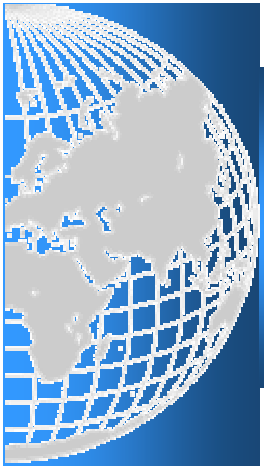


Overview

“Overview of the Partnership for Clean Fuels and Vehicles (PCFV) and the Opportunities for Partnership and Capacity Building in EST Areas,”

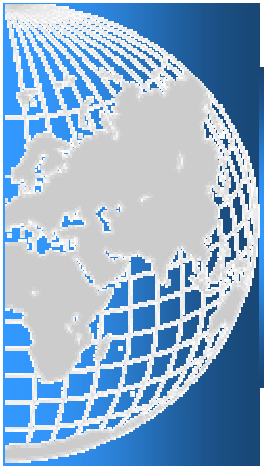


UNEP-PCFV Presentation
4th Regional EST Asia Forum
24th February, 2009
Seoul, Republic of Korea



“ Ministers of the environment must be ministers for sustained economic success. Creating a green economy goes hand-in-hand with sustainable development and the achievement of the Millennium Development Goals,” Oliver Dulic, Serbia’s Minister of the Environment and President of the Governing Council/GMEF at the Nairobi Governing Council, Feb,2009 said.

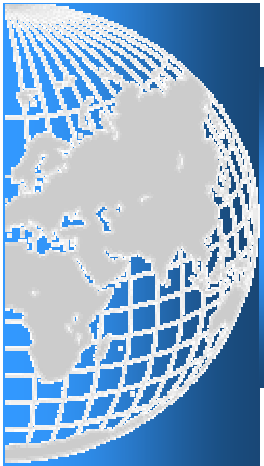
“The resounding message is that while the world struggles with the financial and economic crises, the environment must not be side-lined—the challenges but the opportunities are simply too great,” he added.



The Partnership for Clean Fuels and Vehicles (PCFV)

- Set up at the World Summit on Sustainable Development, September 2002
- Public – private Partnership, 116 members – governments, private sector (oils & vehicles), civil society and international organisations
- To promote cleaner and more efficient fuels and vehicles in developing and transition countries
- Clearing-House based at UNEP Headquarters in Nairobi, Kenya
- Activities at global, regional and national level
- Provides technical, networking, financial and outreach activities and support
- Leading global initiative for developing & transition countries

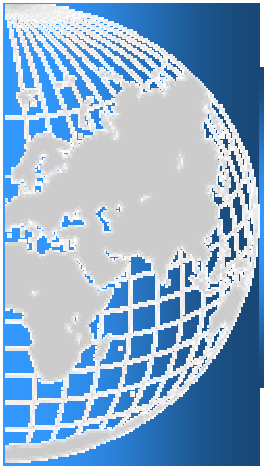




Mission Statement

- Help developing and transition countries to **develop action plans** to complete the global elimination of leaded gasoline and start **to phase down sulphur in diesel and gasoline fuels**, concurrent with **adopting cleaner vehicle requirements**;
- Support the development and adoption of cleaner fuel standards and cleaner vehicle requirements by **providing a platform** for exchange of experiences and successful practices in developed and developing countries as well as **technical assistance**;





Mission Statement...cont

- **Develop** public outreach **materials**, educational programmes, and awareness campaigns; adapt economic and planning tools for clean fuels and vehicles analyses in local settings; and **support** the **development of enforcement and compliance programmes**, with an initial focus on fuel adulteration; and
- **Foster key partnerships** between government, industry, NGOs, and other interested parties within a country and between countries to facilitate the implementation of cleaner fuel and vehicle commitments.





Campaigns

- the elimination of **lead** in gasoline,
- the phase down of **sulfur** in diesel and gasoline fuels, concurrent with
- the adoption of **cleaner vehicle technologies**
- the development of **Fuel and Vehicle Efficiency** policies and strategies [new UNEP campaign]



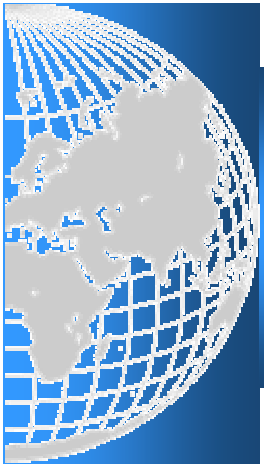
Some PCFV Partners



המשרד לאיכות הסביבה
وزارة جودة البيئة
Ministry of the Environment



שלום עם הסביבה



PCFV Partners in Asia

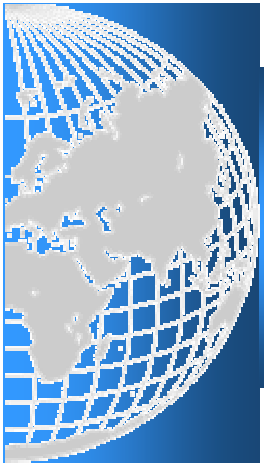


China State Economic and Trade Commission [now MEP]
Thailand Ministry of Natural Resources and Environment (MoNRE)
South Asia Co-operative Environment Programme (SACEP)
Mongolia, Ministry of Nature, Environment and Tourism
Lao PDR, Ministry of Public Works and Transport
Indonesian Ministry of Environment

.....also have implementation partners at the national level







Partners

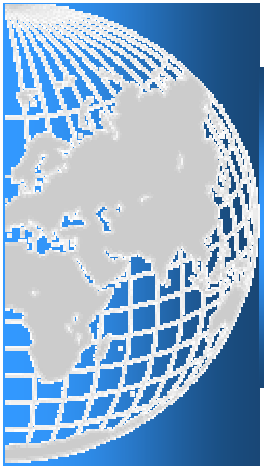
- Partners driving force behind accomplishments and successes
- Representation from all corners of the globe, from both the private and public sectors
- PCFV fosters environment of cooperation and collaboration
- Provides forum where governments can work directly with the fuels and vehicles industries - as well as international and non-governmental organisations - to improve urban air quality.
- Unique collaborative approach of working through regional and national forums,
 - The development of strategies and timelines by the stakeholders themselves has been the underpinning success of the Partnership.





PCFV Goal.....Better Air Quality through Cleaner Fuels and Vehicles

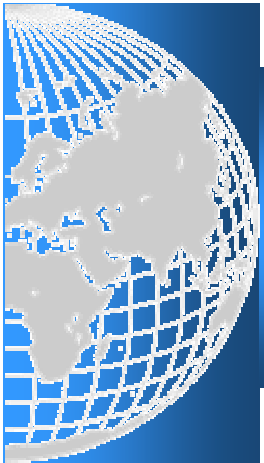




Vehicle Growth

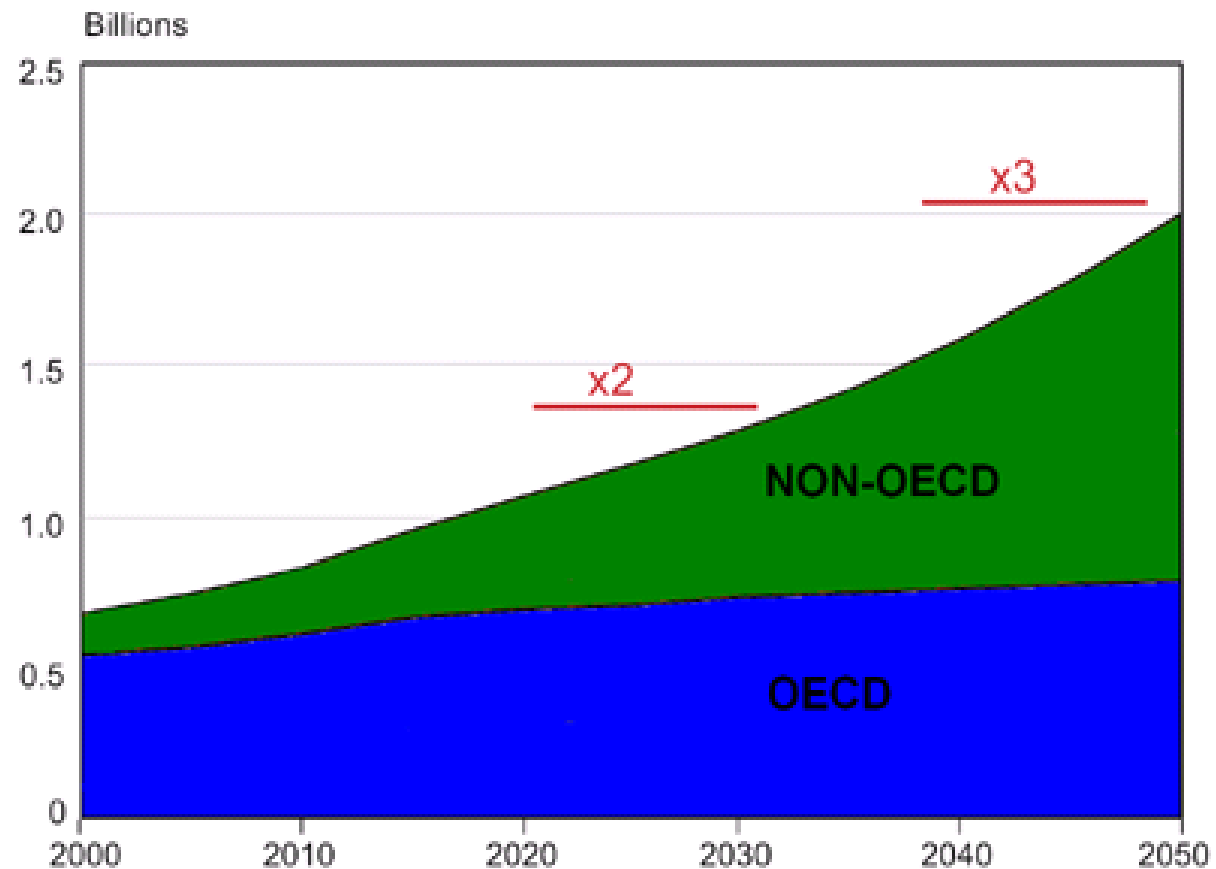
- Global vehicle fleet to triple
- Almost all growth in developing and transition countries
- Greenhouse gas contribution of global vehicles fleet to grow from one-quarter to one-third
- While OECD countries are moving ahead with fuel efficiency strategies apart from China and India no non-OECD have climate strategies for vehicle fleets
- Global responses absent (global mechanisms lacking, CDM, GEF, WB, ...)
- PCFV supporting development and implementation of fuel efficiency strategies in all non-OECD countries



