

California's Diesel Retrofit Program

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California Environmental Protection Agency



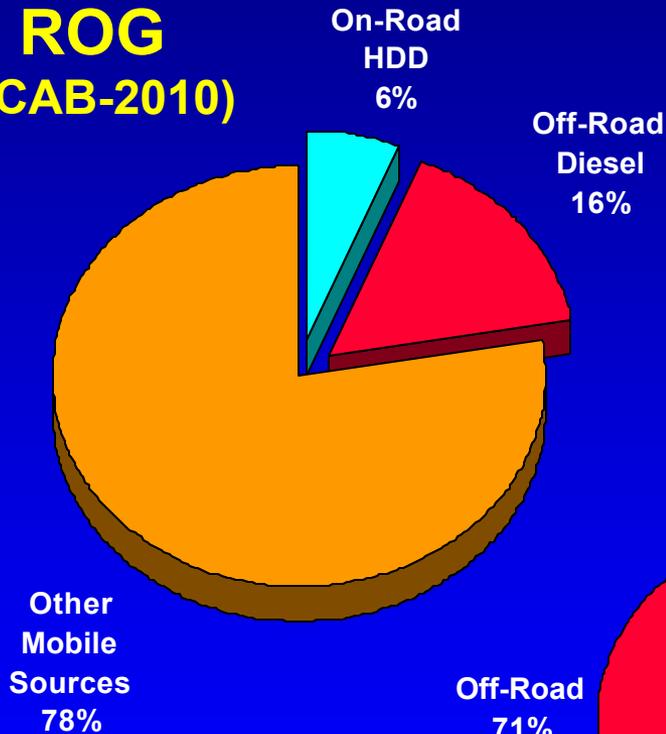
Air Resources Board

Overview

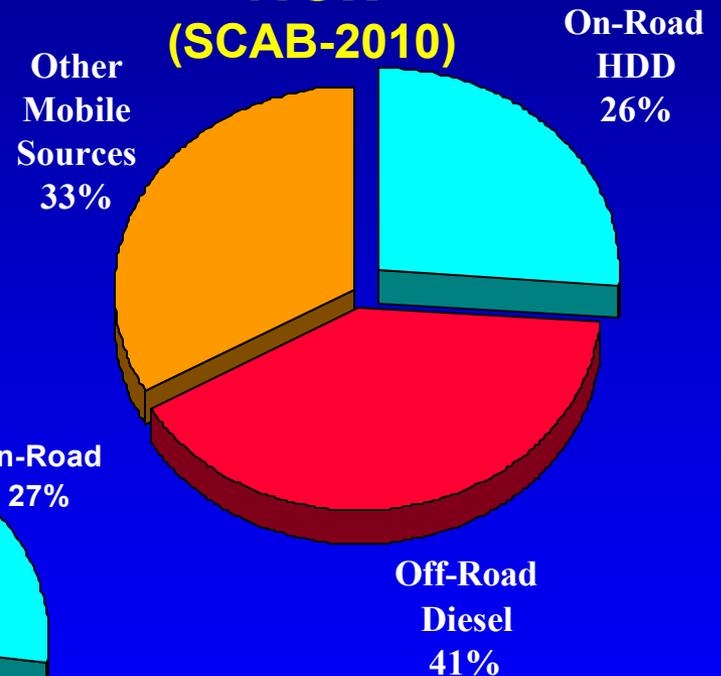
- Need for Diesel Emission Reductions
- Diesel Risk Reduction Plan
- In-Use Diesel Retrofit Program
- Retrofit Verification & Considerations
- Demonstration Programs
- Implementation

