

Emission Inventories for Criteria Pollutants

Maricopa County Air Quality Dept. Brown Bag Seminar Series

September 14, 2010



WALK MORE USE CFLS MORE CARPOOL MORE
BIKE MORE RAKE MORE TELECOMMUTE
MORE DRIVE HYBRIDS MORE CONSOLIDATE
ERRANDS MORE RIDE PUBLIC TRANSPORTATION
MORE USE ENERGY EFFICIENT APPLIANCES
MORE CARRY REUSABLE TOTE BAGS MORE
CONSIDER SOLAR MORE RUN COLD WATER
CYCLES MORE USE REUSABLE CONTAINERS
MORE CONSERVE ELECTRICITY MORE REDUCE
WOODBURNING MORE RECYCLE MORE USE
ELECTRIC LAWN AND GARDEN EQUIPMENT
MORE REFUEL AFTER DARK MORE RIDE
THE BUS MORE RIDE THE LIGHT RAIL MORE
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**CLEAN AIR
MAKE
MORE**

What is an emission inventory?

- a current, comprehensive listing, by source, of the air pollutant emissions
- a specific geographic area
- a specific time period
- identified set of uses



Emission Inventories for Criteria Pollutants

Background

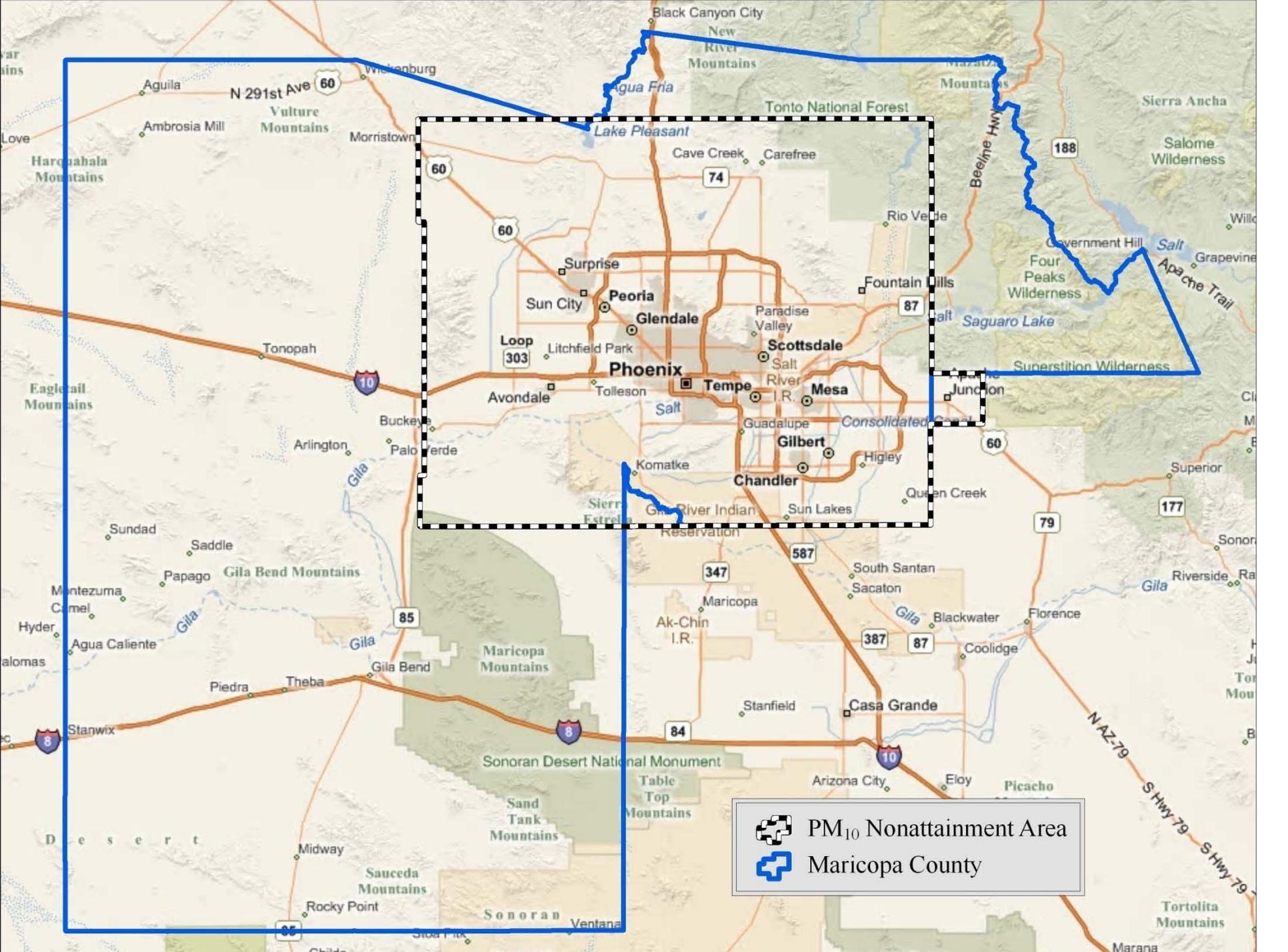
"Comprehensive, accurate and current" emission inventories:

