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Report No:

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GEF GRANT

IN THE AMOUNT OF
US$ 4.2 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

GEF GUANGDONG GREEN FREIGHT DEMONSTRATION PROJECT

[DRAFT]
February 18, 2011

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 15, 2010)

Currency Unit	=	RMB
RMB 6.67	=	US$1

FISCAL YEAR

July 1 – June 30

ABBREVIATIONS AND ACRONYMS

CDM	Clean Development Mechanism	ICB	International Competitive Bidding
CER	Certified Emissions Reduction	IDA	International Development Association
CHUEE	China Utility Energy Efficiency	M&E	Monitoring and Evaluation
DA	Designated Account	MOF	Ministry of Finance
DOT	Department of Transport	MOT	Ministry of Transport
EMM	Environmental Management Manual	NCB	National Competitive Bidding
EPA	Environmental Protection Agency	OA	Operating Account
FM	Financial Management	OECD	Organization for Economic Co-operation and Development
FMM	Financial Management Manual	OP	Operational Policy
GEF	Global Environment Facility	ORAF	Operational Risk Assessment Framework
GHG	Greenhouse Gas	PDO	Project Development Objective
GOC	Government of China	PMO	Project Management Office
GPAO	Guangdong Provincial Audit Office	PLG	Project Leading Group
GPFB	Guangdong Provincial Finance Bureau	SME	Small and Medium-sized Enterprises
GPS	Global Positioning System	SOE	Statement of Expenditure
IBRD	International Bank for Reconstruction and Development	TOR	Terms of Reference

Regional Vice President:	James W. Adams, EAPVP
Country Director:	Klaus Rohland, EACCF
Sector Director:	John Roome, EASSD
Sector Managers:	Ede Jorge Ijjasz-Vasquez, EASCS
	Vijay Jagannathan, EASIN
Task Team Leader:	Ke Fang, EASIN

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PAD DATA SHEET

People's Republic of China

GEF Guangdong Green Freight Demonstration Project

PROJECT APPRAISAL DOCUMENT

East Asia and Pacific Region

EASSD

Date: August 31, 2010 Country Director: Klaus Rohland, EACCF Sector Director: John Roome Sector Managers: Vijay Jagannathan, EASIN; Ede Jorge Ijjasz-Vasquez, EASCS Team Leader(s): Ke Fang, EASIN Project ID: P119654 Lending Instrument: GEF Grant	Sector(s): General Transportation Sector Theme(s): Climate Change (P), Environmental Policies and Institution (S), EA Category: C

Project Financing Data:

Proposed terms:

[ ] Loan [ ] Credit [X] Grant [ ] Guarantee [ ] Other:

Source	Total Amount (US$M)
Total Project Cost:	US$ 13.97 million
Cofinancing:	US$ 9.77 million
Recipient:	US$ 9.77 million
Total GEF Financing:	US$ 4.2 million
IBRD	US$ 0.0
IDA	US$ 0.0
New	US$ 0.0
Recommitted	US$ 0.0

Recipient: Ministry of Finance, People's Republic of China

Responsible Agency: Department of Transport, Guangdong Provincial Government

Contact Person: Mr. Xu Shaohua, Director, Project Management Office for the GEF Green Freight Project, Guangdong Department of Transport, 27 Baiyun Road, Guangzhou, Guangdong, China. Telephone No.: 020-8383-5328, Email: greenfreight_gd@126.com

Estimated Disbursements (Bank FY/US$ m)			
FY	2010	2011, 2012 and 2013	2014
Annual	0.2	1.2	0.4
Cumulative	0.2	3.8	4.2

Project Implementation Period: April 1, 2011 – March 31, 2015
Expected effectiveness date: March 31, 2011
Expected closing date: September 30, 2015

Does the project depart from the CAS in content or other significant respects?	○ Yes ● No
If yes, please explain:	

Does the project require any exceptions from Bank policies?	○ Yes ● No
Have these been approved/endorsed (as appropriate by Bank management?	○ Yes ● No
Is approval for any policy exception sought from the Board?	○ Yes ● No
If yes, please explain:	

Does the project meet the Regional criteria for readiness for implementation?	● Yes ○ No
If no, please explain:	

Project Development Objectives:
(a) demonstrate the global and local environmental benefits of the application of energy efficiency vehicle technologies and operating techniques, and (b) support improving energy efficiency and reducing greenhouse gas emissions in the road freight transport sector in Guangdong Province.

Project description [*one-sentence summary of each component]*

Component 1: Green Truck Technology Demonstration: facilitating communication and cooperation among energy efficient vehicle technology suppliers, freight carriers, freight shippers, and other key stakeholders, and enabling project participants access to government and commercial financing, including the provision of financing Green Freight Technology Rebates and Performance-Based Incentives schemes.