Reducing Diesel Emissions is a Priority

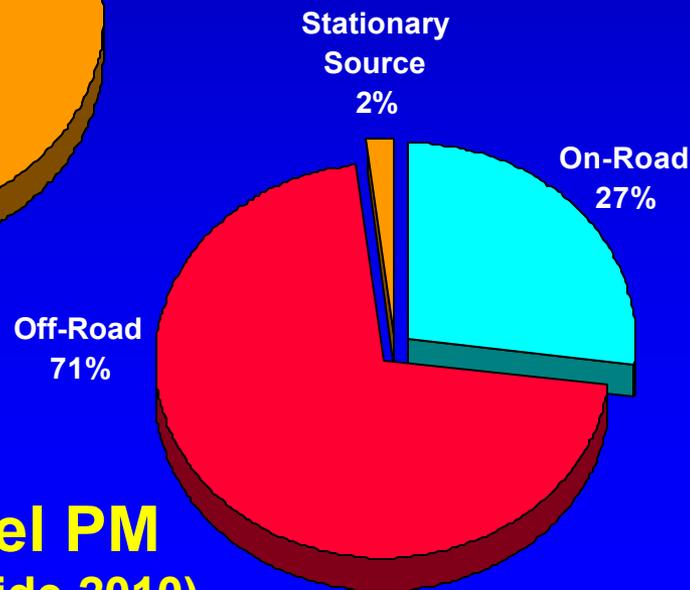
**ROG
(SCAB-2010)**



**NOx
(SCAB-2010)**

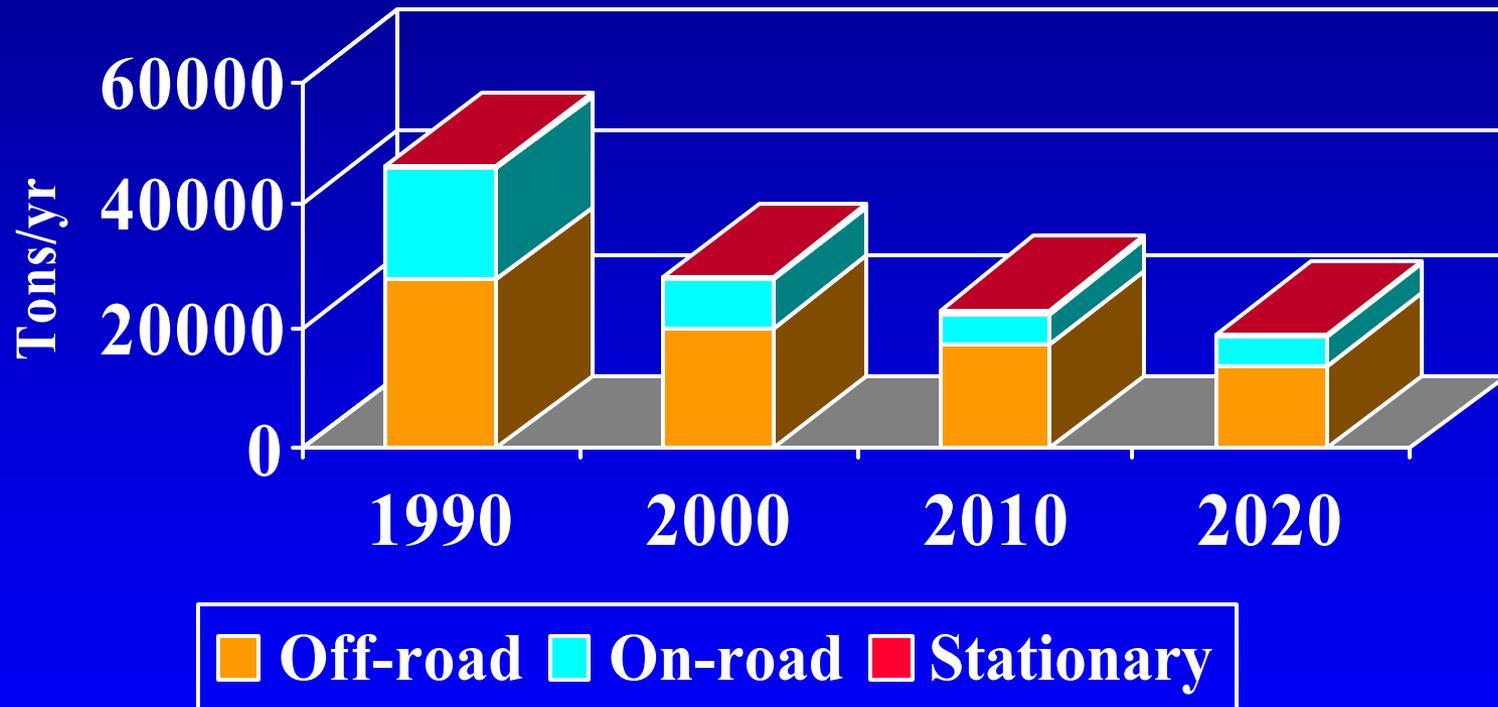


**Diesel PM
(Statewide-2010)**



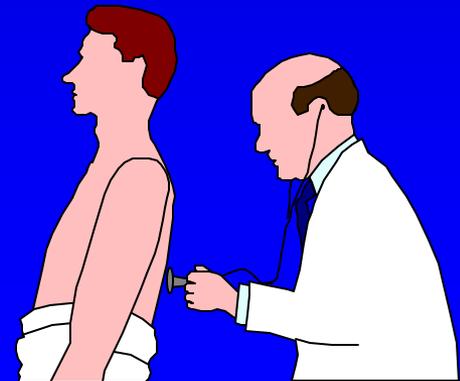
Source for ROG and NOx: 1994 SIP

