Reducing the Impact of Diesels on Air Quality and Public Health

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Air Resources Board
August 20, 2000
Diesel Exhaust is Unhealthy

- **NOx**
  - Precursor to Ozone - a lung irritant
  - Precursor to PM2.5 - lung disease, mortality

- **Diesel PM = toxic air contaminant (TAC)**
  - Identified as TAC in August 1998
  - Contains over 40 substances identified as TACs
  - Carcinogenic in humans & animals
  - Non-cancer damage to lungs
Diesel’s PM Cancer Risk is High

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Statewide Los Angeles

Risks (excess risk per million)

1990 1995 MATES II

- Other TAC
- Diesel PM
Reducing Diesel Emissions is a Priority

ROG (SCAB-2010)
- Other Mobile Sources: 78%
- Off-Road Diesel: 16%
- On-Road HDD: 6%
- Stationary Source: 2%

Diesel PM (Statewide-2010)
- Off-Road: 74%

NOx (SCAB-2010)
- Other Mobile Sources: 33%
- Off-Road Diesel: 41%
- On-Road HDD: 26%

Source for ROG and NOx: 1994 SIP
Heavy Diesel Trucks Dominate On-Road Heavy-Duty Diesel Emissions

Source: EMFAC2000, Year 2010, Statewide
Off-Road Diesel’s Contribution is Distributed

Source: OFF-ROAD, Year 2010, Statewide
Diesel Truck Usage Will Increase -- Emissions Will Decrease

Source: EMFAC2000, Statewide On-Road HDD
Construction Equipment Activity Will Increase -- Emissions Will Decrease

Source: OFF-ROAD, Statewide Construction Equipment
Existing Control Measures Will Produce These Decreases

- New Engine Emission Standards
  - On-Road Truck
  - Off-Road Diesel
- Transit Bus Fleet Rule
- Carl Moyer Program ($$ incentives)
- Smoke Enforcement Programs
Future Control Measures: Still Needed

- Reduce Toxics Risk
- Assure Ozone Attainment
- Reduce Secondary $\text{PM}_{2.5}$ Formation
Diesel PM Control Plan

- Draft plan issued July 15, hearing late Sept.
- Adopt New Aftertreatment-Based Standards
  - 2007 NOx, PM for New On-road Trucks
  - Tier 3 PM Standard for New Off-Road Equipment
  - Tier 4 NOx, PM for New Off-Road Equipment (2009?)
  - Ultra-low sulfur diesel on and off-road
- Retrofit Existing Diesels with PM Controls
- I&M and In-Use Compliance Testing
- On-Board Diagnostics for Heavy Diesel Trucks
New Diesel Truck Emission Standards Are Proposed

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![Graph showing reduction of emissions over model years]

- **NOx**
- **PM x 10**

Model Year:
- 1988
- 1991
- 1994
- 1998
- 2002
- 2007 proposed

Graph indicates a proposed 98% reduction in NOx emissions by 2007.
Off-Road Diesels are as Important as Trucks and Buses

Greater LA in 2010
Current regulations

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New Off-Road Diesel Emission Standards Need to Be Developed

Goal: Zero and near-zero emissions

Model Year

175-300 hp

HC+NOx
PM x10

97+% reduction

No control 1996 2003 2006
Lower Sulfur Limits Are Needed and Feasible

* Beginning July 1, 2002
Natural Gas Remains an Option

California Transit Bus Fleets

Number of Vehicles

Diesel
Natural Gas
Other

7081
1216
144

Source: 9/1999 Transit Fleet Inventory
Retrofit Programs Reduce Emissions “Now”

- Goal: Retrofit All In-Use Diesels in CA
  - School bus retrofits begin 2001
  - Transit bus retrofits begin January 2003
  - Retrofit control plan - all others
  - Guided by International Advisory Committee

- Demonstration programs - USA
  - 1000s of trucks in Europe
  - 100s in USA
  - More where needed
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Incentives Help to Lower Emissions “Now”

- **Objective:** Pay Incremental Cost of Low Emission Technologies
- **Carl Moyer Program** *(NOx; NOx + PM)*
  - $44 M to date; $50 M for FY00/01
  - Reductions first year: 4 t/day NOx; 100#/day PM
- **School Bus Replacement & Retrofit Program** *(PM, NOx)*
  - $50 M
  - Purchase of new low-emitting buses
  - PM retrofit for existing buses
- **Sacramento/San Joaquin Special Allocations** *(NOx)*
  - Meet SIP obligations
  - $75 M
Dieselizing SUV & PU Trucks* Would Increase PM Emissions

* MDVs under 8,500 lbs GVW only
Conclusions

- Diesel exhaust harms public health
- Diesel emissions are declining
- Additional control measures needed to remove health threat
  - After-treatment based standards for on- and off-road
  - Low sulfur diesel fuel on- and off-road
  - Better in-use compliance
  - Retrofit of existing diesels with PM filters
  - Encourage alternative fuels and technologies