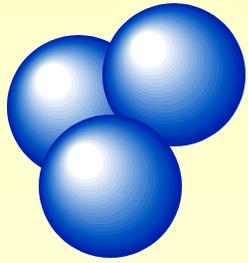


# Overview of Ozone in St. Louis

I/M Summit  
July 22, 2005

Wendy Vit  
Missouri DNR Air Pollution Control Program



# What is Ozone?

- Ozone is a gas composed of 3 oxygen atoms
- “Good” ozone is produced naturally in upper-atmosphere where it protects the Earth from the sun’s UV rays
- “Bad” ozone is formed at the Earth’s surface where it causes health problems in humans and damage to plant species

# Why Is Ozone a Concern?

- Breathing ozone is harmful to human health
  - Irritates respiratory systems
  - Aggravates asthma, emphysema and bronchitis
  - Inflames and damages linings of lungs
- People most susceptible include those with respiratory illnesses, older adults, healthy adults and children who are active outdoors

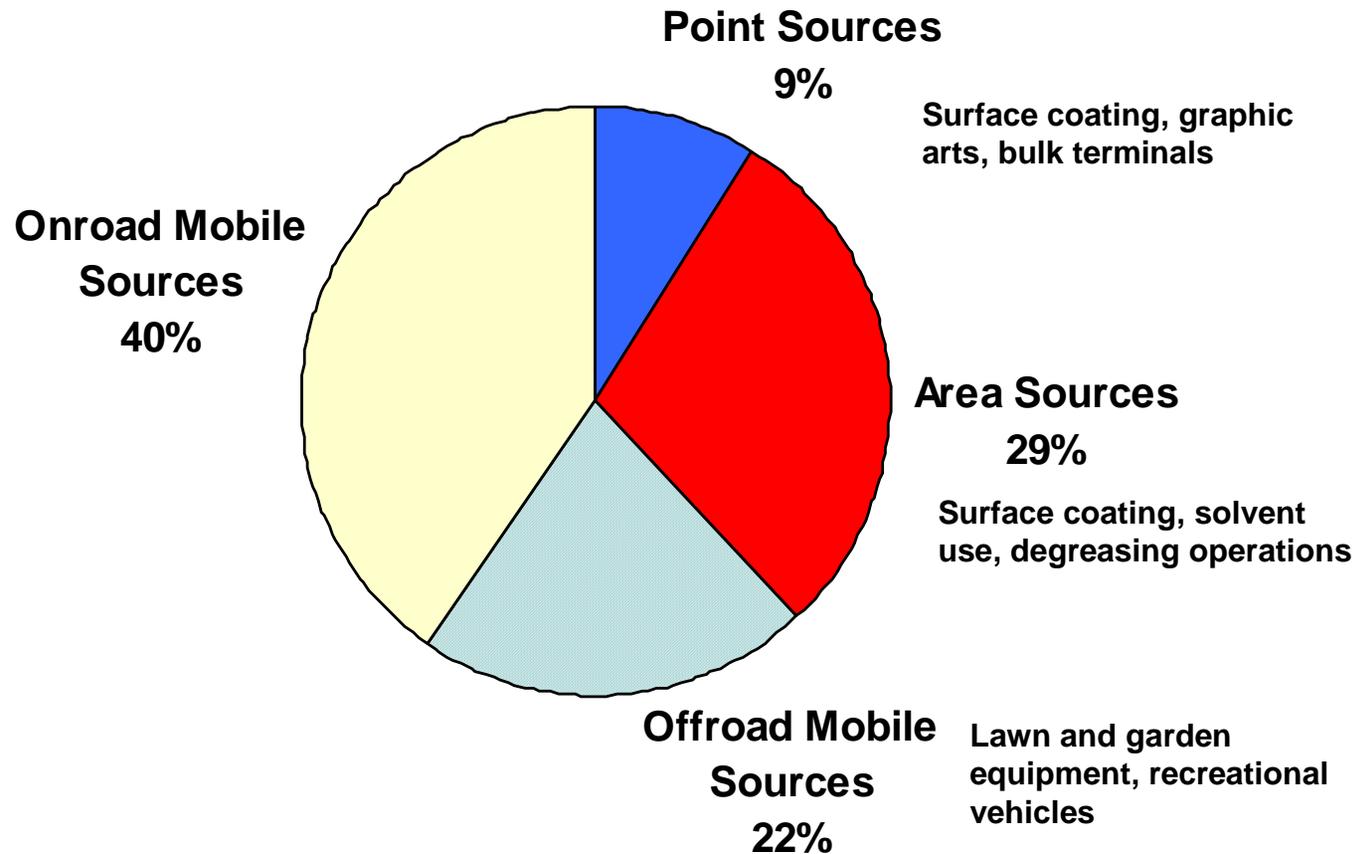
# How is Ozone Formed?



