



# **Air Quality and Transport in Developing Countries**

Todd M. Johnson

The World Bank

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# Questions for policy appraisal

Is the impact of outdoor air pollution serious compared to the impacts from other sources?

Yes

No: Look for incremental opportunities in transport policy

Which pollutants cause the most damage to public health on account of toxicity, elevated concentrations and exposure?

Fine PM

Lead: Eliminate lead in gasoline

Is transport a significant contributor to high exposure?

Yes

No: Look for incremental opportunities in transport policy

Which vehicle and fuel combinations are likely to be responsible?

**Diesel:** Heavy-duty  
Medium to light-duty

**Gasoline:** Four-stroke  
Two-stroke

# Why is action difficult in the transport sector ?

- ⇒ Actors are fragmented and self-interested
- ⇒ Key goal of transport policy:
  - Increase access to mobility
  - Move goods efficiently
- ⇒ Key goal of environmental policy:
  - Reduce adverse environmental effects of transport activities
- ⇒ How do we marry the two?
  - Economic incentives and disincentives, standards and regulations

# Interventions in the transport sector

- ⇒ Transport system improvements: planning, management, public transport vs. private vehicles
- ⇒ Fiscal policies: fuel taxes, import duties, road pricing
- ⇒ Control of In-use vehicles (I&M)
- ⇒ Fuel quality and vehicle technology: vehicle and fuel standards, import policies

# Vehicle-fuel technology for dramatic emission reduction

- ⇒ Tier 2 gasoline vehicles
- ⇒ Continuously regenerating particulate traps and “lean de-NO<sub>x</sub>” catalyst using ultra-low sulfur diesel
- ⇒ Gaseous fuel vehicles (LPG, CNG)
- ⇒ Hybrids, electric, fuel cells



# Typical developing country context

- ⇒ Little quantitative assessment of the air quality problem;
- ⇒ Emissions from heavy-duty vehicles and 2-3 wheelers;
- ⇒ Private operators with low profit margin, highly polluting vehicles and/or bus companies with limited resources for O&M;
- ⇒ Old vehicle fleets, second-hand vehicle imports, weak maintenance, overloading, overfueling;
- ⇒ Fuel adulteration

# Transport priorities in developing countries

- ⇒ Increase access to motorized transport while not creating safety hazards for pedestrians and bicyclists
- ⇒ Least cost way to do this is usually through public transportation – buses
- ⇒ Need to find low-cost ways of transporting for large numbers of people: e.g., BRT, priority lanes, ...
- ⇒ Often need transport sector reforms in order to improve the viability, efficiency, safety, and cleanliness of transportation

# Reducing emissions from in-use vehicles

- ⇒ A small percentage of vehicles contribute disproportionately to overall transport emissions.
  - In the USA: 20% is responsible for 80% of emissions ⇒ repair or remove. I/M, scrappage
- ⇒ For a given vehicle and fuel combination, driving and operating patterns affect emissions significantly
  - Policies: traffic management, I/M, awareness



# Considerations for CNG

- ◆ *Do diesel emissions contribute significantly to ambient particulate pollution in the city?*
- ◆ *Are there sufficient supplies of natural gas that are available to the city?*
- ◆ *Is diesel taxed sufficiently?*
- ◆ *Implications of potentially higher costs of vehicle maintenance and the need for suitably trained technical staff?*
- ◆ *Is fundamental reform in the transport sector needed to make the operation of vehicles being targeted financially viable?*

# Considerations for biofuels

- ◆ *Are petroleum products costly in the country and is supply stable?*
- ◆ *Are gasoline and diesel taxes sufficient to allow biofuels to compete?*
- ◆ *If air pollution: Will biofuels reduce the types of air pollution problems in the city?*
- ◆ *If energy security (or CO<sub>2</sub> reduction): what is the quantity and type of biomass feedstock available to the city?*
- ◆ *Are resources needed for biofuel support fungible? Are there less costly ways to achieve the same goals?*

# Clean Air Initiatives

- ⇒ Launched in Latin America and expanded to Africa and Asia
  - LAC: WB primary funding source
  - Asia: WB and ADB share funding
- ⇒ Knowledge sharing, capacity building, action plans and pilot projects
  - Website: [www.cleanairnet.org](http://www.cleanairnet.org)
- ⇒ Partnership of relevant stakeholders locally, regionally and internationally

# PM2.5 concentrations in Dhaka Declines by 41% because of Two Stroke Phaseout

