** CAA section 110 requires all states to submit "Infrastructure SIPs" showing they have basic AQM program components in place to implement NAAQS.

- **Within 18 months of effective date of designations:** NA area $PM_{2.5}$ SIPs due.

- **End of 6th calendar year after effective date of designations**: "Moderate" area attainment date.

Addressing Wildland Fire and Air Quality

- On Nov 9, 2023, **EPA, DOI, USDA and CDC signed updated MOU on Wildland Fire and AQ**
- Joint workplan to:
  - Scale up prescribed fire to reduce risk of large fires.
  - Ensure pathways under CAA to allow for increased prescribed fire.
  - Develop on-the-ground “tabletop” exercises to support prescribed fires.
- EPA developing tools for **excluding data impacted by prescribed fire and wildfire smoke** 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.

Additional Resources

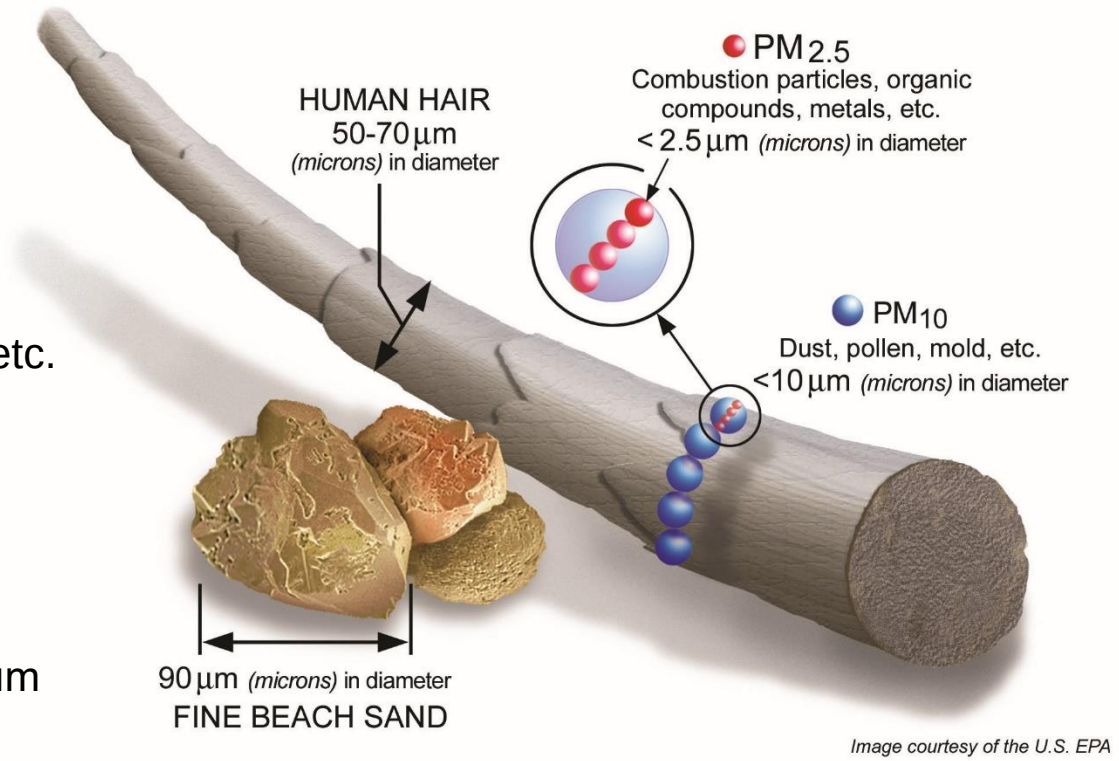
- PM pollution: https://www.epa.gov/pm-pollution
- Final PM NAAQS, including fact sheets: https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm
- PM NAAQS review process and related documents: https://www.epa.gov/naaqs/particulate-matter-pm-air-quality-standards

United States Environmental Protection Agency

Appendix

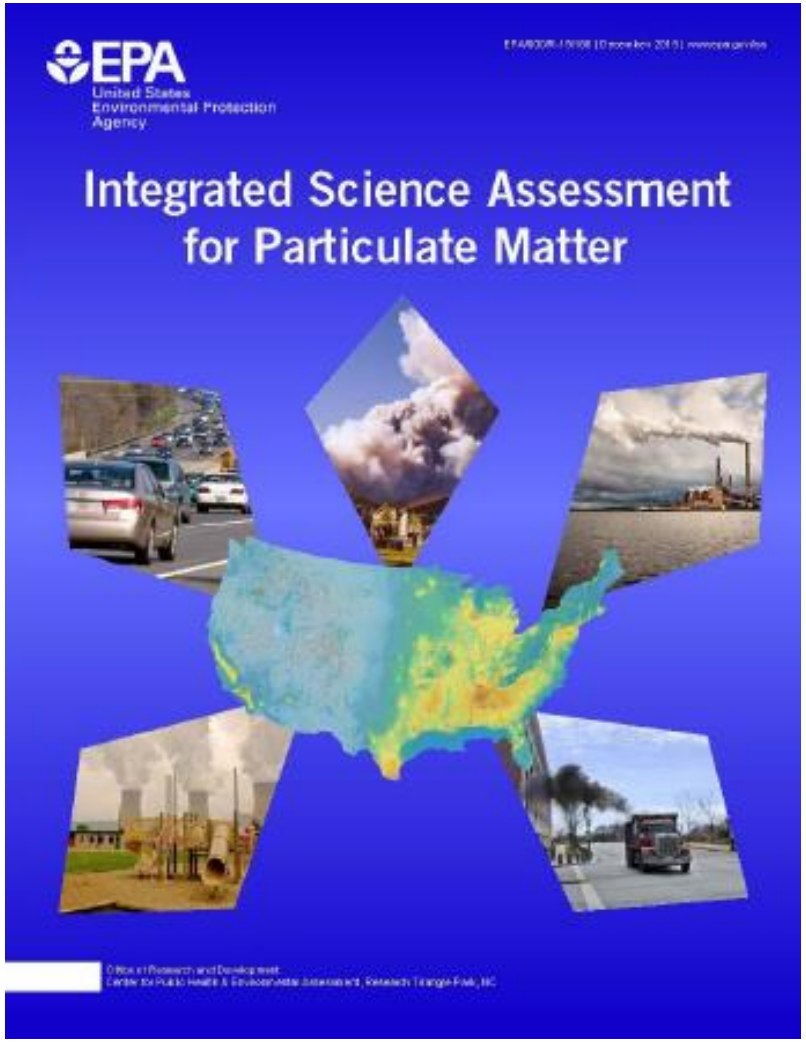
What is Particulate Matter (PM)?

- 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 ≤ 10 µm
  - Fine particles ($PM_{2.5}$), aerodynamic diameter ≤ 2.5 µm
  - Ultrafine particles (UFPs), aerodynamic diameter ≤ 0.1 µm



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 PM_{10}), 1997 (set $PM_{2.5}$), 2006 (revised $PM_{2.5}$, PM_{10})

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