Component 2: Green Freight Logistics Demonstration: Carrying out of market studies for drop and hook logistics methods and a proposed provincial logistics brokerage platform, and assisting in demonstration exercises of such methods and platform, through the provision of financing of Green Freight Technology Rebates and Performance-Based Payments.

Component 3: Capacity Building: Provision of technical advisory services for the preparation of green freight policy research papers, delivery of training curriculum/materials for government officials and enterprise managers, and promotion of the Project and green freight development, including support to the Guangdong Green Freight websites.

Component 4: Project Implementation Support: Provision of technical advisory services for project implementation, stakeholder consultations, Project results evaluation and dissemination, as well as project management.

Safeguard policies triggered?	
Environmental Assessment (OP/BP 4.01)	● Yes ○ No
Natural Habitats (OP/BP 4.04)	○ Yes ● No
Forests (OP/BP 4.36)	○ Yes ● No
Pest Management (OP 4.09)	○ Yes ● No
Physical Cultural Resources (OP/BP 4.11)	○ Yes ●No
Indigenous Peoples (OP/BP 4.10)	○ Yes ● No
Involuntary Resettlement (OP/BP 4.12)	○ Yes ● No
Safety of Dams (OP/BP 4.37)	○ Yes ● No
Projects on International Waters (OP/BP 7.50)	○ Yes ● No
Projects in Disputed Areas (OP/BP 7.60)	○ Yes ● No

Conditions and Legal Covenants:

Financing Agreement Reference	Description of Condition/Covenant	Date Due

Section I.A., Schedule of Project Agreement	The Project Implementing Entity shall maintain a Project Management Office at the Guangdong Provincial Department of Transport (DOT) with adequate staff responsible for different aspects of the Project.	Recurring
Section I.C., Schedule of Project Agreement	The Project Implementing Entity through the PMO shall ensure that each Participating Company performs, in accordance with the provisions of its Participation Agreement, all of the obligations of said Participating Company therein set forth.	Recurring

I. Strategic Context

A. Country Context

1. China is responsible for up to 60% of the global increase in carbon emissions over the past ten years, and today, China is among the world's largest emitters of greenhouse gases, accounting for nearly 25% of global carbon emissions.[1] Recognizing the need to stem recent energy consumption trends and the impacts of that consumption – air pollution, greenhouse gases, and threats to energy security – Chinese leadership announced at the Copenhagen climate negotiations in December 2009 an ambitious target of a 40 to 45% improvement in national energy efficiency from 2005 by 2040.

2. Leading up to and in support of this goal, the Government of China (GOC) has passed a series of laws and regulations to improve energy efficiency and mitigate greenhouse gas emissions as well as a series of national energy efficiency targets since 2005. For example, in 2008, the Ministry of Transport committed to reduce road freight sector energy intensity from 2005 levels 12% by 2015, and 16% by 2020.

B. Sectoral and Institutional Context

3. The transport sector is a significant energy consumer and a major source of greenhouse gas (GHG) emissions in China. The sector comprised 30% of total national crude oil consumption in 2008 and emitted about 290 million tons of CO_2 in 2004. Further, GHG emissions from transport are expected to grow to 522 million and 1.108 billion tons by 2015 and 2030, respectively. Within the transport sector, road-based freight transport, which primarily comprises trucks, accounts for 54% of total transport sector fuel consumption.[2]

4. Guangdong province has experienced a significant increase in freight traffic over the past decade. For example, total freight traffic, in tons, moved by trucks increased by more than 125% since 2000.[3] Over that same period, the provincial highway network grew at an average rate of 11% per year,[4] and the number of registered trucks grew by 56%.[5] Road-based-freight accounted for 70% of transported goods (measured in tons) in 2008.[6]

5. Despite the growing importance of this sector, energy efficiency in Chinese road freight transport, including in Guangdong Province, remains very low. There are two major challenges, the first being **truck technologies.** According to the Ministry of Transport

[1] Stockholm Environment Institute (SEI). November 2009. "Going Clean – The Economics of China's Low Carbon Development." Stockholm Environment Institute and the Chinese Economists 50 Forum.
[2] Ministry of Transport, September 25, 2008, Medium and Long Term Plan for Energy Conservation in Road and Waterway Transport in China "公路水路交通节能中长期规划纲要";
http://www.moc.gov.cn/zfxxgk/JG010000/JG010300/JG010303/200811/t20081104_533455.html
[3] Data Source: Guangdong Statistical Yearbook. 2009. "Table 14-5 Total Freight Traffic."
http://www.gdstats.gov.cn/tjnj/table/14/e14_5.htm
[4] Guangdong Statistical Yearbook. 2009. "Table 14-12: Length of Highways and Number of Bridges."
http://www.gdstats.gov.cn/tjnj/table/14/e14_12.htm
[5] Clean Air Initiative. May 2010. "Guangzhou Green Trucks Pilot Project: Background Analysis Report for the World Bank -- "Truck GHG Emission Reduction Pilot Project."
[6] China statistic year book 2000-2008.

