For assistance in accessing this document, please send an email to NEI_Help@epa.gov.

Marc Houyoux
EPA, OAQPS, AQAD, Emissions Inventory and Analysis Group

September 29, 2023

Emissions Inventory Guidance

Course Overview

- 1:00 – 2:10 pm — Module 1: State Implementation Plan (SIP) Emissions Inventory Basics
  - Break
- 2:20 – 3:00 pm — Module 2: Regional Haze SIPs – Emissions Inventory Uses
  - Break
- 3:10 – 4:00 pm — Module 3: Ozone SIPs – Emissions Inventory Uses and Requirements
  - Break
- 4:10 – 4:35pm — Module 4: $PM_{2.5}$ SIPs – Emissions Inventory Uses and Requirements
- 4:35 – 5:00pm — Module 5: SIP Inventories and the Proposed AERR Revisions

MODULE 1

SIP Emissions Inventory Basics

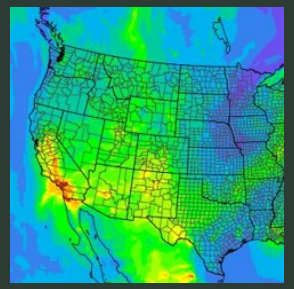
Module Outline

- Types of emissions inventories and their purposes
  - Planning inventories
  - Modeling inventories
- Emissions inventory steps for SIPs
  - Planning
  - Creating inventories
  - Preparing documentation
  - Public hearings
- Common sources of confusion

SIP Emissions Inventory Basics

Types of Inventories and Purposes

- Planning inventories
  - Nonattainment area emissions only
  - In some cases, the detailed emissions data are a required part of the SIP



- Modeling inventories
  - Statewide and/or regional emissions (include data from other states)
  - Could include international emissions sources
  - For modeled attainment demonstrations for ozone (O_3) and particulate matter $\leq$ 2.5 microns ($PM_{2.5}$)
  - For modeling that may be done as part of Regional Haze planning
    - Screening sources to identify which sources should be considered for emissions reductions
    - Assessing future impacts of emissions reductions

SIP Emissions Inventory Basics – Types and Purposes

Planning Inventories (1 of 2)

- Base year nonattainment area inventory (O_3 | $PM_{2.5}$)
  - Provides a current, accurate, and comprehensive data source for emissions contributing to the air quality (AQ) problem addressed by the SIP
    - All sources
    - Within nonattainment area
    - Only certain pollutants, depending on AQ standard
  - Anthropogenic portion is the baseline for reasonable further progress (RFP) requirements
- Periodic inventories (O_3)
  - Provide periodic updates of emissions inventories to help assess progress
  - Generally consistent methods as compared to the base year nonattainment area inventory
  - For 2015 ozone RFP requirements, can be used to show compliance with Milestone Compliance Demonstrations (MCDs)

SIP Emissions Inventory Basics – Types and Purposes

Planning Inventories (2 of 2)

- Maintenance plan inventories (O_3 | $PM_{2.5}$)
  - "Attainment inventory" and "projected inventory"
  - Submitted with a maintenance plan
  - Will address this further in training modules for O_3 and $PM_{2.5}$ SIPs
- Attainment projected inventory for the nonattainment area (O_3 | $PM_{2.5}$)
  - Provides estimated future-year emissions in the expected attainment year
  - Can be used to show emissions reductions to meet RFP requirements in a SIP
    - If so, the motor vehicle part is the motor vehicle emissions budget for purposes of transportation conformity
  - Will address this further in training modules for O_3 and $PM_{2.5}$ SIPs

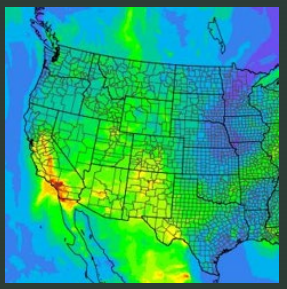
SIP Emissions Inventory Basics – Types and Purposes

Planning Inventories – Anthropogenic Portion

- Evolving thinking regarding certain traditionally “biogenic” sources
- Just because emissions come from a “biogenic” mechanism, does not necessarily mean the emissions are all not anthropogenic:
  - Increased soil NOX and NH3 due to fertilizer application
  - Agricultural vegetation emits VOCs
  - Irrigation impacts
- EPA is considering guidance revisions and new terms – some early ideas
  - Nature-based emissions (from organisms, weather events, water bodies, wildfires)
  - Redefine “biogenic” to reflect sources from biological origin without significant, intentional, and ongoing anthropogenic effects
  - Anthropogenic biological emissions

SIP Emissions Inventory Basics – Types and Purposes

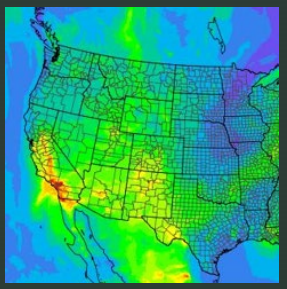
Modeling Inventories (1 of 2)



- Base year (baseline) modeling inventory
  - Like a base year nonattainment area inventory
    - Provides a current, accurate, and comprehensive data source for emissions contributing to the AQ problem addressed by the SIP
    - All sources
  - Unlike a nonattainment area inventory
    - Base year for modeling can differ from nonattainment area inventory
    - All areas within modeling domain
    - All emitted pollutants that are relevant for modeling the target ambient pollutant or haze
    - Hourly, chemical speciation, gridded, and input formats required by models
  - Purpose is to provide a point of comparison to the future-year modeling to demonstrate AQ or haze improvement as compared to a standard

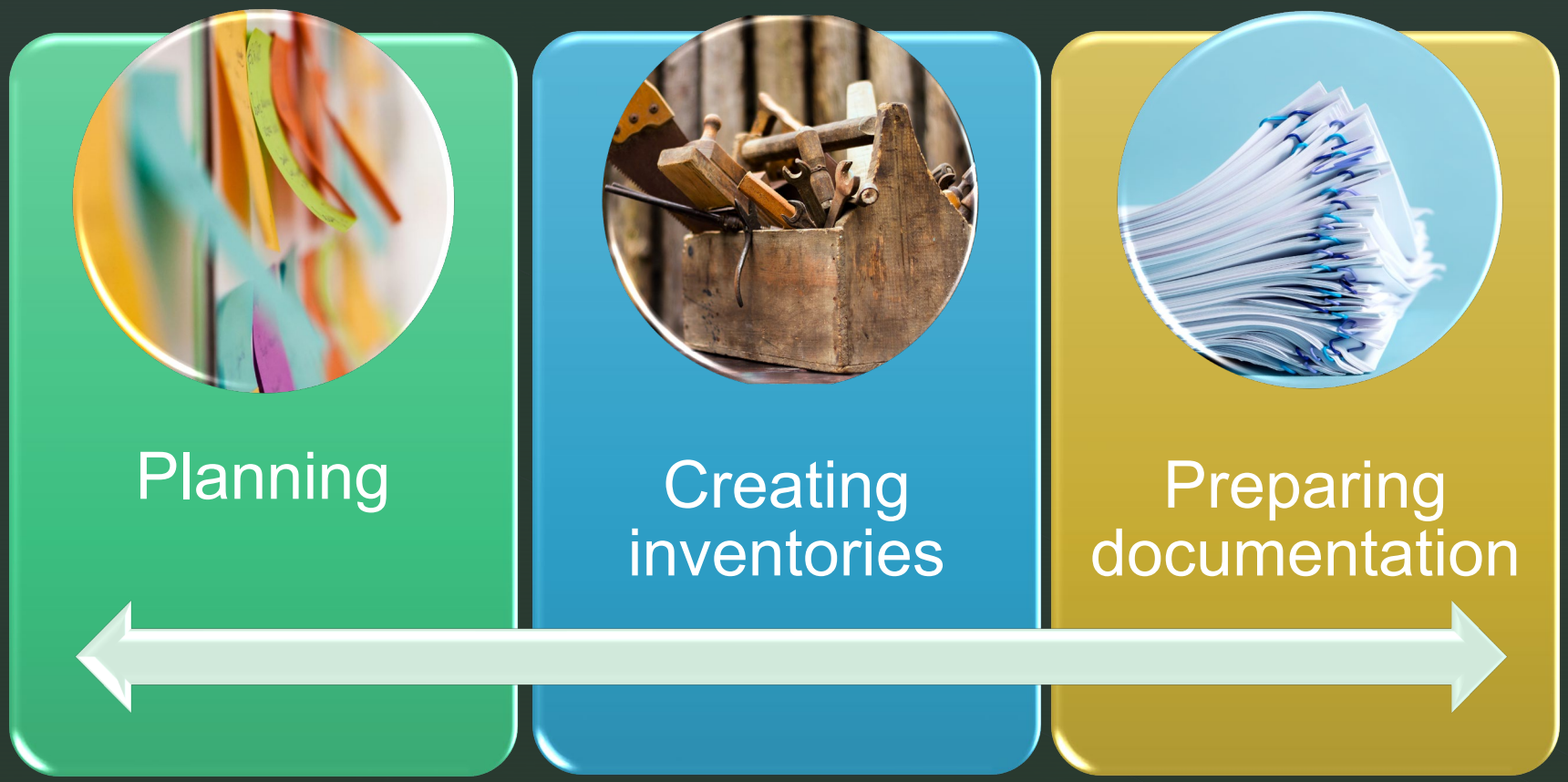
SIP Emissions Inventory Basics

Modeling Inventories (2 of 2)



- Analytic year (future-year) projected inventory for modeling
  - Purpose is to estimate future AQ or visibility conditions, including impacts of SIP control measures
  - Similar to the base year inventory for modeling
  - With exceptions:
    - Includes control measures being established with the SIP
    - Includes other projection factors for estimating future-year emissions
      - On-the-books control measures, both federal and State/Local
      - Models run for future years to capture expected impacts of some controls (e.g., mobile sources, electric generating units)
      - Estimated changes in activity (e.g., fuel use, animal population)

Emissions Inventory (EI) Steps for SIPs



Planning (1 of 5)

Key Steps

- Review requirements and guidance materials
- Understand requirements
- Inventory Preparation Plan (IPP)
- Quality Assurance Project Plan (QAPP)
- Discuss with EPA Regional Office

Planning (2 of 5)

- Start with "What do I need to do and why?":
  - This training
  - Ozone SIP Checklist Guide and O_3 Implementation Training
  - PM SIP Checklist Guide and $PM_{2.5}$ Implementation Training
  - Visibility Implementation Draft Guidance
- Then find out "How am I supposed to do that?"
  - Emissions inventory guidance
  - Mobile source emissions inventory guidance
  - Transportation conformity guidance
  - Air quality modeling guidance

Planning (3 of 5)

Understand Requirements

- What is needed and when?
- Inventory year(s)
- Spatial extent (nonattainment area, State, region)
- Temporal extent (average day, average season day, annual)
- Pollutants to include
- Sources to include
  - Usually “all”
  - Sometimes only anthropogenic (man-made), such as for RFP
- For AQ modeling: any extra steps and associated data needed for processing

Planning (4 of 5)

Inventory Preparation Plan

- Is an IPP required?
  - No, and IPP is not required by the Clean Air Act or by any of the implementation rules, but is recommended by guidance
- Since it's not required, why would I do an IPP?
  - An IPP is a tool to help ensure a State can meet the inventory requirements to be *a comprehensive, current inventory of actual emissions from all sources of the relevant pollutant or pollutants*