Statewide Diesel PM Emissions



Diesel Particulate is a Toxic Air Contaminant

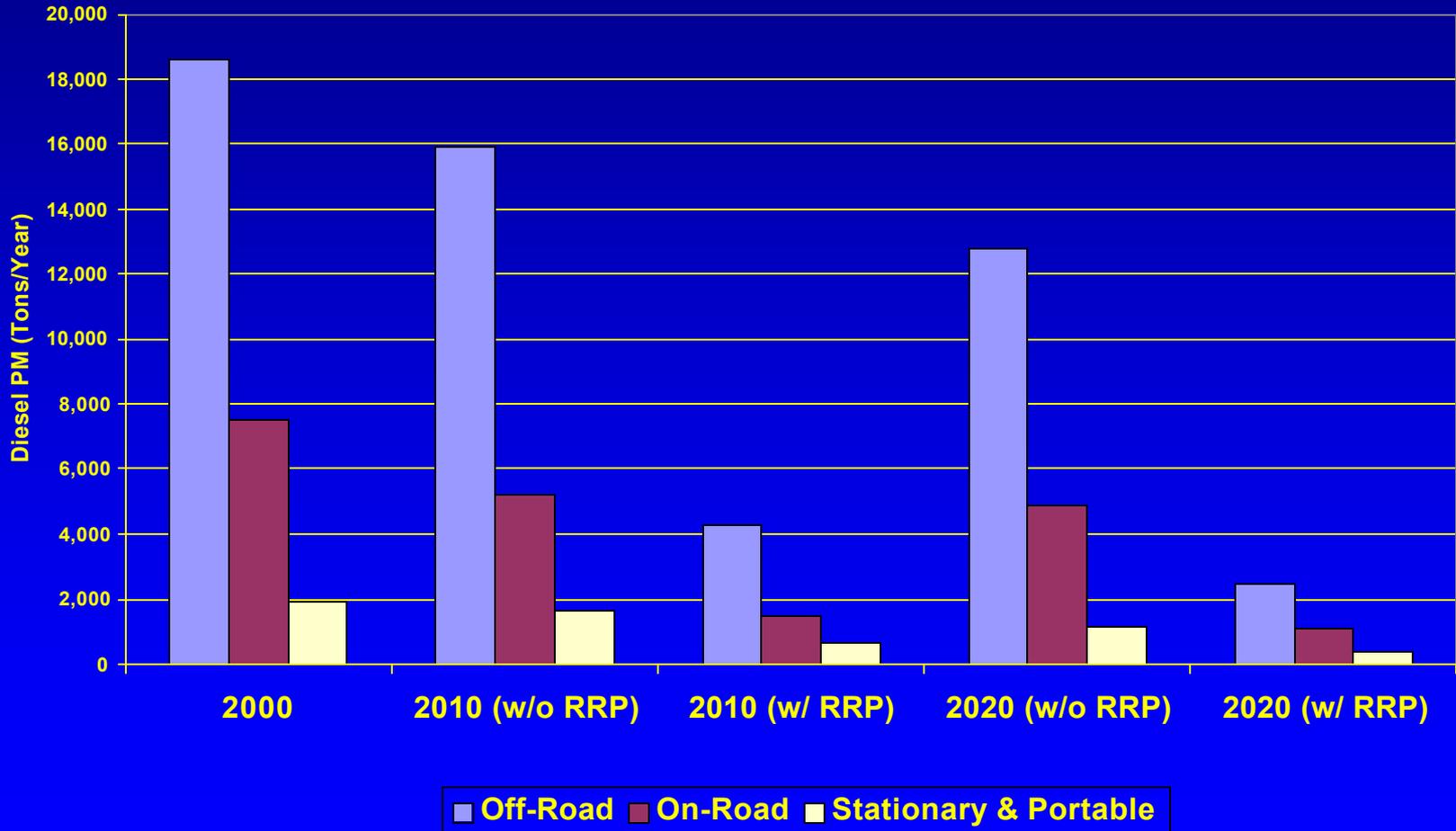
- Increases Lung Cancer
- Increases Asthma Attacks
- Aggravates Bronchitis
- Contributes to Premature Death in Those with Existing Heart and Lung Disease



