

Voluntary Energy Efficiency and Emission Reduction Program for Freight Transport in China

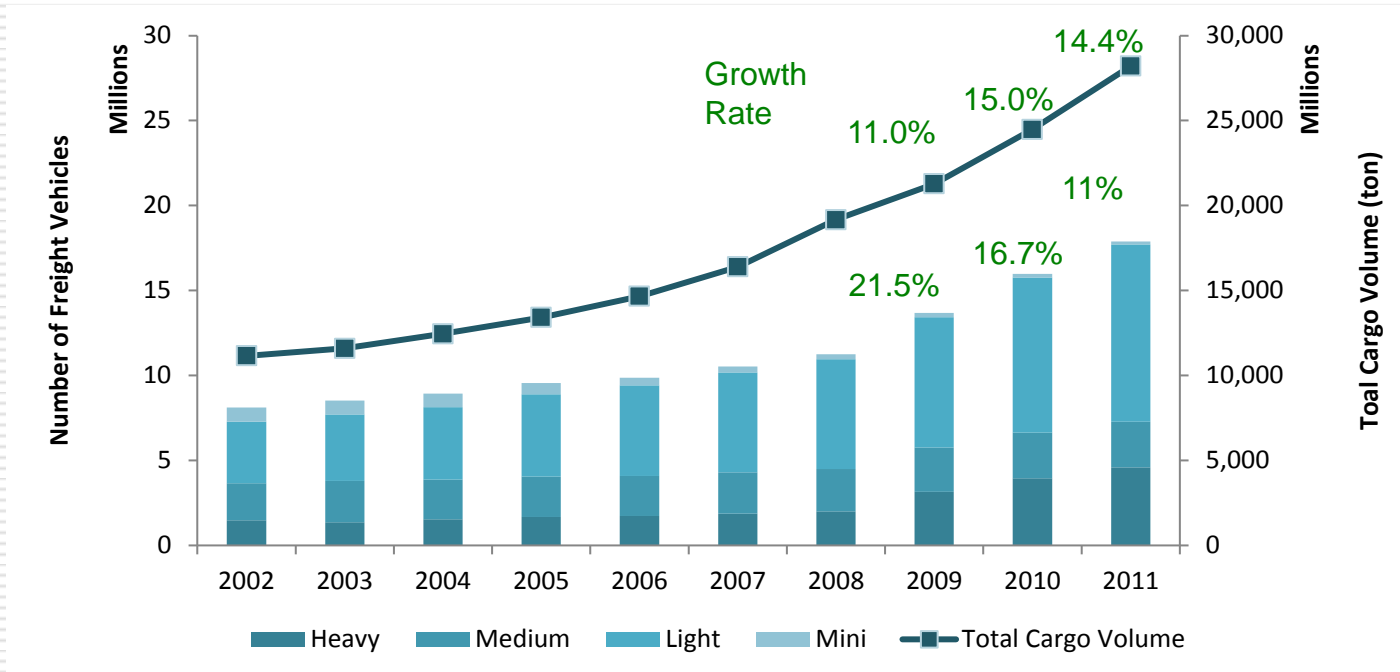
Guangdong Green Freight Demonstration Project

Binyam Reja
Country Sector Coordinator, Transport
China Sustainable Development Unit
World Bank, Beijing Office

Presentation for the 2nd Forum on Technologies & Policies for
Transportation Energy Conservation and Emissions Reduction
November, 2013



