

Opportunities and Challenges for Fuel and Emissions Reductions in Trucks in China and Asia

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About the Clean Air Initiative

The Clean Air Initiative for Asian Cities promotes better air quality and livable cities by translating knowledge to policies and actions that reduce air pollution and greenhouse gas emissions in transport, energy and other sectors



CAI-Asia began in 2001 as a multi-stakeholder initiative by ADB, World Bank and USAID

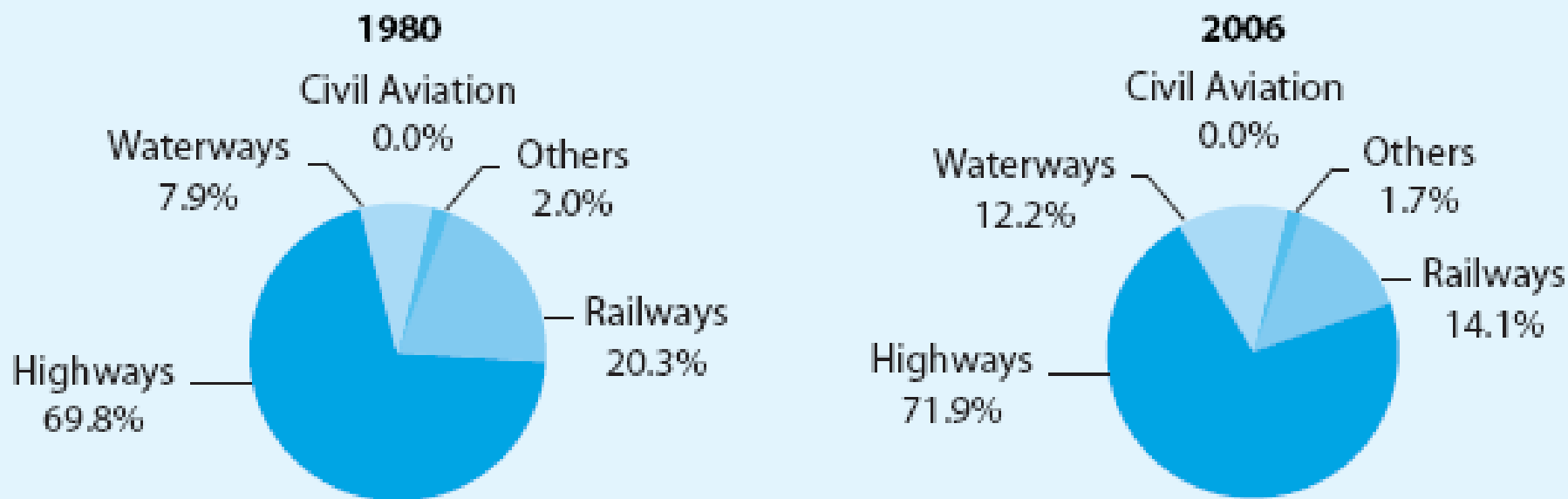
Since 2007, CAI-Asia is a **UN Type-II Partnership** with over 170 organizational members, **8 Country Networks**, and the **CAI-Asia Center** as its secretariat (a non-profit organization)



Outline

- Why should we need to look at trucks?
- What can we do to reduce truck fuel use and emissions?
- Guangzhou Green Trucks Pilot Project results
- Opportunities and challenges

Trucks carry most freight in China



Source: ADB. 2008. Promoting Environmentally Sustainable Transport in PRC

- Freight transport by highways dominates with **70%**
- Road freight volumes increased from 60 million ton km in 2002 to over 100 million ton km in 2007 – a **67%** increase

