

New Resources for Improving Regional PM_{2.5} Emission Inventories



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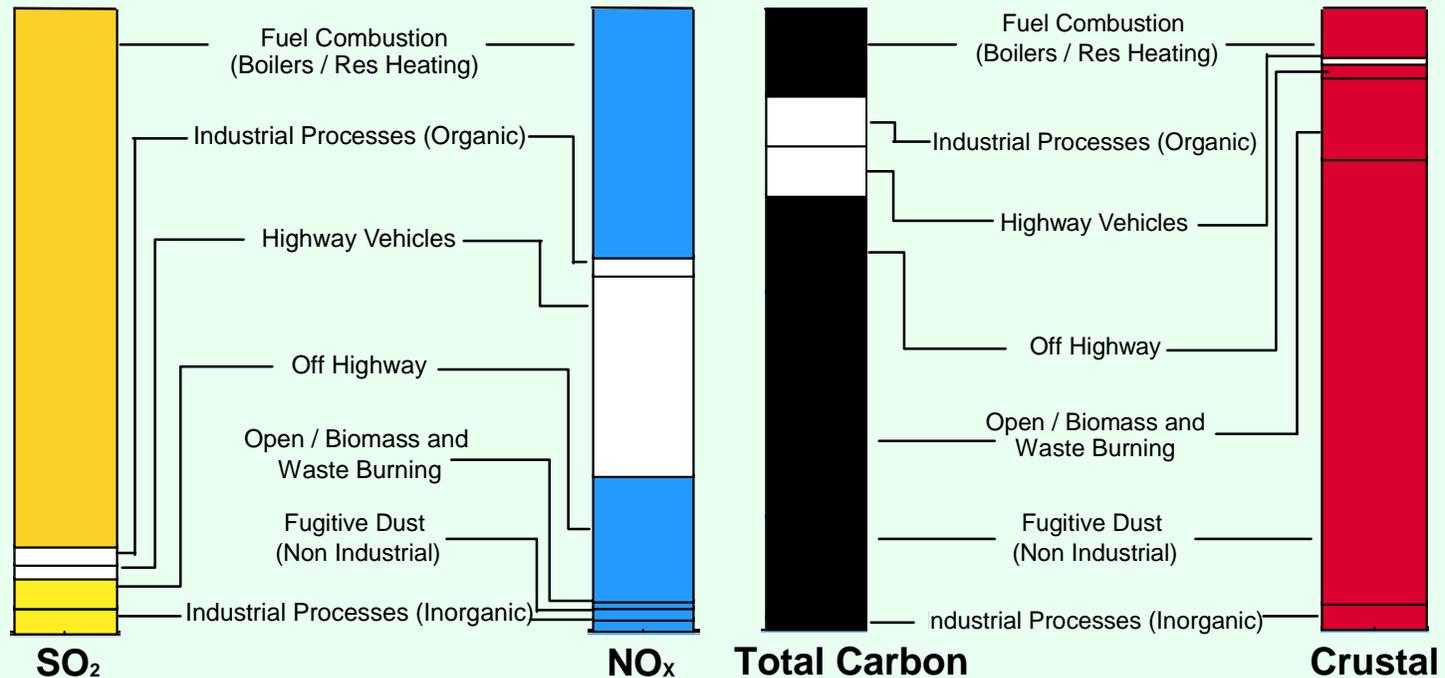
Overview



- **PM2.5 Sources of Interest**
- **Overview of the NEI**
- **Strategies for a Better NEI**
- **EPA Products**
- **EPA/EIIP Joint Products**
- **RPO Products**
- **Handout of Key Web Addresses**

Sources of PM2.5

PM2.5 National Emissions Summary



Key PM2.5 Source Categories (National EI)

DIRECT EMISSIONS

Carbonaceous^{a, b}

- **Residential Wood Burning**
- **Managed Burning**
- **Non-Road Mobile**
- **Wildfires**
- **Residential Waste Burning**
- **On Road Mobile**
- Power Gen Coal
- Boilers (Oil, Gas)
- Boilers (Wood)

Crustal / Metals^b

- Fugitive Dust
- Mineral Prod Ind
- Ferrous Metals

PRECURSOR EMISSIONS

SOx^c

- **Power Gen (Coal)**
- **Power Gen (Oil)**
- Boilers (Coal)
- Boilers (Oil)
- Pulp and Paper