Growing Freight Sector in China



Number of Freight Vehicles and Total Cargo Volume 2002 to 2011

Source: Yearbook of China Transportation & Communications

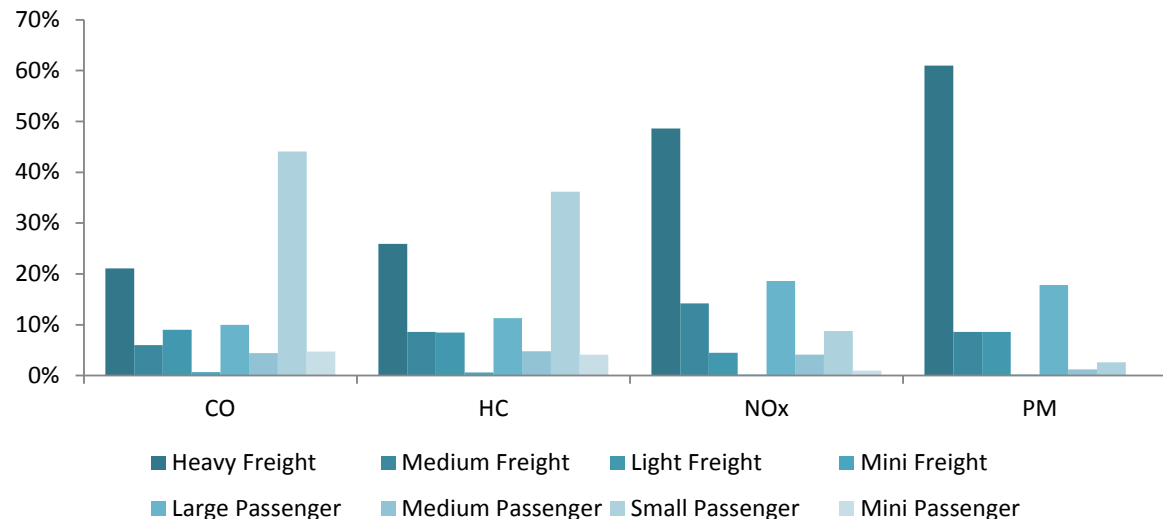


Freight/Logistics-Why do we care?

- Competitiveness
 - Major cost component of delivered goods
 - “Regressive” access to logistics in inefficient systems
- Poverty Reduction
 - Rural agricultural productivity
 - Access to markets and services
 - Prices of food and essentials
 - Environmental Concerns
 - Major local air pollution source
 - Fast growing source of GHG emissions
- National Energy Safety
 - Major oil consumer
 - Increasing demand for energy

Freight is Key Contributor to Air Pollution & GHG Emission in China

- Trucks (22% of total fleet in number) account for **54%** of total transport sector fuel consumption in China.
- Heavy- and medium- duty freight vehicles only account for 7.7% of the total automobile fleet in 2011. However, together they account for **62.8%** of NO_x and **69.6%** of PM_{2.5} emissions.



Emission Contribution by Vehicle Type, China 2011

Source: 2012 China Vehicle Emission Control Annual Report



Tightening Vehicle Emission Standards and Fuel Standards

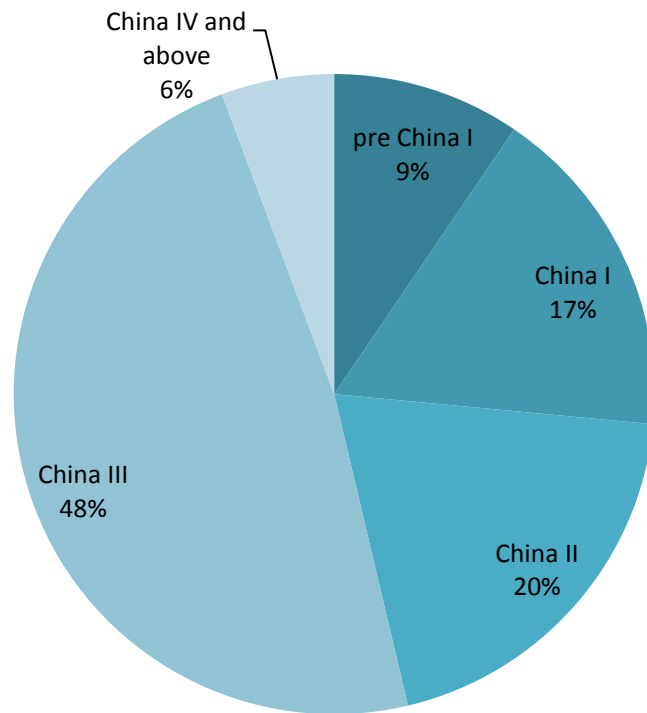
China Emission Standards for Heavy-Duty Diesel Engines, g/kWh (smoke in m-1)

Tier	Date	Test	CO	HC	NOx	PM	Smoke
China III	Planned Jan 1, 2007/Actual July 1, 2008	ESC & ELR	2.1	0.66	5	0.10 0.13	0.8
China IV	Planned Jan 1, 2010/Updated planned July 1, 2013		1.5	0.46	3.5	0.02	0.5
China V	Planned Jan 1, 2012/Will be postponed for sure, expected in 2015		1.5	0.46	2	0.02	0.5
China VI	Under discussion	WHSC					

- Over the past decade, fuel standards in China have been tightened as well but consistently lagged behind the fuel requirements corresponding to the vehicle emission standards.