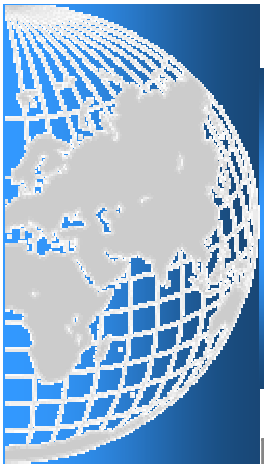


Vehicle Growth

Global Growth Light Duty Vehicles

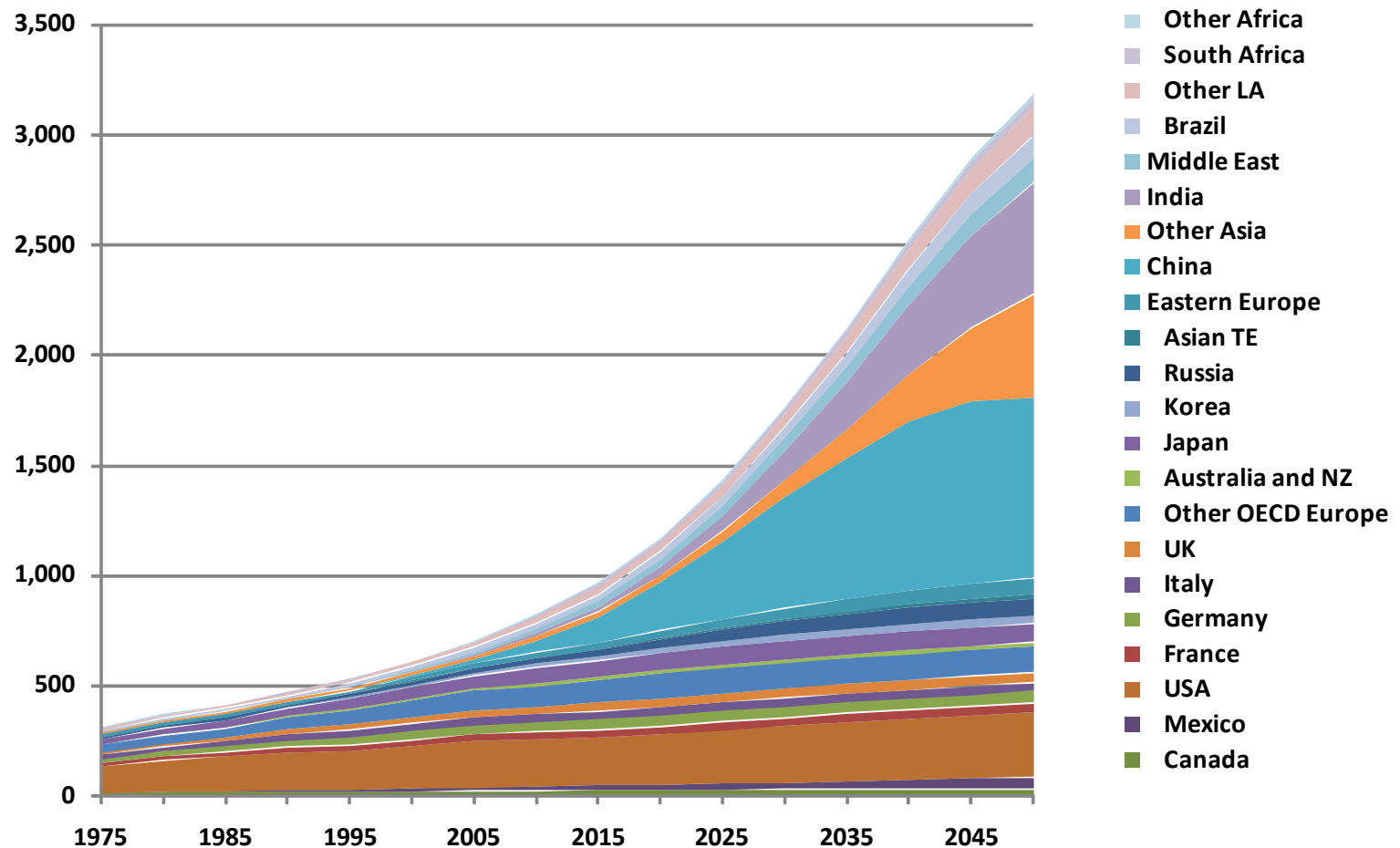


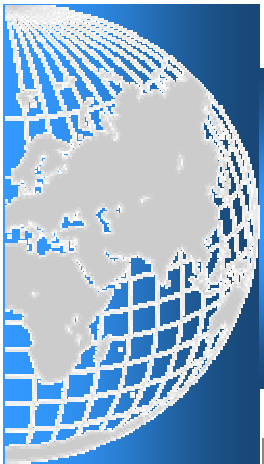
Source: WBCSD, 2003



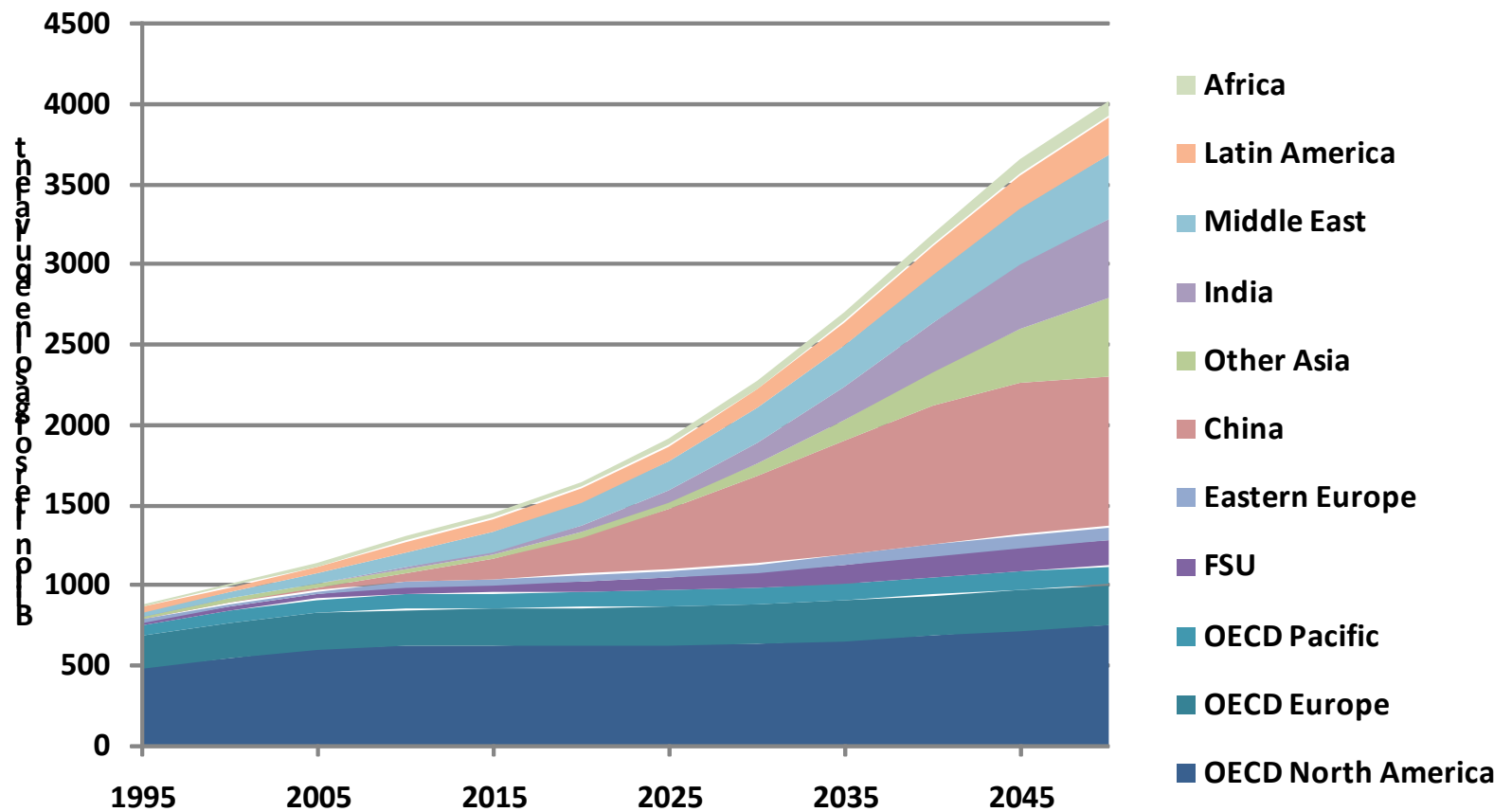
IEA Vehicle ownership projections

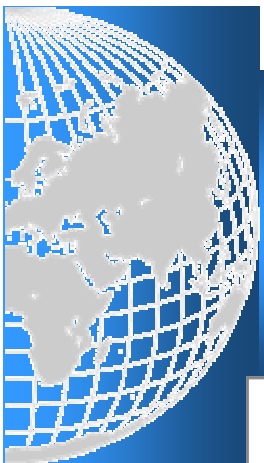
Millions of light-duty vehicles by region