NOx

- **On Road Mobile (Gas, Diesel)**
- **Non-Road Mobile (Diesel)**
- **Power Gen (Coal)**
- **Boilers (Gas)**
- Residential (Gas, Oil)
- Mineral Prod Ind

NH3

- **Animal Husbandry**
- Fertilizer Application
- On Road and Non Road
- Wastewater Treatment
- Boilers

VOC^d

- **Biogenics**
- Solvent use
- On Road (Gas)
- Storage and Trans
- Residential Wood
- Petro Industry
- Waste Disposal

- a Includes organic particles, elemental carbon and condensable organic particles
 b Impact of carbonaceous emissions on ambient PM 5 to 10 times more than crustal emissions impact
 c Includes SO₂ and SO₃ and H₂SO₄ condensable inorganics
 d Contributes to formation of secondary organic aerosols

NOTE: Categories in **BOLD ITALICS TYPE** are most important.



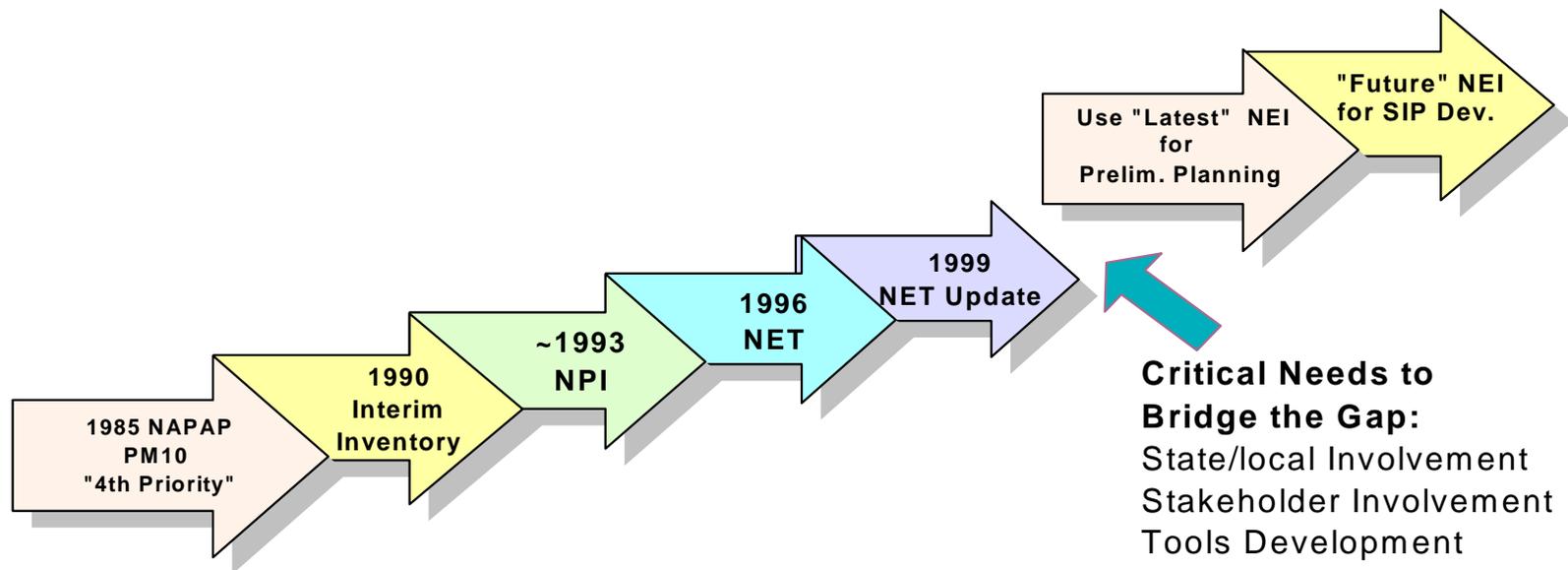
June 2000 / tgp

The NEI



- **NEI:** National Emissions Inventory of point, area & mobile sources
 - Annual, County-level
- **Combines & harmonizes:**
 - National Toxics Inventory (NTI)
 - National Emissions Trends Inventory (NET)
- **Jointly developed**
 - From EPA, RPO, State & Tribal EI's
- **Evolutionary**
 - "PM" NEI builds on other pollutants & inventories