Managing In-use Vehicles is Critical



China's Automobile Fleet by Emission Standards

Source: 2012 China Vehicle Emission Control Annual Report



Efficient Freight Operations are Also Critical

- China's logistics cost accounts for 18.4% of total GDP in 2007 (8.99% in developed countries)
- Deadhead rate is as high as 40% (10% in developed countries)
- Improving freight and logistics will enhance the efficiency and competitiveness of the economy
 - Moving from export-oriented economy to consumption-based economy will require an efficient transport system
 - Important for Guangdong to remain a high-value manufacturing base in a changing economic structure



Huge energy efficiency potential in green freight has not yet been fully tapped

- The constraints to investment are usually not the financial viability or maturity of Energy Efficiency technologies
 - Cost-effective green freight/logistics technologies and practices are viable and available.
 - Many EE measure are financially viable, with short payback periods and "negative" lifetime costs (fuel savings are greater than additional investment)
 - EE presents the largest and cheapest source of emission reductions
 - But they are not widely deployed in developing countries, despite potential economic benefits from fuel saving.
-

Because Market Failure and barriers exist

- According to China experience, the key problem is:
 - **Lack of information and confidence on the performance, cost and reliability of fuel efficiency technologies/practices**
 - Limited financing for the high up-front investment
 - A lack of institutional champions due to the fragmented nature of Energy Efficiency (EE) measure
 - Returns from EE are shared among different actors (manufactures, suppliers, and trucking) and there is uncertainty on the allocation of returns

Overcoming Market Failure by applying both policy tools and financial instruments

Government to kick start
Government to take actions

Overcoming Market Failure: Multi-fold innovation in Guangdong Green Freight project

- ❑ Technology Demonstration programs
- ❑ Partnership
- ❑ Finance programs
- ❑ Capacity building programs
- ❑ Outreach and Education programs



Guangdong Green Freight Demonstration Project (2011-2015)

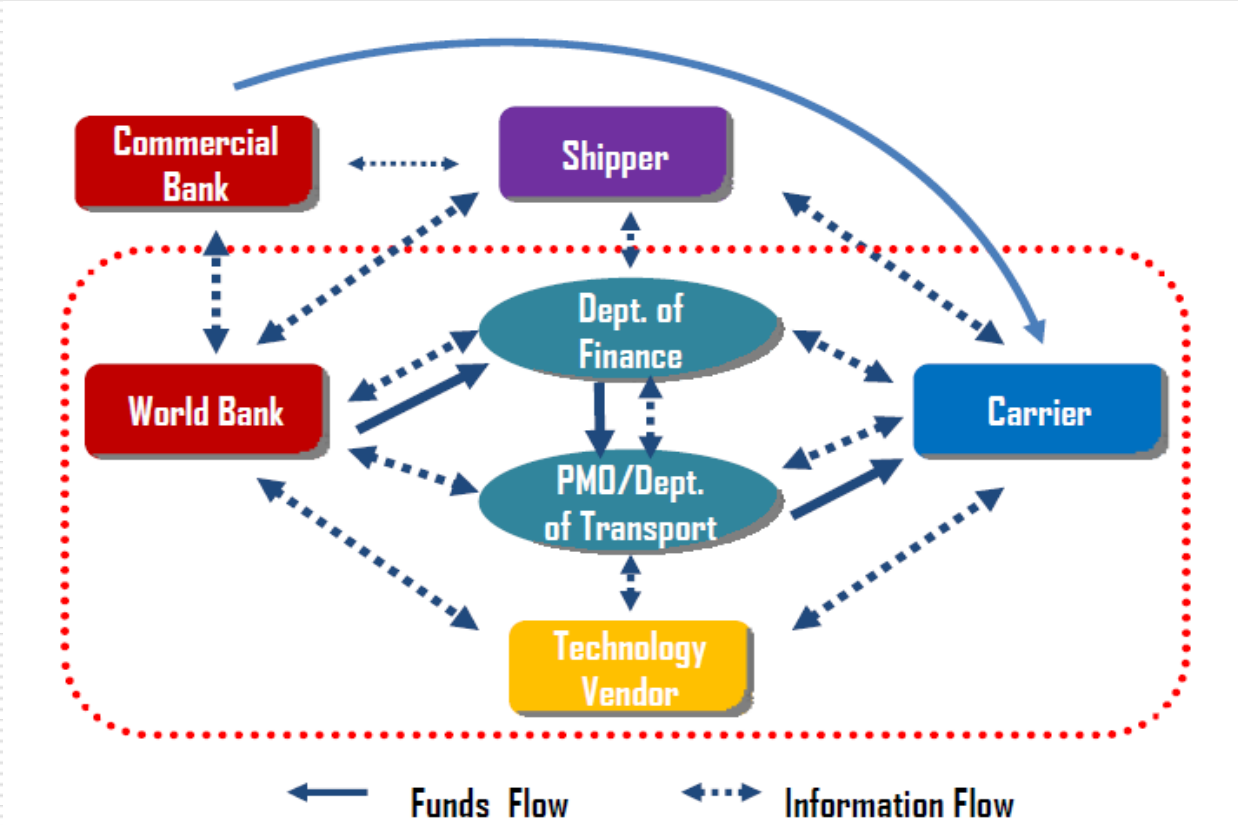
- First demonstration project in China's road freight sector
- Project objectives:
 - Improve energy efficiency through retrofitting truck fleets with new technologies and innovative financing methods
 - Utilize information technologies to facilitate freight operations lowering the deadhead rate of trucks