    - Clean Air Act (CAA) § 172(c)(3)
- How does an IPP help me do that?
  - Provides a way to clearly communicate your inventory plans to the EPA Regional Office responsible for reviewing the SIP
  - Provides a roadmap for the inventory work and methods needed, including quality assurance steps

Planning (5 of 5)

Inventory Preparation Plan

- What should be included in an IPP?
  - Some EPA Regional Offices may want to see specific things, and specify that in their 105 grants
  - Otherwise, you can include whatever is needed to describe your EI plans effectively
  - Section 3.2, Table 9 of the EI Guidance provides some *suggested* content
  - It should include the emissions inventory QAPP, which can depend on:
    - Available inventory data (if any)
    - Inventory related requirements that you are trying to meet
    - Sections 4.9 and 5.5 of the EI Guidance

Creating Inventories

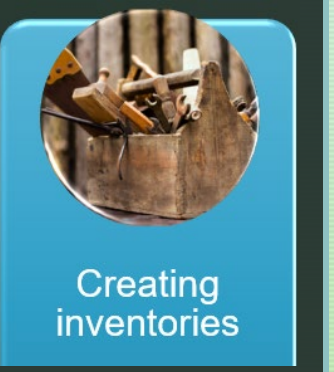
Key Steps

- Assess available data on which to build (both base and future)
  - Public? Current and correct year? Correct pollutants? All sources?
- Identification of priority sources
- Emissions estimation and quality considerations
- Special adjustments for nonattainment area inventories
  - Partial counties
  - Average-day emissions

SIP Emissions Inventory Basics

Creating Inventories

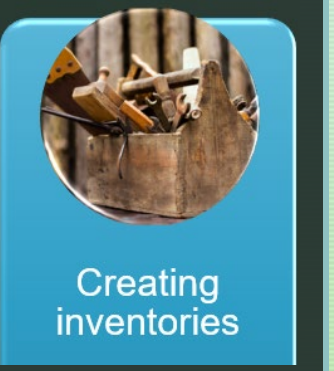
Assess Available Data



- 2016 modeling platform
  - Collaborative effort with States and MJOs
  - Three versions of emissions data available (via FTP only)
- 2017 National Emissions Inventory (NEI)
  - Via the Emissions Inventory System (EIS)
  - Via the EPA Website for 2017 NEI
- Modeling platforms available for 2018 and 2019
- 2022 modeling platform efforts just starting (will cover more in Regional Haze module)
- Clean Air Markets Program Data
  - Data menu → Bulk Data Files
  - Data Type → Emissions and Subtype → Hourly

Creating Inventories

Identify Priority Sources

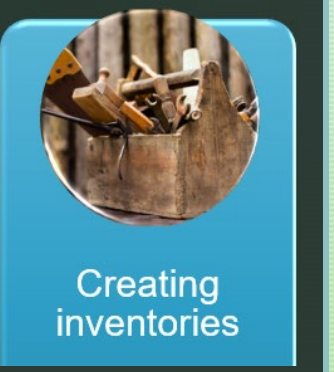


- EIs used for SIPs expected to be complete, with “all sources”
- No requirement that all parts of EI be completed with same rigor
- Which sources in an EI should get more review?
  - Sources within the nonattainment area
  - Sources outside an area of interest contributing pollution to that area
  - Use emissions summaries to find the largest contributors to pollutants of interest
  - Use source contribution modeling to learn which sources matter most
  - Sources that are expected to grow, rather than those expected to decline
  - Consider whether emissions levels will make impact on policy decisions
  - Where outdated methods or inaccurate data have been used

SIP Emissions Inventory Basics – EI Steps

Creating Inventories – Point Sources

Emissions Estimation and Quality Considerations



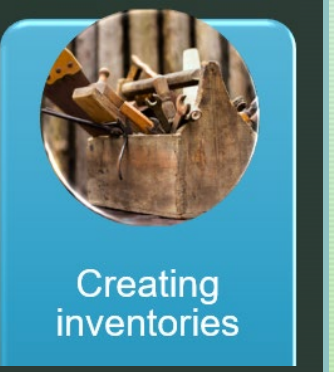
- Point sources of data
  - Continuous emissions monitors (CEMs)
  - Source tests and source-specific emissions factors
  - Average emissions factors
  - Engineering judgement

Best

- Startup/shutdown emissions
  - Planned and predictable emissions should be included in SIP planning inventories
  - Malfunctions are not predictable
  - Challenging to estimate
- High Electricity Demand Day (HEDD) periods
  - May be relevant in some cases, or not representative in other case
  - Challenging to estimate

Creating Inventories – Other Sources (1 of 4)

Emissions Estimation and Quality Considerations



- Stationary sources that are not point sources and compiled on an areawide basis ("nonpoint" or "area" sources)
  - Current updated methods are included as tools on the EPA NEI website and Sharepoint site (the latter for NEI data submitters)
  - Basic survey work may be needed to augment default input data to tools
  - Need to assure no double counting between point and nonpoint sources
- On-road mobile sources
  - For all states except California, use Motor Vehicle Emissions System (MOVES)
  - Need to create Run Specification (RunSpec) files for MOVES inputs and local data including meteorology, fleet, activity, and control measure information
  - MOVES Guidance covers the details

Creating Inventories – Other Sources (2 of 4)

Emissions Estimation and Quality Considerations

- Nonroad mobile equipment
  - Also MOVES model
  - 260 specific types of nonroad equipment further stratified by horsepower ratings
  - Default data
  - If agencies create their own inputs, these should be submitted to EPA as part of the emissions documentation, with description about why defaults changed
  - Overlap with inputs needed for on-road mobile sources (e.g., meteorology and fuels), which should be consistent
- Other nonroad mobile
  - Commercial marine, locomotives, and aircraft
  - Most updated approaches are provided with NEI documentation and emissions
  - Some airports and rail yards are treated as point sources
  - Commercial marine methods include shapefiles for greater spatial resolution

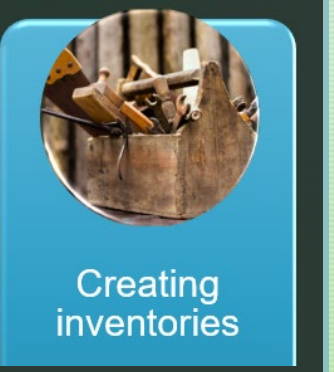
Creating Inventories - Other Sources (3 of 4)

Emissions Estimation and Quality Considerations

- Biogenic sources
  - No required model
  - Models seem to work better in some areas than others
  - Most common model choices:
    - Biogenic Emissions Inventory System (BEIS)
    - Model of Emissions of Gases and Aerosols from Nature (MEGAN)
- Geogenic sources
  - Oil or natural gas seeps, soil wind erosion, lightning, volcanos, fumaroles (vapor or gas vents in a volcanic region), and sea salt
  - EPA does not provide approaches for these sources

Creating Inventories – Other Sources (4 of 4)

Emissions Estimation and Quality Considerations

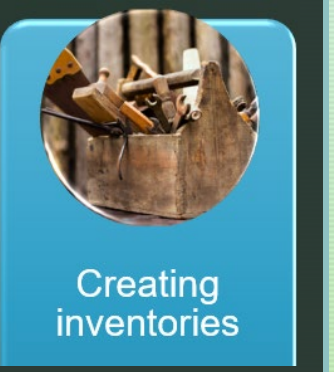


- Wildland fires
  - Wildfires, prescribed fires, and wildland fire use
  - NEI fires data will generally suffice for *nonattainment area* (NAA) inventories to provide a general idea of the level of contribution to the overall emissions within the NAA
  - Important considerations
    - Prescribed fires can be used to prevent future wildfires
    - Wildfires are naturally occurring and not “controllable”
    - High plume rise and impacts across large distances
    - Fires can block sunlight and thus reduce ozone formation in some cases
  - Should not be removed from modeling inventories, even for exceptional events
    - Not appropriate for model performance evaluations
    - Not usually possible to know exactly which fire(s) caused the exceptional event

Special Adjustments for NAA EIs

Partial County Emissions (1 of 2)

- Many nonattainment areas do not follow county boundaries
- Many inventories and tools work at the county level, posing a challenge
- Point sources can be identified as within a nonattainment area based on their latitude/longitude and with a geographic information system (GIS)
- Nonpoint sources – methods for partial county emissions
  - Custom calculations, but can be labor intensive
  - Shapefile-based inventories
  - Using spatial allocation surrogates, such as road networks and census data
  - Using gridded data from modeling
  - Expert judgement



SIP Emissions Inventory Basics – EI Steps

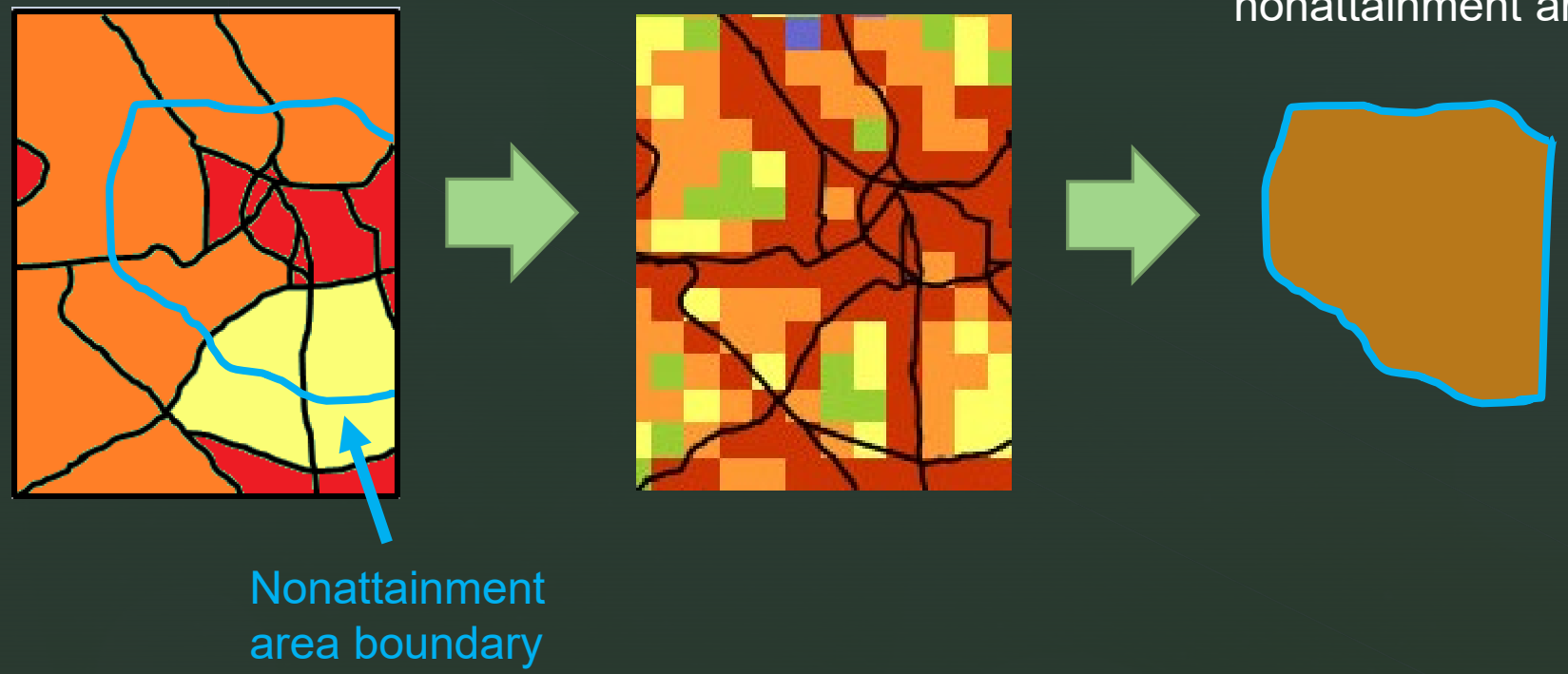
Special Adjustments for NAA EIs

Partial County Emissions (2 of 2)