- Formed by reactions involving oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC) in sunlight
- Influenced by weather: sunlight, high temperatures, inversions, calm winds
- Computer models are needed because of the complex chemical and atmospheric processes

# Total 2002 VOC Emissions for Franklin, Jefferson, St. Charles, St. Louis Counties and City of St. Louis

2002 Summer Day VOC Emissions -- Total 249.5 tons/day

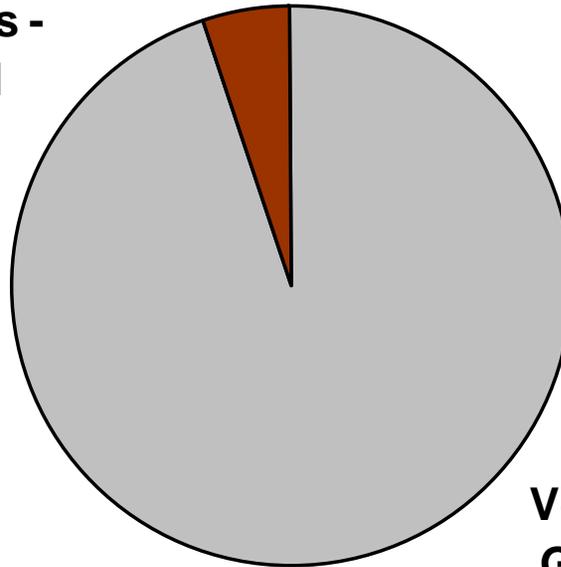


Source: MDNR ACP, Draft St. Louis Base 1 Modeling Inventory

# Total 2002 Onroad Mobile VOC Emissions for Franklin, Jefferson, St. Charles, St. Louis Counties and City of St. Louis

## Onroad Mobile VOC -- Total 100.5 Tons/Day

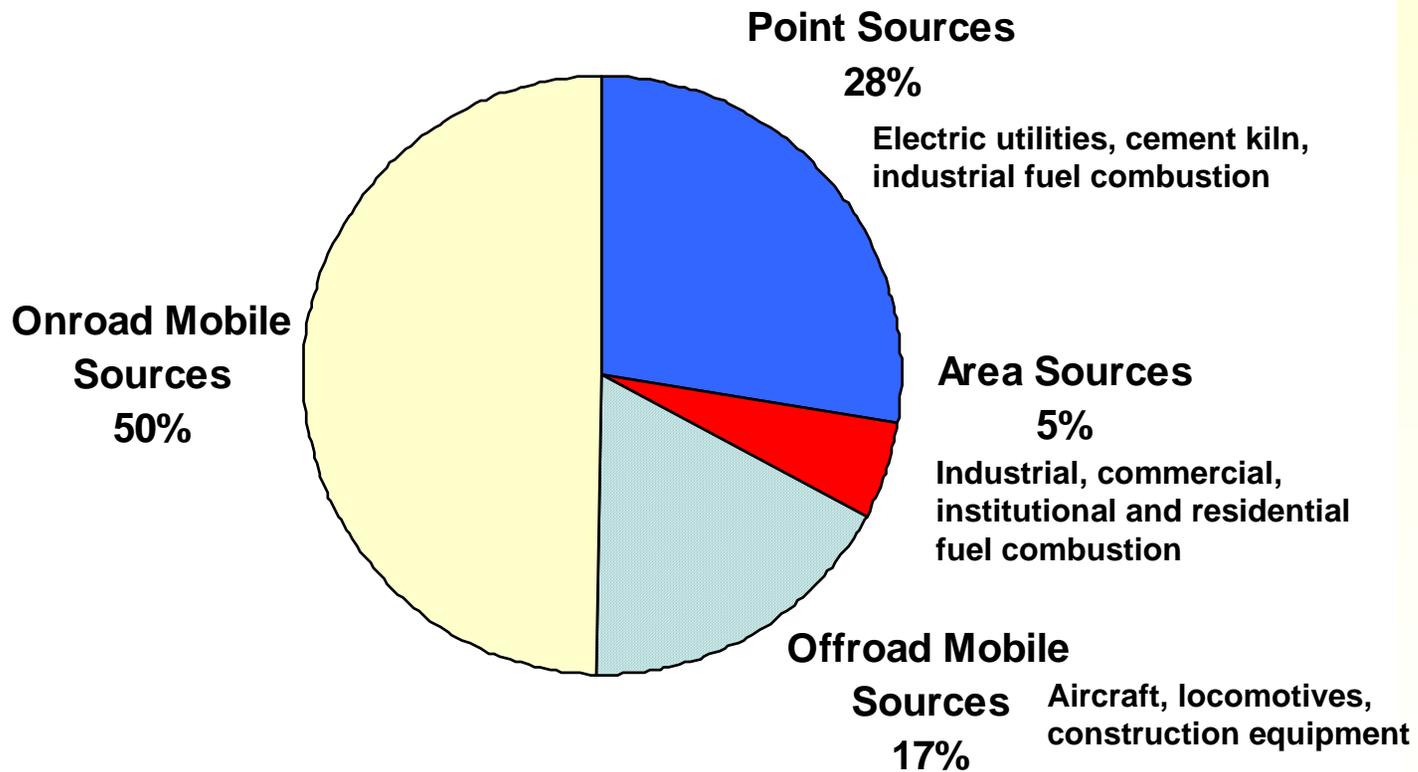
**Motor  
Vehicles -  
Diesel  
5%**



**Motor  
Vehicles -  
Gasoline  
95%**

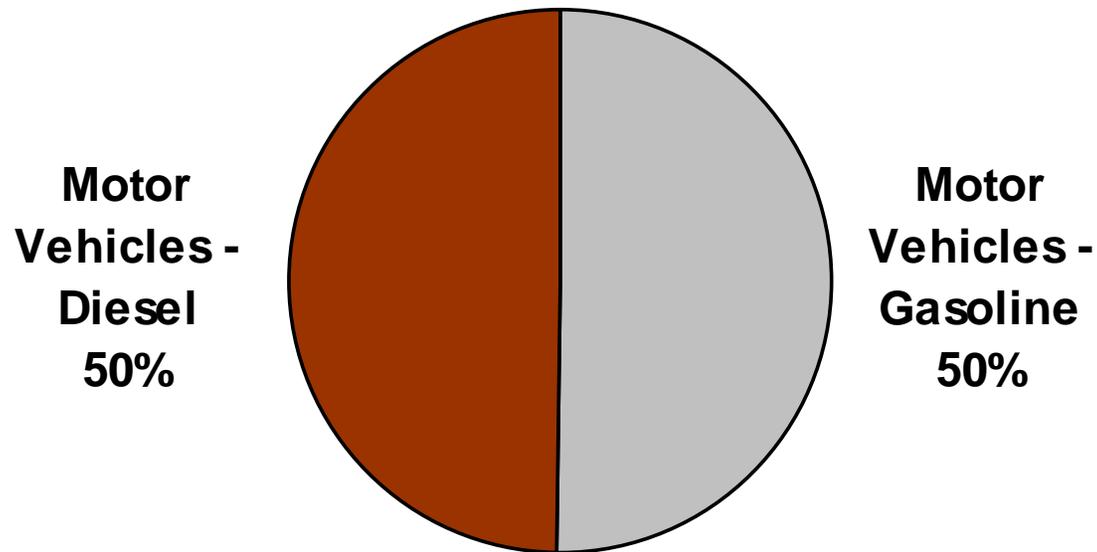
# Total 2002 NO<sub>x</sub> Emissions for Franklin, Jefferson, St. Charles, St. Louis Counties and City of St. Louis

2002 Summer Day NO<sub>x</sub> Emissions -- Total 361.4 tons/day



# Total 2002 Onroad Mobile NOx Emissions for Franklin, Jefferson, St. Charles, St. Louis Counties and City of St. Louis

**Onroad Mobile NOx -- Total 179.2 Tons/Day**



# Why Vehicle Emissions Inspection and Maintenance?

- 2002 St. Louis area daily vehicle miles traveled (VMT) = 65,255,260
- Percent of VMT from light-duty gasoline vehicles = 86.8%
- St. Louis area light-duty gasoline vehicle VMT = 56,641,566
- By identifying and repairing high-emitting vehicles, ozone is reduced