Pilot Testing

- Carried out in Guangzhou, 2008-2009
 - Technology testing on 14 trucks in three truck fleets
 - Tire systems, Aerodynamics
 - EPA technical guidance, SmartWay™ contacts
- Test provided impetus for larger program
 - Best case 18% improvement and investment by fleet
 - Interest from the government in a broader program



Partnership Framework



Partnership Development

广东省交通运输厅

广东省发展和改革委员会

广东省环境保护厅

广东省财政厅

广东省经济和信息化委员会

广东省公安厅



The World Bank



Australian Government
AusAID



The Energy Sector
Management Assurance
Program



Guangzhou Transport
Committee

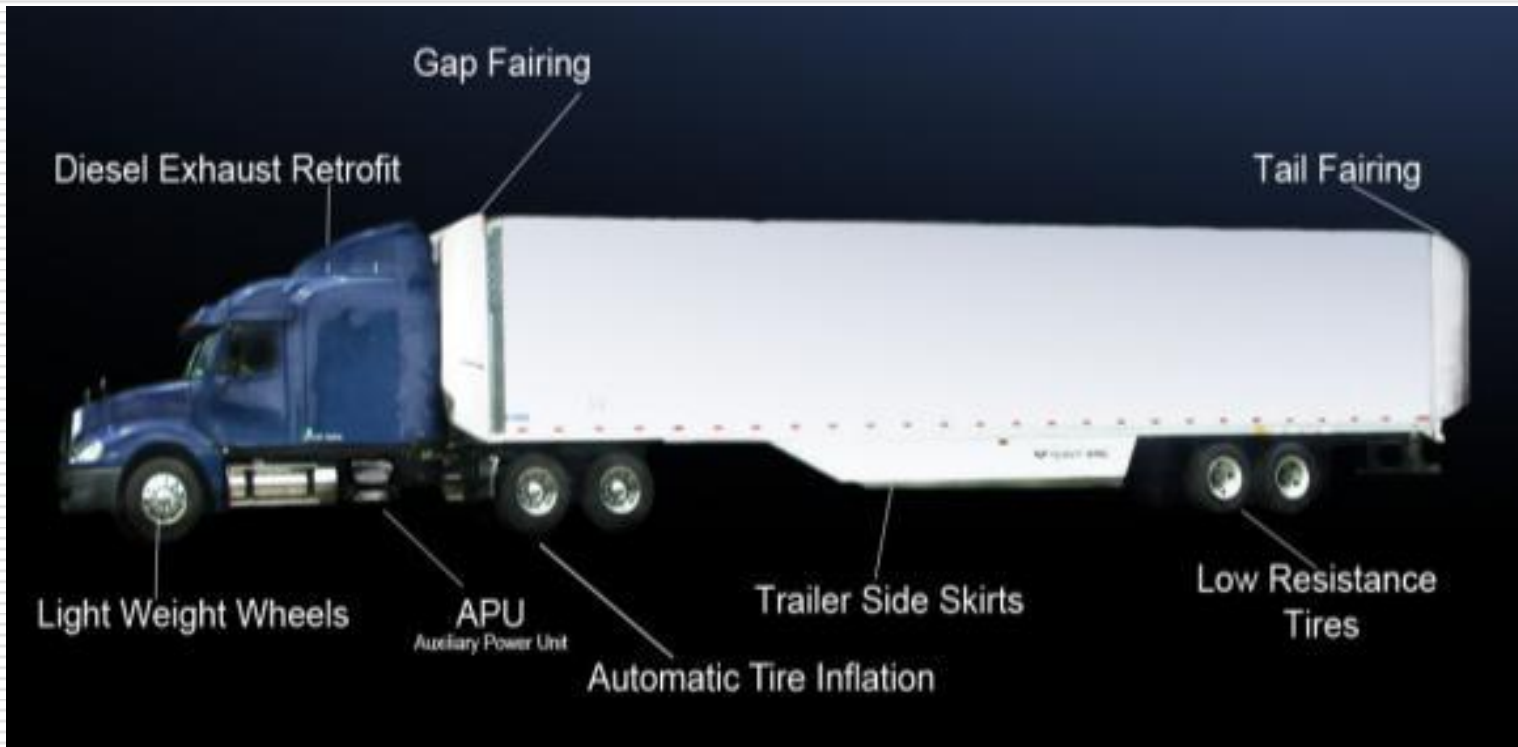


Technology Demonstration

- Energy Efficiency truck technologies demonstration
 - 1500-1800 trucks
- Pilot testing of logistics operation technologies:
 - Pilot Advanced Brokerage Information System
 - Pilot “Drop-and-Hook” freight operations