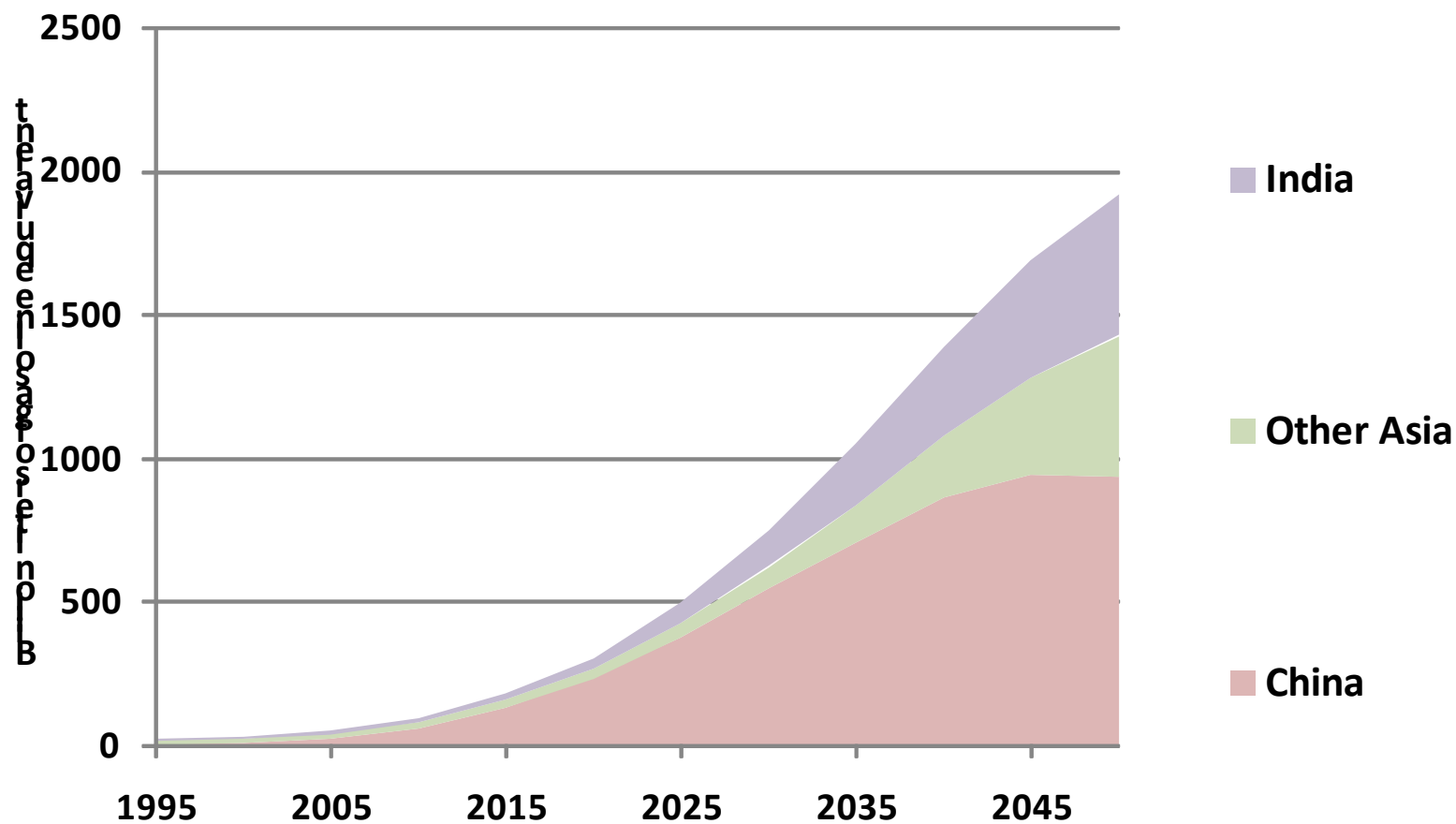


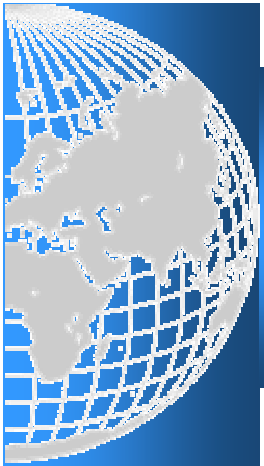
IEA Projections for LDVs: Resulting Fuel Use by Region





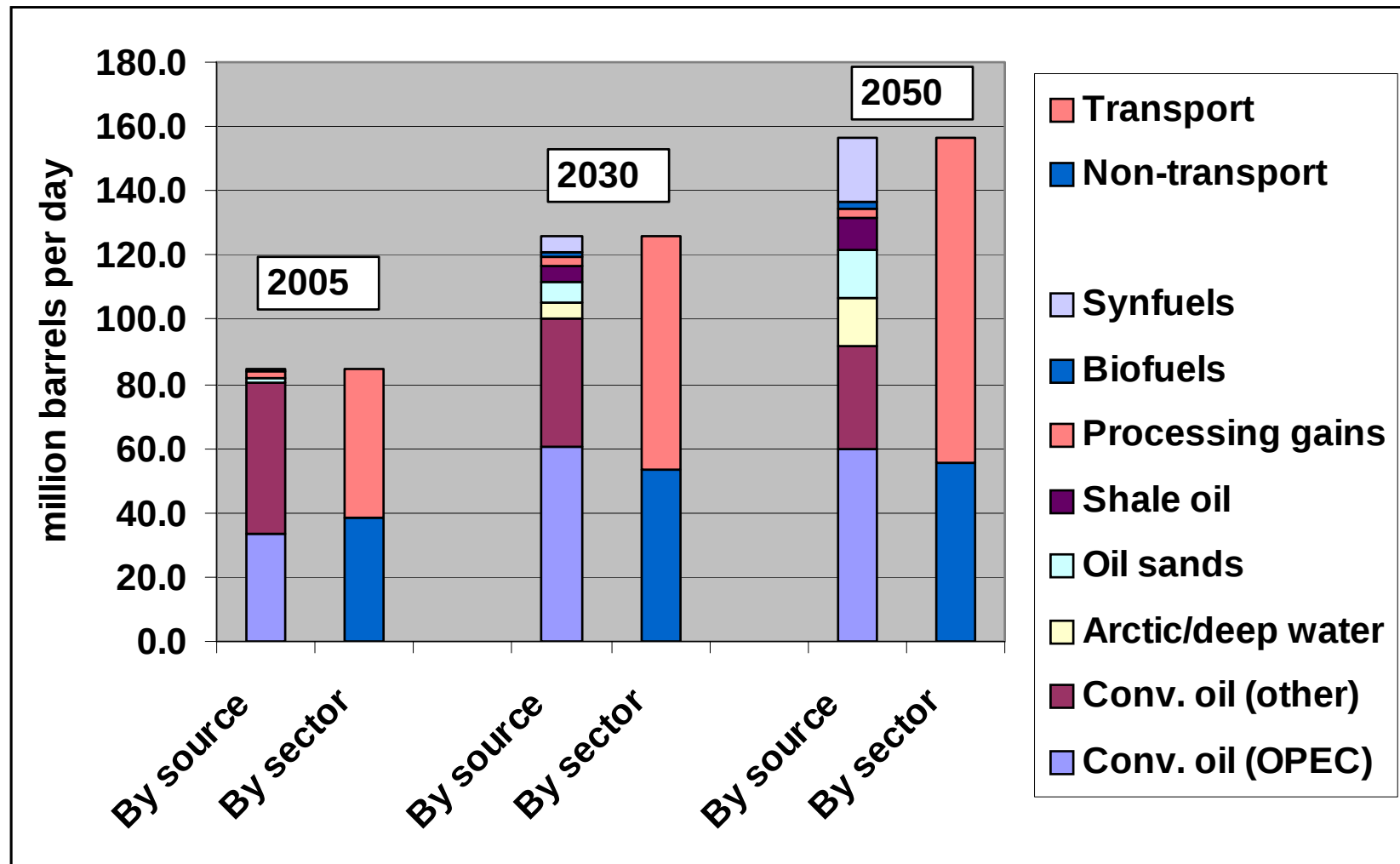
Close-up: Resulting LDV Fuel Use in Asian Regions

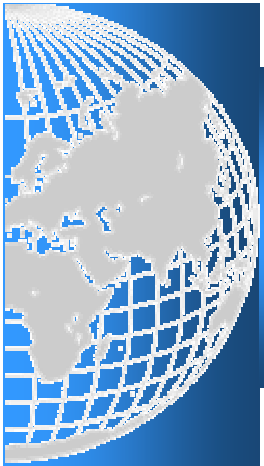




IEA Energy Technology Perspectives 2008

Baseline: Liquid Fuels to 2050

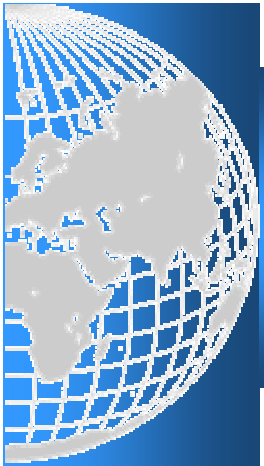




Impacts

- **Health:** 1 billion people exposed to outdoor air pollution exceeding WHO standards
- **Cost of urban air pollution** estimated to be 2% - 5% or more of GDP (e.g. 7% China)
- **Leaded petrol** – lead particles emissions very toxic - organs effected, and also IQ of children
- High **sulphur levels in fuels** – problems with small particulates; cardio and respiratory problems, carcinogenic
- Cleaner fuels are necessary for the introduction of **modern vehicles** that are **90 % or more cleaner** and more efficient
- Technology transfer from developed to developing countries – for **cleaner and more efficient vehicles**
- Transport sector emitting one-quarter of **global greenhouse gas emissions**

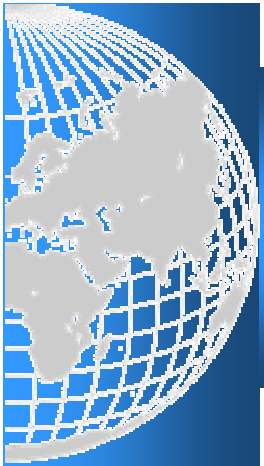




Impacts....2

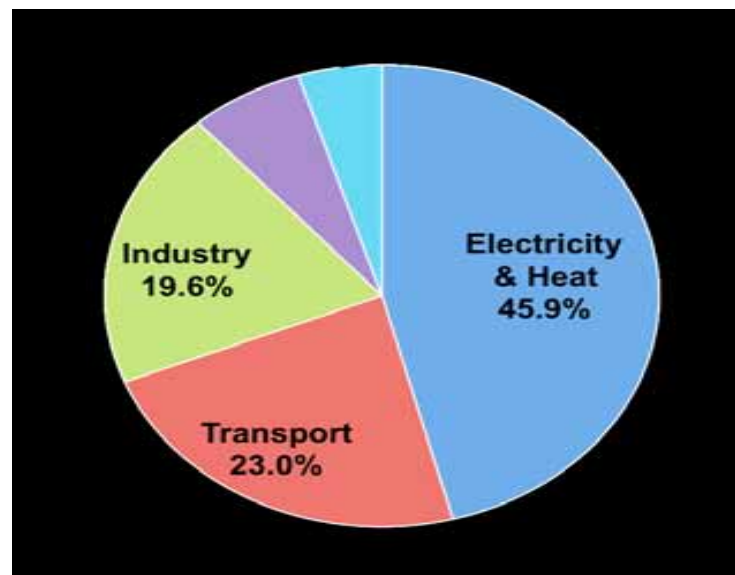
- Another key concern: energy security and balance of payments
- International oil costs will account for transfers on order of USD 2 trillion during 2008
- Dramatic price swings will probably continue
- Consumers are unlikely to address the problem without government help
 - Higher prices will have only a small effect on demand for efficient vehicles
 - Market failure associated with consumer lack of information, uncertainty and loss aversion