County totals (black lines)

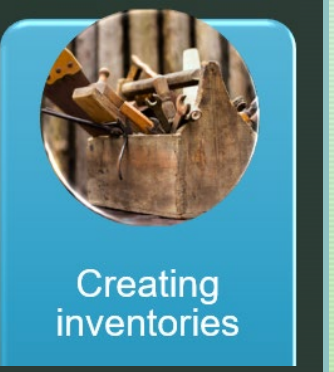
Spatial surrogate or gridded emissions

Estimate of emissions in nonattainment area



Special Adjustments for NAA EIs

Average-Day Emissions

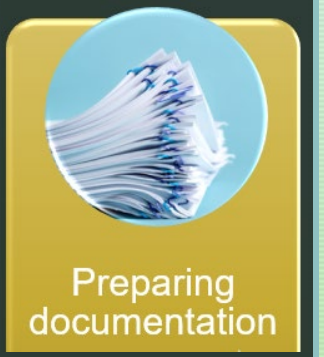


- Select appropriate days for averaging
  - Months
  - Days of week
  - Representative of the days leading to NAAQS exceedances
  - Consider intermittent sources if appropriate
- Different requirements for ozone vs. $PM_{2.5}$
  - Ozone: No annual data and ozone-season day presumed based on weekday
  - $PM_{2.5}$: May be annual and/or average-season day, and even episodic average
- Simple arithmetic average of the selected days

SIP Emissions Inventory Basics – EI Steps

Preparing Documentation

Suggested Elements of an Emissions Inventory SIP Document

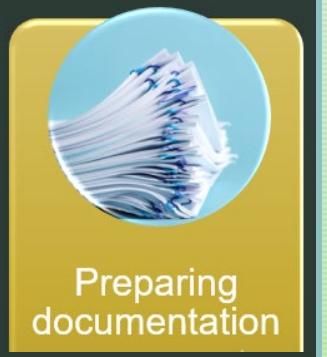


- Background
  - Source categories, pollutants, spatial extent, other key EI aspects (All)
  - Base year emissions summaries (O_3 | $PM_{2.5}$)
  - Projected attainment year emissions summaries (O_3 $^{\text{Moderate and above}}$ | $PM_{2.5}$)
  - Recent year emissions summaries (Haze)
  - May include modeled emissions summaries
- For each source category (point, area/nonpoint, on-road, nonroad, other)
  - Introduction with more detailed documentation
    - Data sources — "Subpart G" 40 Code of Federal Regulations (CFR) 51.114(a)
    - Models — 40 CFR 51.114(a)
    - Control and projection assumptions — 40 CFR 51.112 & 51.114(c)
    - Approaches to calculate temporal and spatial extent, if relevant
  - Summaries (base and future) — 40 CFR 51.114(c)

SIP Emissions Inventory Basics – EI Steps

Preparing Documentation

Other Information for Emissions Inventory SIP Document

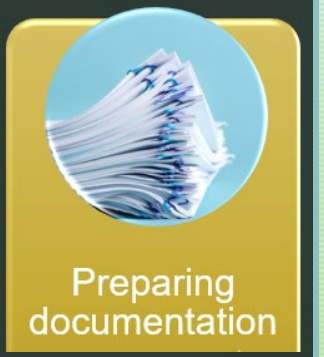


- Each implementation rule has its own specific requirements
- Relevant criteria for determining the completeness of emissions inventory information in SIPs 40 CFR 51 – Appendix V
  - 2.2 Technical Support:
    - (b) identification of the location of affected sources included in the EPA attainment/nonattainment designations…
    - (c) quantification of the changes in plan allowable emissions from the affected sources and estimates of changes in current actual emissions from affected sources
    - (e) modeling information required to support plan revisions (which includes emissions information)

SIP Emissions Inventory Basics – EI Steps

Preparing Documentation

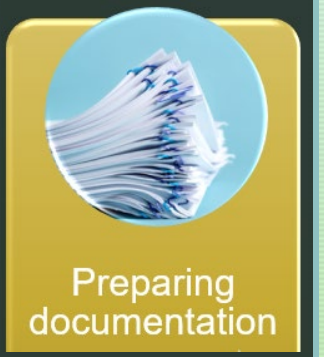
Emissions Summaries for SIP Background



- For SIPs that require AQ modeling
  - Background can include both summaries of the planning and modeling inventories
- See Section 3.10.3 of EI Guidance, for example for ozone:
  - Ozone-season day base year emissions for nonattainment area by data category
  - Same by data category and county
  - Same for projected attainment emissions (optionally)
  - Point source by facility
  - Nonpoint and mobile sources by emissions process groups (source classification code groups)

Preparing Documentation

Other Information



- Data availability requirements — 40 CFR 51.116

  (a) The State must retain all detailed data and calculations used in the preparation of each plan or each plan revision, and make them available for public inspection and submit them to the Administrator at his request.

  (b) The detailed data and calculations used in the preparation of plan revisions are not considered part of the plan.

  (c) Each plan must provide for public availability of emission data reported by source owners or operators or other obtained by State or local agency. Such emission data must be correlated with application emission limitations or other measures.

SIP Emissions Inventory Basics – EI Steps

Public Hearings

- Public hearing requirement for SIPs

  The State must hold a public hearing or provide the public the opportunity to request a public hearing 40 CFR 51.102(a)

  - Possible no one requests a public hearing when offered
- For ozone and $PM_{2.5}$, emissions data and emissions summaries part of SIP
  - It is okay to have data summaries only at the hearing, so long as the detailed data are available to public in accordance with CAA and regulations
- For Regional Haze, emissions summaries only
- No longer a “de minimus” deferral policy for “regulatory significance”
- Must provide EPA verification that a public hearing was offered

Common Sources of Confusion (1 of 2)

- What parts of a SIP are *required* versus *recommended*?
  Required elements of a SIP are in the CAA and the implementation rules. Elements only in guidance are not required, but your SIP needs to pass public scrutiny and perhaps hold up in court. So, the recommendations in EPA guidance are there to help you ensure credibility and quality.
- Do the modeling inventories need to be the same as the planning inventories?
  No. While consistency is encouraged, modeling inventories must have more pollutants and a greater spatial extent, at least. Mobile source approaches for modeling inventories are often more detailed, while the planning inventories can use simpler approaches given their role in transportation conformity (and a need to be easily repeatable). Consistency that can reasonably be achieved is encouraged.

Common Sources of Confusion (2 of 2)

- How does the Air Emissions Reporting Rule (AERR) relate to SIPs?
  While the AERR is the rule that requires States to submit data to EPA for use in NEI, it also sets some inventory reporting requirements for ozone and $PM_{2.5}$ SIPs, such how to determine a point source and the data elements required for emission inventories.

  If states voluntarily report smaller sources as point sources for the NEI, this does not impact their SIP requirements.

- Can the NEI be used to meet my ozone periodic inventory requirement?
  Yes, but not the default annual submission, since the periodic inventory requirement is for nonattainment area inventories. See Table 10 of the EI SIP Guidance.

- Why does EPA require throughput or emissions factors data, when facilities in my state say that it's confidential business information (CBI)?
  According to the CFR, emissions data are not CBI, and throughput and emissions factors are classified as emissions data because they are necessary to understand how emissions have been estimated. See 40 CFR 2.301

MODULE 2

Regional Haze – Emissions Inventory Uses

Regional Haze

Module Outline

- Program background
- General emissions inventory details
- General emissions inventory uses for regional haze analyses
  - Contribution of international and wildland prescribed fires
  - Screening analysis
  - Modeling impacts of emissions reductions on regional haze
- EPA emissions data sources for supporting Regional Haze analyses

Regional Haze - Background

Statutory and Regulatory Basis

- CAA 169(A), via CAA 1977 Amendments
  - (a)(1): *Congress hereby declares as a national goal the prevent of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made air pollution.*
  - (b)(1): *Regulations … shall – provide guidelines to the States, taking into account the recommendations [from a mandated study] on appropriate techniques and methods for implementing this section…*
- CAA 169(B), via CAA 1990 Amendments: Studies, visibility transport regions and commissions
- Regional Haze Rule: 40 CFR 51.308 and 51.309 (aka Subpart P) are the regulations developed to implement the Regional Haze program

Regional Haze - Background

Class I Areas

Two Class I areas on the map, Bradwell Bay in FL and Rainbow Lake in WI are not areas of concern for visibility (a decision made in 1979) and are not part of the 156 Class I areas subject to the regional haze rule.

Regional Haze - Background

Regional Haze Rule, June 1999

- Core requirements for initial regional haze SIPs
  - States must address regional haze in 156 Class I Federal areas – both within State and outside the State in certain cases
  - Reasonable progress goal for each area
    - Uniform rate of progress (URP): baseline visibility conditions to natural visibility conditions
    - Emission reduction measures needed to achieve the rate
  - Long-term strategy: measures to achieve reasonable progress goals
  - Monitoring strategy and other requirements
- Best Available Retrofit Technology (BART) requirements
- Periodic comprehensive revisions of SIPs
- Periodic reports describing progress

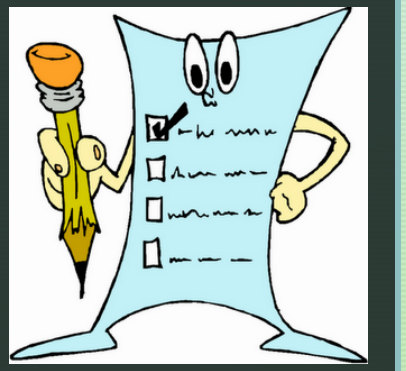
Regional Haze - Background

Regional Haze Rule Revisions, 2017

- Rule revisions finalized January 10, 2017
  - Petitions for review were filed in the D.C. Circuit as well as petitions for reconsideration
- January 2018: EPA announced plans to revisit aspects of 2017 rule
  - EPA is currently working on a new rulemaking to address the 3rd planning period requirements (2028 and beyond)
  - EPA plans to do stakeholder outreach on aspects of the rule
- EPA released two guidance documents related to 2nd planning period SIPs:
  - Guidance on Regional Haze SIPs for the 2nd Implementation Period
  - Clarifications Regarding Regional Haze SIPs for the 2nd Implementation

Regional Haze

General Emissions Inventory Details



- Source categories: all sources are needed for AQ modeling
- Pollutants:
  - Pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area

    For first and second planning period – most approved SIPs included SO_2, NO_X, and PM
- Statewide inventory
- Annual emissions
  - Derived from annual nature of the visibility program

Regional Haze Inventory as Compared to NAAQS

- The inventory needs for Regional Haze are different from inventory requirements for ozone and $PM_{2.5}$ implementation rules
  - Statewide inventory, rather than an inventory for a smaller nonattainment area
  - Annual emission (as compared to seasonal for ozone or optionally for $PM_{2.5}$ hourly)
  - No submission requirement for the inventory as (or as part of) a SIP revision
  - Requires SIPs to "provide for" emissions inventories and summarize emissions information 51.308(f)(6)(v)