- Required by the Clean Air Act (CAAA), the 2002 Consolidated Emissions Reporting Rule (CERR), and the 2009 Air Emissions Reporting Rule (AERR)
- a primary tool for tracking progress in meeting and maintaining attainment with NAAQS
- used to assess current and potential control strategies
- a long-range planning tool

Emission Inventories for Criteria Pollutants

Source Categories





PM₁₀ Nonattainment Area



Maricopa County



Phoenix-area Air Quality Planning Areas

YAVAPAI

GILA

PINAL

MARICOPA

1 Hr Ozone NAA/CO Maintenance Area Boundary

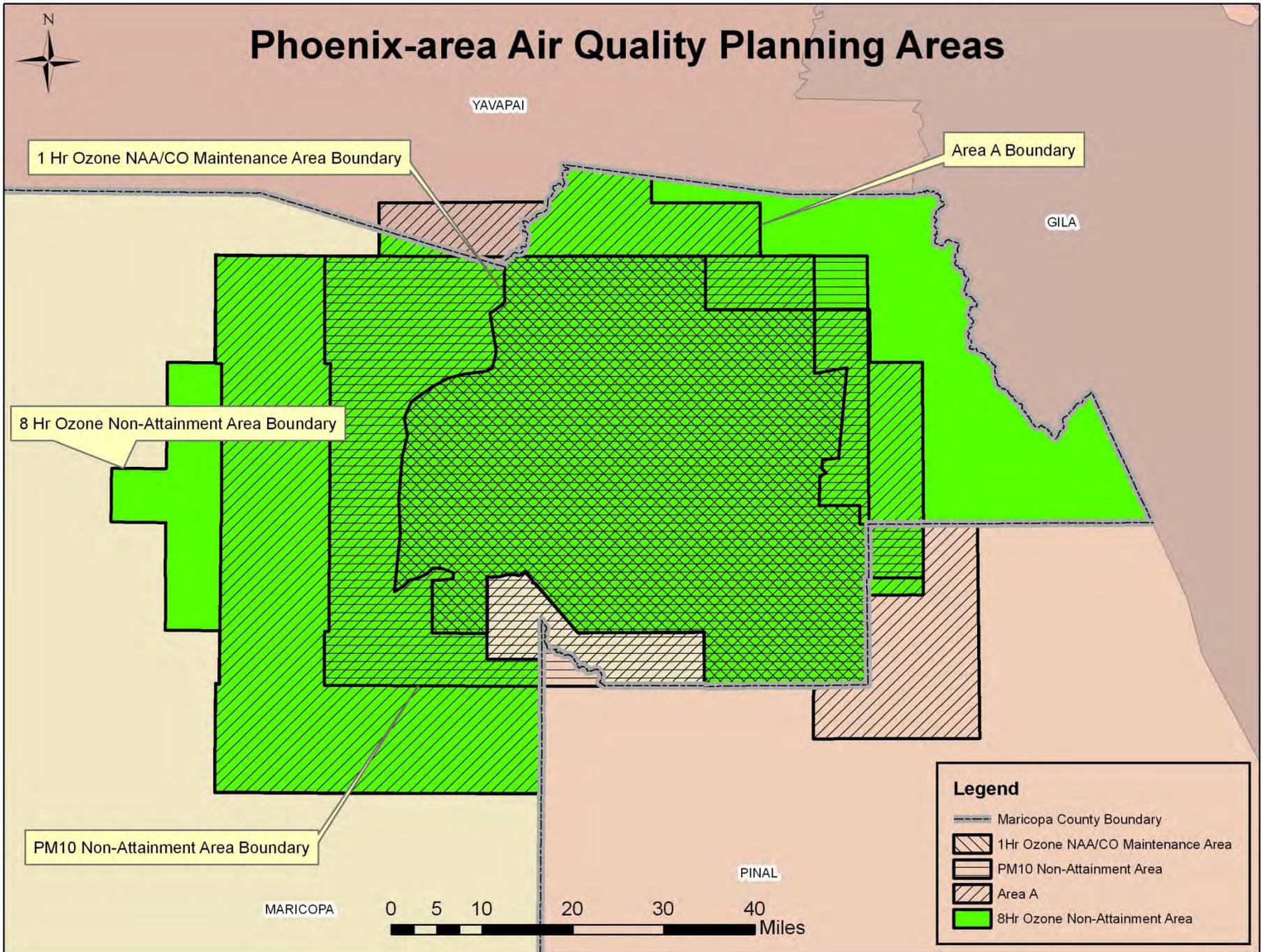
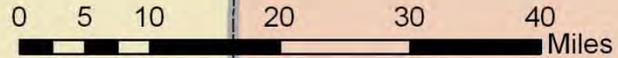
Area A Boundary