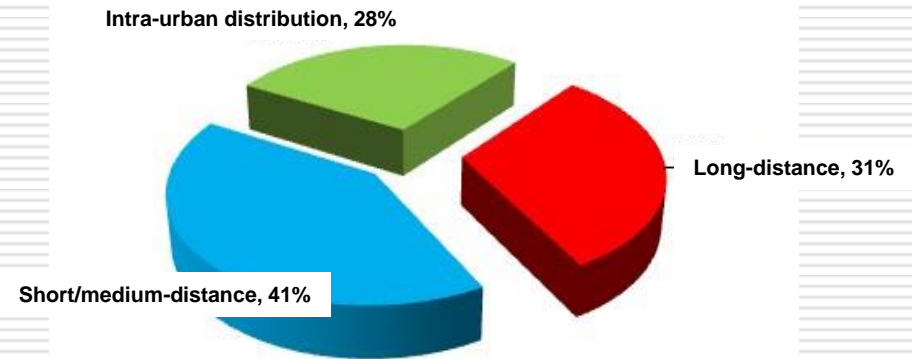
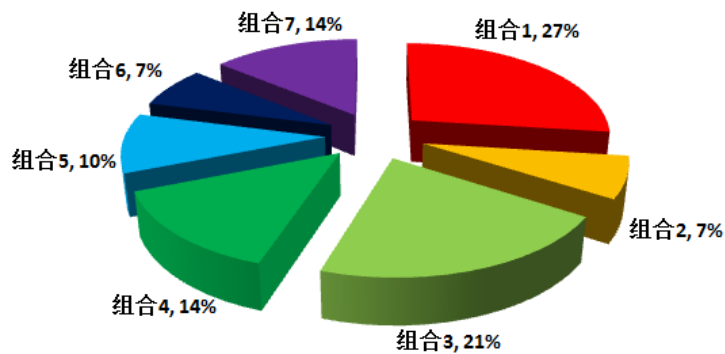


Technology: Truck Retrofitting



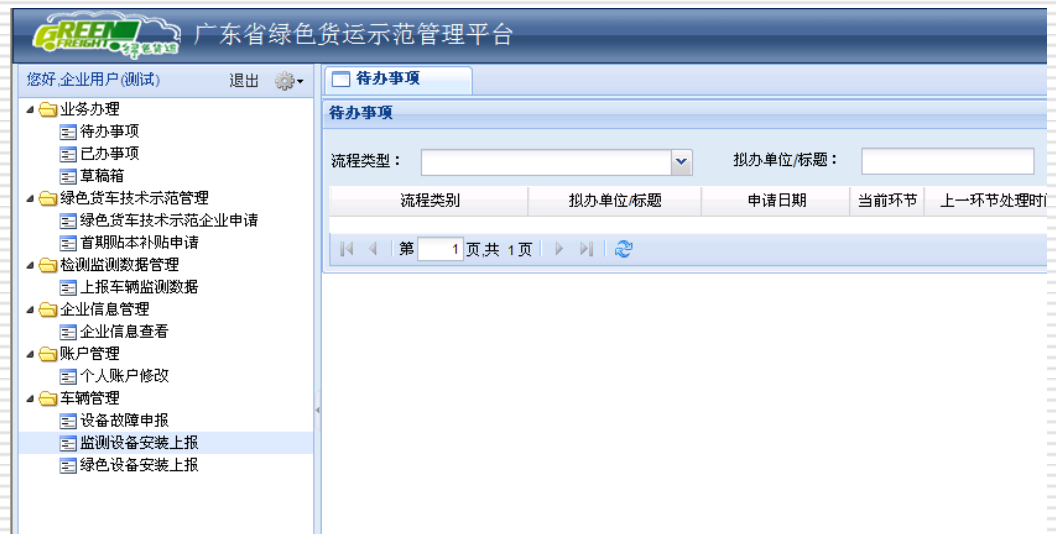
Technology: Phase I Update

- 10 participating trucking companies
- 145 participating trucks
- 7 technology combinations