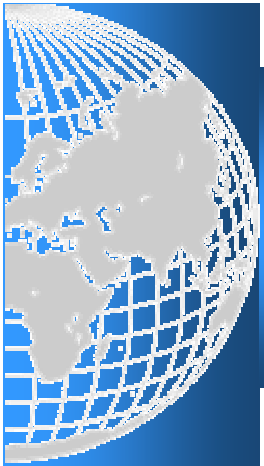




World's CO2 Emissions in 2006

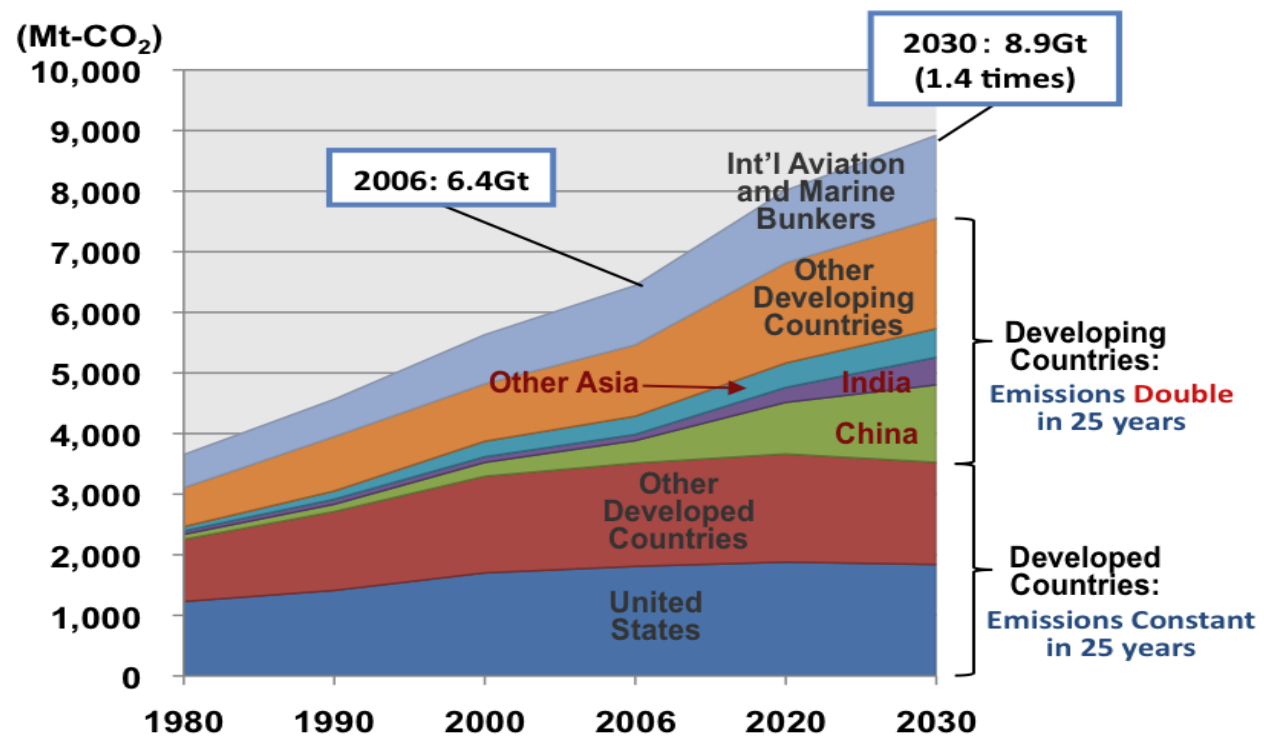
- World's CO2 Emissions by Sector in 2006
- The world's CO2 emissions in 2006 were 28 billion tons (gigaton, Gt), among which the transport sector was responsible for 23%, or 6.45 Gt.





Transport CO2 Emissions in 2006

- Trends in Transport CO2 Emissions: 1980-2030





World's CO2 Emissions in 2006...2

- According to IEA estimates, the worldwide transport CO2 emissions will increase by 1.4 times to 8.9 Gt by 2030.
- Particularly, transport CO2 emissions from developing countries will double in the next quarter century,
- This makes it urgent to accelerate international efforts to achieve both economic development and environmental protection.



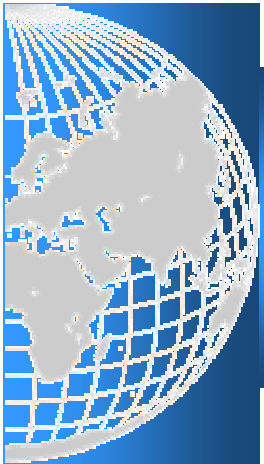
Source: International Energy Agency (IEA) (2008), *CO2 Emissions from Fuel Combustion, 2008 Edition*; IEA (2008), *World Energy Outlook 2008*.



PCFV Lead Campaign

- Lead pollution very serious/ harmful
- Toxicity already at low level (no safe NAEL)
- Several organs effected
- Impacts development of children
 - loss of IQ: 1ug/dl – 0.25-0.5 IQ point
 - for each 10ug/dl: height decrease by 1 cm
 - behavioral aspects
- Blocks clean vehicles technologies, esp. introduction catalytic converters
- Developed countries unleaded in '80s
- PCFV target/ agreement: lead phase out world wide by end 2008





PCFV lead campaign Success

- When PCFV started in 2002 almost all non-OECD countries still using leaded gasoline. Today nearly achieved a global lead phase out with over 99% of fuel sold being unleaded

- Only 14 countries remain

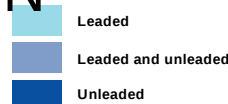
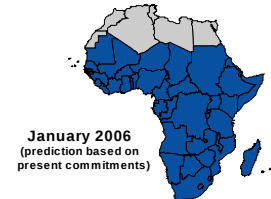
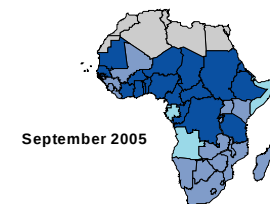
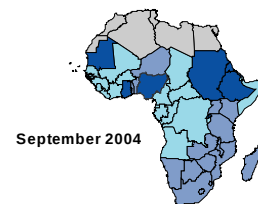
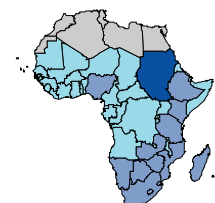
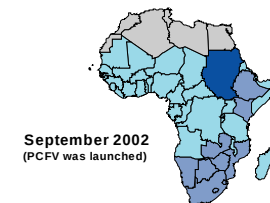
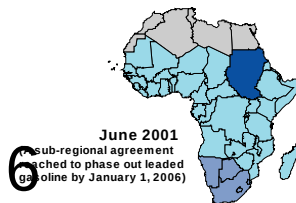
- 5 in Asia

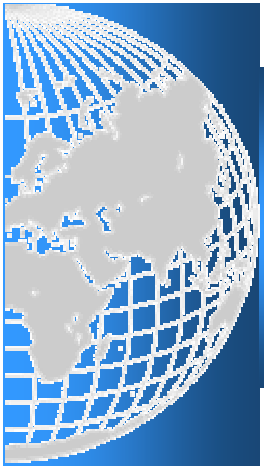
- PCFV supporting 6 of these

- Successful campaign lead to UN 21 Award by PCFV



Progress of leaded petrol phase out in sub-Saharan Africa

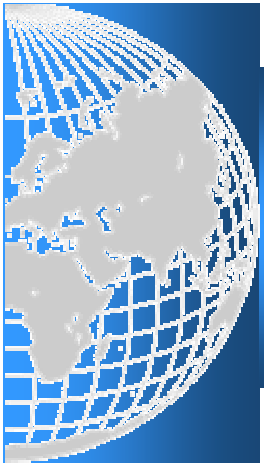




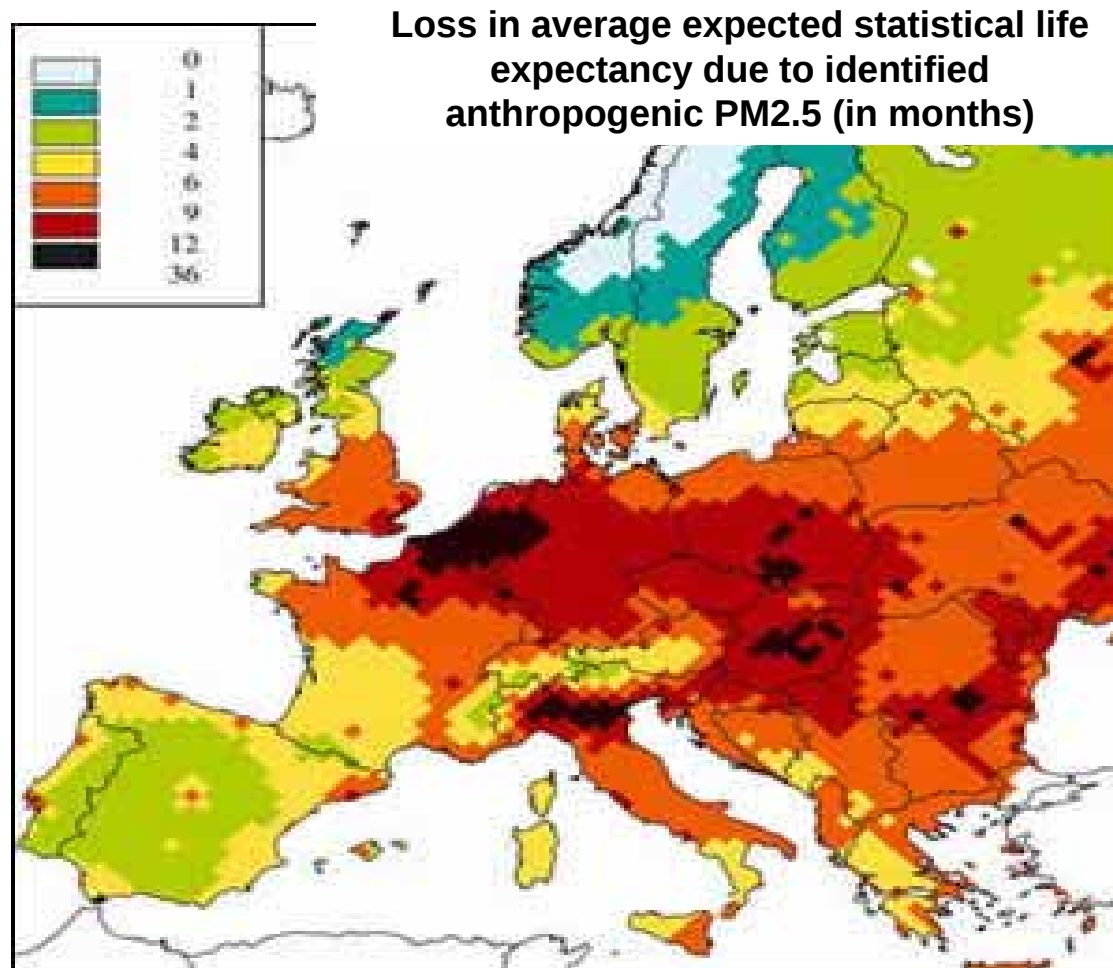
PCFV Sulfur Campaign

- Health impact significant
 - Sulfur and Particulate problems –Bronchitis, Asthma, damage to plants / buildings
 - PM: Cardio-respiratory problems and some constituents of fine particulate matter, such as diesel smoke, are carcinogenic
- Even in economic terms, the benefits of clean vehicles and fuels will far outweigh the costs.
- Need for lower sulfur levels for modern engines
- Developed countries moving to 10 ppm sulphur in fuels, many developing countries at 5,000 or even 10,000 ppm
- In Asia sulphur in fuels level ranges between 10,000 ppm and less than 25 ppm
- Climate change (black carbon) a concern
- PCFV Campaign is for 50 ppm or less worldwide, time frames and roadmaps to be established at regional & national level – hand in hand with vehicles





Sulfur: Health Effects of PM 2.5 (example Europe)



Avg. 9 months of life expectancy lost

386,000 premature deaths annually due to PM

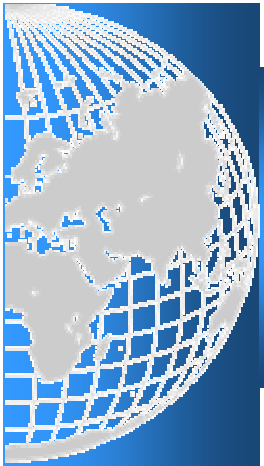
Source: EU 2005



Why Low Sulfur Fuel?