Regional Haze

Emissions Inventory Uses

- Estimating impacts of international anthropogenic sources and/or the impacts of certain wildland prescribed fires to adjust natural conditions

1

- Identifying sources that matter most for visibility, which could include source apportionment modeling

2

- Photochemical modeling to understand visibility issues and potential emissions reductions that could help

3

Regional Haze

Impacts of International Emissions Sources

- Optional adjustment may be made to natural visibility conditions endpoint
- There is no specific method mentioned in the current rule
- EPA released guidance addressing estimating international anthropogenic impacts and also released modeling which international impacts in 2028
  - Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program
  - Technical Support Document for EPA's Updated 2028 Regional Haze Modeling
- Consult with the EPA before attempting to adjust natural conditions

Regional Haze

Impacts of Wildland Prescribed Fires

- Expect prescribed fires to continue or increase
- Wildland prescribed fires to consider are those:
  - Conducted with one of the objectives:
    - To establish, restore and/or maintain sustainable and resilient wildland ecosystems
    - To reduce the risk of catastrophic wildfires, and/or
    - To preserve endangered or threatened species
  - During which appropriate basic smoke management practices were applied
- Current rule does not require a specific method
- Consult with the EPA

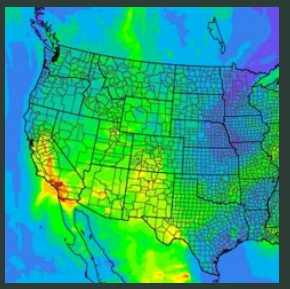
Regional Haze

Source Screening Analysis

- Source screening can be used to identify emissions sources that need further analysis under the 4 statutory regional haze factors
  - Which sources should the state consider including in a control strategy to reduce haze?
- States have used a variety of screening metrics, such as:
  - Annual emissions of a source / distance to affected Class I area (Q/d)
  - Emissions-weighted back trajectory analysis
  - Source contribution modeling
- All of these approaches would need emissions data
  - This could be either baseline (current or recent data) or future year projections (end of planning period)

Regional Haze

Emissions for AQ Modeling Analyses (1 of 4)

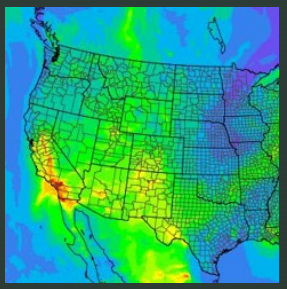


- Prepare/obtain baseline emissions
  - 2016 data and modeling platforms readily available
  - 2022 platform work starting (more later)
  - Other choices as appropriate
- Project emissions to relevant analytic (future) year (e.g., end of planning period)
  - Emissions limits that have been adopted and enforceable (“on the books”)
  - Activity growth/reduction and available source-specific information
  - Any controls that are needed to address regulatory requirements

Regional Haze

Emissions for AQ Modeling Analyses (2 of 4)

Base Year Modeling Inventory

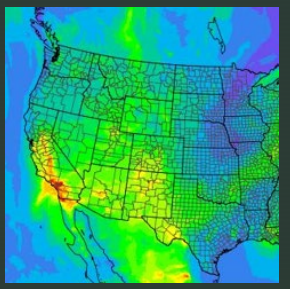


- Base year modeling inventories are needed for:
  - Modeling to compare with observations (model performance evaluation)
  - Source screening approaches
- Key attributes of modeling inventories for regional haze analyses
  - All source categories
  - Multi-State emissions within modeling domain
  - Pollutants: CO, NOx, VOC, SO_2, PM_{10}, $PM_{2.5}$, NH_3
  - NOx, VOC, and $PM_{2.5}$ require additional speciation during emissions modeling
  - Where available, hour-specific, day-specific, and month-specific emissions should be used as part of scientifically credible approaches (e.g., EGUs, biogenic, fires, on-road mobile)
  - Could include international emissions sources

Regional Haze

Emissions for AQ Modeling Analyses (3 of 4)

Projected Modeling Inventory

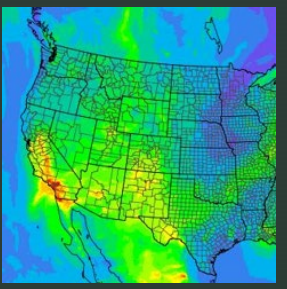


- Projected modeling inventories could be used to show progress towards remedying visibility impairment
- Summaries (not detailed data) included with any plan submitted
- Differences compared to base year modeling inventory
  - Projection year is end of planning period (e.g., 2028)
  - Anthropogenic sources projected to future year
  - Temporal approach for sub-annual sectors may be different (EGU, fires)
- Biogenic emissions typically held constant
- Future-year international emissions can be a challenge
  - EPA coordinates with Mexico and Canada and includes available data in platforms

Regional Haze

Emissions for AQ Modeling Analyses (4 of 4)

Control Strategy Considerations



- States can consider various sources of information for estimating future-year emissions:
  - Emissions reductions from ongoing air pollution control programs ("on-the-books") from both Federal and State programs
  - Future compliance with Federal and/or State rules, known fuel switches
  - Source retirement and replacement schedules
  - New sources under construction
  - Basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management

Regional Haze

Sources of Uncertainty in Projections

- Energy usage
- Vehicle miles travelled
- Population changes including migration
- Uncertainties associated with State plans from the first planning period under judicial review and/or not yet completed
- SIPs for ozone, $PM_{2.5}$, and other sources of State emissions reductions
- Future fuel switches due to markets or climate pollution reduction measures
- Future (but unknown) plant closures
- Changes to federal regulations

Regional Haze

EPA Modeling Platforms

Background

- Provide a comprehensive AQ modeling system that uses the most recent science tools available
- EPA uses modeling platforms to support EPA regulations and other analyses
- Major components of a modeling platform:
  - Meteorological models
  - Boundary conditions
  - Emissions and associated factors/tools for projections and emissions processing to support modeling
  - AQ models

Regional Haze

EPA Emissions Modeling Platforms

Background

- Platform contents:
  - Starting point is a version of the National Emissions Inventory
  - Related data sets needed for processing
  - Software and scripts to process inventories into AQ model inputs
  - Base year and one or more future years
- Historic platform development process:
  - Base and future inventories and meteorology data developed by EPA
  - Other data and software developed by EPA to process emissions
  - Platform released for public comment
  - EPA incorporates comments into new version of platform

Slide courtesy of Alison Eyth, US EPA

Regional Haze

EPA Emissions Modeling Platforms

Recent and Upcoming Platforms

- Recent platforms:
  - 2016 platform based on 2014 NEI and collaboration with states and Multi-Jurisdictional Organizations (MJOs)
    - 2016, 2023, and 2026, and 2032
  - 2017, 2018, and 2019 platforms also available based on 2017 NEI
- A “case” is a specific set of emissions and other data within a platform and is named with an abbreviation (*e.g.*, 2016fj_16j or 2032fj_16j)
- Upcoming:
  - 2020 and 2021 platform development ongoing for 2020 AirToxScreen
  - Collaborative effort for 2022 platform is ongoing with MJOs and states

Regional Haze

2022 Emissions Modeling Platform

New!

- Collaborative effort at request of MJOs and states
- 2020 NEI with 2022 SLT point source submissions is the starting point
  - EPA will provide 2022 emissions for onroad, nonroad, CMV, oil and gas, biogenic, and fires
- Several versions of a 2022 platform will be developed:
  - 2022v1 targeted for calendar year 2024
  - 2022v2 targeted for calendar year 2025
  - Analytic years will be 2026, 2032, and 2038
  - Base years in spring and analytic (future) years by summer-fall

For further questions

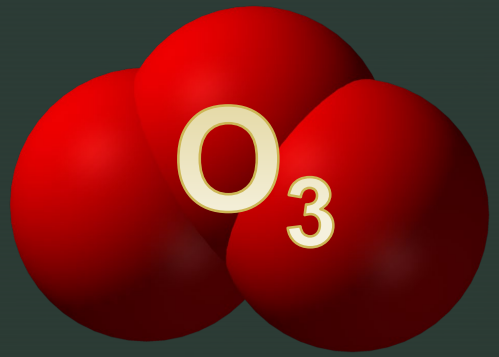
- Regional Haze
  - Regional office regional haze expert
  - Brian Timin, OAQPS, timin.brian@epa.gov
- EPA Modeling Platforms
  - Alison Eyth, OAQPS, eyth.alison@epa.gov

MODULE 3

Ozone - Emissions Inventory Uses and Requirements

Ozone SIPs

Module Outline



- Background
- General emissions inventory details and timing
- Base year emissions inventory data
- Source emission statements
- Projected emissions inventories
  - Rate of progress (ROP)
  - Reasonable further progress (RFP)
  - Modeling inventory
- Periodic nonattainment area and maintenance inventory requirements
- Ozone inventories decision tree

Ozone SIPs - Background

2008 Ozone Implementation Rule

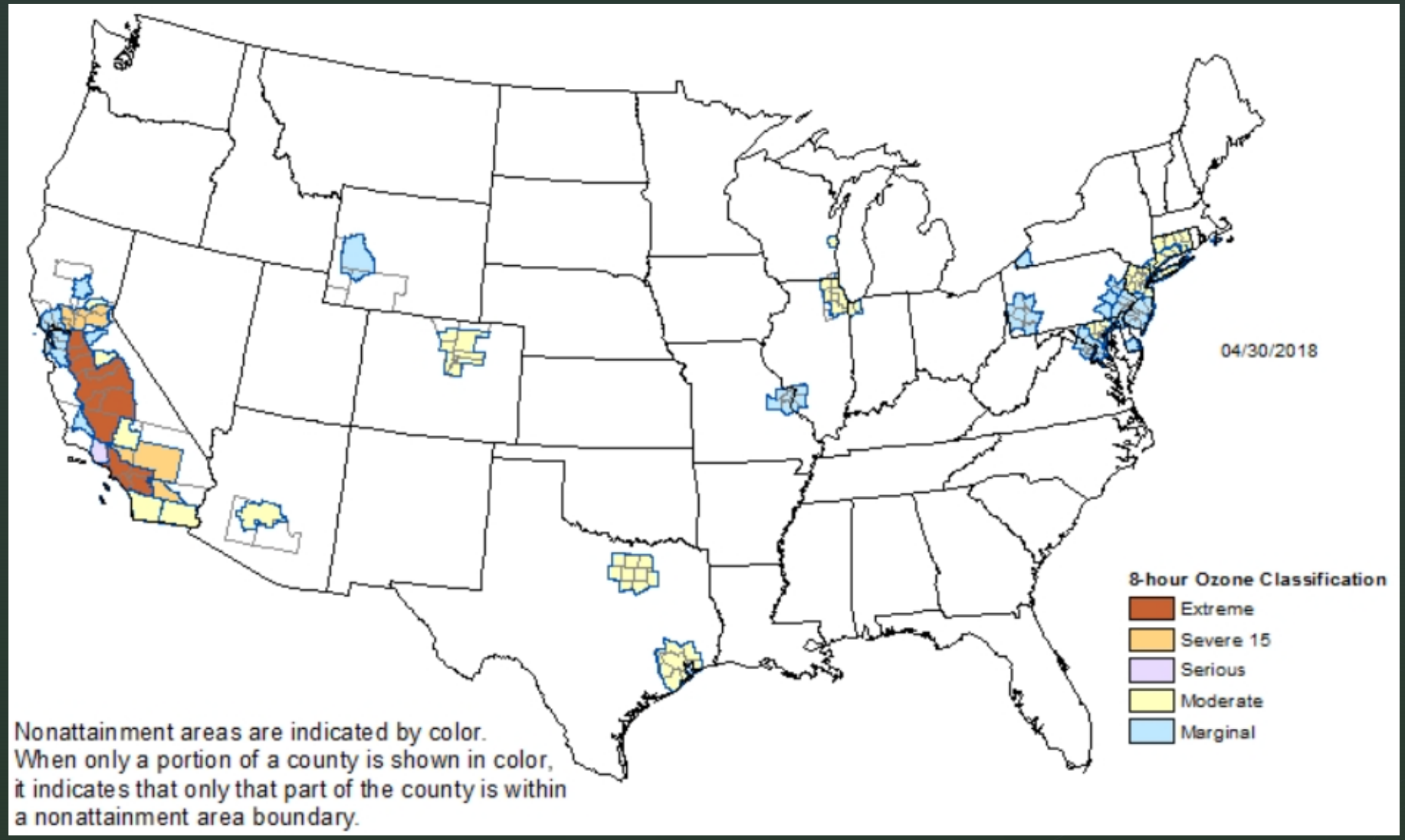
- In 2008, revised 8-hour standard to 75 parts per billion
- In 2012, 46 initial nonattainment areas designated (marginal, moderate, serious, severe, extreme)
- In 2015, finalized Ozone Implementation Rule
  - Subpart AA replaces Subpart X