(MoT), the fuel efficiency of Chinese trucks is about 30% lower than in advanced OECD countries. This is mainly because advanced fuel saving technologies and practices, despite their economic benefits through fuel saving, have not been widely adopted in China. This market failure occurs because: (a) the competition among carriers, i.e., trucking companies is very strong and carriers are reluctant to experiment with new or unknown technologies; and (b) the market lacks information on the performance, cost and availability of fuel efficiency technologies.

6. The second obstacle to improved energy efficiency in this sector is **logistics management.** Similar to many industrialized countries, the trucking industry in China is largely operated by the private sector and the sector is fragmented and most companies are very small – often single truck owner operators. However, different from other countries, there are no clearly leading companies, of which each at least occupies 1% of road freight market in China and thus can play a role in leading innovations and improvements in operational management. Moreover, lack of modern logistics brokerage makes it difficult to share information and coordinate operations among carriers. As a result, a large number of annual empty back-haul kilometers -- reported to be more than 30% of all freight vehicle-kilometers traveled in Guangdong Province.

C. Higher Level Objectives to which the Project Contributes

7. The proposed Guangdong Green Freight Demonstration Project (the Project) will address the market failures discussed above by providing better information and better confidence in the performance of proved energy efficiency technologies and practices, increased awareness and demand for them, and increased supply of the technologies in Chinese market.

8. The objectives of the Project are consistent with the World Bank pillars of the Country Partnership Strategy for 2006-2010 (Report No. 35435-CN), approved by the Board on May 23, 2006. Specifically, the project supports the third pillar: "managing resource scarcity and environmental challenges," and the fourth pillar: "deepen financial intermediation, by expanding access to financial services (especially among small and medium enterprises)…"

9. The proposed project is fully consistent with the GEF climate change focal area, specifically in terms of climate change mitigation, where the GEF "supports projects that reduce or avoid greenhouse gas emissions in the areas of…energy efficiency, and sustainable transport."[7] The project also supports the objectives of the GEF Technology Transfer Fund, as it facilitates broader application and deployment of innovative energy efficiency technologies in China.

II. Project Development Objectives

A. PDO

10. The Project Development Objectives (PDO) of the Guangdong Green Freight Demonstration Project are to: (a) demonstrate the global and local environmental benefits of the application of energy efficiency vehicle technologies and operating techniques, and (b) support

[7] UNDP. Accessed 21 July 2010. "GEF Climate Change Focal Area." http://www.undp.org/gef/portfolio/cc.html

improving energy efficiency and reducing greenhouse gas emissions in the road freight transport sector in Guangdong Province.

1. Project Beneficiaries

11. Project beneficiaries include: (a) more than 500, 000 trucking companies registered in Guangdong (including truck owners and operators) that are seeking to reduce operating costs; (b) about 96.4 million residents in Guangdong (about 47.2 million are women), particularly those (about 63% of the total population) living in urban areas, who are demanding better air quality while still enjoying continuous economic growth; (c) suppliers of energy efficient technologies seeking to expand the market for these technologies; and (d) shippers (or enterprises which request the carriers to transport their goods) who are seeking to reduce carbon footprints in their business practices and make their business more environmentally friendly. [8]

2. PDO Level Results Indicators

12. The key outcome indicators for measuring achievement of the development objectives are: (a) improvement in fuel economy (km per unit of fuel combusted) of participating trucks; (b) reduction in operating cost of truck fleets managed by participating companies (per ton-km travelled); and (c) total amount of CO_2e emissions reduction directly generated from fuel savings through the duration of the demonstration.

13. Intermediate indicators include: (a) total private sector investment leveraged through the Project; (b) number of drivers trained; (c) establishment and maintenance of Project website; (d) number of government officials and enterprise representatives trained; (e) development and implementation of Green Freight Logistics and Technology Trade Fair; and (f) policy recommendations to reduce carbon footprints from the sector are presented to the Guangdong Provincial Government.

III. Project Description

A. Project Components

14. Component 1: Green Truck Technology Demonstration: facilitating communication and cooperation among energy efficient vehicle technology suppliers, freight carriers, freight shippers, and other key stakeholders, and enabling project participants access to government and commercial financing, including the provision of financing Green Freight Technology Rebates and Performance-Based Incentives schemes.

15. Component 2: Green Freight Logistics Demonstration: Carrying out of market studies for drop and hook logistics methods and a proposed provincial logistics brokerage platform, and assisting in demonstration exercises of such methods and platform, through the provision of financing of Green Freight Technology Rebates and Performance-Based Payments.

[8] All figures used in this paragraph are derived from the 2009 Guangdong Statistics Yearbook.

