EPA
United States
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Agency

# NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) PROCESS OVERVIEW AND UPDATES

National Ambient Air
Monitoring Conference

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# Outline

1) Introduction to the NAAQS
   - Clean Air Act Statutory Requirements
   - Overview of the NAAQS Review Process: Standard Setting
     - Planning
     - Assessment
     - Rulemaking
2) Updates from Active NAAQS Reviews

# Introduction to the NAAQS

EPA sets National Ambient Air Quality Standards (NAAQS) for **6 "criteria" pollutants** to protect public health and welfare:

- Photochemical Oxidants, including Ozone ($O_3$)
- Particulate matter (PM)
- Oxides of Sulfur ($SO_X$)
- Oxides of Nitrogen ($NO_X$)
- Lead (Pb)
- Carbon monoxide (CO)

The **Clean Air Act** outlines a 2-step process for setting and then meeting standards

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 does not allow the to EPA consider cost in setting the NAAQS

Step 2 ***Implementing the Standards:*** involves states putting measures and programs in place 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 may be considered in this step

# Clean Air Act Statutory Requirements

- **Primary (health-based) standards**… in the "judgment of the Administrator" are "requisite" to protect public health with an "adequate margin of safety"
  - "Requisite" means sufficient but not more than necessary
  - "Adequate margin of safety" – intended to address uncertainties associated with inconclusive evidence, and to provide a reasonable degree of protection against hazards that research has not yet identified
  - Includes consideration of potential effects in at-risk populations or lifestages
- **Secondary (welfare-based) standards** "…specify a level of air quality the attainment and maintenance of which" in the "judgment of the Administrator" is "requisite to protect the public welfare from any known or anticipated adverse effects"
  - Welfare effects include . . . "effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate . . ."
- The Clean Air Act establishes a 5-year review cycle, and requires the Administrator to "appoint an independent scientific review committee composed of seven members" (role played by the Clean Air Scientific Advisory Committee - CASAC)

