Strategies For Black Carbon Controls in the Transportation Sector



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Bellagio Principles

- Design Programs & Policies That Reduce Conventional, Toxic, Noise and Greenhouse Emissions in Parallel
- Treat Vehicles and Fuels As A System
- New Vehicle Standards for Greenhouse Emissions & Conventional Pollutants Should Be Fuel Neutral
- Expect & Require Best Technologies and Fuels Worldwide – in Both Industrialized and Developing Countries



WWW.THEICCT.ORG

BC Emission Sources

top: diesel vehicles, agricultural burning bottom: rural cook stove, brick kiln









U.S. Black Carbon Emissions, 2002

In the United States, diesel engines particulate emissions have the strongest warming impact due to large BC and small OC emissions



Average BC concentrations for site A to D for the sampling period from August 2005 to August 2007.

For the majority of the sampled weeks, night samples showed higher BC concentrations than day samples. This observation could be explained by the regulation, that lorries are only allowed to drive during night time in most parts of Beijing.







Stringent Standards for New Vehicles Have Been Adopted by US EPA

Highway





Tier 2 Light-duty (1999)



Common Aspects--

- Systems approach
 fuel change enables clean technologies
- Large environmental benefits
- Responsive to needs of States to meet air quality goals

NonroadLocomotive/MarineTer 4 diesel (2004)



* This figure is intended to illustrate the timeline for the final highway and nonroad diesel fuel sulfur control programs. It is not drawn to exact scale. Refer to 40 CFR Part 80 for specific program dates.





EU and US Light Duty Gasoline and Diesel Vehicle Standards

Grams/Km



Modern Diesel?



Black Carbon Reduces Diesel Benefit



Average CO2-equivalent Emissions, GWP20 (g/km)

Source: ICCT Analysis

Emission Controls Enhance Diesel Benefit



U.S. vs. Europe Heavy-Duty Engine Transient Cycle Emission Standards

g/kWh

■ Diesel NOx ■ Diesel PM X 100



Cumulative Emissions By Age – Diesel Trucks



85% Less Diesel PM by 2020 (On- and Off-road Vehicles, Stationary Engines)

- New vehicle and engine standards (90% control)
- Low-sulfur (15 ppmw) diesel and alternative fuels
- Retrofits/re-powering with funding (\$65M per year)
- International Diesel Retrofit Advisory Committee
- Anti-idling measures
- Enforcement programs



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

National Clean Diesel Program

\$60M for FY2009, Estimated \$60M for FY2010

National

Estimated \$84 Million (70%) \$42M for FY09 and Estimated \$42M for FY10 combined for competitions

State

(30%) \$18 Million FY09 Estimated \$18 Million FY10

National Clean Diesel Funding Assistance Program \$32M for FY09 and Estimated \$32M for FY10 - \$64M

Clean Diesel Emerging Technologies Program \$4M for FY09 and Estimated \$4M in FY10 - \$8M

SmartWay Clean Diesel Finance Program \$6M for FY09 and Estimated \$6M for FY10 - \$12M State Clean Diesel Grant Program 2009

State Base

Matching Bonus

* Budget amounts for FY10 are estimated.

ARRA Clean Diesel Projects



Particulate Filters Being Applied To Various Types of Vehicles



Small tractor



Port equipment



Long haul heavy-duty truck



School bus



Earth mover

Fix It or Scrap It!!!!



Trends in On Road Vehicle Black Carbon Emissions in Latin America

Normalized to 2000





Normalized to 2000



Marine Black Carbon



Concerns with deposition on snow, especially Arctic Control strategies Technologies (e.g. diesel particulate filter) Fuel switching (e.g., marine diesel oil) Operations (e.g., speed control & emission control areas)

Thank You Very Much

ACTUAL FLEET AVERAGE GHG EMISSIONS DATA THROUGH MY2008 AND NEAREST TARGETS ENACTED OR PROPOSED THEREAFTER BY REGION



THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Black Carbon Emissions By Road Vehicle Type

Base Case

Million Metric Tons