16. Component 3: Capacity Building: Provision of technical advisory services for the preparation of green freight policy research papers, delivery of training curriculum/materials for government officials and enterprise managers, and promotion of the Project and green freight development, including support to the Guangdong Green Freight websites.

17. Component 4: Project Implementation Support: Provision of technical advisory services for project implementation, stakeholder consultations, Project results evaluation and dissemination, as well as project management.

B. Project Financing

1. Lending Instrument

18. The project will be supported through a grant from the Global Environment Facility (GEF), totalling US$ 4.2 million.[9]

2. Project Cost and Financing

19. The Table below indicates the Project cost and GEF co-financing, by Component:

Project Components	Cost (USD)	GEF (USD)	GEF (%)
1) Green Truck Technology Demonstration	9,805,000	2,400,000	24
2) Green Freight Logistics Demonstration	1,900,000	900,000	47
3) Capacity Building	1,645,000	550,000	33
4) Project Implementation Support	560,000	290,000	52
Total	**13,910,000**	**4,140,000**	**30**
Contingencies	60,000	60,000	100
Total Project Cost	**13,970,000**	**4,200,000**	**30**

20. Counterpart financing include contributions from both the government and participating companies. See detailed cost table in Annex 2.

IV. Implementation

A. Institutional and Implementation Arrangements

21. The Guangdong Provincial Government designated the Department of Transport (DoT) as the leading agency for preparation and implementation of the Project. A Project Management Office (PMO) has been established at the DoT, which is overseen by a Project Leading Group (PLG) that comprises senior officials from various relevant provincial governmental departments, including the DoT, the Development and Reform Commission, the Department of Finance, the Department of Public Security, the Environment Protection Bureau, and the Economic and Information Commission. See Annex 3 for further details.

[9] In addition, a GEF Project Preparation Grant (PPG) in amount of $225,000 has been provided to support project preparation activities.

B. Results Monitoring and Evaluation

22. The Monitoring and Evaluation (M&E) system of the Project includes: (i) regular monitoring and documentation by participating companies: (2) monitoring, inspection and evaluation by an independent M&E consultant by using GPS-based monitoring device installed on each participating trucks; (3) periodic inspection and verification by PMO staff. PMO will prepare a consolidated monitoring report and submit to the Bank every six months. Further details on the full monitoring and evaluation process may be found in Annex 3.

C. Sustainability

23. Long-term sustainability will be ensured through the following features in the project design:

- Collaboration with leading national government agencies, such as NDRC and MoT, and the US EPA SmartWay Program and several NGOs, such as the Clean Air Initiative in Asia (CAI Asia Center), the Energy Foundation, and the Cascade Sierra Solutions (CSS), which have been actively promoting clean and energy efficiency technologies in the transport sector;
- Facilitating cooperation among technology vendors, freight carriers, freight shippers, and facilitating discussion and initial development of a market-oriented voluntary green truck partnership program in the longer term;
- Communicating with commercial banks to promote leveraging of local financing mechanisms for the procurement of green freight technologies;
- Setting a precedent for encouraging international suppliers to provide equipment to participating local firms;
- Identifying sector-wide improvements that would complement the green freight technologies, such as a province-wide logistics brokerage platform, or wide scale adaptation of drop-and-hook methods;
- Identifying areas for institutional or policy improvement that could further support energy efficiency gains in the freight sector; and
- Providing capacity-building training to relevant government officials and enterprise managers.

V. Key Risks

24. As discussed in detail in Annex 4 Operational Risk Assessment Framework (ORAF), the overall risk of the Project is rated Medium-Likelihood. The most critical risks are related to (i) the design of the Project and (ii) the delivery quality of the Project. As such, some participating companies may not use the green technology/equipment properly, and applications of these technologies may not be widely replicated.

25. To mitigate those risks, the project preparation process has included intensive communication and collaboration among different stakeholders. This inclusive process will be further enhanced during the project implementation to obtain inputs from key stakeholders to the detailed design and implementation of the Project. Additionally, the green technology

demonstration will only include those that have been verified by the US EPA SmartWay Program or similar national energy efficient trucking technology accreditation systems.

VI. Appraisal Summary

A. Economic and Financial Analysis

26. The Project has the dual-benefit of supporting economic development and the environment simultaneously. By improving the fuel efficiency of Project vehicles, the Project results in (a) the reduction of operating costs for participating companies; and (b) mitigation of greenhouse gas emissions. Further, since this is a GEF grant project, the impacts of the investment are two-fold – there is small impact achieved from the demonstration itself ("demonstration impacts"), as well as the more far-reaching repercussions from program replication ("long term impacts").

27. The Project net benefit (benefit, less expenditures) from fuel savings for Component 1 in the short term would be about US$ 9.4 million –more than the GEF grant itself, which means that from an economic perspective, short term emissions reductions achieved from this component (26,760 tons CO_2e) pay for themselves. For complete assumption and derivation of these figures, please see Annex 7: GEF Incremental Cost Analysis.