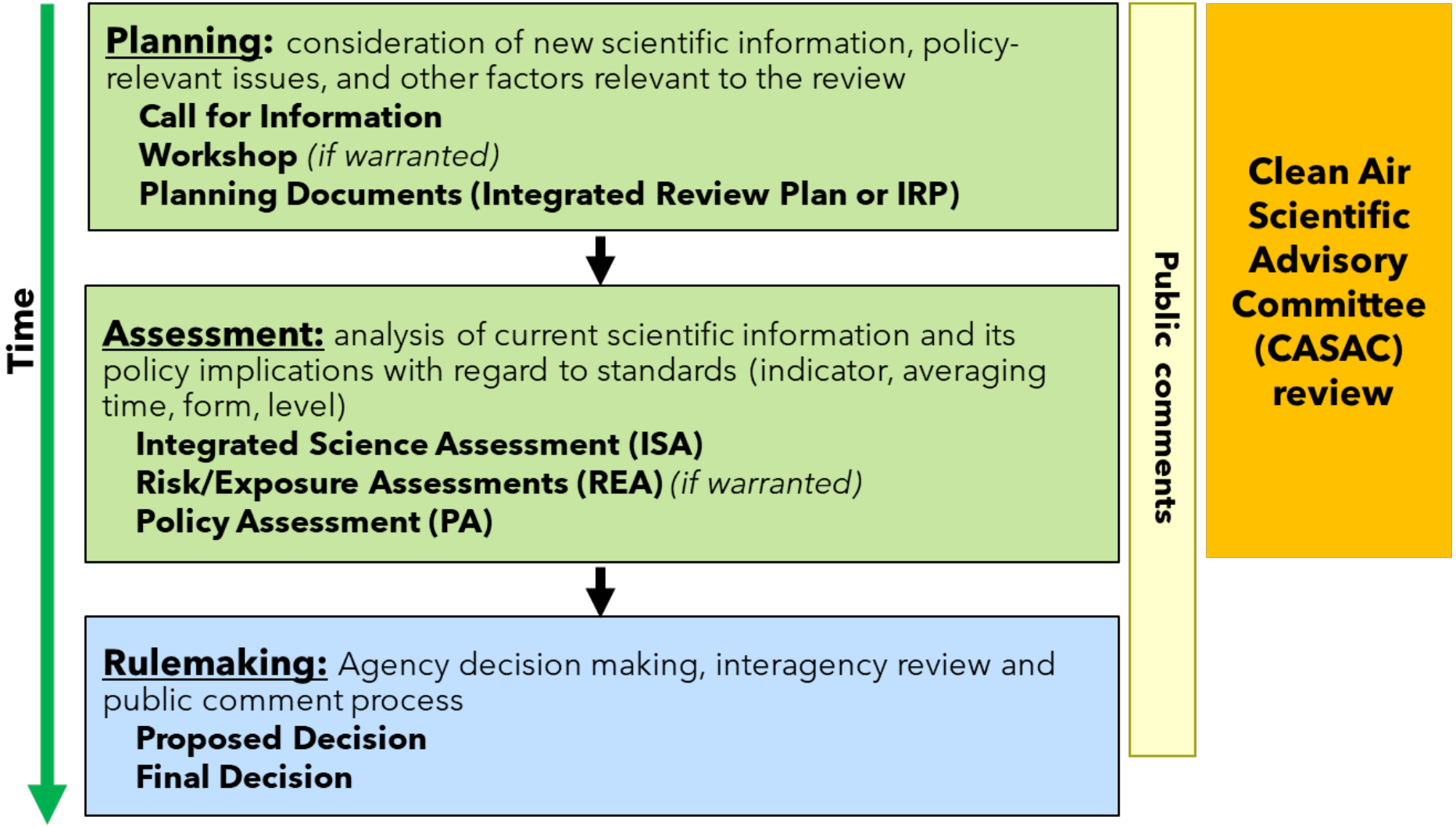
# Parts of the NAAQS

- Each primary and secondary standard has four parts:
  - Indicator
  - Averaging Time
  - Level
  - Form
- For example, the primary and secondary standards for Photochemical Oxidants (a criteria pollutant) include:

| Indicator Pollutant | Averaging Time | Level | Form |
|---|---|---|---|
| **Ozone ($O_3$)** | 8 hours | 0.070 ppm | Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years |

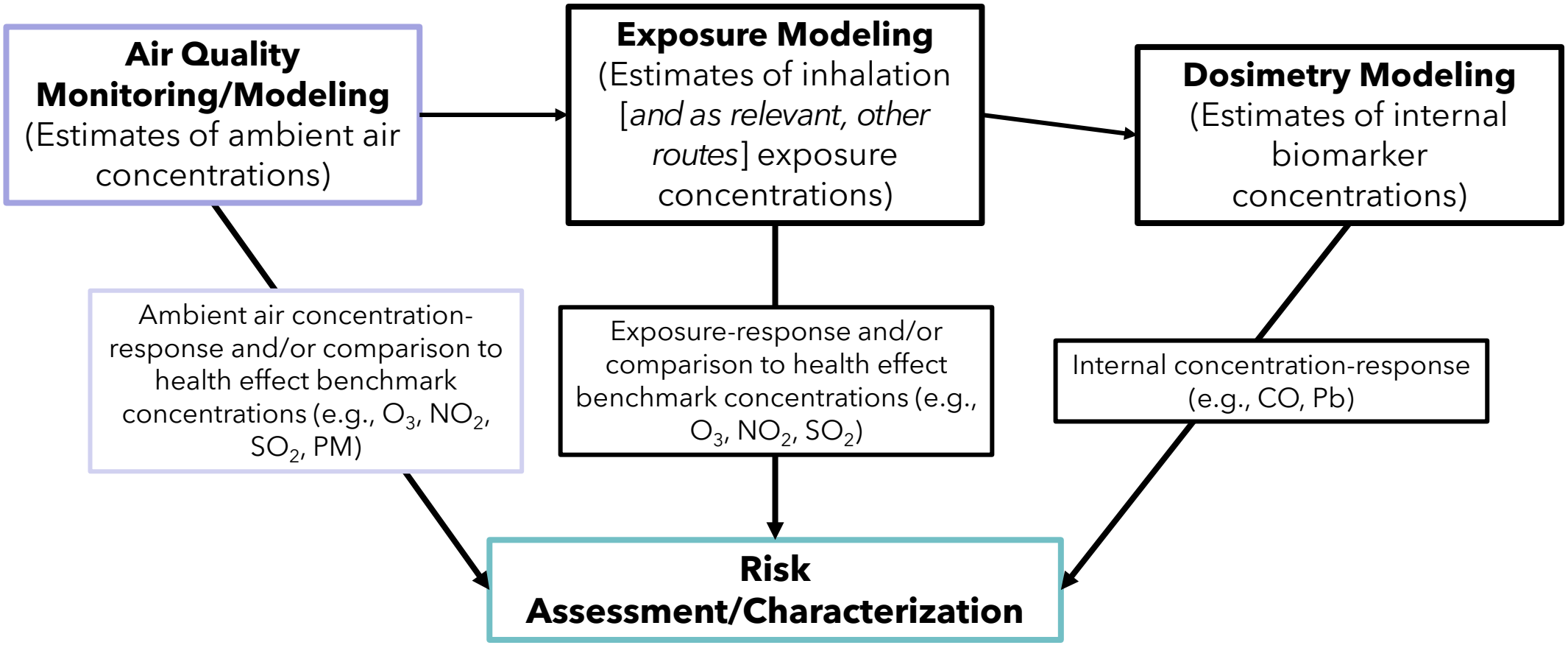
- All four parts are subject to review during a NAAQS review.