Evolution of the PM2.5 Emissions Inventory



NAPAP - National Acidic Precipitation Assessment Program

NPI National Particulate Inventory

NET National Emission Trends Inventory

NEI Merger of NET and Nat'l Toxics EI

The Regional EI & NEI Development Process

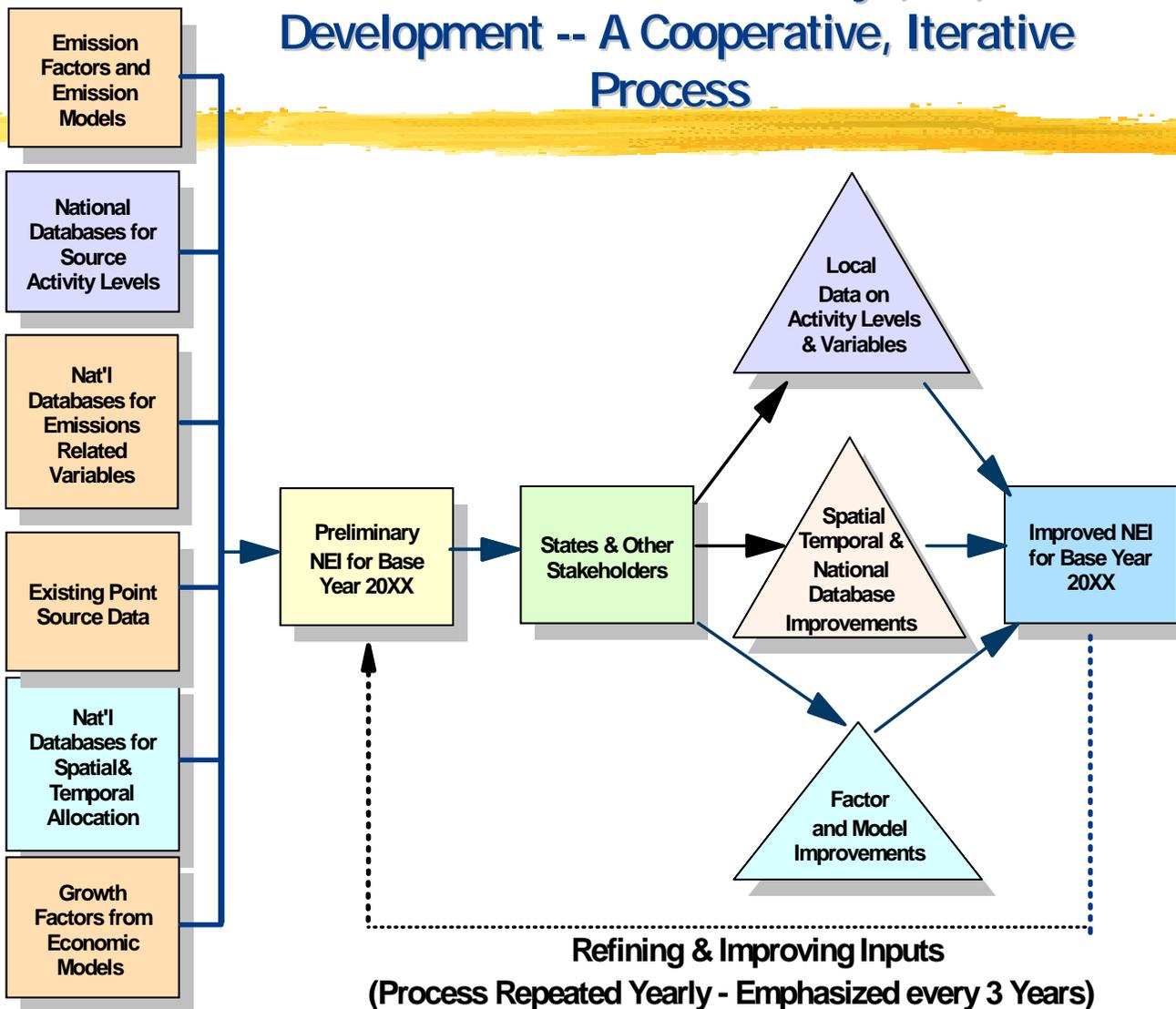
- **EPA:** shares its plans, data with RPO's, States & Tribes.
- **EPA:** collects/creates additional data.
- **RPOs/States/Tribes:** submit their data to EPA.
- **EPA:** selects and merges estimates.
- **RPOs/States/Tribes:** (and others) review EPA's draft inventory.
- **EPA:** makes corrections, resolves disputed estimates.
- **EPA:** releases NEI.
- **Note:** RPOs/States/Tribes have ongoing uses for their own EI's