- Lowers Emissions From Existing Vehicles
 - SO₂ from all vehicles
 - PM from diesel vehicles (clear link between sulphur & PM)
 - CO, HC, NOx, Toxics from all catalyst vehicles
- Enables advanced technologies & tight Standards for new vehicles
- Enables retrofit technologies to clean up existing vehicles

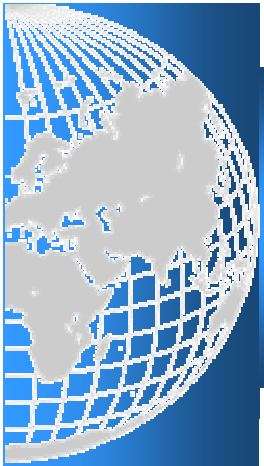




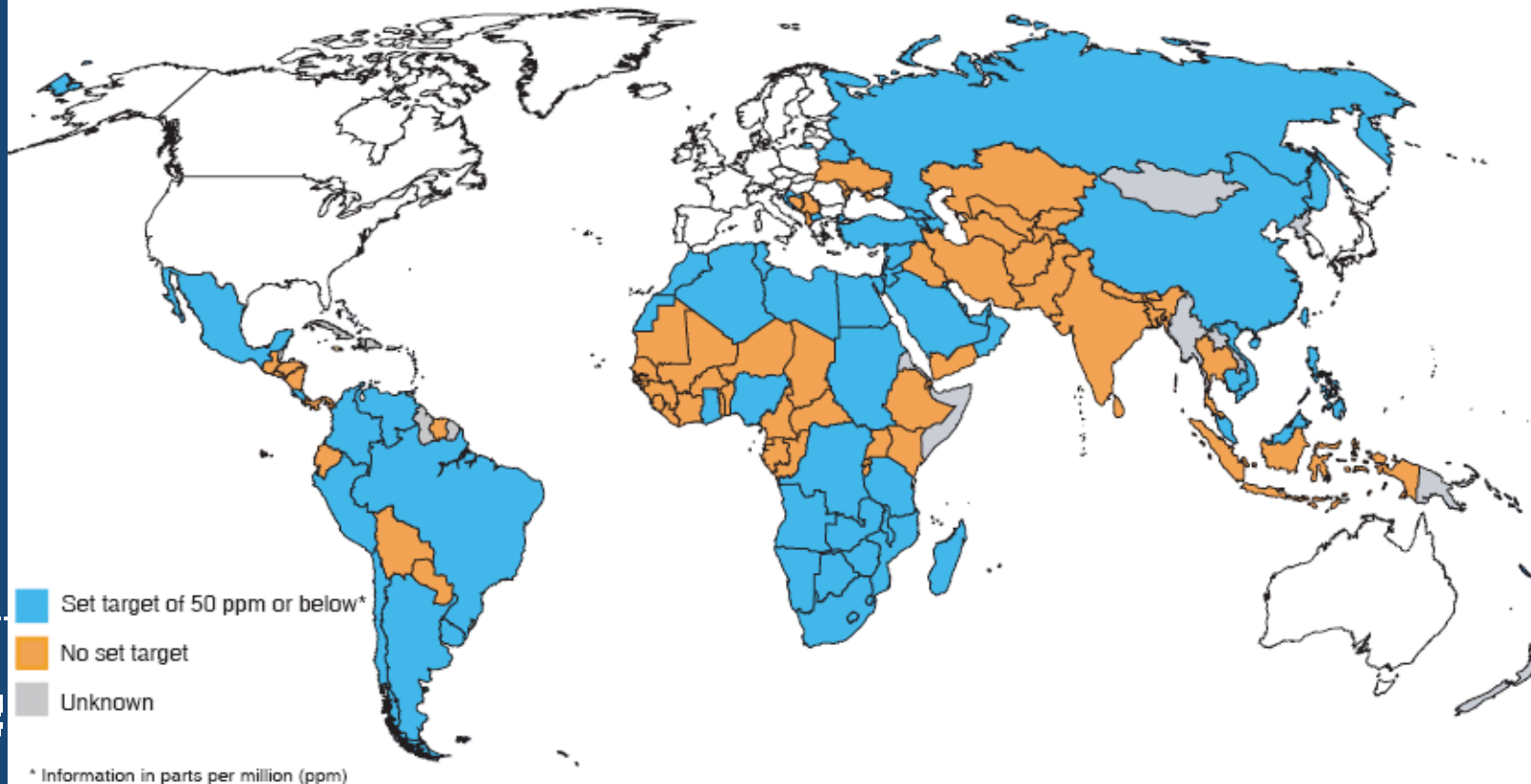
PCFV sulphur campaign success

- Sulphur levels in diesel fuel were very high in non-OECD countries when the PCFV started its work
- PCFV agenda has led to 50ppm sulphur in diesel adoption by 67 countries in 2008 alone-Latin America & Caribbean, Southern Africa, and Eastern African regions at regional forums
- Today most non-OECD countries have put in place programs to reduce their levels and many, with PCFV support, have started to implement these reductions
- Many countries have developed strategies since 2005 (see blue map next slide) for 50ppm
- But still about one-third to go (orange) particularly in Asia

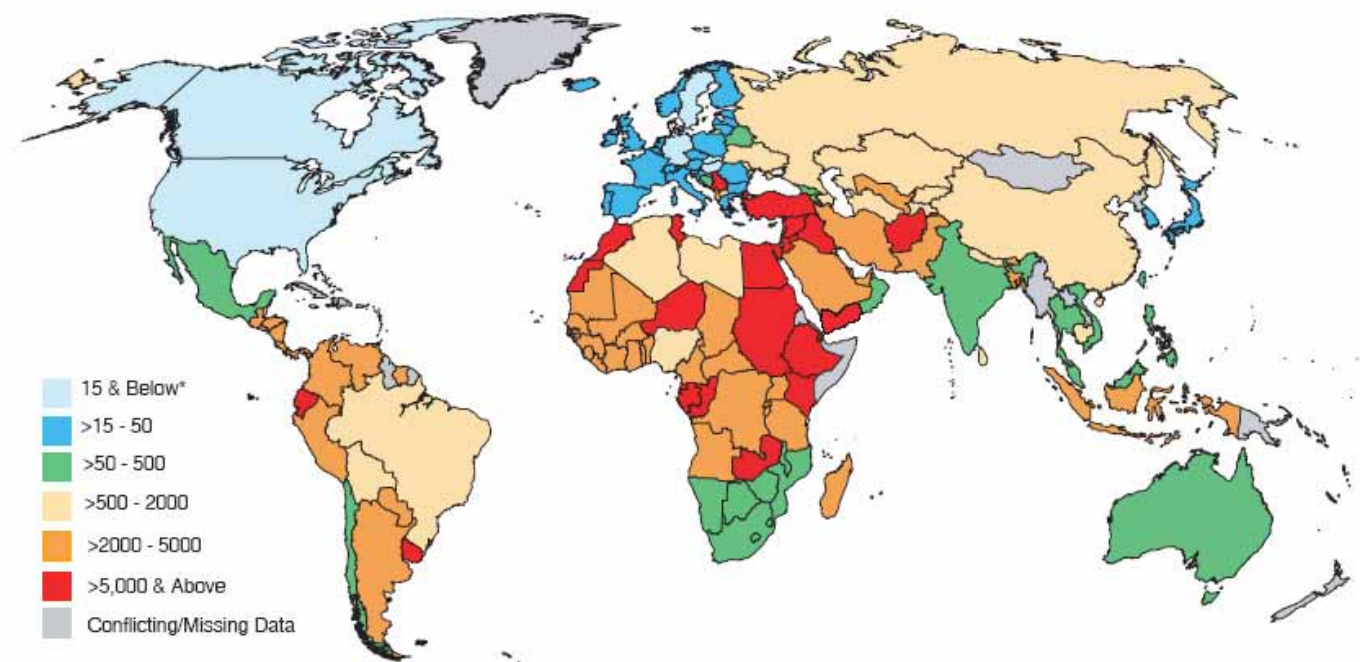




Global map Tracking 50ppm sulphur in Diesel Adoption



Current Global Sulphur Levels



* Information in parts per million (ppm)

Sulphur levels are maximum allowable as of May 2008. For additional details and comments per country, visit www.unep.org/pcfv.



15 & Below*

>15 - 50

>50 - 500

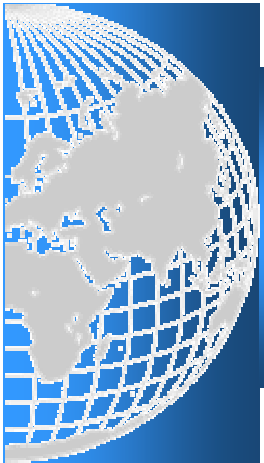
>500 - 2000

>2000 - 5000

>5,000 & Above

Conflicting/Missing Data

August 2008



Current diesel sulphur levels in Asia

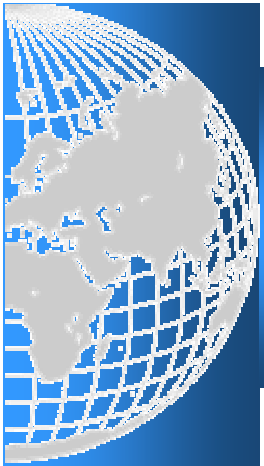
•Afghanistan	10,000	•Brunei	1,000
•Bangladesh	5,000	•Fiji	500
•Bhutan	500	•Lao PDR	2,500
•Cambodia	1,500	•Nepal	2,000 *
•China	2000/50ppm*	•Pakistan	5,000-7,000
•India	500/350ppm*	•Philippines	500
•Maldives	Unknown	•Republic of Korea	50
•Malaysia	2,000	•Singapore	50
•Mongolia	5,000	•Sri Lanka	500
•Sri Lanka	500	•Thailand	350
		•Vietnam	500

** Lower levels for 11 major cities
& Beijing*

*NB: India moving to 50ppm for 11
major cities & 350ppm nationwide
from April 2010*