# Overview of the NAAQS Review Process: Standard Setting



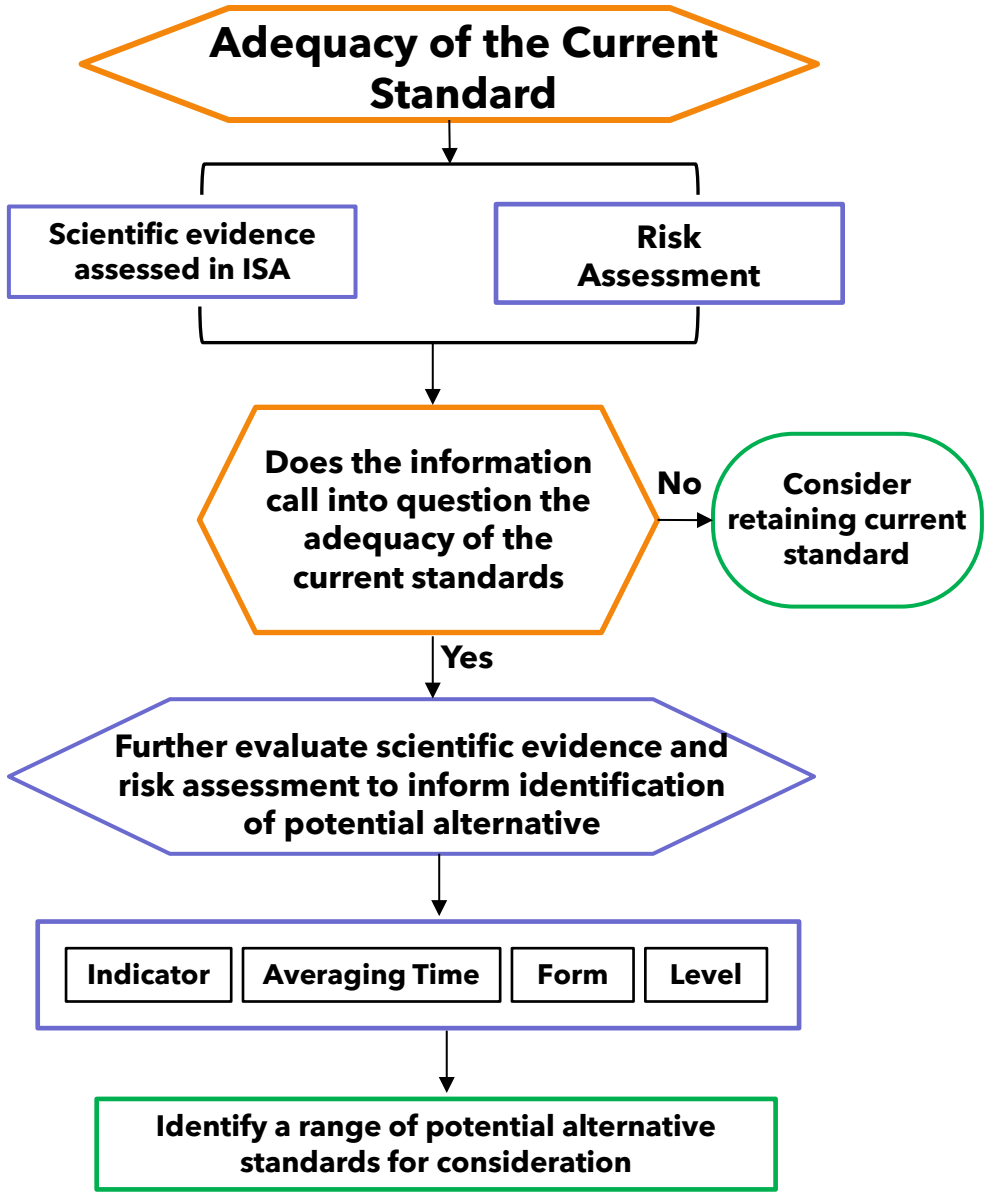
# Risk and Exposure Assessment (REA)