40 CFR 51.1100 – 51.1119

- Inventory due dates from July 20, 2014 through July 20, 2016
- Serious and above with continued rate-of-progress updates
- Continued periodic inventory requirements
- See also Ozone Implementation Training

Ozone SIPs - Background

2008 Ozone Nonattainment Areas



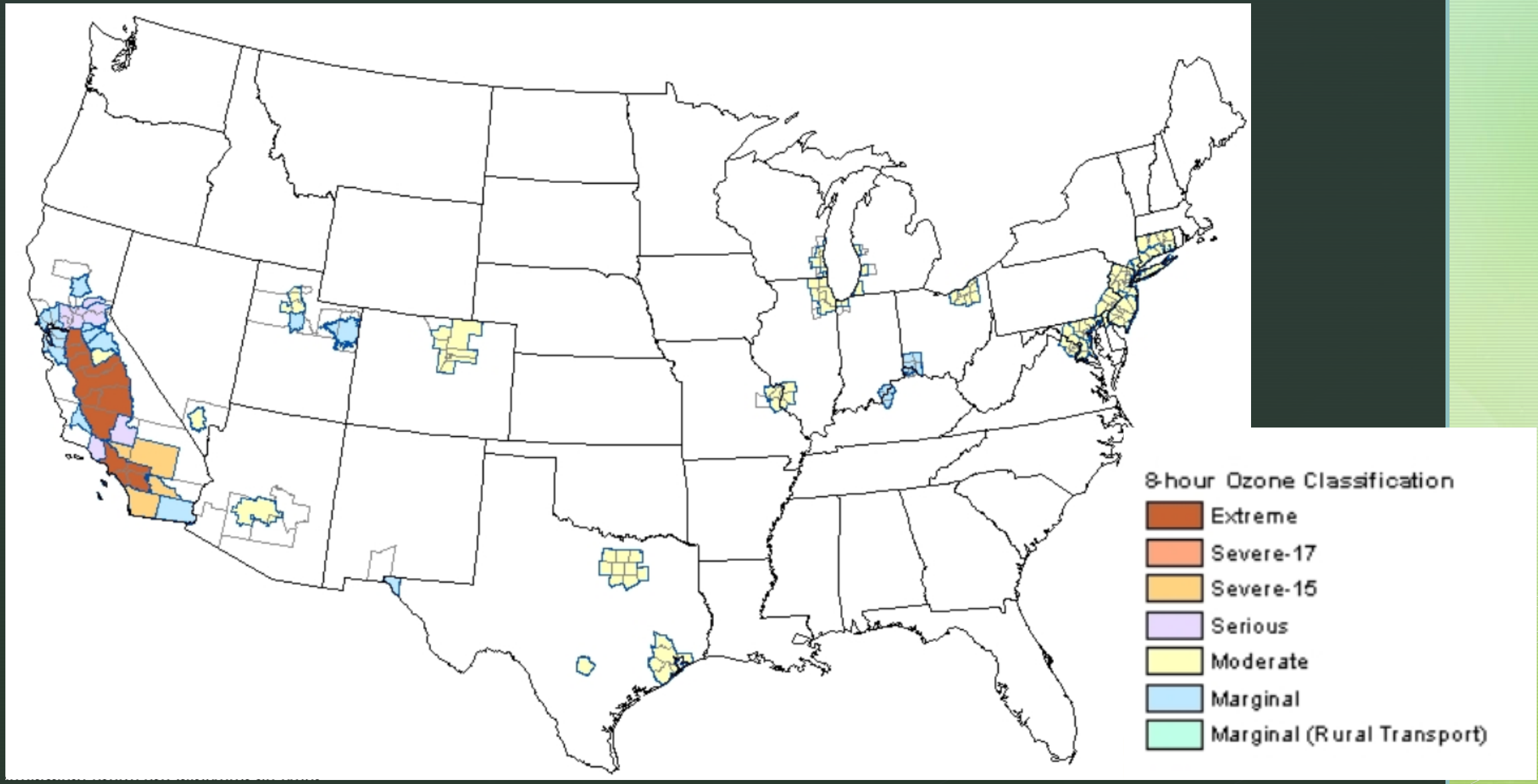
Ozone SIPs - Background

2015 Ozone Implementation

- 2015 Ozone NAAQS revised to 70 parts per billion
- In 2018, EPA completed designations of nonattainment areas
  - Ongoing legal activity for some areas
- In 2018, EPA finalized Ozone Implementation Rule
  - Subpart CC 40 CFR 51.1300 – 51.1319
- Inventory due dates start 24 months after effective date of designations
- Moderate and higher designations require RFP plan 36 months after effective date of designations
  - Final rule included changes to RFP MCDs
- See also Ozone Implementation Training

Ozone SIPs - Background

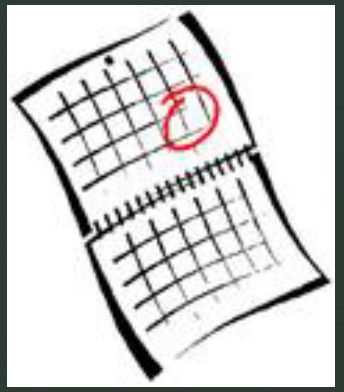
2015 Ozone Nonattainment Areas

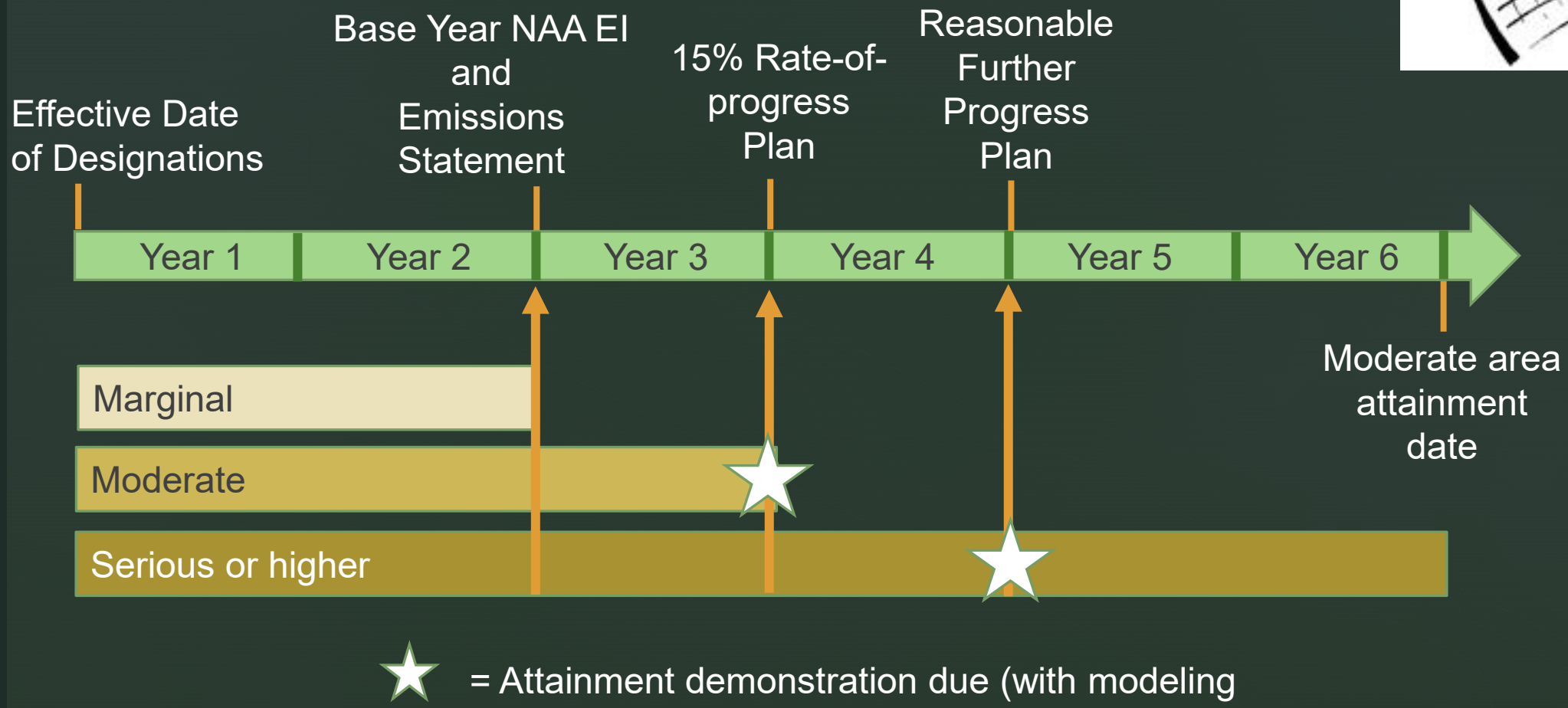


Ozone SIPs

General Emissions Inventory Details

Timing





★ = Attainment demonstration due (with modeling inventory summaries)

Ozone SIPs

General Emissions Inventory Details (1 of 4)

Planning Inventories

- Source categories: CAA 182(a)(1)
  Comprehensive, accurate, current inventory of actual emissions of all sources
- Pollutants: VOC and NOx 51.1100(bb)
- Within boundaries of nonattainment area 51.1100(bb)
- Ozone season day emissions 51.1115(c)
- Emissions base year
  - *Inventory year shall be selected consistent with the baseline year for the RFP plan* 40 CFR 51.1115(a)
  - *Baseline emissions inventory shall be the emissions inventory for the most recently available triennial emission inventory…* (available before designation) 51.1110(b)

Ozone SIPs

General Emissions Inventory Details (2 of 4)

Planning Inventories

New!