Nat'l Emissions Inventory (NEI)

Development -- A Cooperative, Iterative Process

3/2001

Inputs to NEI



Improving Upon the Current ('99) NEI



■ **General Approach**

- **Start with Current 1999 EI** - based on activity data and factors available to EPA at this time.
- **Obtain Better Activity Data** - available locally for many categories.
- **Check Emission factors** - are constantly being improved; local measurements may be better.
- **Spatial & Temporal Allocation** - Get local data

■ **Fugitive Dust, Combustion & Ammonia**

- Many “opportunities” for local input.
- It's difficult, but doable by working together.

Strategy for a Better EI



- **Establish priorities** - what can *you* do?
- **Leverage resources** - States, Tribes, other RPO's.
- **"Ground truth"** - establish uncertainty bounds with:
 - Transport / transformation models
 - Ambient measurements
 - Chemical characterization
 - Source Apportionment tools:
 - Tracer compounds and physical properties
 - Data analytic techniques: UNMIX, PMF, CMB, MLR
- **Expand & enhance research programs**
- **Pick your battles!** - Resources are limited

The “Battleground” NEI’s PM Area Source Inventory

■ PM Focus:

- Primary - PM_{2.5}, PM₁₀, (EC, Organics by Speciation)
- Precursors - NH₃, SO₂, NO_x

■ County/Grid level:

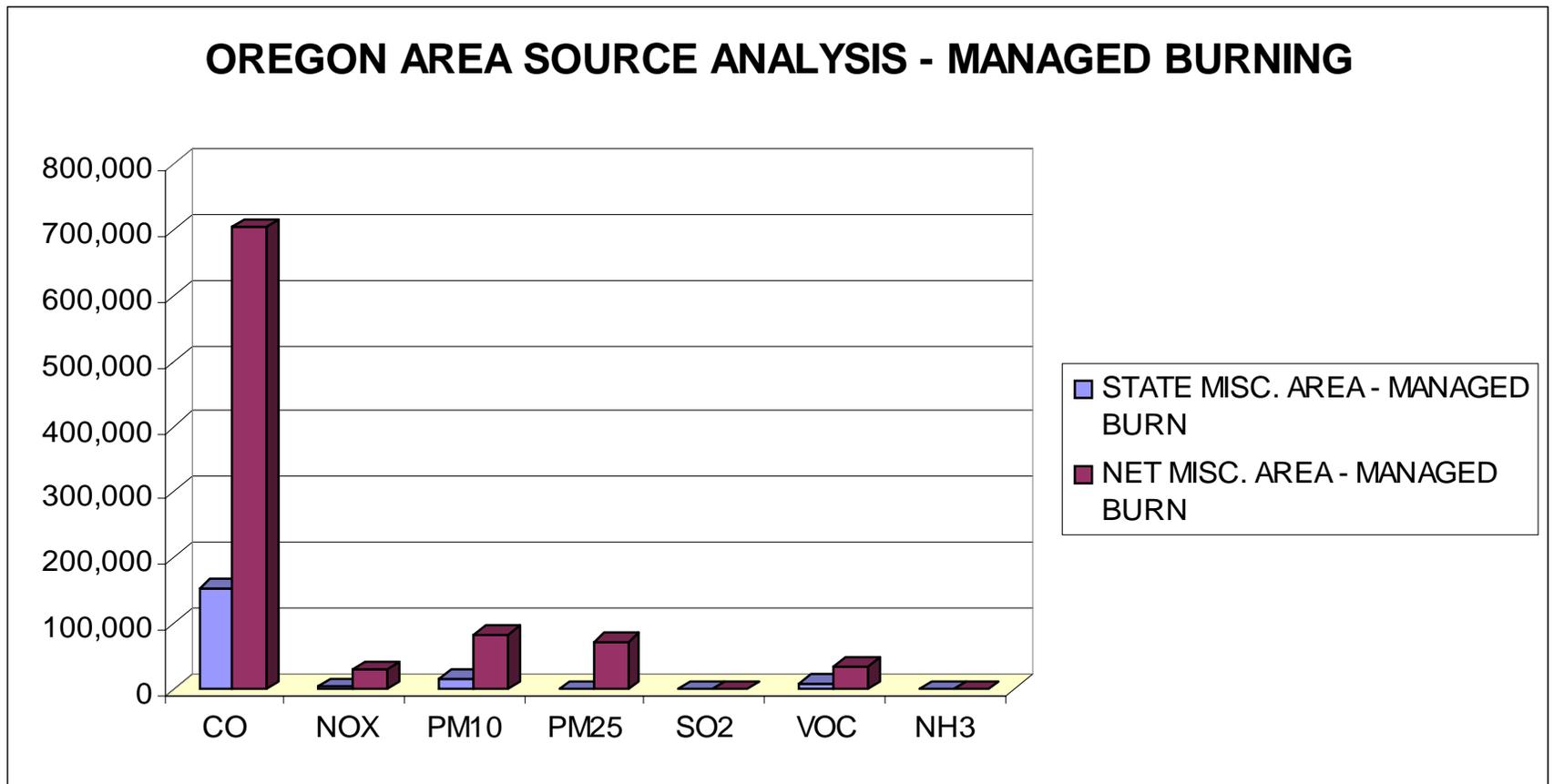
- Total emissions of numerous small, “anonymous” sources w/ similar emission characteristics