- As appropriate, EPA's Office of Air and Radiation (OAR) develops quantitative assessments of air quality, exposures, and/or risks
- Assessments conducted vary based on the type of information available for each review and each pollutant, and on the potential for assessments to inform decisions



# Purpose and Focus of the Policy Assessment (PA)

- The PA is meant to ***bridge the gap*** between the Agency's scientific assessments and the judgments required of the Administrator in determining whether it is appropriate to retain or revise the NAAQS
- It is also intended to facilitate the ***CASAC's advice*** regarding the adequacy of the existing standards and revisions that may be appropriate to consider
- The PA addresses ***key policy-relevant questions*** related to the existing standards and alternative standards, as appropriate
- The final PA seeks to provide as broad an ***array of policy options*** as is supportable by the science, recognizing that final decisions will reflect the Administrator's judgments as to what weight to place on the various types of information



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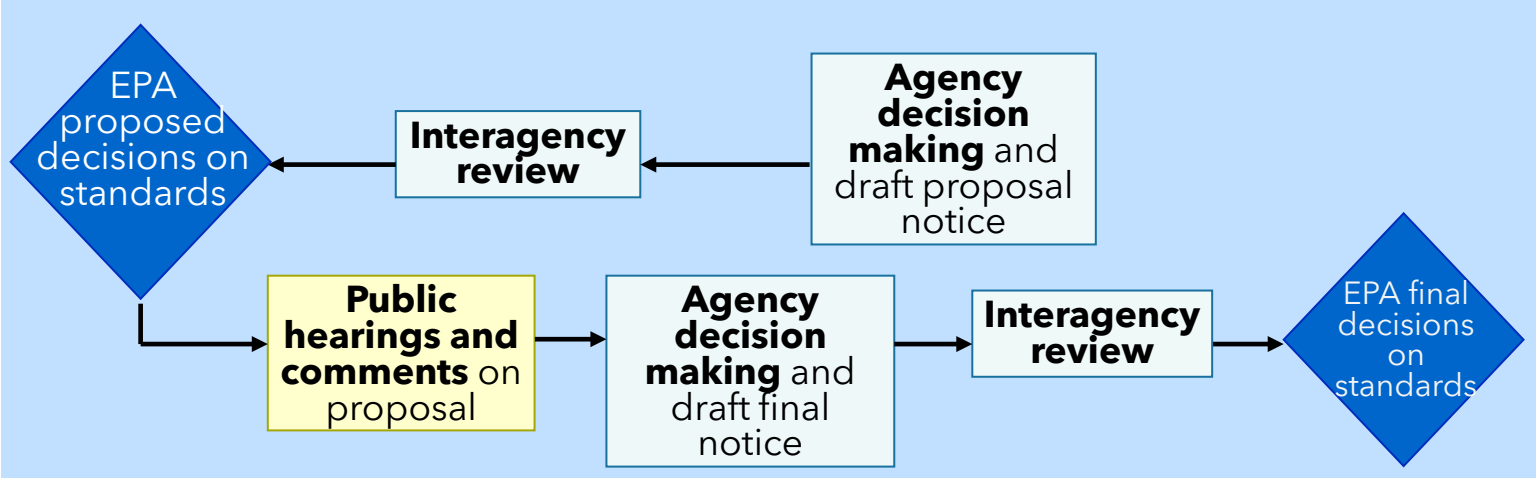
# Rulemaking

- OAR leads the Agency decision making process for the proposed and final rulemakings, which includes a series of briefings for managers and workgroup members prior to Option Selection by Administrator
- Both proposed and final rules also go through interagency review coordinated by Office of Management and Budget (OMB)
  - Proposed rules also have public comment period (typically 90 days) and public hearings
- Final decisions are informed by scientific evidence, any quantitative analyses conducted, staff conclusions in the PA, CASAC advice, and public comments on the proposal