** Or 500ppm ?*

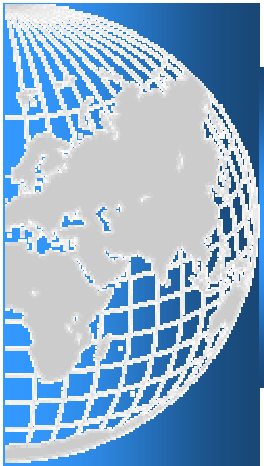




Cleaner Vehicles

- Recognising that fuels and vehicles work together as a system, the greatest emission benefits can be achieved by combining lower sulphur fuels with appropriate vehicle emission control technologies
- 3 key interventions needed:
 - Low Emissions, Fuel-efficient cars
 - Low-carbon fuels
 - Reduced vehicle-miles traveled through congestion pricing, Bus Rapid Transit, etc.
- Stringent vehicle emissions standards combined with clean low sulfur fuels major step towards improving air quality and reducing health impacts





General PCFV Vehicle Recommendations

- Once Each Country Shifts To Lead Free Petrol
 - Require all imported (new & used) cars have a functioning Catalytic convertor (reduces up to 90% emissions)
 - Institute, at a minimum, a simple inspection & maintenance (I/M) test to check
- Once 500 PPM Sulfur
 - All new vehicles meet Euro 2 Equivalent Standards or USA or Japan or UNECE
 - Consider retrofitting of Diesel Oxidation catalyst (DOC) – reduces emissions by further 90%
- Once 50 PPM Sulfur
 - All new vehicles meet Euro 4 Equivalent Emissions Standards or USA or Japan or UNECE
 - Consider retrofitting of Particulate filters- 60% further

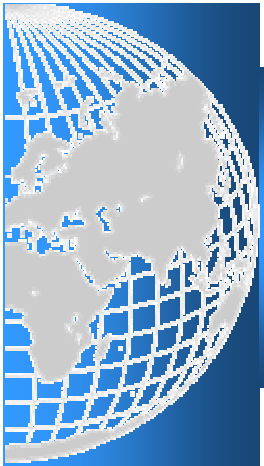




...cont

- Mandate Inspection & maintenance (I/M) Program
 - Taxis & High Mileage Vehicles Semi Annual
 - Require Failing Vehicles To Be Fixed
 - Gradual Phase In
- Encourage Scrappage of Old/High Polluting Cars
- Transportation Controls To Minimize Discretionary Driving (Parking Fees, Congestion Pricing)
- Public Awareness Campaigns Critical

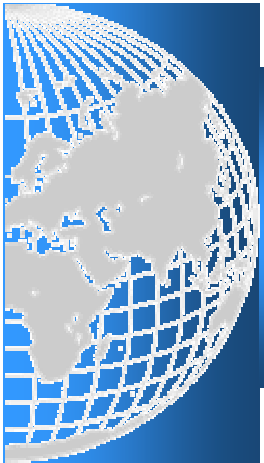




The Role of Vehicle Fuel Economy

- Light Duty Vehicles (LDV) can achieve large oil use and CO₂ emissions reductions
 - Efficiency improvement generally is our cheapest option
 - Clearly our most important near term option
 - Electric and hydrogen vehicles are important long-term options, but will take time
 - Plug-in hybrids are a likely first step
 - Biofuels could be important, but only if sustainable and really deliver CO₂ reductions – big questions

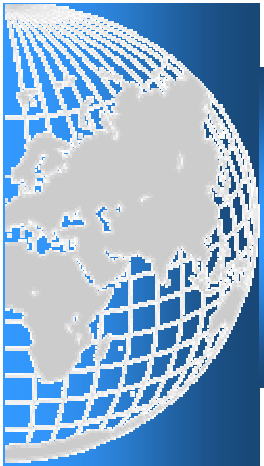




The Role of Vehicle Fuel Economy...2

- New LDVs can become 50% more efficient by 2030
 - In some countries, progress toward this 50% target has already begun
 - This is, very roughly, moving from 8 L/100 km to 4. EU is already well below 8.
 - Some individual vehicles, like Prius are there already
 - Involves maximum use of available technology, including hybrids
 - Important to constrain increases in vehicle size, weight and power
 - Plug-in hybrids may play a significant role if battery costs come down further





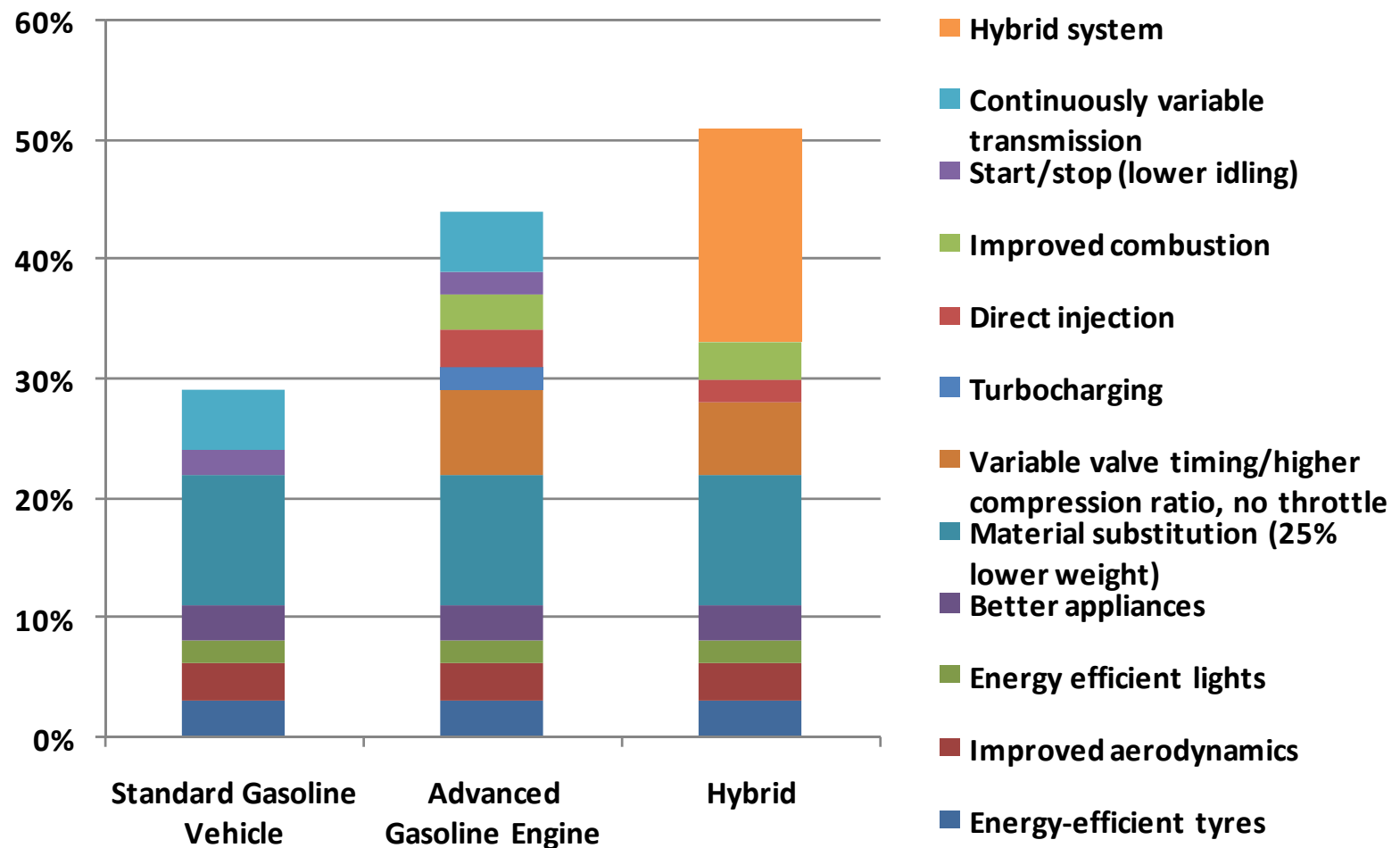
Vehicle Fuel Economy...3

- Without policy interventions oil use in many countries will expand by an order of magnitude by 2050
- Other key concerns: fuel costs, energy security and balance of payments
- International oil costs will account for transfers on order of USD 2 trillion during 2008
 - dramatic price swings will probably continue
- Oil costs are of great concern to governments, consumers, but policy action has been slow in coming
 - Higher prices will have only a modest effect on demand for efficient vehicles
 - Market failure associated with consumer lack of information, uncertainty and loss aversion
- Reasonable to target a 50% reduction in vehicle energy intensity, on average around the world by 2030 re G8 & IPCC GHG targets
 - However better data on baseline values and current trends in individual countries is needed
- Identification of information gaps, the optimal forms of policy, the role for different actors is also required





IEA Estimates of Vehicle Fuel Economy Improvement Potential for Gasoline Vehicles

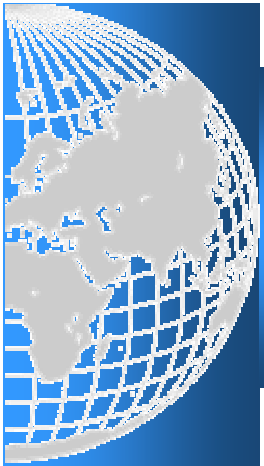




What the Opportunities for Partnership and Capacity Building in EST Areas ?



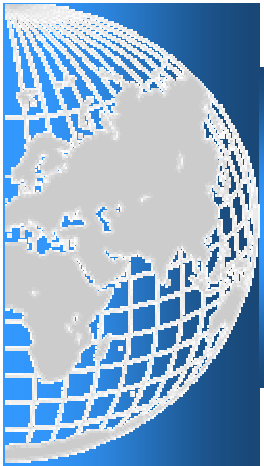
First Drive: Toyota Prius Plug-In Hybrid



Asian Region commitment to clean fuels and vehicles

- In **AICHI STATEMENT**, 2005, members from 22 countries recognized under item j) the need for both national and local level governments to develop and adopt integrated policies, strategies, and programmes incorporating key elements of environmentally sustainable transport such as
 - **“Phasing out leaded gasoline as rapidly as possible, and phasing down sulphur levels in gasoline and diesel as required to achieve advanced vehicle emission standards”**
- Resolution no 16 ASEAN Declaration on Environmental Sustainability, Singapore July 2008 or 20 Nov 2007
 - **“To intensify cooperation on the joint research, development and deployment of low emission technologies for the cleaner use of fossil fuels, recognizing that fossil fuels will continue to play a major role in our energy mix;”**

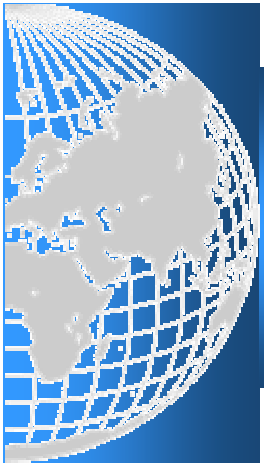




Asian Region commitment to clean fuels and vehicles

- The Regional Environmental Action Plan by Central Asia countries, the Air Pollution report identified the causes of the increase in the negative impact of transport on free air as
 - **“wear of vehicles, bad quality of roads, poor quality of consumed fuel and weak control of the quality of automobile exhausts in terms of toxicity and smoke density”.**
- Malé Declaration on Control and Prevention of Air Pollution and its likely Transboundary Effects for South Asia
- Governmental meeting on Urban Air Quality in Asia
 - 1st meeting, Dec 2006 in Indonesia recommended countries **“develop roadmaps for fuel quality and vehicle emission standards for new vehicles”**
 - 2nd meeting, Nov 2008 in Thailand **encouraged countries 2nd participating countries to “prepare a national long term vision statement for urban air quality and urged members to make good use of the different international initiatives such as the PCFV”.**

