

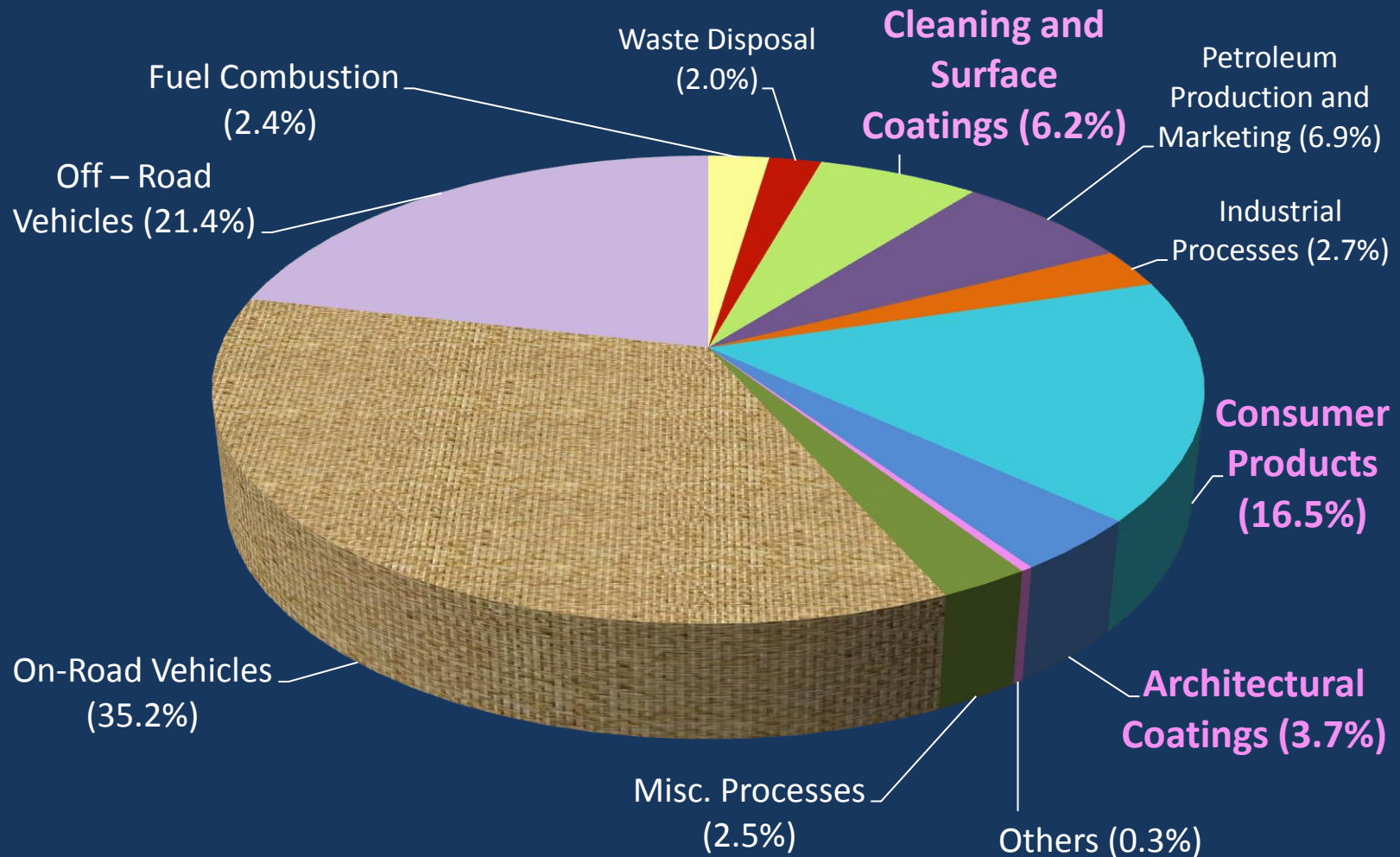


Stationary Source Controls for Ozone (NO_x, VOC)

Naveen Berry
Manager
Planning, Rule Development, and Area Sources
June 11, 2015

Cleaning The Air That We Breathe...