■ Main Types of Sources:

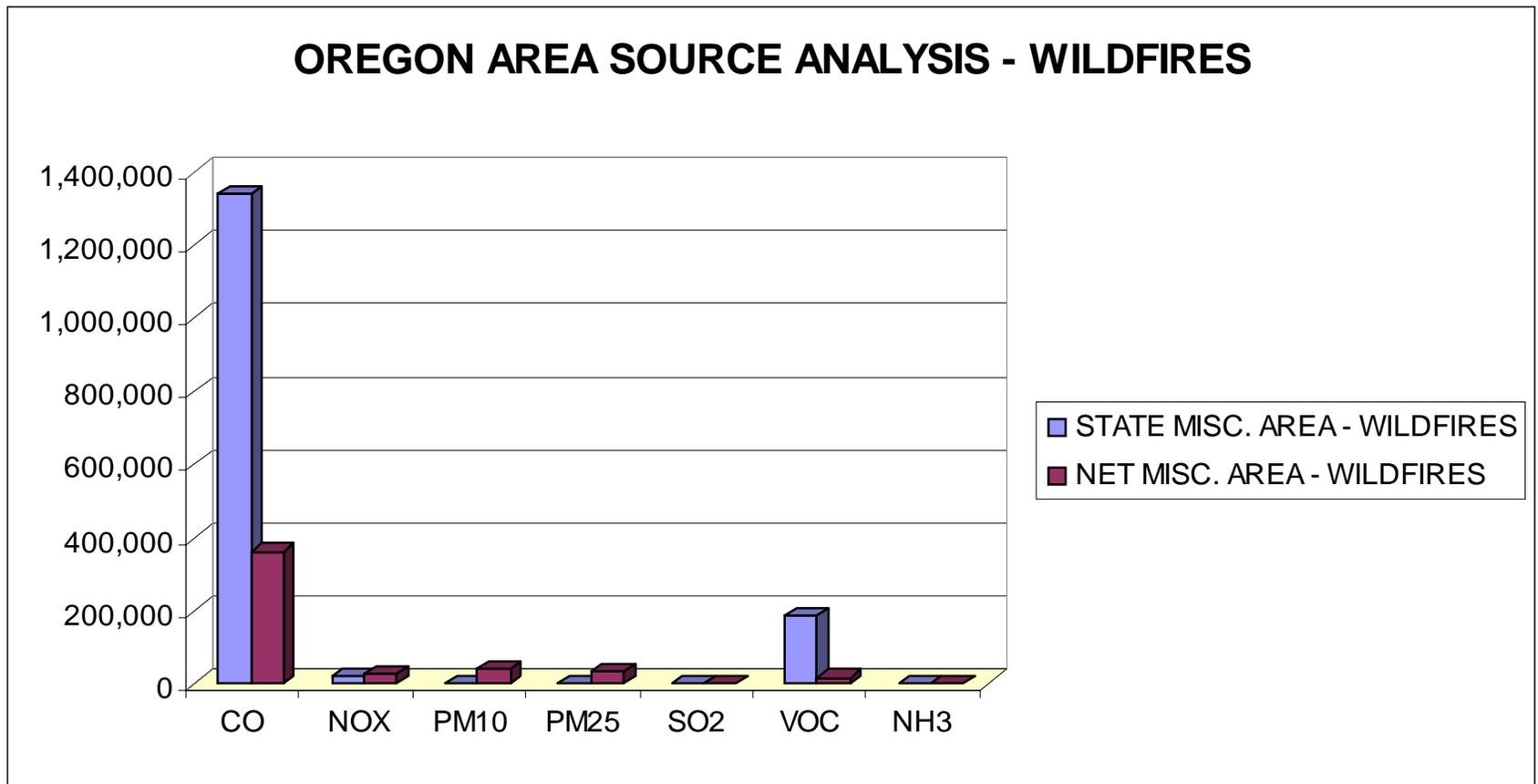
- Fugitive Dust, Combustion, Ammonia from agriculture