8 Hr Ozone Non-Attainment Area Boundary

PM10 Non-Attainment Area Boundary

Legend

-  Maricopa County Boundary
-  1Hr Ozone NAA/CO Maintenance Area
-  PM10 Non-Attainment Area
-  Area A
-  8Hr Ozone Non-Attainment Area



Emission Inventories for Criteria Pollutants

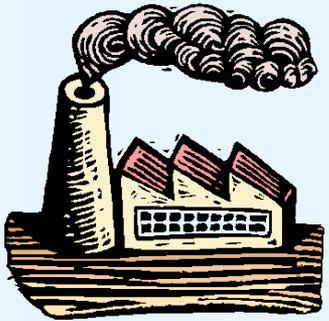
Variety of emission calculation methods...

"Bottom-up" vs. "top-down" approaches

▪ source-specific	▪ more general
▪ requires detailed data	▪ use national/state info
▪ higher accuracy, but resource-intensive	▪ May be less accurate; can be done with less data / time / people

Variety of emission calculation methods...

Comprehensive site-specific surveys:



- Over 1,000 large industrial facilities
- Airports: Traffic volume and patterns for both aircraft activity, as well as GSE / APUs (MAG)



Variety of emission calculation methods...

Specialized surveys of annual activity for key source categories:



- Fire depts., locomotive operators, etc.



- Pesticide usage



- Supply-side surveys (e.g., natural gas distribution, wood combustion)

Collect/analyze data from other entities:



- MCAQD: earthmoving permit activity, stationary source permit info
- ADEQ: state-permitted portable source activity
- ADOT: data on vehicle miles traveled
- MAG: land use, demographics, economic data
- MCESD, AZ Land Dept., Agricultural Statistics, et al.



CLEAN AIR
MAKE
MORE

WALK MORE USE CYCLES
EXTRA MILES
MORE CONSIDER SOLAR
REDUCE WOODBURNING
MORE RIDE THE BUS

Emission Inventories for Criteria Pollutants

Variety of estimation techniques/approaches

USE CONSOLIDATE
TOTE BAGS
ELECTRICITY MORE
REFUEL AFTER DARK
MORE RAKE MORE

Use of Specialized Emission Modeling Tools:



- EDMS (aircraft)



- NONROAD (offroad engines)

- MOBILE 6.2 (onroad mobile sources)



- MEGAN (biogenic emissions)