Major Source Contribution To VOC (2012)



2012 VOC = 593 tons/day

VOC Source Specific Rules

Industrial Coatings and Solvents

- Dry Cleaning (Rule 1102)
- Boats (Rules 1106 & 1106.1)
- Metal (Rule 1107)
- Buildings (Rule 1113)
- Solvent Cleaning (Rules 1122 & 1171)
- Aerospace (Rule 1124)
- Metal coil and containers (Rule 1125)
- Printing (Rules 1130 & 1130.1)
- Wood (Rule 1136)
- Paint thinners (Rule 1143)
- Metalworking fluids (Rule 1144)
- Plastic/Rubber/Glass (Rule 1145)
- Auto refinishing (Rule 1151)
- Polyester Resin (Rule 1162)
- Adhesives (Rule 1168)

***Consumer products** (regulated by California Air Resources Board)

VOC Source Specific Rules

Fugitive Emissions

- Fuel Dispensing (Rule 461)
- Liquid Loading (Rule 462)
- Liquid Storage (Rule 463)
- Refinery Process Turnarounds (Rule 1123)
- Oil Wells (Rules 1148, 1148.1, 1148.2)
- Storage Tank Degassing (Rule 1149)
- Landfills (Rule 1150, 1150.1, 1150.2)
- Leaks from Refineries (Rule 1173)
- Sumps and Wastewater Separators (Rule 1176)
- LPG Transfer and Dispensing (Rule 1177)
- Storage at Refineries (Rule 1178)

Significant VOC Reductions (1990-2012)

<u>Categories (Examples)</u>	<u>Tons per Day</u>
Solvents – Industrial and Consumer	102
Coatings/Sealants	75
Fuel Dispensing	67
Leak Detection and Repair	15

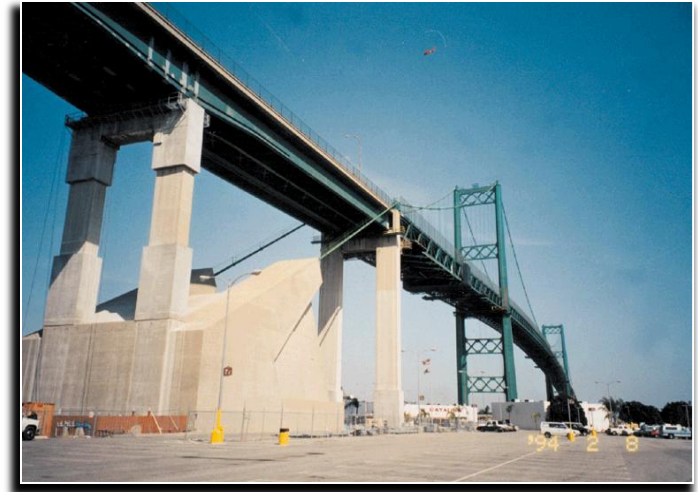
Compliance Reviews

- **Critical aspect**
 - Vital for further rule development and improvements
- **Compliance components**
 - Annual Reporting
 - Visual inspections/Emission Monitoring
 - Labeling – VOC/Toxicity/etc.



Lessons Learned

- **Inclusive rule development**
 - Industry acceptance
- **Industry can thrive under “smart” regulations**
 - Pollution Prevention



- **R&D/Incentive Funds**
 - Development of low- and non-emitting technologies
 - Early adoption/EJ communities
- **VOC/NO_x reductions**
 - Lead to toxics & PM_{2.5} reductions

VOC Controls White Paper

- Definition and Classification of VOCs
- The Role of VOCs in Ozone Formation
- The Role of VOCs in Particulate Matter (PM_{2.5}) Formation
- Ozone Control Modeling Analysis
- Strategies to VOC Reductions



Recommendations

NOx-heavy controls with strategic and limited VOC reductions

1. Maximize co-benefits (NOx, GHG, toxics)
2. Pollution prevention programs
3. Incentivize zero and near-zero VOC materials
4. Maximize reductions from existing regulations

Recommendations

NO_x-heavy controls with strategic and limited VOC reductions

5. Prioritize reductions of most reactive VOCs (Ozone & PM_{2.5} formation)
6. Avoid toxicity trade-offs
7. Evaluate practicality and effectiveness for time and place controls
8. Conduct further studies related to VOCs

Future Studies and Challenges

- Remote Optical Sensing
- Intermediate Volatile Organic Compounds (IVOCs)/Semi-Volatile Organic Compounds (SVOCs)
- Reactivity vs. Toxicity
 - Added flexibility may increase use of toxic compounds
- Reactivity-based versus Mass-based emissions
 - Much more regulatory complexity with reactivity
- Test Methods
 - Low VOC limits in rules challenge methodologies