Technology: Online Monitoring and Reporting System

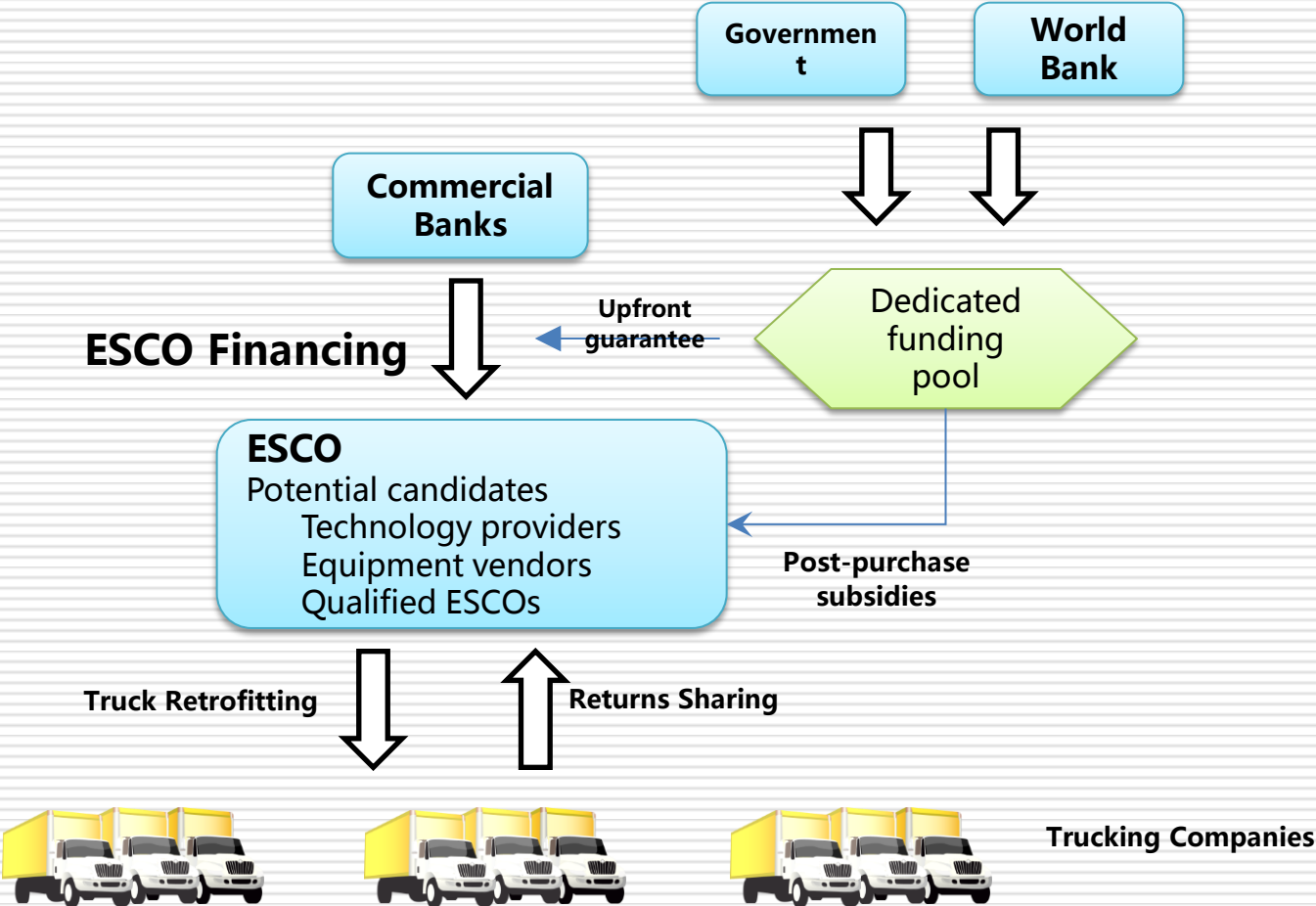
- Record and archive travel speed, loading, fuel consumption, and travel distances
 - Scientifically
 - Objectively
 - Real-time
 - Automatically