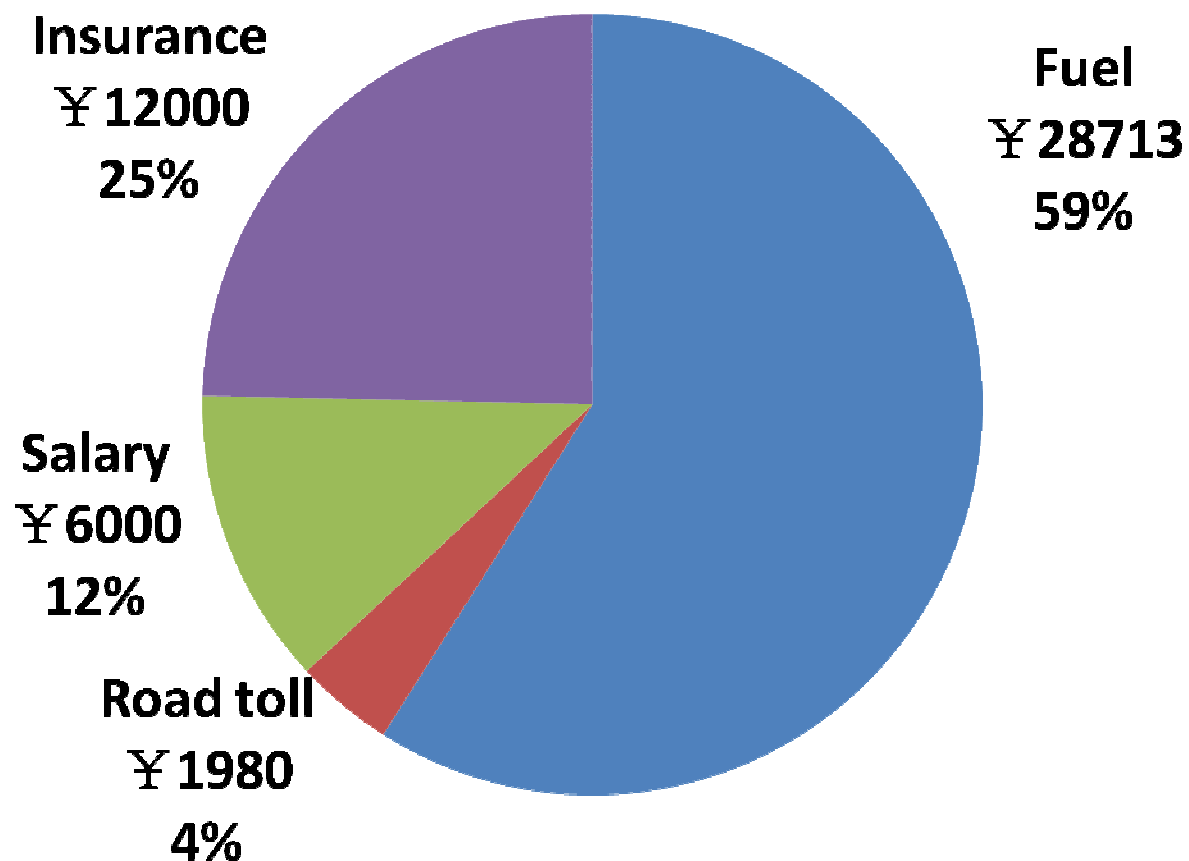


High emissions from diesel trucks



- Emissions from trucks: SO₂, NO_x, VOC, particulate matter, black carbon
- Diesel is “dirtiest” fuel
- Impacts
 - Air pollution (smog/haze)
 - Acid rain: agriculture, forests, buildings
 - Health
 - Climate change

Fuel costs are high compared to total costs



- Fuel is about 60% of truck operating costs (excl maintenance, depreciation costs)

Green Trucks Pilot Project in Guangzhou

- To develop a “proof of concept” for a truck program in Guangzhou and PRD that aims to:
 - Enhancements of the fuel economy of the truck fleet in PRD
 - Reduce black carbon and other air pollutants from trucks
 - Consequently obtain GHG emission savings
- Adopt a co-benefits approach!
- Partners:



Green Trucks Pilot Project Components

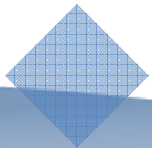
The project consisted of four components:

A. Background analysis

B. Survey of trucks and truck companies in Guangzhou

C. Driver training course for fuel efficiency of trucks

D. Technology pilot



Technologies: Tires

- **Single-wide tires or Dual low rolling resistance tires:** reduces rolling resistance

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- **Aluminum wheels:** reduces weight



- **Automatic tire pressure monitoring system:** keeps tire pressure more constant



Technologies: Aerodynamics

- **Skirts:** reduce wind underneath the trailer



- **Nosecone:** reduces turbulence



- **Gap fairing:** reduces the tractor-trailer gap



Technologies: diesel particulate filters

- Collects particulates in the exhaust
- Reduces 60-90% of
 - Particulates (PM)
 - Hydrocarbons
 - Carbon monoxide



Results Pilot test

Company	Pilot	Investment	Payback period	Fuel Saved	Emissions	Fuel Savings (scale-up)
Garbage trucks	2 pilot trucks, 1 baseline	\$ 6320	0.65 year	6.9 l/d (18.5%)	18.14 kg CO ₂ ; 0.14 g PM ₁₀ per day	1500 truck fleet: 3.7 million liters/yr
SOCL Long haul	2 pilot trucks, 1 baseline	\$ 14,800	2.7 year	10.83 l/d (6.7%)	28.4 kg CO ₂ ; 0.23 g PM ₁₀ per day	30 truck fleet: 106,741 liters/yr

Challenges: technologies

- Availability of technologies in China
- High speeds needed for aerodynamics to work are not always achieved in Chinese cities
- Diesel particulate filters
 - Low sulfur diesel is required (right now diesel in China has too high S levels)
 - High costs
 - Maintenance needed especially for retrofitted DPFs
 - Low speeds in urban traffic
- Limited technology case study examples for China and Asia