■ Example: Oregon’s Improvements to the NEI...

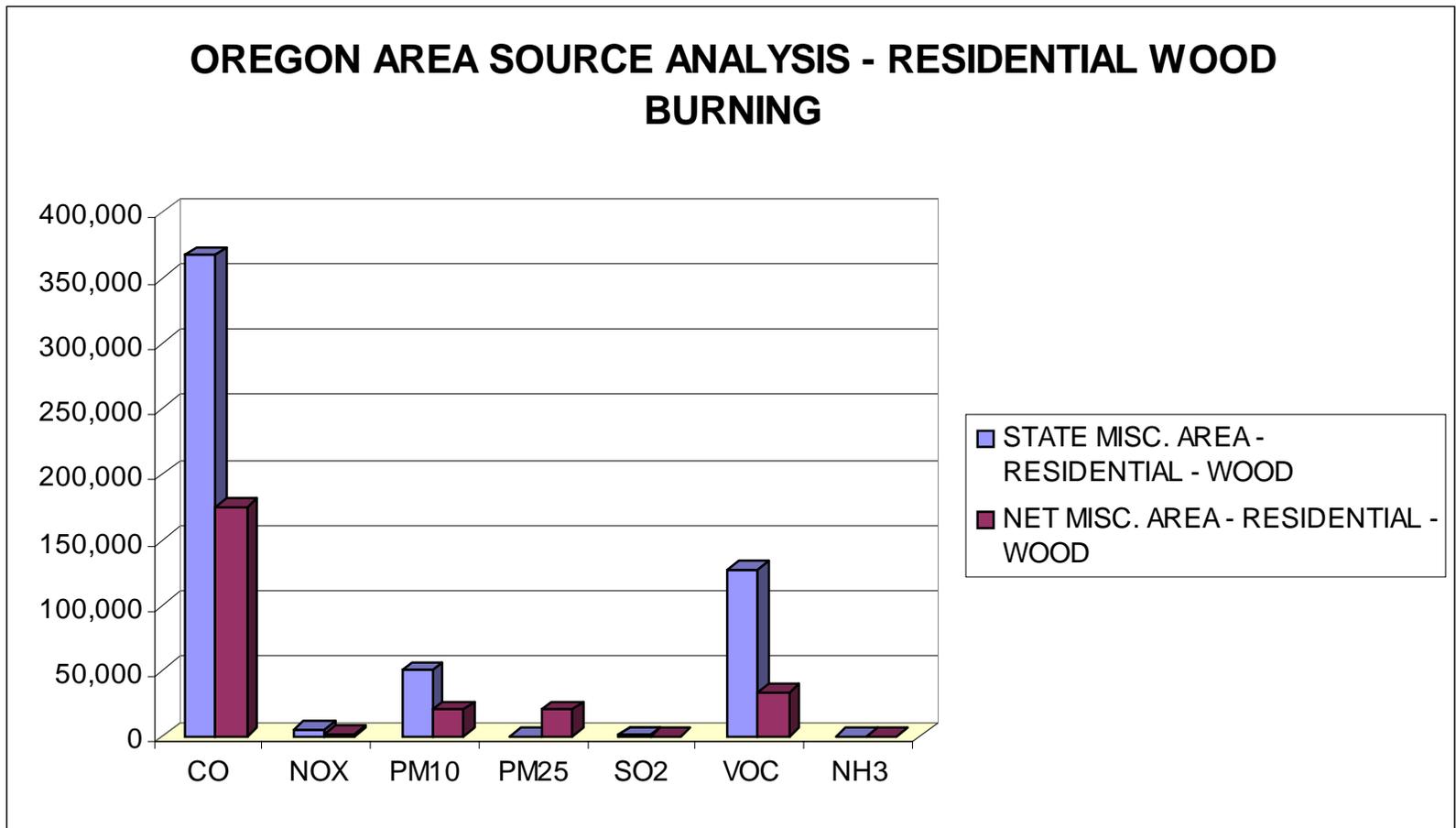
Oregon Area Sources - Managed Burning



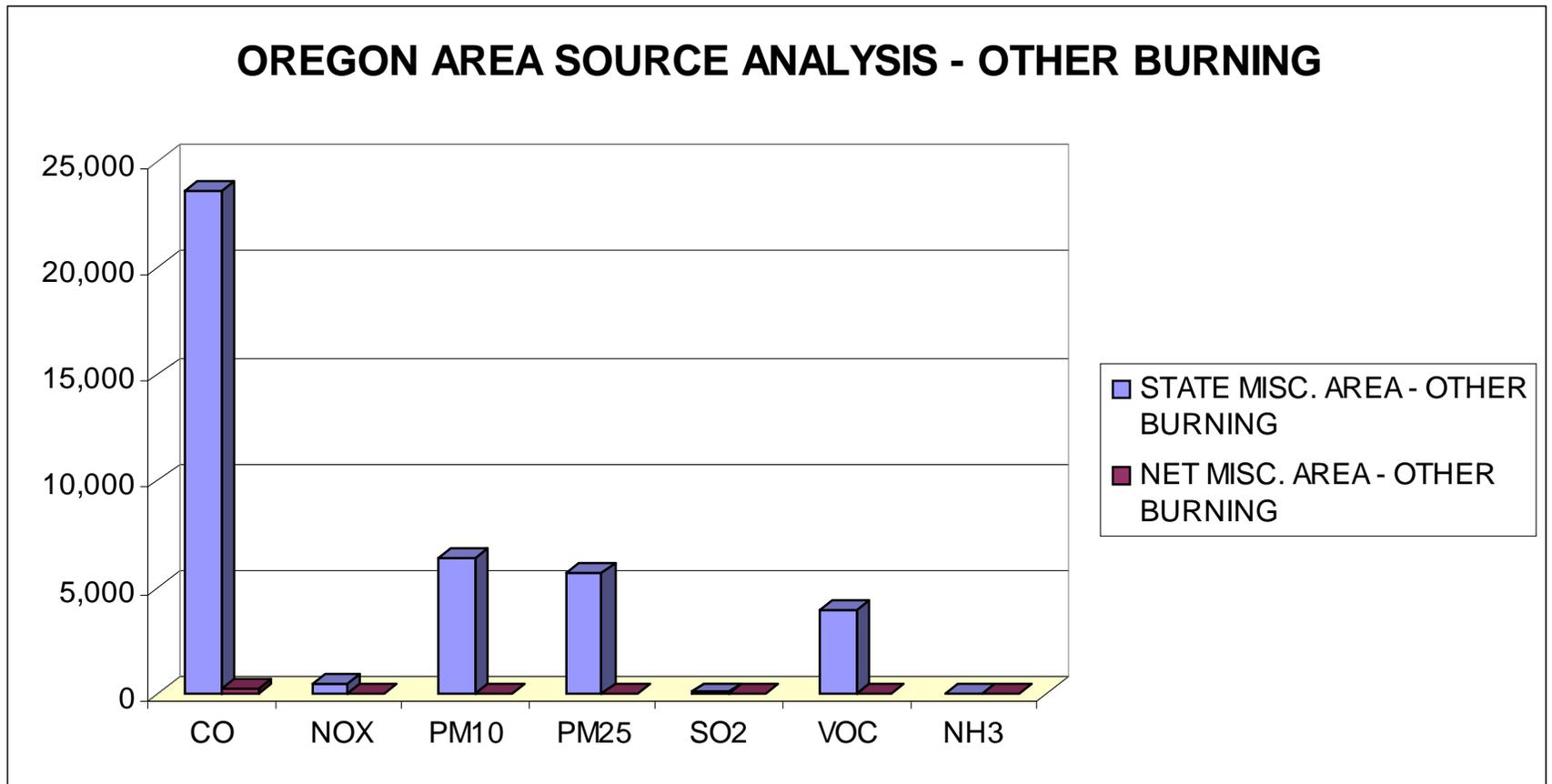
Oregon Area Sources - Wildfires



Oregon Area Sources - Residential Wood Burning



Oregon Area Sources - Other Burning



EPA Products



- **AP-42** - Factor updates for PM-2.5 and precursors for selected sources
- **FIRE** - Factor updates for PM-2.5 and precursors for selected sources
- **PM-CALC** - Tool to estimate PM-2.5 from existing PM10 estimates