Diesel Risk Reduction Plan (DRRP)

- Reduce Emissions from New Engines
- Require Retrofit of Existing Engines
- Ensure In-use Emission Performance
- Provide Low Sulfur Fuel (<15ppm) to Enable Aftertreatment Technology

DRRP Will Significantly Reduce Diesel PM Emissions



In-Use Diesel Retrofit Program

- Substantial Reductions “NOW”
- Verification
- Demonstration
- Implementation

Successful Retrofit

- Reduces Emissions
- Is Durable
- Is Compatible With Normal Operation

Retrofit Verification Goals

- Emission Reduction Claims are Real and Accurate
- Emission Control System (ECS) is Durable
- Emission Control System is Compatible with Engine and Application

Multi-Level Verification Process

- Passive Particulate Filters MAY Not Be Appropriate for Some Engines (e.g., Two-Stroke Engines)
- Multiple Verification Levels Allow for Application of Different Technologies
- Thus, a Multi-Level Approach Allows Inclusion of More Diesel Engines in the Retrofit Process.

Diesel Retrofit Verification Standards

- Level 1 Verification - Technologies that Attain PM Reductions $\geq 30\%$, but $< 60\%$
- Level 2 Verification - Technologies that Attain PM Reductions $\geq 60\%$, but $< 85\%$
- Level 3 Verification - Technologies that Attain PM Reductions $\geq 85\%$ OR
- PM Emissions of ≤ 0.01 g/bhp-hr

Emission Tests

- Engine Family Specific
- Criteria Pollutants (HC, CO, NO_x, and PM)
- Additional Analysis May be Required to Ensure No Increase in Toxics

Test Cycles

Test Type	On-Road	Off-Road	Stationary
Engine	HD Transient FTP	Steady-state Test Cycles	Steady-state Test Cycles
Chassis	UDDS, NYBC, ARB approved cycle	N/A	N/A

* Including Portable Engines

Durability Demonstration

- Test Cycles Same as for Emission Tests
- Testing at the Beginning, Middle and End of the Durability Period

In-Use Inspection and Testing Program

- Verified Emission Control Systems will be Subject to In-Use Compliance Testing
- Still Under Development

Comparison with U.S. EPA's Verification Program

<u>Elements</u>	<u>CARB</u>	<u>U.S. EPA</u>
Program Nature	Regulatory	Voluntary
Engine selection and application	Specific	General
Chassis Testing	NYBC, UDDS or ARB approved cycle	N/A
Engine Testing	HD Transient FTP and steady-state cycles	HD Transient FTP and steady-state cycles

Current Verification Status

- Verification of Filter-Based Systems for Several Late Model Engine Families in On-Road Applications Is Expected Shortly.
- Fulfill Durability Requirements Via Combination of Demonstration Data, Pre-Existing Data and Additional Testing

Verification Schedule

- Workshop September 5th
- Board Hearing Early 2002
- Verified ECS will be Posted on the Web Site:

www.arb.ca.gov/diesel/dieselrrp.htm

Demonstration Programs

- British Petroleum ECD - 154 vehicles
 - Grocery Trucks -20 vehicles
 - Fuel Tanker Trucks - 29 vehicles
 - Urban Buses -20 buses
 - Refuse Haulers -15 trucks
 - Theme Park People Movers -20 vehicles
 - School Buses - 30 buses
- SCAQMD School Bus Demo - 40 buses

Summary of Demonstrations

- Preliminary Test Results Consistently Show Over 90% Reduction in HC, CO, and PM
- Fleet Managers Pleased with Performance, Maintenance, and Clean Emissions
- Currently ARB Has Test Results of Fleets Having Over 100k Mileage Accumulation and Anticipates Additional Data

Current Diesel Retrofit Projects

- Urban Transit Agencies - ~ 4,500 vehicles
- School Districts - ~ 2,000 vehicles
- City of Los Angeles - ~ 1,300 vehicles
- Incentive Funds For Emissions Reductions
 - Carl Moyer and Similar Programs

Future Implementation

- Transit Buses
- Refuse Haulers
- Fuel Delivery Tanker Trucks
- Publicly Owned/Contracted Fleets
- Private Fleets

Benefits



Reduces Exposure to Diesel PM Thereby Decreasing Potential Cancer Risks

Decreases Noncancer Health Effects

Allows Continued Use of Existing Engines



For More Information about the ARB's
Diesel Risk Reduction Program,
Please See Our Diesel Web Page at:

www.arb.ca.gov/diesel/dieselrrp.htm