DRIVE HYBRIDS MORE CONSOLIDATE ERRANDS MORE RIDE PUBLIC TRANSPORTATION MORE USE ENERGY EFFICIENT APP
TOTE BAGS MORE CONSIDER SOLAR MORE RUN COLD WATER CYCLES MORE USE REUSABLE CONTAINERS MORE CONSE
WOODBURNING MORE RECYCLE MORE USE ELECTRIC LAWN AND GARDEN EQUIPMENT MORE REFUEL AFTER DARK MORE

Application of "top-down" national or state data:



- Architectural coatings
- Consumer solvent usage

Development of new approaches:

- Windblown dust



Data analysis, QA/QC, review cycle(s)...



3

2102006000

101006*,
102006*
(external),
201002*,
202002*
(internal)

County fuel supply
data from local gas
companies

In

Indust. emp

3

2102004000

101005*,
102005*

DOE, EIA AZ fuel
supply data
to County
Industrial
employment

In

Indust. empl



3.2.3

n/a

2103006000

fuel supply
in local gas
companies

Ret.+Ofc.+Public+ other
employment (1)
Ret.+Ofc.+Pub
employee

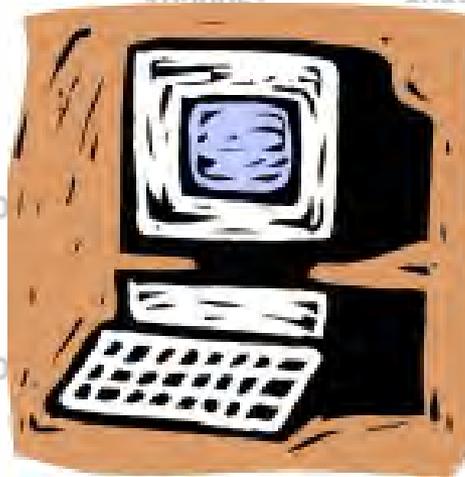
3.2.4

n/a

2103004000

AZ fuel
supply data
to County

Ret.+Ofc.+Public+ other
employment (1)
Ret.+Ofc.+Pub
employee



(internal)

by non-Industrial
employment

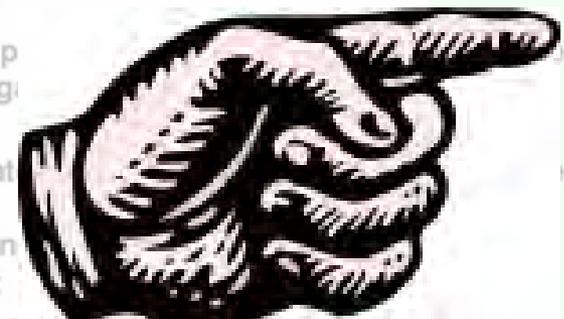


3

2104006000

n/a

County fuel supp
data from local g
companies



ent pop

3

2104008000

n/a

State data allocat
to Cty by #
households usin
wood for heat

ent pop

3....