28. When factoring in long term improvements from Component 2 to the compounding effects of Component 1 of the Project, it is expected to see a fleet-wide 10% fuel efficiency improvement across 60% registered trucks in Guangdong Province.[10] Assuming a constant fleet size in 2009, annual CO_2e emissions reductions would be about 1.2 million tons per year.

29. Since the GEF grant is US$4.2 million, the cost of GHG reductions equates to US$3.5 per ton –about a quarter of the cost borne by entities capped under the Kyoto Protocol to reduce emissions (based on market prices for EU ETS allowances).

B. Technical

30. For the purpose of the demonstration, only technologies that have already been approved by the US SmartWay Program or similar national energy efficient trucking technology accreditation systems are eligible. The pilot Green Freight Demonstration Project in Guangzhou, Guangdong Province showed that these technologies can also be effective in China. These technologies include: low resistance tires, tire pressure gauges, side skirts, gap fairing, roof domes, as well as "smart-driving" training for drivers.

C. Financial Management

31. The GEF grant, including overseeing the Designated Account, will be managed by Guangdong Provincial Finance Bureau (GPFB). A financial management capacity

[10] For reference, OECD trucks are on average 30% fuel efficient than trucks in China, according to Ministry of Transport, Medium and Long Term Plan for Energy Conservation in Road and Waterway Transport in China.

assessment has been conducted by the Bank and actions to strengthen the Project's financial management capacity have been agreed with the relevant implementing agencies. The FM assessment has concluded that with the implementation of these proposed actions, the financial management arrangements will satisfy the Bank's minimum requirements under OP/BP 10.02. Annex 3 provides additional information on financial management.

D. Procurement

32. The PMO is responsible for preparing the procurement plan and bidding documents, as well as the request for proposals, organizing bidding process, and reviewing all necessary domestic and the Bank review procedures. The procurement capacity assessment concluded that the PMO has adequate experience and capacity to carry out procurement activities for the proposed Project. Measures to further strengthen the PMO's procurement capacity have been agreed and will be implemented during project implementation (see details in Annex 3). All procurement activities have been identified and documented in a Procurement Plan which has been reviewed and cleared by the Bank at Appraisal.[11]

E. Social (including safeguards)

33. The Project will have positive social impacts in Guangdong Province. It will not have any impact on specific ethnic minority communities and will not involve relocation of people or acquisition of land.

F. Environment (including safeguards)

34. The project is classified as Category C because of its minimal adverse environmental impacts. An environmental screening has been conducted and an Environmental Management Manual (EMM) has been prepared to provide guidance to PIUs for managing environmental issues in the construction and operation phase. The environmental screening concluded that the project will bring significant positive environmental impacts, including reduction of greenhouse gases. Possible environmental issues include noise, air pollution and solid waste during the auxiliary facility installation stage. The preventive and mitigation measures, monitoring measures and training during the construction and operational phase are noted in the EMM, and will either minimize the impacts to acceptable level or eliminate the negative impacts.

35. Public consultation, including expert consultations, questionnaires, symposia, and interviews, was conducted with stakeholders. The EMM has been disclosed at the website of the PMO and relevant government agencies. It was also disclosed at the website of the World Bank's InfoShop on October 1, 2010.

G. Other Safeguards Triggered (if required)

36. No additional safeguards are triggered by this Project.

[11] The Procurement Plan may be updated during project implementation, subject to no objection from the Bank.

Annex 1: Results Framework and Monitoring

Project Development Objective (PDO): (a) demonstrate the global and local environmental benefits of the application of energy efficiency vehicle technologies and operating techniques, and (b) support improving energy efficiency and reducing greenhouse gas emissions in the road freight transport sector in Guangdong Province.

PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Annual Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR 1	YR 2	YR3	YR 4					
Indicator One: Improvement in fuel economy (km per unit of fuel combusted) of participating trucks**	☒	Liter/100 km	32	n/a	30.4	28.9	27.4		Reported every semester	GPS devices; existing DoT and PSB monitoring platform; supplemental surveys	Participating trucking companies; Independent consultants, under supervision of the PMO; and PMO	Average of improvements on all participating trucks
Indicator Two: Reduction in operating cost of truck fleets managed by participating companies (per ton-km travelled)**	☒	$ / ton-km	25.6	n/a	24.3	23.1	21.9		Reported annually	GPS devices; existing DoT and PSB monitoring platform; supplemental surveys	Participating trucking companies; Independent consultants, under supervision of the PMO; and PMO	Average of improvements on truck fleets of all participating companies
Indicator Three: Total amount of CO_2e emissions reduction directly generated from fuel savings through the duration of the demonstration**	☒	tons CO_2 / ton-km	1.50	n/a	1.43	1.36	1.29		Reported annually	GPS devices; existing DoT and PSB monitoring platform; supplemental surveys	Consultants, under supervision of the PMO; and PMO	Average of improvements on all participating trucks.
Intermediate Indicator One: Total private sector investment leveraged through the Project.	☐	$'000,000	0	0.1	0.3	0.3	0.3		Reported every semester	Rebate Scheme Reports	DoF and PMO	Measure the private sector investment leveraged by the Project.