- *South Coast II* decision impacted base years allowed
- For 2008 NAAQS, year must be 2011 — 40 CFR 51.1110(b)
  - *At the time of designation for the 2008 ozone NAAQS, the baseline emissions inventory shall be the emissions inventory for the most recent calendar year for which a complete triennial inventory is required to be submitted to EPA under the provisions of [the AERR].*
  - Vacated and no longer relevant: ~~*States may use an alternative baseline emissions inventory provided the state demonstrates why it is appropriate to use the alternative baseline year, and provided that the year selected is between the years 2008 to 2012.*~~
  - *All states associated with a multi-state nonattainment area must consult and agree on a single alternative baseline year.* (not really an issue given limited to 2011)

Ozone SIPs

General Emissions Inventory Details (2 of 4)

Planning Inventories

New!

- For 2015 NAAQS, base year is 2017, or 2018 can be an alternative
  - Year must be consistent with RFP baseline year — 40 CFR 51.1315(a)
  - RFP Baseline requirements: — 40 CFR 51.1310(b)

    … at the time of designation as nonattainment for an ozone NAAQS, the baseline emissions inventory shall be the emissions inventory for the most recent calendar year for which a complete triennial inventory is required to be submitted to EPA… (underlines added)

    States may use an alternative baseline emissions inventory provided that the year selected corresponds with the year of the effective date of designations as nonattainment for that NAAQS
- RFP baseline year does not change once it has been with SIP for initial designation (emissions methods could change, but year does not)

Ozone SIPs

General Emissions Inventory Details (4 of 4)

Ozone-Season Day

- State must select the representative months and work weekdays
  - General expectation that emissions are higher on weekdays
  - In event weekend emissions were to be higher, would want to consider this in making decisions in coordination with Regional Office
  - High Electricity Demand Days (HEDD) could be considered
- Arithmetic average of emissions on days selected by source
  - Some sources have very specific emissions per day, such as CEM sources and fires
  - Other source types may need to rely on temporal profiles or other methods
- Considerations for on-road mobile sources
  - Averaging a modeling inventory that uses gridded, hourly meteorology is difficult
  - Using MOVES with representative daily temperature information is expected for planning inventories - more easily repeated for transportation conformity

Ozone SIPs

Base Year Inventory Data (1 of 6)

Planning inventory

- Due 24 months after the effective date of nonattainment designations
- For recent designations: 60 days from publication of designations in the Federal Register + 2 years
- Point sources reported according to the Type B point source potential-to-emit thresholds in the AERR (Appendix A, Table 1)

	Point sources thresholds (tons/yr PTE)
VOC or NO_X	≥ 100
	Serious ≥ 50
	Severe ≥ 25
	Extreme ≥ 10
VOC	within OTR[1] ≥ 50

[1] Ozone Transport Region (see CAA § 184)

Ozone SIPs

Base Year Inventory Data (2 of 6)

Planning inventory

- Point source "facility" data elements reported according to the AERR (Appendix A, Table 2a)
- Called "Facility Inventory"

Data Field	Associated information
State/Co FIPS[1] code or tribal code	
Facility ID	Facility-level info (e.g., name, latitude/longitude, street address, NAICS[2])
Unit ID	Unit type, unit capacity
Emission Process ID	Source classification code (SCC)
Release Point ID	Release point characteristics
	Control measure, affected pollutant(s), percentage reductions

[1] Federal Information Processing Standards

[2] North American Industry Classification System

Ozone SIPs

Base Year Inventory Data (3 of 6)

Planning Inventory

- Select emissions data elements reported according to the AERR (Appendix A, Table 2b)

Data element	Point	Nonpoint	Onroad	Nonroad
State/Co FIPS Code	X	X	X	X
SCC		X	X	X
Emission factor	X	X		
Throughput (value, material, unit of measure)	X	X		
Pollutant code	X	X	X	X
Emissions and units of measure	X	X	X	X
Reporting period type (annual, average day…)	X	X	X	X
Emissions calculation method code	X	X		

Ozone SIPs

Base Year Inventory Data (4 of 6)

Planning Inventory

- Aren't the "Emission factor" and "Throughput" considered CBI?
  No, these are not considered confidential data by default or by EPA. Emission factor and throughput help to document the way in which the emissions have been calculated.
- What is the point of the "Reporting period types" data?
  While the AERR requires States to report annual emissions to EIS every third year, States may also report to EIS season-day emissions to meet some of their SIP requirements, so long as certain conditions are met.
- What is the importance of the "Emissions calculation method code"?
  This code indicates the way in which the emissions have been estimated, and along with the emission factor and throughput, provides documentation that is useful in understanding the quality of the data.

Ozone SIPs

Base Year Inventory Data (5 of 6)

Modeling Inventory

- Base year modeling inventories are needed for modeled attainment demonstrations (Moderate and above)
- Summaries (not detailed data) included with the attainment demonstration
- Differences compared to base year inventory for the nonattainment area inventory
  - Base year may be different (more on next slide)
  - In addition to NOx and VOC, should include CO
  - Multi-State emissions within modeling domain
  - Could include international emissions sources
  - More temporal and spatial detail for EGUs, biogenic, fires, on-road mobile
  - Method for on-road mobile may be different

Ozone SIPs

Base Year Inventory Data (6 of 6)

Modeling Inventory Year

- The base year selected for the modeled attainment demonstration should which reflect a variety of meteorological conditions that frequently correspond with observed 8-hour daily maxima concentrations greater than the level of the NAAQS at monitoring sites in the nonattainment area.
- This can be different from the emissions year for the base year inventory for the NAA
- Refer to the available guidance for air quality modeling at https://www.epa.gov/scram/state-implementation-plan-sip-attainment-demonstration-guidance

Ozone SIPs

Emissions Statements

- What are they?
  - A regulation by which a State requires stationary sources to report VOC and NOx
  - Says how facilities must report these emissions to the State air agency
- Why do I have to do this?
  - CAA 182(3)(B)
  - It's part of the SIP and therefore, the public hearing requirement applies
- What needs to be included in a SIP, and when?
  - The regulation itself is what is submitted. Needs to be submitted within 2 years of the effective date of designations (usually sent with the EI SIP)

Ozone SIPs

Projected Emissions Inventories

Rate of Progress

- Purpose is to assure that States take steps to make steady and incremental progress towards attaining the NAAQS
- Anthropogenic portion of the base year inventory for the nonattainment area serves as the baseline
- Moderate areas and above must submit plan that: CAA 182(b)(1)(A) & 40 CFR 51.1110(a)
  - Ensures 15% VOC reduction (accounting for growth) by 6 years after designation
  - NOx reduction can be substituted for VOC
  - Due within 3 years after effective date of nonattainment designation
- Summarizing differences between base and projected inventory is a way to demonstrate 15%
  - Same characteristics as baseline RFP inventory
  - Moderate areas: Projected inventory for ROP and attainment projected emissions are same
  - Serious and above: Multiple projected inventories (different years)

Ozone SIPs

Projected Emissions Inventories

Reasonable Further Progress

- Purpose is to assure that States take steps to make steady and incremental progress towards attaining a NAAQS
- Anthropogenic portion of the base year inventory for the nonattainment area serves as the baseline
- Serious and above nonattainment areas must submit a plan to achieve 3% annual reduction in VOC after the initial 6 years (until attainment) CAA 182(c)(2)(B)
  - NOx reduction can be substituted for VOC CAA 182(c)(2)(C)
  - Due within 4 years of effective date of nonattainment designation
- Summarizing differences between base and projected inventory is most common way to demonstrate 3% per year
  - Same characteristics as baseline RFP inventory

Ozone SIPs

Projected Emissions Inventories

Modeling Inventories

- Projected modeling inventories are needed for modeled attainment demonstrations (Moderate and above)
- Summaries (not detailed data) included with the attainment demonstration SIP
- Differences compared to base year modeling inventory
  - Projection year is attainment year
  - Anthropogenic sources projected to future year, including any emission reduction measures devised for attaining the NAAQS
  - Temporal approach for sub-annual sectors may be different (EGU, fires)
- Biogenic emissions typically held constant
- Future-year international emissions can be a challenge (can use what is available in EPA modeling platforms)

Ozone SIPs

Periodic Nonattainment Area Inventory (1 of 2)

- Periodic inventory required to be submitted no later than each 3-year period after the submission of the base year EI — CAA 182(a)(3)(A)
- Same details as as base year EI
- Periodic inventories are a SIP revision, and subject to public review *notice* requirement
- Periodic requirement can be met at least 2 ways:
  - Inventory can be submitted to the regional office in some form
  - AERR triennial submission can be used under certain conditions…

Ozone SIPs

Periodic Nonattainment Area Inventory (2 of 2)

- AERR submission can be used to meet period requirement, if…
  - Public hearing has been offered
  - Ozone season day emissions submitted
  - Submit mobile emissions (*not* inputs as now required by AERR)
  - Complete – all sectors
  - Submitted within 3 years or less since previous inventory submitted
  - Partial county emissions are used where appropriate
- Under 2015 Ozone Implementation Requirements Rule (Subpart CC), periodic inventory is one way to demonstrate compliance with MCDs

Ozone SIPs

Maintenance Inventories

New!

- Maintenance Plans must include inventories
- Attainment inventory
  - Except the year, has the same requirements as base year inventory for the NAA (*e.g.,* all sources, NO_X and VOC, and nonattainment area only)
  - Should be a year for which all air quality monitors in the NAA had ozone concentrations below the level of the standard
- Projected inventory
  - Except the year, has the same requirements as base year inventory for the NAA
  - The end projection year is 10 years after the estimated effective date of the maintenance plan

Inventory Decision Tree for Ozone SIP Inventories

New!

Required data	Pollutant	Sources
Base year inventory for the NAA	NO_X, VOC	All in NAA
Periodic inventory		
RFP baseline[1]		See footnote 1
Modeling inventories	CO, NO_X, VOC	All in model domain
Attainment inventory	NO_X, VOC	All in NAA
Projected inventory		

[1] The anthropogenic portion of the base year inventory for the NAA is the RFP baseline

For further questions

- Regional office ozone planning lead
- Robert Lingard, Lingard.Bob@epa.gov

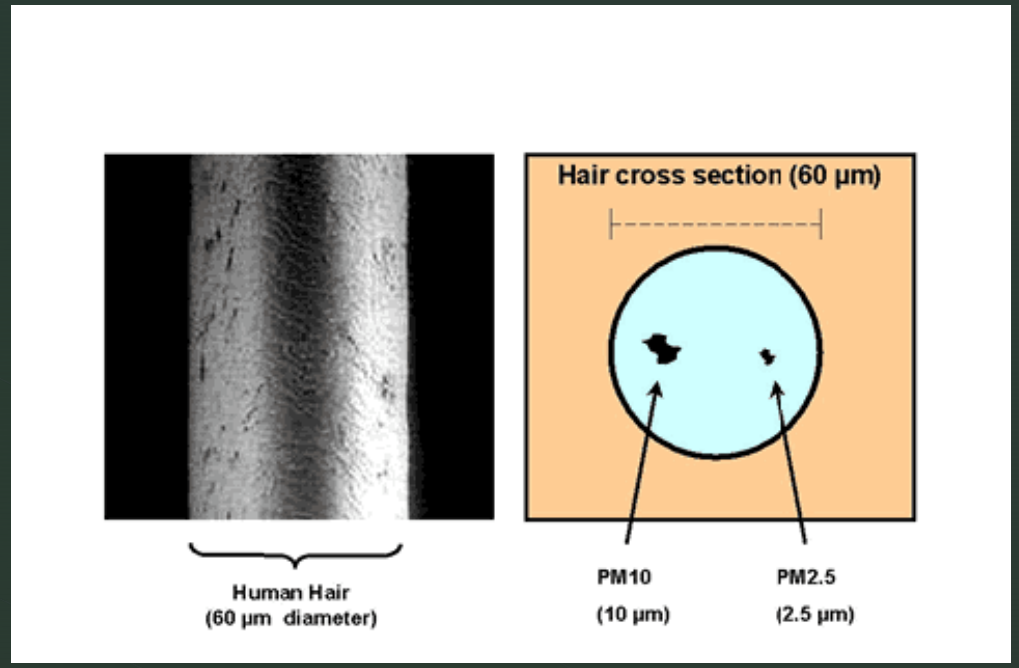
MODULE 4

$PM_{2.5}$ - Emissions Inventory Uses and Requirements

$PM_{2.5}$ SIPs – EI Uses and Requirements

Module Outline

- Background
- Emissions general details and timing
- Base year emissions inventory data
- Optional precursor demonstration
- Projected emissions inventories
  - Projected attainment year inventory for the nonattainment area
  - RFP
  - Modeling inventory