Opportunities: savings potential

- Tire & aerodynamics technology packages:
 - Fuel saving: 10,500 liters (12%, compared to 17% US experience)
 - CO2 emissions: 26.8 tons
 - NOx: 0.17tons
 - PM: 0.011 tons
- Payback period: 1.8 years
- If applied to estimated 826,000 HDTs in Guangdong Province
 - Fuel savings: 8.6 billion liters fuel per year
 - CO2 emission reductions: 22.3 million tons per year

Same as total emissions of a large city



Opportunities and Challenges: financing

- China committed to energy efficiency translates to fund allocations for fuel economy investments,
 - limited existing tax policies for truck industry relevant to energy and emissions management
- Investment costs are too high for many companies, even if potential savings are high and payback periods short.
 - Truck sector not considered most reliable sector for lending (especially small companies and individual truck driver-owners)
- ESCOs (energy service companies) established for industry
 - but no experience with trucking fleets
- Climate change funds increasing: freight industry can tap
 - Capacity weakness: knowledge/tools missing for financial appraisal

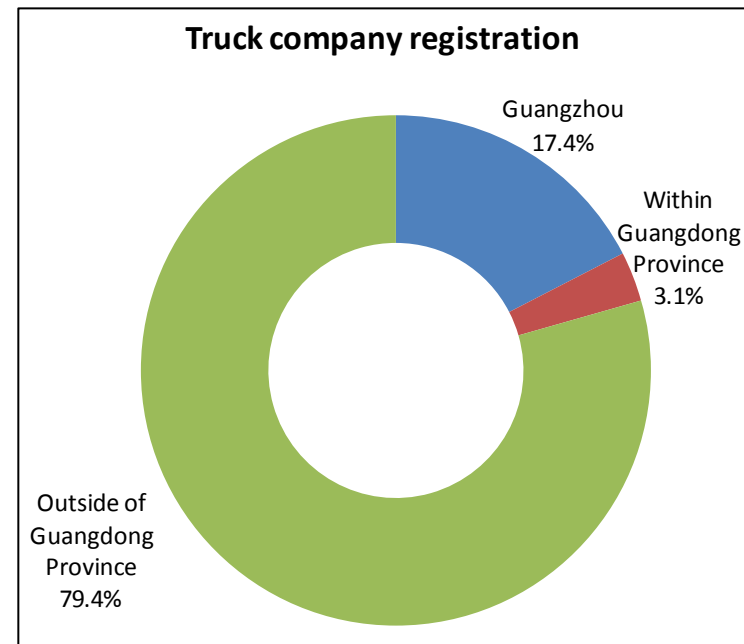


Challenges & opportunities: institutions & policies

- Current policies do not allow for changes of truck. This makes application of certain technologies difficult
 - Single-wide based tires and Aerodynamics (especially skirts)
- Policies are usually first developed/strengthened for LDVs and much later for trucks
 - Vehicle emission standards
 - Fuel economy standards
- Cooperation from different government agencies needed
 - National, provincial, city
 - Transport, environment, industry, energy

Challenges : truck industry

- Fragmented industry with majority owner-driver trucks
- Multiple logistics centers thus limiting coordination of trucks
- Long-haul trucks often travel large parts of trips in urban areas
- Trucks driving to/from Guangdong Province are often registered elsewhere in China so difficult to control
- Shippers seem to have a less direct relationships with carriers compared to the US



Source: CAI-Asia Center and World Bank, Survey of Truck Drivers and Companies in Guangzhou, 2009

Opportunities: stakeholders

Support from many stakeholder groups needed but there are benefits for each:

- **Chinese Government:** energy efficiency, CO2 reduction and air pollution reduction are all Chinese Government priorities
- **Truck companies:** interested in reducing fuel costs, especially with fluctuating fuel prices
- **Technology suppliers:** greater potential to market technologies through a coordinated program
- **Carriers:** extension of Corporate Social Responsibility in their supply chain in China (*many carriers operating in China are US/EU based*)
- **Associations** (China Truck Association) and NGOs: greater impact through coordinated program
- **Development agencies / banks:** potential for loans/grants in sustainable development area
- **SMARTWAY program:** roll-out of program to Asia



Continue the discussion at:



BAQ 2010 - “Air Quality in a Changing Climate”

[For information, email BAQ2010@cai-asia.org](mailto:BAQ2010@cai-asia.org)



For more information



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- <http://cleanairinitiative.org/portal/GreenTrucksPilot>
- Video in Mandarin and English <http://cleanairinitiative.org/portal/knowledgebase/videos/>
- May 2010: New website www.greenfreight/cleanairinitiative.org
 - Policies; Strategies & technologies; Financing; Programs & projects
 - Green Freight Network
 - News; Publications; Events; Training