Intemediate Indicator Two: Number of existing or newly purchased trucks installed the green truck technologies			0	0	330	435	435		Reported every semester			Measure progress in project implementation
Intemediate Indicator Three: Number of drivers participating in the Project training program	☐	Number of drivers	0	100	500	600	0		Reported every semester	Post-training reports (including copies of driver training certificates)	Trainers under supervision of PMO; and PMO	Approximately one driver per participating vehicle.
Intermediate Indicator Four: Establishment of a Project website	☐	Establishment of website	No website	Website established	Website maintained	Website maintained	Website maintained		Reported every semester	Review of latest updates in project website and feedback from website users	PMO	The website will include information about the Project, relevant green freight news and regulations, and on-line survey forms.
Intermediate Indicator Five: Number of government officials and enterprise representatives trained through Project	☐	Number of government officials (g) and enterprise representatives (e)	0	15 (g)	60 (g) and 1000 (e)	60 (g) and 1000 (e)	25(g) and 1000 (e)		Reported every semester	Training evaluation and feedback forms collected from each trainee	Trainers under supervision of PMO; and PMO	By training government officials and enterprises, the repercussive effects of the project expand.
Intermediate Indicator Six: Organization and implementation of green freight trade fair	☐	Implementation of green freight trade fair	No fair	Implementation of green freight trade fair.	n/a	n/a	n/a		Reported annually	Participation registration data record, feedback forms collected from participants, and brief post-evaluation note	Consultants, under supervision of the PMO; and PMO	The green freight trade fair, the first of its kind in China, will support project implementation and support a market-based

												approach to improving freight vehicle energy efficiency
Intermediate Indicator Seven: Policy recommendations to address critical institutional and regulatory needs for improving the energy efficiency of the sector presented to Guangdong Provincial Government for approval	☒	Institutional and Policy Needs (qualitative)	n/a	n/a	Policy actions identified	Policy notes completed and submitted to the Provincial Government	n/a		Reported every semester	Progress reports and final reports (including policy notes and PPT presentations)	Consultants, under supervision of the PMO; and PMO	Three Project studies, drop-and-hook feasibility study, logistics brokerage feasibility study, and the green freight policy study, will provide analyses on key institutional and policy needs.

Annex 2: Detailed Project Description

A. Component 1: Green Truck Technology Demonstration

1. Overview

1. This component will facilitate communication and cooperation among energy efficient vehicle technology suppliers, freight carriers, freight shippers, and other key stakeholders, and enabling Project participants access to government and commercial financing, including the provision of financing Green Freight Technology Rebates and Performance-Based Incentives schemes.

2. Component Activities

2. *Participation Criteria Development.* To ensure program sustainability, a fair and transparent process has been established to invite program participants, and participant criteria have been jointly developed by the PMO and the World Bank team.

3. *Selection of Eligible Technologies.* For the purpose of the demonstration, only technologies that have already been verified by the US EPA SmartWay Program or similar national energy efficient trucking technology accreditation systems are eligible. These technologies that were implemented during the pilot Green Freight Demonstration Project in Guangzhou, Guangdong Province, showed that these technologies can also be effective in China.

4. *Supplier Management (Trade Fair).* The PMO will be responsible for a trade fair event, which would serve as a "One-Stop Shop" venue for all program stakeholders. The objectives of the event are to: (a) create an opportunity to link Chinese companies with domestics and overseas vendors of green freight technology, as well as to link Chinese companies and participating commercial banks and government agencies; (b) introduce the Project in a high-visibility venue; (c) and provide training on green freight technology to a wide audience).

5. *Identification of Certified Suppliers and Establishing Initial Contact*. Prior to the trade fair, a small outreach campaign will be conducted to ensure that the maximum number of eligible suppliers are made aware of the Project and are invited to participate.

6. *Incentives.* Since the sustainability of this component hinges on more than just the demonstration of green truck technologies – the development of effective, market-based mechanisms to support financing of the equipment, as well as the development of the market for the supply of green technologies is equally critical – special consideration has been given to project financing and incentives. Specifically, the Project includes the following elements:

    - Traditionally, small and medium-sized enterprises (SMEs) have less access to financing than traditional larger firms. Since, in terms of fleet size, SMEs comprise more than 95% of Guangdong's freight industry, to support long term Project sustainability, the Project will be linked, informally, to the on-going IFC China Utility Energy Efficiency (CHUEE) guarantee program. Through provision of this risk-sharing facility, participating banks

can mitigate their exposure when lending to higher-risk SMEs. In the long term, once the viability of the market is established, the guarantees will eventually no longer be necessary. Further, the PMO will consolidate and publish all lending and financing opportunities banks are willing to provide to participants – in this way, should a participating company seek financing, all of the legwork will have been completed for them, thereby reducing transaction costs.