$PM_{2.5}$ SIPs - Background

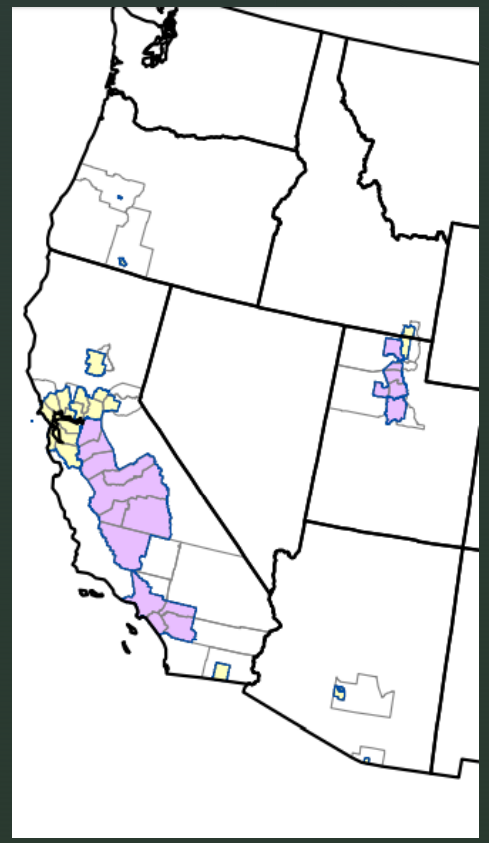
2016 $PM_{2.5}$ Implementation Rule

- In 2006, the EPA set the 24-hour primary $PM_{2.5}$ standard to 35 micrograms per cubic meter ($\mu g/m^3$)
- In 2012, the EPA revised the primary annual $PM_{2.5}$ standard from 15 to 12 $\mu g/m^3$
- Designations occurred starting after the 1997 $PM_{2.5}$ standard up through 2015 for the 2012 NAAQS
- In 2013, the courts remanded the original implementation rules because they did not include the CAA requirements specific to PM_{10} nonattainment areas
- In 2016, finalized the $PM_{2.5}$ SIP Requirements Rule 40 CFR 51.1000 – 51.1016
- Inventory due dates 18 months from effective date of designation
  - Depends on area (effective designations starting ~4/15/15 through 6/19/17)
- See also $PM_{2.5}$ Implementation Training

$PM_{2.5}$ SIPs – Background

Nonattainment areas

2006 (24-hr) Standard
(+ small areas in PA and AK)

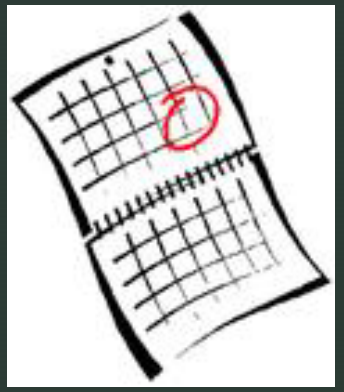


2012 (Annual) Standard

$PM_{2.5}$ SIPs

General Emissions Inventory Details

Timing



Base Year
NAA EI, Projected Attainment NAA EI and RFP Plan

Effective Date of Designations

Moderate area attainment date

Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6

Moderate

New EIs for everything

Year 7 | Year 8 | Year 9 | Year 10

Serious (if area is reclassified)

★ = Attainment demonstration due (with modeling inventory summaries)

$PM_{2.5}$ SIPs

General Emissions Inventory Details (1 of 3)

Planning Inventories

- Source categories: *Actual emissions of direct $PM_{2.5}$ and all $PM_{2.5}$ precursors from all sources within the boundaries of a nonattainment area…* 40 CFR 51.1000
- Pollutants: $PM_{2.5}$ (total, condensable, and filterable) SO_2, NOx, VOC, and NH_3
  - $PM_{2.5}$ precursors: SO_2, NOx, VOC, and NH_3 51.1000
  - Direct $PM_{2.5}$: *… include filterable and condensable $PM_{2.5}$ emissions…* 51.1000
- Annual, average season-day, or both
  - If annual standard: annual
  - If 24-hour standard: annual or average season-day (with rationale) 51.1008(a)(iii)

General Emissions Inventory Details (2 of 3)

Planning Inventories

New!

- Emissions base year – depends on designation
  - Moderate: 51.1008(a)(1)(i)

    …in one of the 3 years used for purposes of designations or another technically appropriate inventory year if justified by the state …
  - Serious (bump up): 51.1008(b)(1)

    … one of the 3 years for which monitored data were used for reclassification to Serious, or another technically appropriate year if justified by the state …
  - Fail to attain Serious (189(d) plan): 51.1008(c)(1)

    … one of the 3 years for which monitored data were used to determine that the area failed to attain the PM2.5 NAAQS by the applicable Serious area attainment date, or another technically appropriate year if justified by the state …

$PM_{2.5}$ SIPs

General Emissions Inventory Details (3 of 3)

Planning Inventories – years summary

New!

Standard/Designation	Base Year for EI for the NAA and RFP Baseline	Alternative
2012 PM2.5 – Moderate designated 12/18/2014	2011, 2012, or 2013	Another technically appropriate inventory year if justified by the state in the plan submission
2012 PM2.5 – Serious	One of the 3 years for which monitored data were used for reclassification to Serious	
2012 PM2.5 – 189(d)	One of the 3 years for which monitored data were used to determine that the area failed to attain	
2006 PM2.5	One of the 3 years for which monitored data were used for designation or reclassification	

$PM_{2.5}$ SIPs

General Emissions Inventory Details

Average-Season Day

- State must select the representative months and days
  - 24-hour NAAQS designed to protect against peak exposures
  - Violations of ambient standard must occur during an identifying season
  - State should coordinate with Regional Office in selecting season, since the rationale for a seasonal approach will be reviewed for approval by EPA
- Arithmetic average of emissions on days selected by State
  - Some sources have very specific emissions per day, such as CEM sources and fires
- Considerations for on-road mobile sources
  - Averaging a modeling inventory that uses gridded, hourly meteorology is difficult
  - Using MOVES with average temperatures is expected for planning inventories so that approach can be more easily repeated for transportation conformity

$PM_{2.5}$ SIPs

Base Year Inventory Data (1 of 5)

Planning inventory

- Due 18 months after the effective date of nonattainment designations
- Point sources reported according to the Type B point source potential-to-emit thresholds in the AERR (Appendix A, Table 1)

Pollutant	Point sources thresholds (tons/yr)
SO_2	≥ 100 Serious ≥ 70
VOC	
NOx	
$PM_{2.5}$	
NH_3	

PM$_{2.5}$ SIPs

Base Year Inventory Data (2 of 5)

Planning inventory

- Point source "facility" data elements reported according to the AERR (Appendix A, Table 2a)
- Called "Facility Inventory"

Data Field	Associated information
State/Co FIPS[1] code or tribal code	
Facility ID	Facility-level info (e.g., name, latitude/longitude, street address, NAICS[2])
Unit ID	Unit type, unit capacity
Emission Process ID	Source classification code (SCC)
Release Point ID	Release point characteristics
	Control measure, affected pollutant(s), percentage reductions

[1] Federal Information Processing Standards

[2] North American Industry Classification System

$PM_{2.5}$ SIPs

Base Year Inventory Data (3 of 5)

Planning Inventory

- Select emissions data elements reported according to the AERR (Appendix A, Table 2b)

Data element	Point	Nonpoint	Onroad	Nonroad
State/Co FIPS Code	X	X	X	X
SCC		X	X	X
Emission factor	X	X		
Throughput (value, material, unit of measure)	X	X		
Pollutant code	X	X	X	X
Emissions and units of measure	X	X	X	X
Reporting period type (annual, average day…)	X	X	X	X
Emissions calculation method code	X	X		

$PM_{2.5}$ SIPs
Base Year Inventory Data (4 of 5)
Planning Inventory

- Why can't I submit only my "Plan precursors" as part of my inventories?
  - An emission inventory is needed for a $PM_{2.5}$ SIP to demonstrate (optionally) which $PM_{2.5}$ precursors are not significant in a NAA
  - The EPA needs to see this inventory to evaluate the precursor demonstration
- NH_3 data are so uncertain, how can we use it for decision making?
  - The CAA does not give an "out" for uncertain data
  - EPA and states continue to improve the data available
  - $PM_{2.5}$ modeled attainment demonstrations have been successful in the past at improving AQ, despite similar (or greater) uncertainties
  - Ongoing work at EPA and elsewhere continues to improve these data

$PM_{2.5}$ SIPs

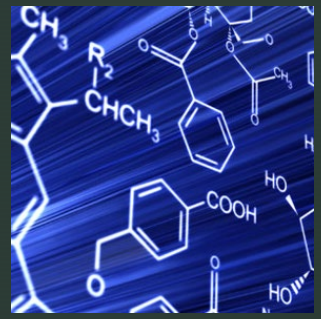
Base Year Inventory Data (5 of 5)

Modeling Inventory

- Base year modeling inventories are needed for modeled attainment demonstrations
- Emissions summaries included with the attainment demonstration
- Differences compared to base year inventory for the nonattainment area inventory
  - Base year may be different (see guidance as per ozone modeling inventory slide)
  - In addition to $PM_{2.5}$ precursors, need CO and PM_{10}
  - Multi-State emissions within modeling domain
  - Could include international emissions sources
  - More temporal and spatial detail for EGUs, biogenic, fires, on-road mobile
  - Method for on-road mobile may be different

$PM_{2.5}$ SIPs

Optional Precursor Demonstration



- *An optional set of analyses provided by a State that are designed to show that emissions of a particular $PM_{2.5}$ precursor do not contribute significantly to $PM_{2.5}$ levels that exceed the relevant $PM_{2.5}$ standard* 40 CFR 51.1000
- Rule does require a particular approach, but it may use modeling and emissions data
  - Concentration-based – contribution of a precursor to ambient $PM_{2.5}$ levels is not significant
  - Sensitivity-based - decrease in emissions does not have significant impact on $PM_{2.5}$
- No specific emissions inventory requirements for the precursor demonstration, but data would be needed to do it