■ See: <http://www.epa.gov/ttn/chief/>

EPA Products (Cont'd)



■ ASEM

- Provides Activity data and Emission Factors used for selected NEI Area Source
- 2nd Beta release ~ mid-summer

■ Category Methodology Improvements

- See: <http://www.epa.gov/ttn/chief/net/index.html#doc>
- Construction
- Waste Open Burning
- Unpaved Roads (in development)

EPA/EIIP Joint Products



■ PM-2.5 Emissions Inventory Resource

Center <http://www.epa.gov/ttn/chief/eiip/pm25inventory/pm25home.htm#>

- Web-based resource with information and links to related Web pages:

- Guidance, Activity databases, EF and equations

- Area Source Tools, Stakeholder Web Sites

- PM-2.5 "Getting Started" Document

- Area Source "1-Pagers"

Format for: Getting Started 1-Pagers

Source Category:	<i>Combustion - Structure Fires</i>
SCC Code:	<i>2810030000</i>
Pollutants of Concern:	<i>PM-10, PM-2.5</i>
Current Methodology:	
Uncertainties / Shortcomings of Current Methods:	
How can State, Local, and Tribal agencies improve upon this methodology?	
Activity Variables Used to Calculate Emissions from Structure Fires	
<i>Current Variables/Assumptions Used:</i>	
<i>Suggestions for Improved Variables:</i>	
Where can I find Additional Information and Guidance?	
EPA Contact: <i>Name, Phone, E-mail</i>	
Web Links	

RPO Products, Documents and Studies



■ WRAP

- Base year inventory for 1996 (Nearly done)
 - Based on State/local/tribal supplied inputs & data
- WRAP States Inventory Survey Report
 - <http://www.wrapair.org/comindex.htm> -- Emissions Forum
- Fire Emissions Database (July '96 & Annual)
 - http://www.airsci.com/FEJF/Task_Team.htm#natback -- FEJF Emissions Task Team
- Fugitive Dust Transport:
 - Workshop, Findings & Recommendations Report
 - <http://www.wrapair.org/comindex.htm> -- R&D Forum

RPO Products, Documents and Studies (Cont'd)



■ OTC, MARAMA, NESCAUM

- Regional Haze and Visibility in the Northeast and Mid-Atlantic States

- <http://www.nescaum.org/committees/haze-download.html>

- NH₃ Emissions Inventory and System

- <http://www.envinst.cmu.edu/nh3/>

■ OTC, MARAMA, NESCAUM, SESARM

- Assessment of Emissions Inventory Needs for Regional Haze Plans

- <http://www.marama.org/visibility/visibility.html>

RPO Products, Documents and Studies (Cont'd)



■ LADCO

- Scoping Study for Regional Haze in the Upper Midwest

- http://www.ladco.org/reports/rpo/rpo_reports.html

■ CENRAP

- Evaluating BRAVO Study
 - Sources Affecting Visibility in Big Bend Nat. Park
- Evaluating other recent field studies
 - Concentrations, Met. Conditions, Sources/Source Areas

Summary of Key Web Addresses for PM Inventory Improvements

- **PM Resource Center:**
<http://www.epa.gov/ttn/chief/eiip/pm25inventory/pm25home.htm>
- **CHIEF:** <http://www.epa.gov/ttn/chief/>
- **EIIP:** <http://www.epa.gov/ttn/chief/eiip/>
- **TribalAIR:** <http://www.epa.gov/oar/tribal/partners/>
- **STAPPA/ALAPCO:** <http://www.4cleanair.org/>
- **NESCAUM:** <http://www.nescaum.org>
- **WRAP:** <http://www.wrapair.org> and
- **LADCO:** http://www.ladco.org/reports/rpo/rpo_reports.html
- **MARAMA:** <http://www.marama.org>
- **CENRAP:** <http://www.censara.org/cenrap.htm>
- **OTC:** <http://www.sso.org/otc/>
- **SESARM/VISTAS:** www.deq.state.nc.us/VISTAS