- Since the availability of green freight technologies is limited in China, the Project includes a rebate scheme to lower the up-front cost of procurement. As these technologies become more widely available and prices begin to fall, and as the demand for these technologies increase, the rebates would eventually no longer be needed to support demand. The rebate scheme would also enable the PMO to more closely monitor leveraged investment, since participants would be obligated to submit procurement receipts from accredited green technology suppliers in order to receive the rebate.

- To provide trucking companies with an incentive to adhere to operating and maintenance principals presented in the Project training program, and to reward companies for participating in the Project reporting and monitoring scheme, the Project also includes provision of performance-based payments.

7. *Driver Training Curriculum Development and Implementation.* The driver training program is based, in part, on the training program designed and implemented under the first pilot green freight demonstration project in Guangzhou. For the purpose of ensuring maximum sustainability, a "train-the-trainer" approach is used, with emphasis on the development of a standardized curriculum that can be implemented on a large scale. Curriculum and training materials will be developed by an independent consulting firm, using funding from the GEF grant.

8. *Vehicle Monitoring and Evaluation.* A combination of GPS and manual survey methods will be used to monitor the following parameters:
   - Vehicle model information and energy-efficiency measures employed;
   - Vehicle-kilometers travelled (km);
   - Weight of goods moved (ton-km); and
   - Fuel consumed (L) and/or fuel efficiency (L/100 km).

9. Participating vehicles are expected to be equipped with GPS units that can be monitored by the Provincial Government (per local regulations), and the Project will provide vehicle owners with special equipment for fuel consumption monitoring.

B. Component 2: Green Freight Logistics Demonstration

1. Overview

10. While energy-efficiency improvements in the vehicles will contribute to improve energy-efficiency for the sector, these improvements may be overshadowed by underlying inefficiencies associated with "empty-miles", lack of efficient and transparent bidding

platforms for linking shippers and carriers, and minimal use of "drop-and-hook" [12]container techniques used widely in other parts of the world, which reduce over vehicle-kilometers traveled. At the request of the PMO, the GEF grant will further be utilized to jump-start reform activities related to these inefficiencies.

2. Component Activities

11. *Logistics Brokerage Modernization Study and Pilot Implementation.* As part of the GEF Project, the Guangdong Provincial Transportation Planning and Research Center will prepare a detailed terms of reference (TOR) for the hiring of a firm to complete a detailed study of the current logistics brokerage industry in Guangdong Province. Pending results of this study, the PMO and the hired consultant will prepare a bid for private sector entities to pilot a modern, web-based brokerage platform.

12. *Drop and Hook Study and Pilot Implementation.* Also, the Guangdong Provincial Transportation Planning and Research Center will prepare a detailed terms of reference (TOR) for the hiring of a firm to complete a detailed study of the feasibility of introducing drop-and-hook methods on a wide scale in Guangdong Province, as well as what supporting infrastructure, institutions, and policies may need to be in place to support these methods. Pending results of this study, the PMO and the hired consultant will prepare a bid for private sector entities to pilot a drop-and-hook scheme.

C. Component 3: Capacity Building

1. Overview

13. To ensure long term Project sustainability of the green freight technology Project, capacity building of both government officials and local enterprises will be critical. To this end, the following components are incorporated into the Project design:

- Green freight policy research – identifying current policies that support wide-scale implementation of green freight technologies and practices, as well as existing gaps;
- Training for government officials and enterprise managers; and
- Project promotion and information dissemination, including support for the Guangdong Green Freight websites.

2. Component Activities

14. *Green Freight Policy Research.* Research objectives for the Green Freight Policy Research Sub-Component are to:
- Provide an overview of the current regulatory and financing environment for green freight technologies and practices in Guangdong Province, and identify needs.
- Propose improvements to existing energy efficiency policies and regulations, as well as new policies and institutions in the freight sector.

[12]

- Provide provincial officials with a policy and institutional capacity building road map for achieving road freight energy efficiency targets, including, as appropriate, references to the US Smartway program.
- Recommend options to enable access to financing and ensure support for green technologies is available.
- Present competitive advantages and gains from improving efficiency, as well as from increasing social responsibility and environmental leadership, for the purpose of disseminating this information to the private sector.
- Provide guidance on improving linkages between the road freight sector and existing ports – a priority development area for the province.
- Developing a 3-5 years implementation plan (including packages of investments and policy strengthening measures) to help implement the policy recommendations proposed by the research.