$PM_{2.5}$ SIPs

Projected Emissions Inventories

Planning Inventories

- Attainment projected emissions inventory for the nonattainment area: the $PM_{2.5}$ rule requires the *data* to be reported 40 CFR 51.1008(2)
- Year: … most expeditious year for which projected emissions show modeled $PM_{2.5}$ concentrations below the level of the NAAQS
- Same sources as base year and only within nonattainment area
- Same temporal period (annual, average-season, or both) as base year
- Same pollutants (all precursors and $PM_{2.5}$ split for filterable and condensable)
- Same sources are point vs. nonpoint as base year
- Same detail as base year (i.e., consistent with AERR)

$PM_{2.5}$ SIPs

Projected Emissions Inventories

Reasonable Further Progress (1 of 2)

- $PM_{2.5}$ SIPs must meet RFP provisions in general — CAA 172(c)(2)
- $PM_{2.5}$ SIPs must contain quantitative milestones — CAA 189(c)(1)
  - Moderate area: no later than 4.5 and 7.5 years after effective date of designation
  - Serious area: no later than 7.5 years and 10.5 years
- RFP baseline is the base year inventory for the nonattainment area
- Requirement to include RFP emissions reductions for each quantitative milestone year — 40 CFR 51.1012(a)
  - Can be met with emissions summaries by sector and pollutant
  - Show either linear progress to projected attainment date or stepwise progress
- Requirement to provide on-road mobile source emissions summaries for each milestone year

PM$_{2.5}$ SIPs

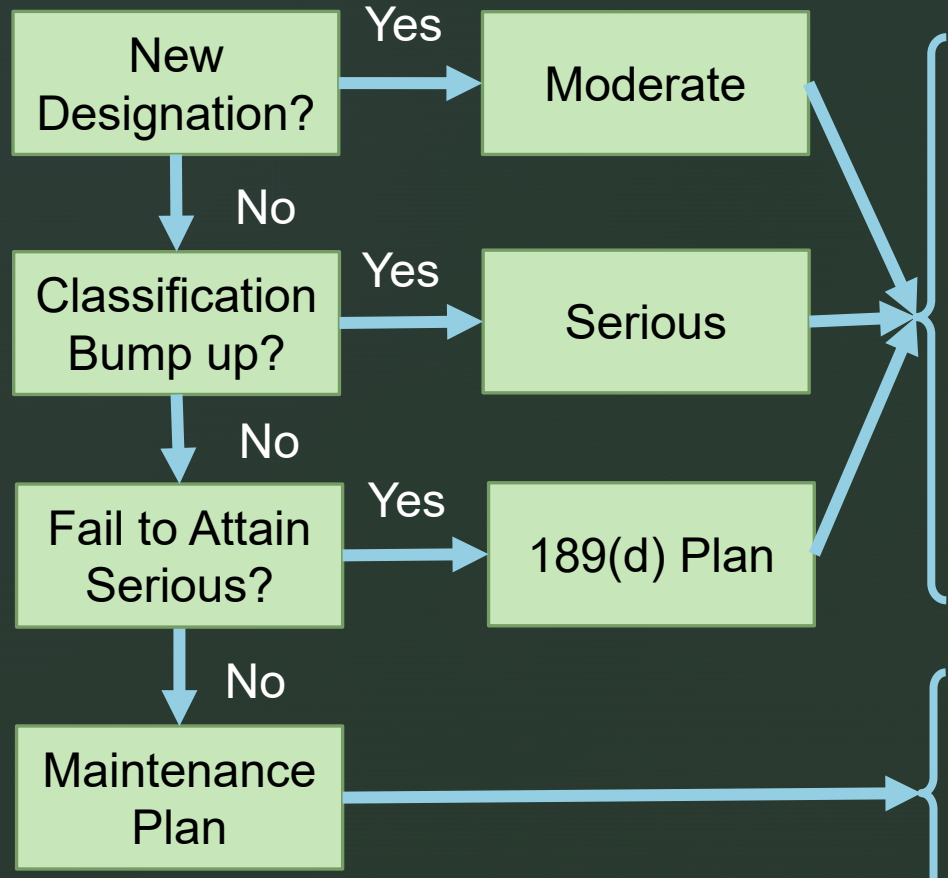
Projected Emissions Inventories

Reasonable Further Progress (2 of 2)

- To create a milestone inventory for RFP, it is not necessary to do a full emissions projection approach
- Interpolation between the base year and projected attainment inventory for the nonattainment area may be acceptable
  - State would need to explain why that makes sense
  - Example: residential wood combustion changes due to percent-per-year phase in of new woodstoves would give a linear rate, for which linear interpolation makes sense
- Closures and control measures can all be set to occur in a specific year, which can take a step-wise approach and occur before or on the milestone year to help demonstrate reasonable progress

Inventory Decision Tree for $PM_{2.5}$ SIP Inventories

New!



Required data	Pollutant	Sources
Base year inventory for the NAA Serves as: RFP baseline	$PM_{2.5}$,* PM_{10}, SO_2, NO_X, VOC, NH_3	All in NAA (only anthro. for RFP)
Projected attainment inventory		All in NAA
Modeling inventories	Same as above + CO	All in model domain
Attainment inventory	$PM_{2.5}$, PM_{10}, SO_2, NO_X, VOC, NH_3	All in NAA
Projected inventory		

* PM2.5 must be provided broken out into filterable and condensable portions

For further questions

- Regional office $PM_{2.5}$ planning lead
- Rich Damberg, Damberg.Rich@epa.gov

New!

MODULE 5

SIP Inventories and the Proposed AERR Revisions

Module Outline

- Background
- Relationship between SIP planning inventories and AERR
- Proposed AERR revisions that would not impact SIP planning inventories
- Proposed AERR revisions that would impact SIP planning inventories

SIP Inventories and the Proposed AERR Revisions

AERR Background

1990 Clean Air Act amendments: New periodic emission inventory requirements for nonattainment areas

1998 NOx SIP call requirements: Set triennial and annual emissions inventory reporting requirements for NOx sources

2002 Consolidated Emissions Reporting Requirements (CERR):

- Simplify emissions reporting, unify reporting dates, add statewide area and mobile sources, include fine particulate matter and ammonia
- EPA: “We plan to develop HAP reporting measures at a future date”

2008 Original AERR: Consolidate, reduce, and simplify current requirements, adds limited new requirements, and provides additional flexibility to states, and accelerates reporting of emissions to EPA

2015 AERR Revision did not propose HAP changes

SIP planning inventories and AERR

- For ozone and $PM_{2.5}$ planning inventories, the AERR sets:
  - Which sources are point sources
  - Which sources must report
  - Which data fields are required
- In the AERR proposal, preamble Section R covers these issues
- Comment period through October 18, 2023
- See AERR website for more information: https://www.epa.gov/air-emissions-inventories/air-emissions-reporting-requirements-aerr

SIP Inventories and the Proposed AERR Revisions

Proposed AERR revisions that would not impact SIP planning inventories (1 of 2)

- Definition of point sources to include HAP
  - Only the reporting thresholds for precursor pollutants relevant for planning inventories, for example:
  - NO_X and VOC reporting thresholds relevant for ozone SIP inventories
  - NO_X, VOC, SO2, NH_3, $PM_{2.5}$, and PM10 reporting thresholds for $PM_{2.5}$ SIP inventories
- Requirement to report hourly fuel use for small electricity generation
- More specific airport and rail yard requirements and implementation options
  - Report emissions instead

SIP Inventories and the Proposed AERR Revisions

Proposed AERR revisions that would not impact SIP planning inventories (2 of 2)

- Prescribed burning activity data
  - Report emissions instead
- Nonpoint survey
- Nonpoint tool inputs
  - Report emissions instead
- Voluntary agricultural burning for triennial inventories
  - Report emissions
- Nonpoint and mobile documentation when submitting emissions values
- Inventory years required by SIPs are still triennial

Proposed AERR revisions that would impact SIP planning inventories

- Requirements on how to report
  - Use best available data
  - Use latest EPA reporting codes
  - Data required under the proposal would not be confidential
  - Include certain mobile source emissions operating at point sources
- Specific approach for reporting nonpoint activity data and emissions when Indian country boundaries overlap with county boundaries
- Additional and modified point source data fields

Proposed AERR revisions – How to Report (1 of 4)

- Starting 2023 inventory year: Proposed §51.5(a)
  - *A State or owner/operator must estimate annual actual emissions … using the best available estimation methods…*
  - *Where current the EPA guidance materials are outdated or are not applicable to sources or source categories, an owner/operator (other than a small entity, as defined by §51.50 of this subpart) should develop and document new techniques for estimating emissions, which should rely on any available source measurements applicable to the emissions source(s).*

Proposed AERR revisions – How to Report (2 of 4)

- Starting 2023 inventory year: Proposed §51.5(j)
  - *A State or owner/operator of point sources reporting under this subpart must use the most current data reporting codes for electronic reporting that are available at the time of reporting.*

Proposed §51.5(n)

  - *The specific data elements submitted under this subpart all fall within the definition of emissions data and are therefore not entitled to confidential treatment.*

Proposed AERR revisions – How to Report (3 of 4)

- Starting 2026 inventory year: Proposed §51.5(b)
  - *A State or owner/operator must include emissions from mobile sources (excluding aircraft and ground support equipment) operating primarily within the facility site boundaries of a point source or multiple adjacent point sources*

Proposed §51.5(c)

  - … must use continuous monitor data applicable to the units and processes … to calculate annual actual emissions.
  - In the absence of monitored data, an owner/operator must use the most recent source test(s) applicable to the operating conditions of the units and processes during that year to estimate annual actual emissions.
  - … must submit a justification for that choice for each unit and pollutant for which such data are not used to estimate emissions…

Proposed AERR revisions – How to Report (4 of 4)

- Starting 2026 inventory year: Proposed §51.5(d)
  - *A State submitting point source emissions on behalf of owners/operators under this subpart must ensure that owners/operators of facilities submitting data to the State take the same approaches as described in paragraph §51.5(a) through (c) of this subpart.*

Proposed AERR revisions – States/Tribes (1 of 2)

- State would either: Proposed §51.15(d)(9)
  - Include total activity input and emissions (inclusive of Indian country) when reporting OR
  - When Indian Tribe expected to report emissions, avoid double counting by excluding the activity within and emissions from Indian country from the county total data reported
- If tribe is not reporting, states report county totals (nothing in the proposal says they would have to split out totals for tribes)

Proposed AERR revisions – States/Tribes (2 of 2)

- Tribes would: Proposed §51.15(d)(10)
  - Report activity data and emissions separately for each county that includes Indian country
- *The EPA encourages the tribe to coordinate with the State(s) and to use EPA-provided tools and include documentation with their submissions*

Proposed AERR revisions – Point Data Fields
(1 of 2)

- Additional required point source data fields
  - Data fields to report controls (same as 2020 NEI)
  - Title V operating permit identifier (starting in 2026, if applicable)
  - Regulatory code, regulation start year, and regulation end year (starting in 2026, if applicable)
    - By unit
    - Limited to those point sources with SLT or EPA permits
    - Includes state agency regulatory description if no available code
  - Small entity type (starting in 2026)
    - For small entities reporting directly to EPA or when SLT reports HAP on their behalf

Proposed AERR revisions – Point Data Fields
(2 of 2)

- Newly required current point source data fields
  - Release point coordinates
- Newly enforced required point source data fields
  - Emission factor (when applicable)
  - Throughput (when using emission factor)
- Modified point source data fields
  - Facility latitude/longitude defined as “air centroid”

For further questions

- NEI Help, NEI_Help@epa.gov
- Please include “AERR” in subject line