8-HOUR OZONE NON-ATTAINMENT AREA  
Monitor Locations - 2005



# St. Louis Ozone Monitoring Data

*Violation of 8-hour ozone standard occurs when 3-year average of 4th-highest value is 85 ppb or above*

<b>ST. LOUIS MONITORS - MO SIDE</b>	<b>4th-High 8-Hr Ozone Concentration (ppb)</b>				<b>3-Yr Avg. of 4th- High Value (ppb)</b>		<b># of Exceedances</b>
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005*</b>	<b>02-04</b>	<b>03-05*</b>	<b>2005*</b>
Arnold	93	80	70	81	81	77	2
West Alton	99	91	77	87	<b>89</b>	<b>85</b>	5
Orchard Farm	98	90	76	83	<b>88</b>	83	3
Blair**				89	na	na	5
Margaretta	98	90	72	90	<b>86</b>	84	5
Sunset Hills	98	88	70	89	<b>85</b>	82	6
Queeny Park	94	86	67	79	82	77	1
Maryland Hts.**				86	na	na	5
Pacific**				81	na	na	3
Bonne Terre	92	83	70	79	81	77	2
Foley**				78	na	na	1

\* Through 7/20/2005

\*\* New sites in 2005

# I/M Is Biggest Part of VOC Control Strategy Plan

- 25 state rules to reduce VOC emissions in St. Louis Nonattainment Area (Missouri-side counties)
  - Enhanced I/M rule reduces onroad mobile source VOC emissions
  - 24 rules reduce stationary source VOC emissions (e.g., industrial surface coating, graphic arts, degreasing, Stage II vapor recovery)

# Other I/M Air Quality Benefits

- Fine particulate matter (PM-2.5) and PM-2.5 precursor emissions (VOC, NOx, sulfur dioxide)
- Hazardous Air Pollutant (HAP) emissions (e.g., benzene, formaldehyde, acetaldehyde)

# How Does I/M Fit into the Big Picture?

For more information:

<http://www.dnr.mo.gov/alpd/apcp/sipworkgrp/sipgrpmain.htm>