2104004000

n/a

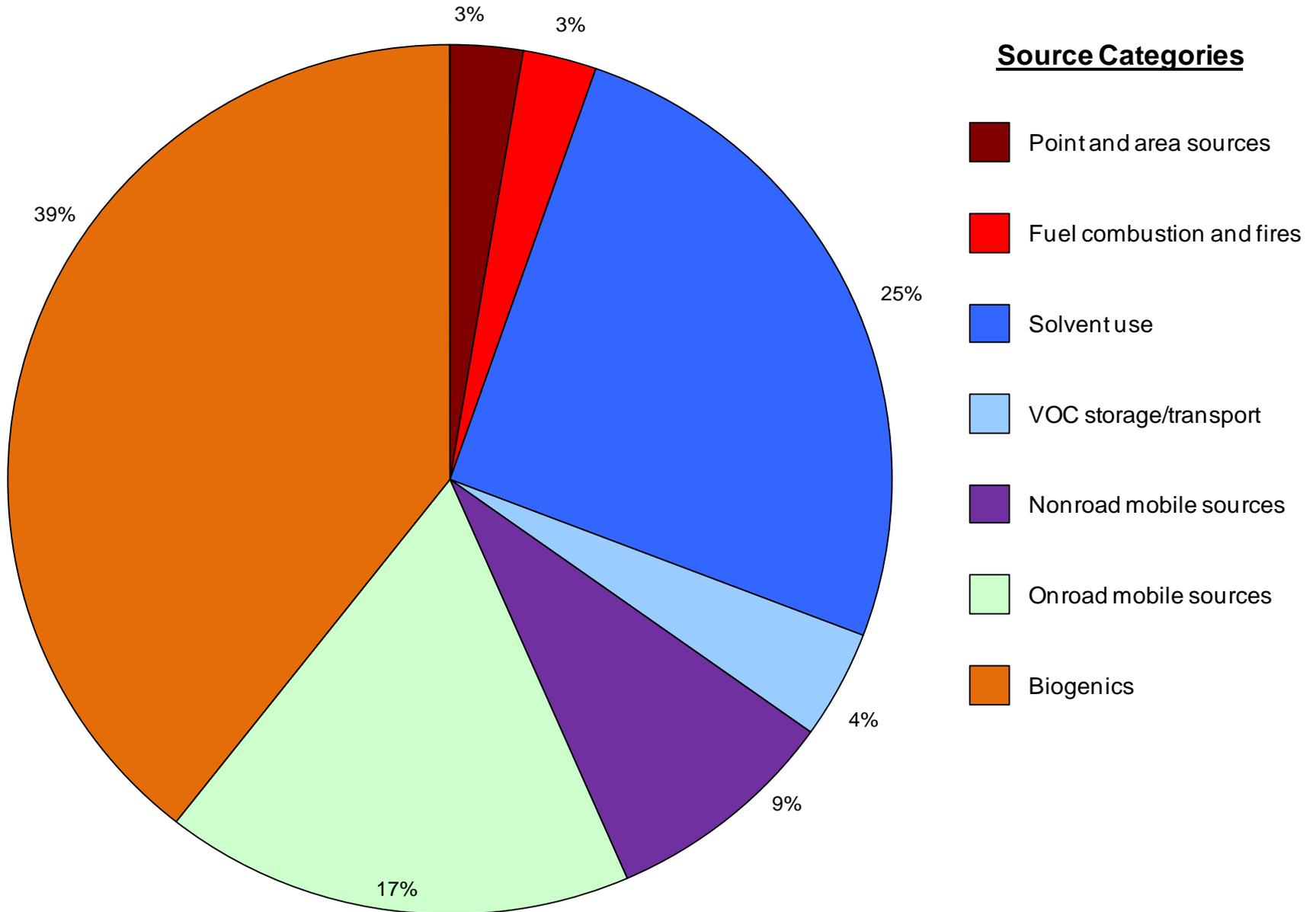
allocation of state
data (see wood
comb.)

Resident population

Resident pop

DRAFT 2008 VOC Emissions

(8-Hour Ozone Nonattainment Area Total =148,078 tons/yr)