# Summary of Current NAAQS

| Indicator Pollutant | | Type | Averaging Time | Level | Form |
|---|---|---|---|---|---|
| **Carbon Monoxide (CO)** | | primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | | 1 hour | 35 ppm | |
| **Lead (Pb)** | | primary & secondary | 3 months | 0.15 $\mu g/m^3$ | Average of three consecutive monthly averages, not to be exceeded |
| **Nitrogen Dioxide ($NO_2$)** | | primary | 1 hour | 100 ppb | Annual 98$^{th}$ percentile daily maximum 1-hour average concentration, averaged over 3 years |
| | | primary & secondary | 1 year | 53 ppb | Annual mean |
| **Ozone ($O_3$)** | | primary & secondary | 8 hours | 0.070 ppm | Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years |
| **Particle Pollution (PM)** | **$PM_{2.5}$** | primary | 1 year | 9.0 $\mu g/m^3$ | annual mean averaged over 3 years |
| | | secondary | | 15.0 $\mu g/m^3$ | |
| | | primary & secondary | 24 hours | 35 $\mu g/m^3$ | Annual 98$^{th}$ percentile 24-hour average concentration, averaged over 3 years |
| | **$PM_{10}$** | primary & secondary | 24 hours | 150 $\mu g/m^3$ | Not to be exceeded more than once per year on average over 3 years |
| **Sulfur Dioxide ($SO_2$)** | | primary | 1 hour | 75 ppb | Annual 99$^{th}$ percentile daily maximum1-hour average concentration, averaged over 3 years |
| | | secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

| Planning | Assessment | Rulemaking |
|---|---|---|

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# NAAQS Review Status

| | PM[1] | Lead | Secondary (Ecological) $NO_x$, $SO_x$, PM[2] | Primary $NO_2$ | Ozone |
|---|---|---|---|---|---|
| **Last Review Completed** | March 2024 | Oct 2016 | Mar 2012 | April 2018 | Dec 2020 |
| **Recent or Upcoming Major Milestone(s)** | March 6, 2024<br>Final Rule<br>(Reconsideration of 2020 Decision) | Jan 2024<br>Final Integrated Science Assessment (ISA)<br><br>Early 2025<br>Draft Policy Assessment | April 3, 2024<br>Proposed Decision<br>(consent decree)<br><br>Dec. 10, 2024<br>Final Decision<br>(consent decree) | March 2024<br>Integrated Review Plan (IRP) Volumes 1 & 2<br><br>Fall 2025<br>Draft ISA and IRP Volume 3 | May 2024<br>Science-Policy Workshop<br><br>Fall 2024<br>Integrated Review Plan Volumes 1 & 2 |

**Additional information regarding current and previous NAAQS reviews is available at: http://www.epa.gov/ttn/naaqs/**

[1]Combined primary and secondary (non-ecological effects) review of PM
[2] Combined secondary (ecological effects only) review of $NO_2$, $SO_2$, and PM

# Overview of Particulate Matter Final Rule

- On March 6, 2024, EPA strengthened the PM NAAQS to protect millions of Americans from harmful and costly health impacts, such as heart attacks and premature death.
- After taking into consideration the available scientific evidence, advice from the Clean Air Scientific Advisory Committee (CASAC), and nearly 700,000 public comments, **EPA strengthened the annual health-based standard for fine particles ($PM_{2.5}$) 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.
- The strengthened standard 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).



For more information on particle pollution and to read the final rule, visit https://www.epa.gov/pm-pollution.

# Overview of Particulate Matter Final Rule (cont.)

- **EPA retained the primary 24-hour $PM_{2.5}$ standard** at the level of 35 µg/$m^3$. The EPA Administrator concluded that the revised annual standard together with the current 24-hour standard will protect public health with an adequate margin of safety.
- **EPA also retained the current primary 24-hour standard for $PM_{10}$**, which provides protection against coarse particles, **and the secondary (welfare-based) standards for $PM_{2.5}$ and $PM_{10}$**, which provide protection against visibility impairment, climate effects, and materials damage.
- EPA revised other key aspects related to the PM NAAQS, including monitoring requirements and the Air Quality Index (AQI).
  - **EPA finalized monitoring changes** that improve data quality and collection leading to better characterization of air quality in communities that are at increased risk of adverse health effects from fine particle exposure.
  - **EPA also changed the breakpoints of the $PM_{2.5}$ AQI** to reflect the strengthened primary annual $PM_{2.5}$ standard and to reflect recent health and scientific evidence. These changes took effect May 6, 2024.

**Final Revision to AQI for $PM_{2.5}$**

| AQI Value | Previous [µg/$m^3$] | New (Revised) [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.

