One Result: Serious Health Concerns

- WHO Concludes ~ 800,000 Premature Deaths Each Year From Urban PM; Most in Asia
- Numerous Studies in Europe & US Consistently Link PM With Premature Deaths, Hospital Admissions, Asthma Attacks, Etc.
- No Evidence of a Threshold
- PAPA Project Indicates Similar Effects in Asia
- Ozone, NO₂, Various Toxics Also Serious Health Concerns
Reconciling the Diesel Engine With the Environment:
A Comprehensive Approach

Tier 2
Light-duty (1999)

Tier 4 diesel (2004)

Common Aspects--
• Systems approach – fuel change enables clean technologies
• Large environmental benefits
• Responsive to needs of States to meet air quality goals
• Collaborative process

Highway
Nonroad Locomotive/Marine
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.
Costs & Benefits of Clean Fuel & Vehicle Programs

Total Cost: $11 billion
Total Benefits: $175 billion
Innovative Aspects of US Program

- Close Collaboration Between CARB and US EPA
- Not To Exceed Provision
- Mandatory Manufacturer In Use Testing
- Heavy Duty Diesel OBD
EPA Regulatory Development Priority

Diesel Locomotive & Marine Engines

EPA requires 15ppm sulfur in fuel for loco/marine in 2012

EPA Engine proposal targeted for 2006/2007
Comparison of Established Standards for Locomotives and Diesel Trucks

- 2007-2010 trucks
- 1990
- 1988 trucks
- Locomotive Tier 2 2005

PM (g/hp-hr) vs NOx (g/hp-hr)
Industry Announcements Show That Industry Can & Will Meet US Requirements

- DaimlerChrysler, VW, and BMW have all announced planned introductions of passenger diesel vehicles in the U.S. market in the 2008/9 timeframe.
- Honda will enter the U.S. passenger diesel market in 2009 using NOx adsorber aftertreatment technology.
Future Size of U.S. LDD Market?

- Ricardo predicts US light duty diesel market to grow from 43,000 units in 2004 to 1.5 million in 2015.

- Similarly, J.D. Power and Associates predicts 4X growth in the U.S. diesel car market by 2015.
Important Implications of the US Diesel Control Program

- Massive Public Health and Environmental Benefits
- Technology Leadership Which Could (Should?) Spread To The Rest of the World
- Potential Fuel Savings and CO2 Reductions in the US
The Potential Fuel Saving and CO2 Benefits Of Higher Diesel Penetration in the US Will Be Squandered If It Only Leads To More Sales of Bigger, Higher Performing Cars and SUVs

Government and Industry Leadership Are Needed!
Comparison of NOx and PM regulations for HD diesel vehicle among Japan, USA and Europe.

Challenging value.

ICCT is actively encouraging global harmonization of HD regulation to the most stringent levels.
Light Duty Is Not As Promising

Duty Gasoline and Diesel Vehicle Standards
Several European Manufacturers Are Leading The Way To Clean Diesels in The US But The EU Unexplainably Is Not Taking Advantage Of This At Home. This is Hurting Diesel Penetration in Other Countries Such As China.
A Few Words About The Greenhouse Effect
Recent and Projected World Transportation Fuel Demand

Transportation is the Fastest Growing CO2 Emissions Source

Source: EIA/DOE (2001)
Recent evidence indicates reducing 1 kg of BC is equal to reducing 2.5 tons of CO2. But CO2 is not the whole story.
Vehicle Emissions Trends
(Business As Usual Scenario)

While Europe (& Japan) Lead on CO2, The EU’s Very Weak Diesel Limits Hurt Globally
Vehicle Emissions Trends
(Aggressive Scenario)

Normalized to 2000

THC  NOx  N2O  HFC

CO  PM  CH4  OC

Tougher Standards in The EU & More Rapid Adoption By Other Countries (i.e., China, India) Could Greatly Improve Trends
CO₂ Equivalent Non-CO₂ Greenhouse Gases From Road Vehicles

- Business as Usual
- Aggressive
Conclusions

• The US Diesel Control Program Leads the World and Diesel Manufacturers Have Risen To The Challenge
• Marine & Locomotive & Existing Stock Remain To Be Successfully Cleaned
• The World is Harmonizing On Stringent HDD Requirements and ICCT Is Pushing This Agenda
• The EU’s Weak Diesel Emissions Proposal Hurts Not Only Local Air Quality But Global Efforts To Reduce Non CO2 Greenhouse Gases