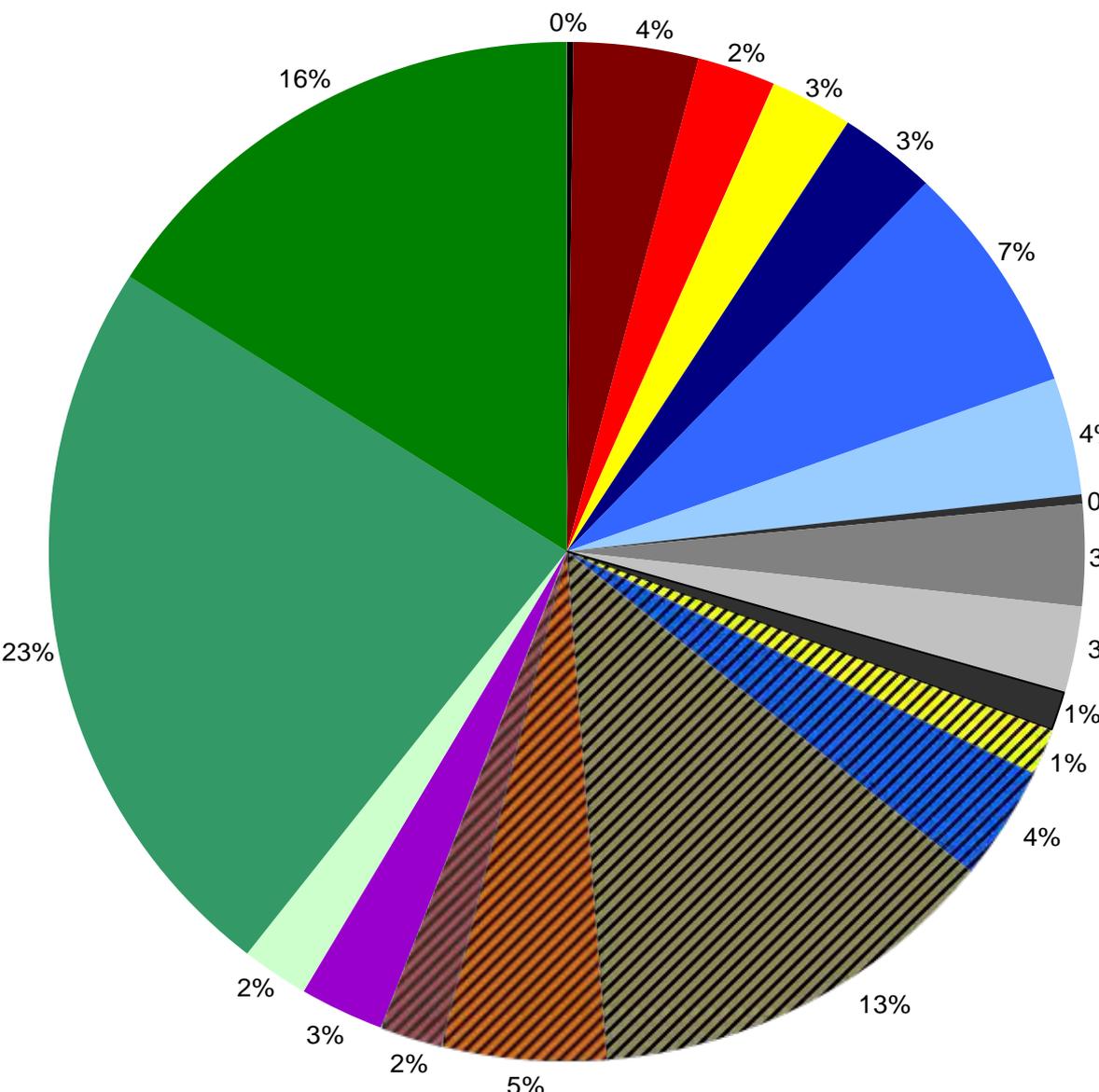
2008 PM₁₀ Emissions Inventory

(PM₁₀ Nonattainment Area Total = 73,410 tons/yr)