# Current Reviews: Secondary (Ecological) $NO_xSO_xPM$

- In May 2023, EPA released a draft Policy Assessment (PA). The CASAC reviewed the draft PA in June 2023.
- Following CASAC review, the final PA was released in January 2024.
- The Notice of Proposed Rulemaking (NPR) was signed on April 3, 2024 (consent decree). The proposed decisions are:

| Criteria Pollutant | Current Secondary Standards | Proposed Decision |
|---|---|---|
| **Sulfur Oxides**[1] | 0.5 ppm, 2nd highest annual 3-hour average $SO_2$ (1971) | *{10-15}* ppb, Annual average, 3-yr average |
| **Nitrogen Oxides**[1] | 53 ppb, Annual average $NO_2$ (1971) | No revision |
| **Particulate Matter**[2] | 15 µg/m³, Annual average $PM_{2.5}$, 3-year average (1997)<br>35 µg/m³, 98th percentile annual 24-hour average $PM_{2.5}$, 3-year average (2006) | No revision<br>No revision |
| | 150 µg/m³, 24-hour average $PM_{10}$,<br>not to be exceeded more than once on average in 3 years (1987) | No revision |

[1]Current secondary standards for N oxides and $SO_x$ are based on direct effects (e.g., leaf injury).
[2]Current secondary standards are based on visibility effects ($PM_{2.5}$), materials damage and soiling ($PM_{10}$) as direct biota effects are associated with higher concentrations.

- The comment period (for comment on the NPR) closed in June 2024.
- The Final Rule will be signed by December 10, 2024 (consent decree).

# Overview of Ozone Review

- After receiving advice from CASAC on the reconsideration, EPA determined in August 2023 that it was appropriate to initiate a new review of the ozone NAAQS in order to ensure consideration of the latest available science.
- EPA published a call for information in the Federal Register on August 25, 2023.
- In May, EPA held a public science and policy workshop to gather input from the scientific community and the public. EPA will summarize that information over the summer regarding how the information can be used to inform the review.
- Topics discussed during the workshop:
  - Is $O_3$ an appropriate indicator, or is there new evidence to suggest that another photochemical oxidant might be more appropriate?
  - Are there new studies to support changes to the REA that were not included in the last ozone review?
  - What are the various exposure metrics that relate to adverse outcomes on vegetation, such as foliar injury and biomass loss? How do these vary for crops vs. trees?
- EPA anticipates releasing Volumes 1 and 2 of the IRP in Fall 2024 for public comment and CASAC consultation.

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# Thank you

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# APPENDIX SLIDES

# Air Quality Index: Reporting Air Quality

| AQI Value | AQI Category | AQI Color |
|---|---|---|
| 0-50 | Good | Green |
| 51-100 | Moderate | Yellow |
| 101-150 | Unhealthy for Sensitive Groups | Orange |
| 151-200 | Unhealthy | Red |
| 201-300 | Very Unhealthy | Purple |
| 301+ | Hazardous | Maroon |

- Purpose:
  - Communicate air quality to the public
  - Inform public what actions to avoid or to reduce exposures to ambient air pollution
- The AQI converts an individual pollutant concentration to a number on a scale
- Uniform system of indexing pollution concentrations for ozone, carbon monoxide, nitrogen dioxide, PM, and sulfur dioxide
- AQI value of 50 typically corresponds to the level of the long-term (annual) NAAQS
- AQI value of 100 typically corresponds to the level of the short-term (e.g., 24-hour, 8-hour, or 1-hour NAAQS)

# Updates to the $PM_{2.5}$ AQI

| AQI Value | Previous [µg/m³] | Updated [µg/m³] | What changed? |
|---|---|---|---|
| 0, Good | 0.0 to 12.0 | 0.0 to 9.0 | EPA updated the breakpoint between Good and Moderate to reflect the updated annual standard of 9 micrograms per cubic meter |
| 50, Moderate | 12.1 to 35.4 | 9.1 to 35.4 | |
| 100, Unhealthy for Sensitive Groups | 35.5 to 55.4 | 35.5 to 55.4 | No change, because EPA retained the 24- hour fine PM standard of 35 micrograms per cubic meter. |
| 150, Unhealthy | 55.5 to 150.4 | 55.5 to 125.4 | EPA updated the breakpoints at the upper end of the unhealthy, very unhealthy, and hazardous categories based on scientific evidence about particle pollution and health. The Agency also combined two sets of breakpoints for the Hazardous category into one. |
| 200, Very Unhealthy | 150.5 to 250.4 | 125.5 to 225.4 | |
| 301+, Hazardous* | 250.5 to 350.4 and 350.5 to 500 | 225.5+ | |

*The 500 breakpoint (325 µg/m³) is used in conjunction with the 300 breakpoint to calculate AQI values within the hazardous category.