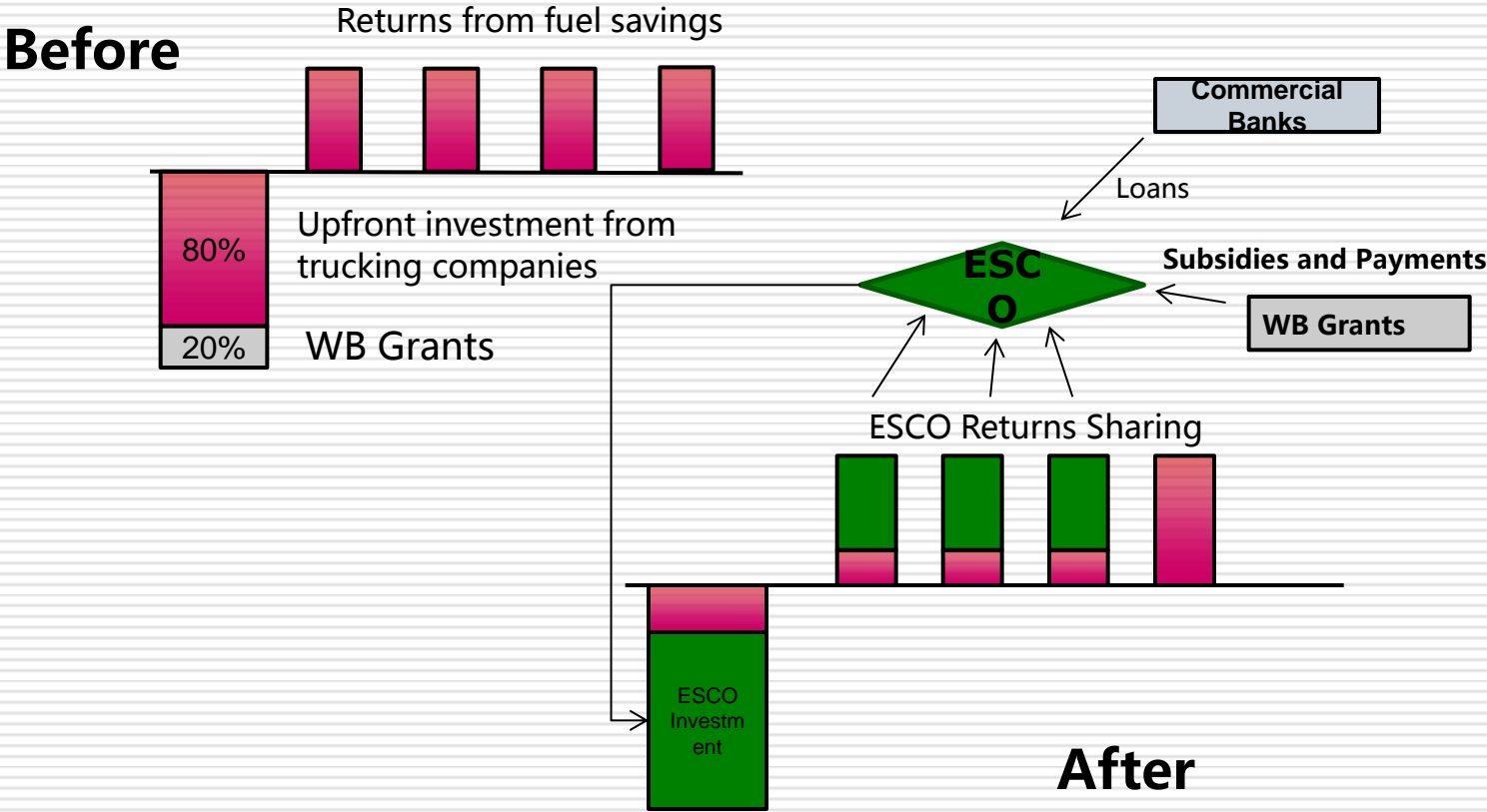
Innovative Financing Programs

- Green Freight technology rebate
 - Based on the prevailing down payment rate for a truck loan
- Performance-based payments
 - Based on the prevailing interest rate of a truck loan
- Better access for SMEs to commercial finance
 - Utilize ESCO as intermediary to connect commercial banks and SMEs

Proposed Innovative Financing Program



Cash Flows for Trucking Companies (in Pink) Before and After



A Multi-Win Scenario

**Trucking
Company**

✓ More balanced cash flow

ESCO

✓ Earn profits from fuel saving

**Commercial
Banks**

✓ Lower risks, lower operational costs

**Technology
Providers**

✓ Increased competitiveness

Government

✓ Leverage social capital for wider goods

Large-scale Capacity Building

- ❑ Research on key policy and regulatory issues
- ❑ Training for government officials and enterprise managers and overseas tours
- ❑ Training for installation and operation of technologies
- ❑ Training for drivers on energy efficient driving skills

Overseas Study Tours and Seminars



Driver Training



广东省绿色货运示范项目推介资料:



Marketing and branding

- ❑ “Green Freight” logo
- ❑ “Green Freight” website
- ❑ Public awareness raising and promotion
- ❑ Documentation and information dissemination
- ❑ “Green Freight Trade Fairs” and “Green Freight Submits”



Project Branding



Monthly Reports and Project Website



A screenshot of the Guangdong Green Freight Network website. The header features the 'GREEN FREIGHT' logo and the text '广东省绿色货运网' and '“绿色货运, 低碳交通”'. Below the header is a navigation bar with links: '首页 | 绿色货运示范项目 | 绿色货车技术示范 | 甩挂运输示范 | 物流交易信息平台示范 | 最新动态 | 培训 | 政策法规 | 信息查询 | 论坛'. The main content area includes a section titled '绿色货运示范项目简介' with a '+ MORE' link, a section titled '全球环境基金赠款绿色货运示范项目评估会议' with a photo of a meeting, and a '会员登录' section with fields for '帐号', '密码', and '验证' (with a 'IOSP' logo), and buttons for '登录' and '注册'. At the bottom, there is a '示范企业名单' section with '李峰' and '深圳丛文科技' listed, and an '信息查询' section.



Broad Dissemination

Home > Green Trucks Pilot Project in Guangzhou (video)

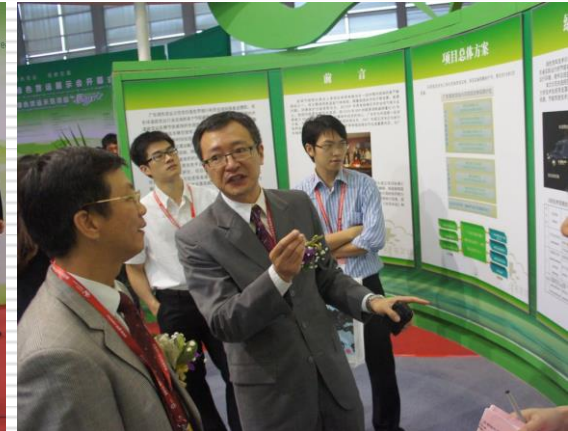
Green Trucks Pilot Project in Guangzhou (video)



To support Guangzhou's efforts to improve air quality in preparation for the 2010 Asian Games, the World Bank and CAI-Asia Center implemented a pilot project aimed at improving fuel economy and reducing CO2 emissions and air pollution from trucks. Preparations are now underway for a broader freight and logistics program in Guangdong Province and China, in collaboration with World Bank, Cascade Sierra Solutions and U.S. EPA, and making use of the US experience with the Smartway program for freight. Freight is not yet getting enough attention compared to other transport modes. This is why we developed a 10 minute film about our trucks



Green Freight Trade Fair



Key Lessons Learnt

Guangdong Green Freight Demonstration Project

- Huge potential for energy efficiency and emission reduction in road freight sector
- Inspiration from the US SmartWay approach
 - Overall programming, Technical guidance, contacts from SmartWay partners
- Importance of locally generated knowledge
 - Pilots and M&E for actual performance, cost and reliability of fuel efficiency technologies/practices
- Partnership with other stakeholders incl. both the public and the private sector incl. local banks - key for scale-up
- Strong promotional and branding efforts help
- What is the World Bank's role?
 - Convener and facilitator, and information, knowledge, and/or financing provider



Key Lessons Learnt

The Role of Government

- ❑ Overcoming Market Failure by applying both policy tools and financial instruments
 - ❑ An effective role for government hinges on
 - ❑ Putting in place a sound enabling environment to attract investment
 - ❑ Coupled with public financing mechanisms to provide incentives to investors and unlock commercial financing
 - ❑ Conducive policies are essential to catalyzing commercial investment in clean energy
 - ❑ Even with effective clean energy policies in place, public financing mechanisms are still needed to mitigate risks and close financing gaps
-

Key Lessons Learnt

The Role of Government

- ❑ Public financing mechanisms requires delicate design
 - ❑ Innovative Energy Efficiency public financing should
 - Mitigate financiers' risk perception
 - Aggregate small deals
 - Enhance the interest and capacity of domestic banks
 - Attract, but not crowd out, private capital
-

Challenges Ahead

- Keep the “Snowball” rolling and keep it “Cool”...
 - Convincing data of fuel saving effects for green technologies
 - Replication in other places in China
 - Attracting participating companies, particularly shippers
 - Dialogue with national agencies on technology certification and other policy and regulatory issues
 - Development of local suppliers and local R&D capacity
 - Materializing the ESCO-oriented financing option and development of green finance market