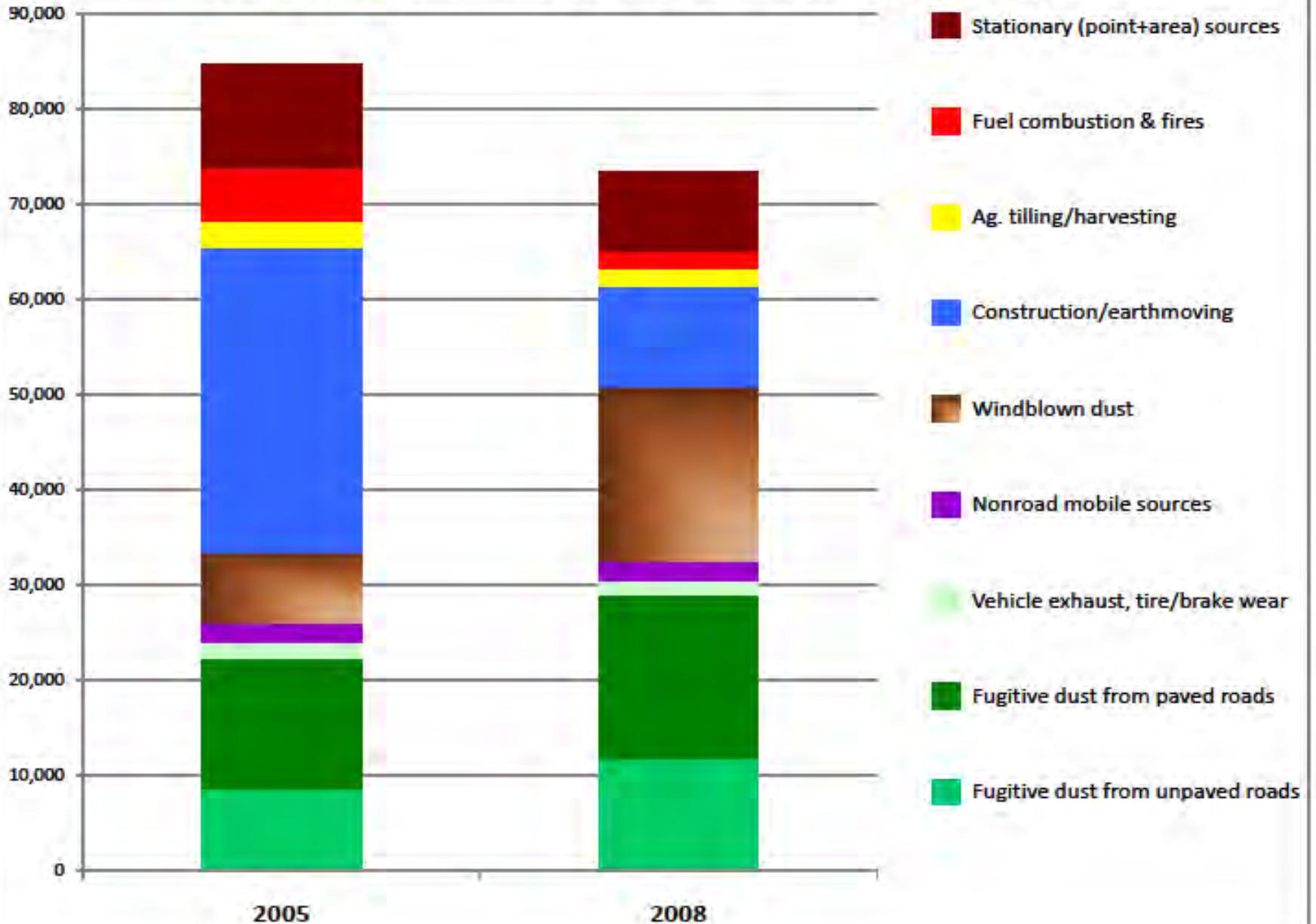
Source Categories

%

Major stationary point sources	(<0.5%)
All other industrial processes	(4%)
Fuel combustion and fires	(2%)
Agriculture	(3%)
Construction, residential	(3%)
Construction, commercial	(7%)
Construction, road	(4%)
Other earthmvg: trenching, weed control	(<0.5%)
Travel on unpaved parking lots	(3%)
Offroad rec. vehicles fugitive dust	(3%)
Leaf blowers fugitive dust	(1%)
Windblown: agricultural land	(1%)
Windblown: developing land	(4%)
Windblown: vacant land	(13%)
Windblown: open areas	(5%)
Windblown: S&G, landfills, test tracks	(2%)
Nonroad mobile sources	(3%)
Exhaust/tire wear/brake wear	(2%)
Paved road fugitive dust, including trackout	(23%)
Unpaved road fugitive dust	(16%)



Annual PM₁₀ Emissions by Source Category (NAA, tons/yr)



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Reporting Results

Written Reports:

- 150-pp. "cookbook" for each source category
- Detailed documentation describes: procedures used to collect (or estimate) input data, sources of data, calculation methods used, any simplifying assumptions made, and thorough documentation of citations used/reference lists.

Electronic Data Sets to EPA:

- Suite of standardized, detailed descriptions of emission calculation methods and results
- Become part of the National Emissions Inventory (NEI).



Questions? Comments?

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