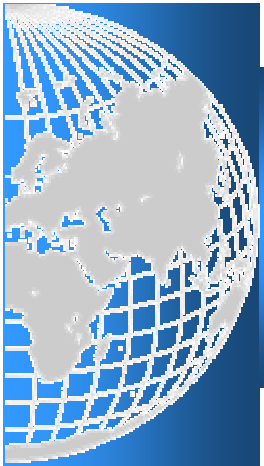




Opportunities for Partnership and Capacity Building EST Areas

- Co-partner on clean fuels and vehicles component of a national EST project
 - Lao PDR (phase I) is an example,
 - Mongolia already supported ahead on EST Phase II
 - planning on Indonesia & Vietnam (Phase II & I respectively)
 - Seeking details on Cambodia (Phase I)
- Technical and Policy assistance
 - Capacity building
 - Sensitizing policy and decision makers
 - Providing funding for national sensitization etc
 - Providing international and regional expert resource
- Support towards regional consensus for a regional sulphur target and basic vehicle emissions standards including for policy for 2/3 wheelers -rapidly growing and major pollutant - (ASEAN, SACEP, EANET etc)
- Data identification and collection for policy development
- Share and learn from experiences
- Support regional and national visions





Opportunities for Partnership and Capacity Building in EST Areas...2

- UNEP and its partners are launching a “Global Fuel Economy Initiative” on March 4th in Geneva
- This initiative will feature four key elements:
 - Data development and analysis of fuel economy potentials by country, region
 - Support for national and regional policy-making efforts
 - Outreach to stakeholders (e.g. vehicle manufacturers)
 - Information campaigns around the world to educate consumers, stakeholders
- What happens next? Shape of national, regional initiatives
 - UNEP and its partners, International Energy Agency (IEA), International Transport Forum (ITF) and the FIA Foundation, are ready to help

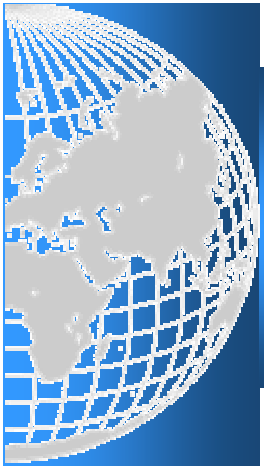




Conclusion

- Urbanization, Transport and GHG Emissions interlinked issue giving rise to global rise in emissions from increasing Mobility Demand
- Over half the world's people now live in cities- 90% of urban growth in developing countries and by 2030 towns and cities in Asia, Africa, and Latin America will hold 80% of the entire earth's population.
- Cities already account for 75% of energy consumption worldwide & an estimated 80% of GHG emissions originate in cities.





Conclusion : some Solutions...

- Addressing road transport and fuel efficiency forms an integral part of the global climate solution, forming a significant portion of the reductions needed to achieve stabilization of GHG emissions, and subsequent reductions. Solutions...
 - 1. Smarter Urban Growth and Design
 - 2. Improve Fuel Efficiency (together with improved fuel quality and emission standards) – The 50 x 50 Initiative
 - **Lead-free, low sulphur** are required for the introduction and proper functioning of cleaner and more efficient vehicles with emission control technologies.
 - 3. Reduce carbon intensity of fuels
 - 4. Reduce vehicle use – Non-motorize transport and modal shifts





Thank You!

The Partnership for Clean Fuels and Vehicles (PCFV)

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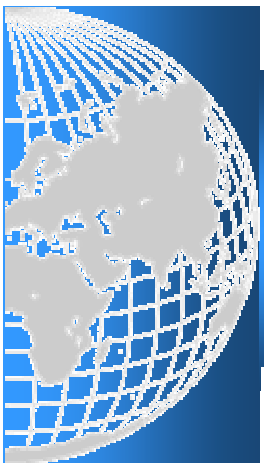
Partnership for
Clean Fuels and Vehicles



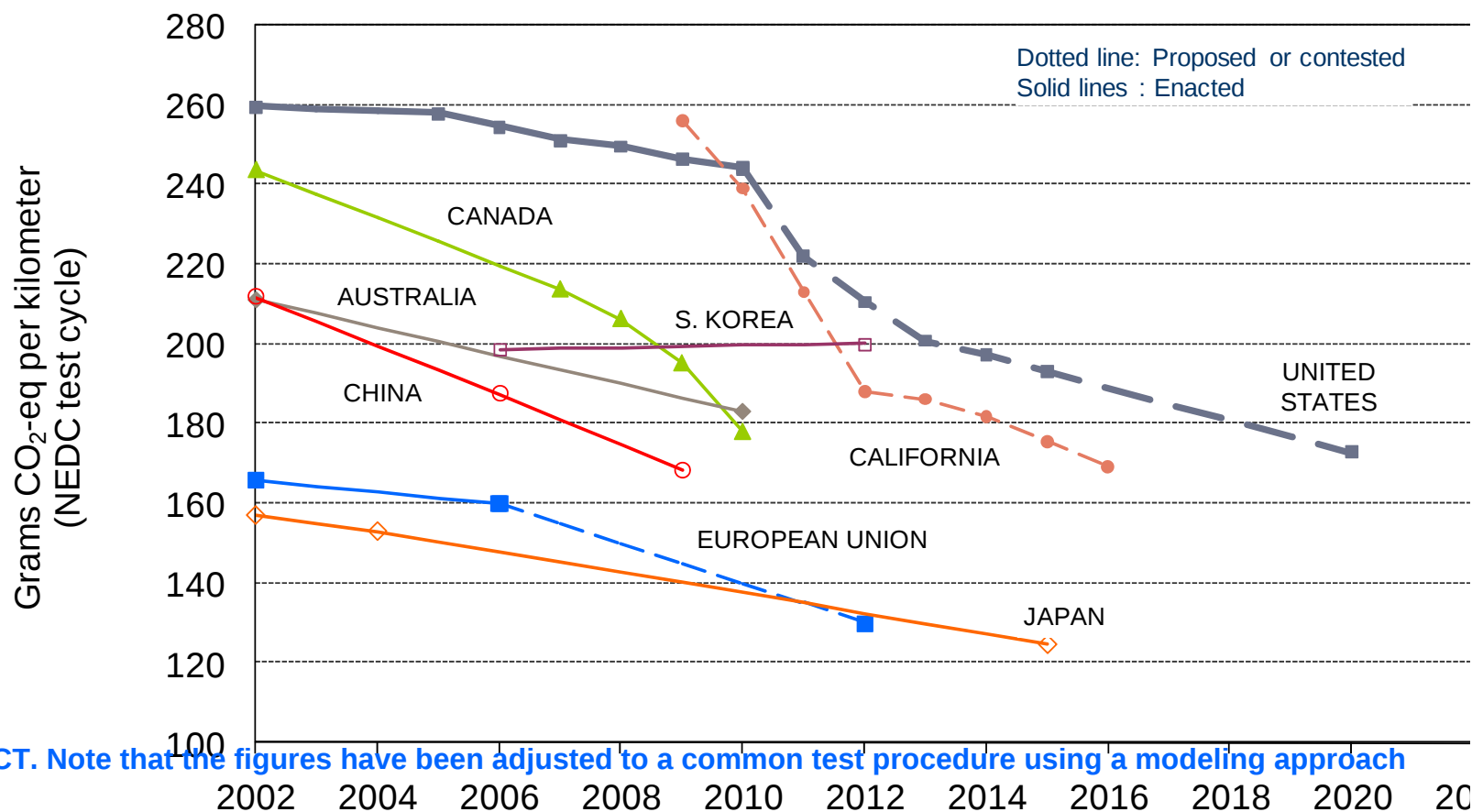


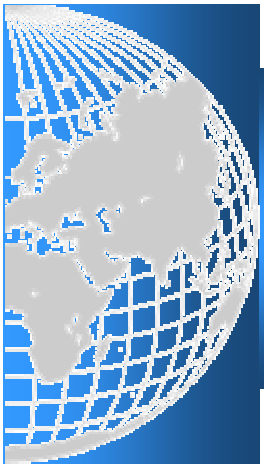
Back up Slides



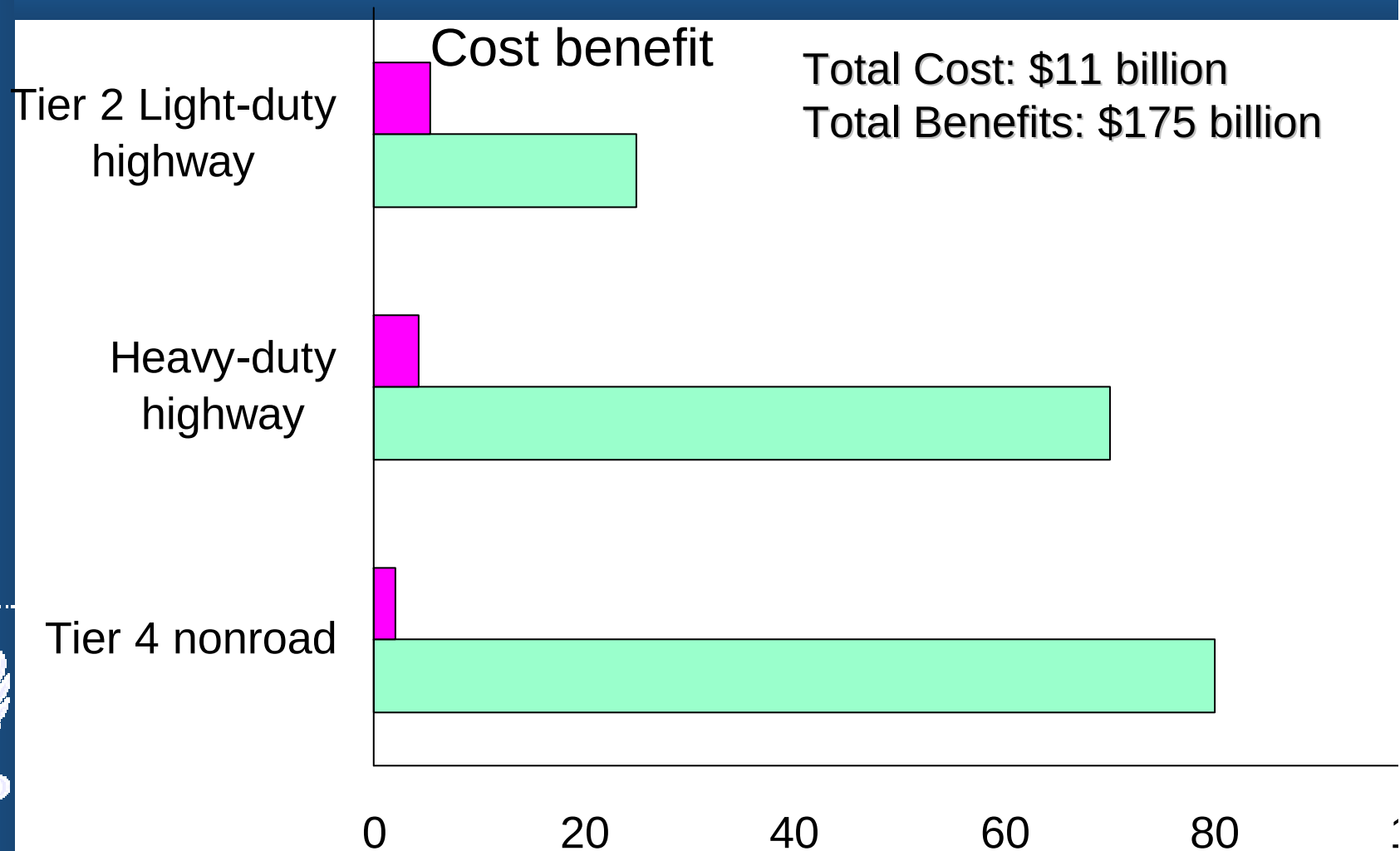


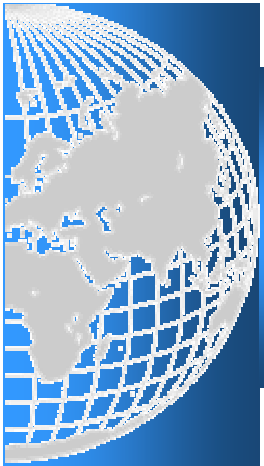
Existing and Proposed Fuel Economy Standards





Costs & Benefits of Clean Fuels and Vehicles

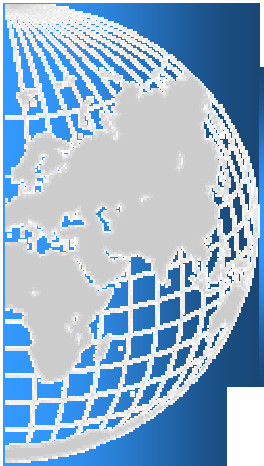




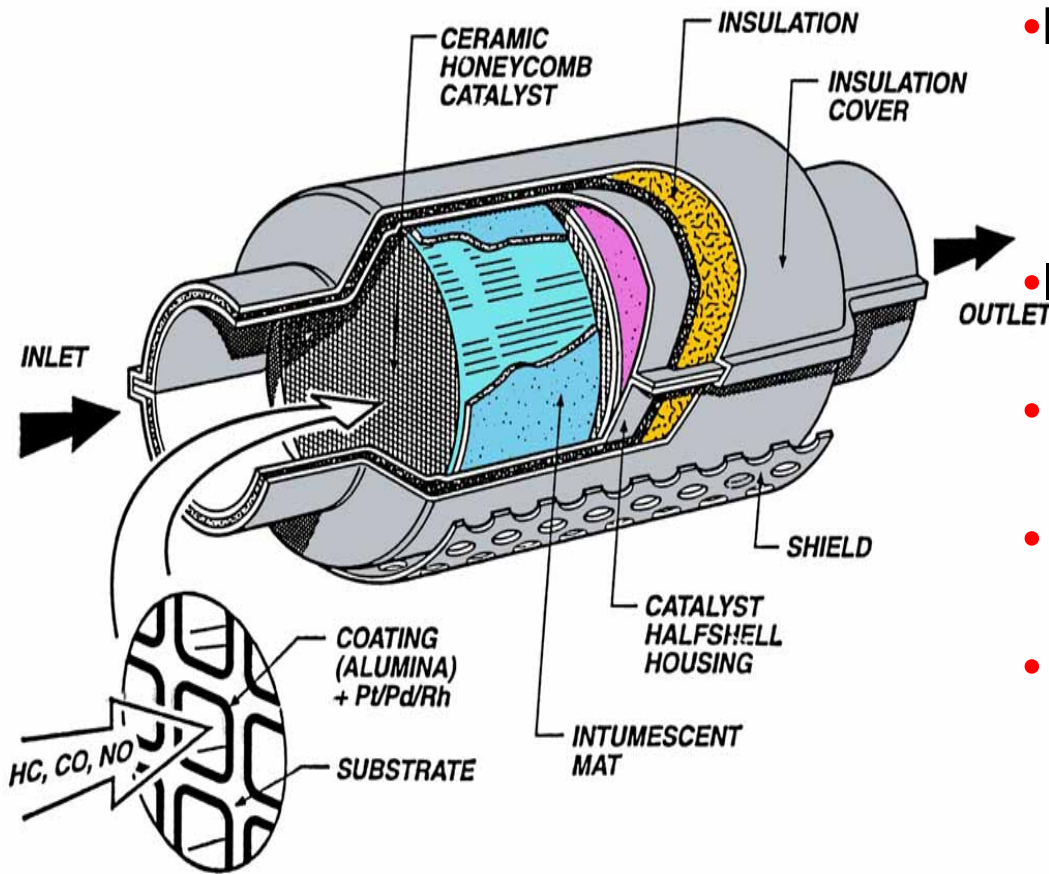
Fuel and Vehicle Economy targeted Outcomes

- Millions of tonnes CO₂ reduction per year by 2050
- Co-benefits
 - hundreds of billions of cost savings to oil importing countries, consumers
 - Reductions in some pollutant emissions (eg. HC)
 - Safety benefits related to lighter vehicles (e.g. to pedestrians and non-motorized traffic).
- Cost savings to manufacturers
 - Aligned policies and regulatory systems should be cheaper to comply to than a patchwork of different systems





The Three-way Catalytic Converter: A Familiar Technology Re-Engineered for High Performance in Close-coupled and Underfloor Applications



- Layered washcoat architectures and support materials with high thermal stability
- Integrated HC adsorption functions
- Mounting materials with improved durability
- High cell density ceramic or metallic substrates
- Insulation schemes for heat management



UNEP

Maximum Emissions Performance Is Only Achieved With Near Zero Sulfur Fuel

GHG emissions & Energy

Energy-related CO₂ emissions today account for around **2 / 3** of all GHG emissions from human activity - power, transport, buildings and industry

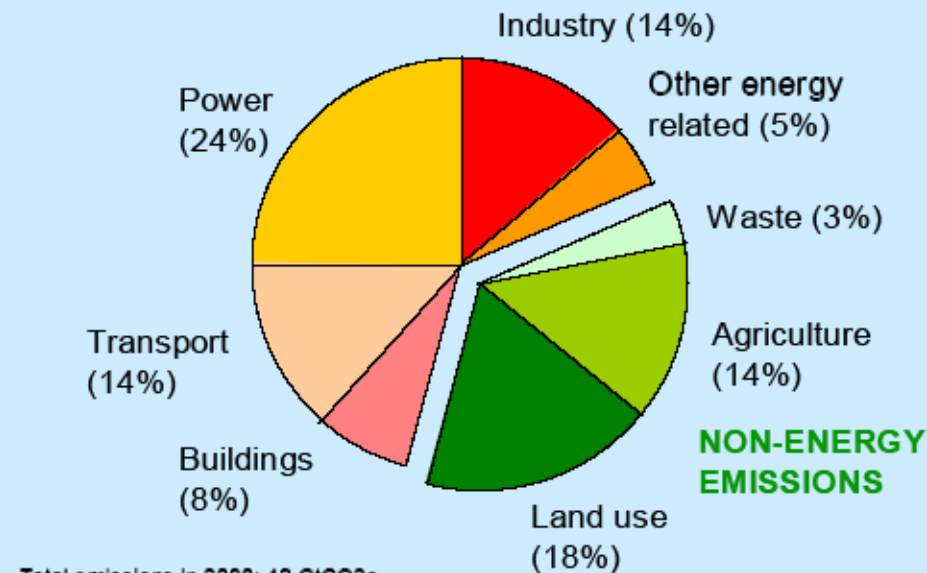
Further divide primary energy use into 1/3's –

1/3 Transport – hybrids...eventual hydrogen, pure electric?

1/3 Electricity – efficiency, renewables, nuclear, carbon capture and stor

1/3 Direct Fuel Use – heating (water, space); solar, efficiency, heat pum

Figure 7.1 GHG emissions in 2000, by source^b



Total emissions in 2000: 42 GtCO₂e.

Energy emissions are mostly CO₂ (some non-CO₂ in industry and other energy related).
Non-energy emissions are CO₂ (land use) and non-CO₂ (agriculture and waste).

Source: WRI (2006)

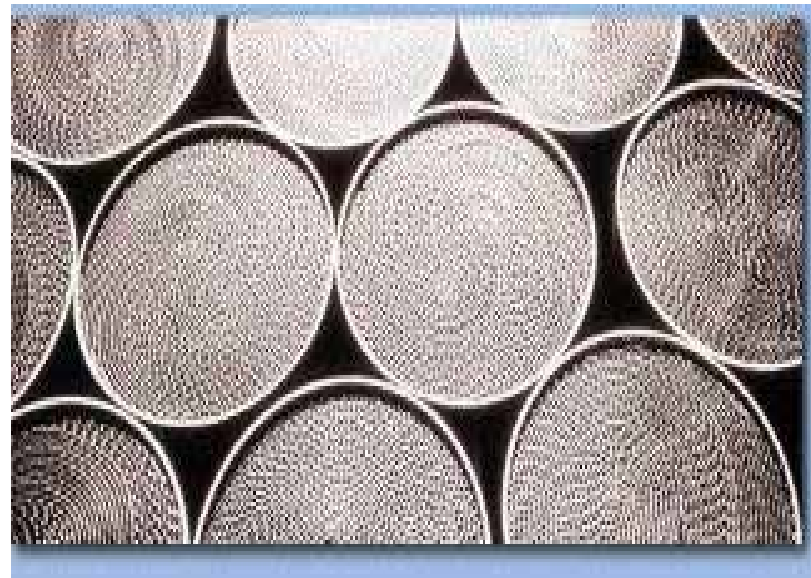


Diesel Retrofit Technologies

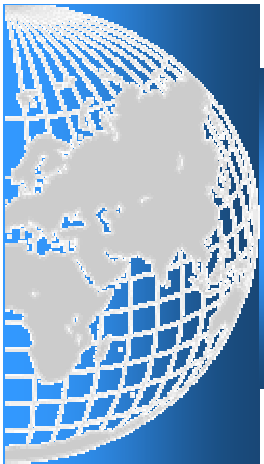
Diesel Particulate Filters

Diesel Oxidation Catalysts

Selective Catalytic Reduction



Diesel particulate filters



Particulate matter Size

Diesel Particulate Matter (PM) Size Compared to Human Hair and Beach Sand