15. *Training for Government and Enterprises.* Basic training curricula have been developed by the Guangdong Provincial Transportation Planning and Research Center, based in part by training experience from the Guangzhou Green Truck pilot, and further consultation will be conducted to enhance the quality of these materials. There are three identified target audiences for the capacity building training, and for each audience, a different level of effort is required.

16. *Promotion of the Project and Green Freight Development.* The Project Promotion sub-component seeks to:
    - Improve overall awareness of green technology in the freight sector and of best operational practices;
    - Broaden the range of potential demonstration Project participants;
    - Encourage support from related government agencies;
    - Support private sector investment in energy efficient technology and vehicle supply through provision of relevant sector and legal information.

    To achieve these goals, the Project advertising and promotion strategy comprises following activities:
    - Green Freight Website;
    - Logo and Branding;
    - Publication of Green Freight Handbooks;
    - On-Going Media Advertising;
    - Other promotion activities which may be required during project implementation.

D. Component 4: Project Implementation Support

1. Overview

17. The Project will provide technical assistance to the PMO for project implementation, stakeholder consultations, project results evaluation and dissemination, as well as project management.

2. Component Activities

18. Major activities of the Component 4 have been identified, including the following:
    - Technical advisory services to help PMO (and participating companies) implement the project, particularly addressing technical issues related to installation and operation of the selected green truck technologies, preparation and review of the logistics studies and operation of demonstration projects, monitoring and evaluation of project results, and discussion of policy issues with national and provincial governments as well as communication with stakeholders.
    - Assistance to PMO in procurement of consulting services and monitoring equipment.
    - Assistance to PMO in selecting participating companies and dealing with issues related to importing technologies and equipment from overseas.
    - Preparation of the Project completion evaluation report
    - Workshops for consultation with stakeholders and dissemination of project results.

E. Specific Activities to be Financed under the Project

19. In addition to Project preparation, the GEF contributes to the following components and sub-components:

Table 1: GEF-Funded Components

Component	Total Cost	GEF Co-finance (USD)	Government Co-finance (USD)	Enterprise Co-finance (USD)*
Component 1: Green Truck Technology Demonstration				
Trade Fair	150,000	150,000	0	0
Inventive Payments	9,337,000	1,965,000	0	7,372,000
Driver Training	70,000	70,000	0	0
Vehicle Monitoring Equipment	148,000	115,000	0	33,000
Vehicle Monitoring and Evaluation	100,000	100,000	0	0
Sub-Total	**9,805,000**	**2,400,000**	**0**	**7,405,000**
Component 2: Green Freight Logistics Demonstration				
Logistics Brokerage Study and Demo	540,000	540,000	0	0
Drop and Hook Operation Study and Demon	1,360,000	360,000	1,000,000	0
Sub-Total	**1,900,000**	**900,000**	**1,000,000**	**0**
Component 3: Capacity Building				
Green Freight Policy Research	90,000	90,000	0	0
Government and Enterprise Management Training	250,000	250,000	0	0
Project Website	1,155,000	100,000	1,055,000	
Project Promotion	150,000	110,000	40,000	0
Sub-Total	**1,645,000**	**550,000**	**1,095,000**	**0**
Component 4: Project Management				
Technical Advisory and Quality Assurance	100,000	100,000	0	0
Technical Assistance for Implementation of Green Truck Technology Component	60,000	60,000	0	0

Procurement Agent	50,000	50,000	0	0
Project Completion Report	10,000	10,000	0	0
Evaluation and Dissemination Workshops	50,000	50,000	0	0
PMO incremental operating cost	290,000	20,000	270,000	0
Sub-Total	**560,000**	**290,000**	**270,000**	**0**
Total Baseline	**13,910,000**	**4,140,000**	**2,365,000**	**7,405,000**
Contingency	60,000	60,000	0	0
TOTAL COST	**13,970,000**	**4,200,000**	**2,365,000**	**7,405,000**

*****Estimated. It only includes required counterpart funds from participating companies; does not include other contributions from participating companies, such as incremental operation and maintenance costs, additional monitoring costs, training provided by technology providers/vendors or by trucking/shipping/logistics companies themselves, and marketing and promotion carried out by participating companies, etc.

Annex 3: Implementation Arrangements

A. Summary of Institutional Responsibilities

Entity	Project Responsibilities
PMO at Department of Transport	• Manage project advertising and public information dissemination • Identify / solicit participants • Organize training program • Manage equipment suppliers • Conduct on-going monitoring • Report to participating banks • Review studies prepared for Component 2 • Review TORs for Component 2 and, if appropriate, prepare bidding announcements • Sign contracts with participating trucking companies for monitoring, rebate and performance subsidy scheme.
Department of Finance	• Oversee GEF grant disbursement • Act as liaison between PMO and participating banks • Coordinate among different departments in Guangdong Provincial Government
Participating Banks	• Send financing opportunity descriptions to PMO
Participating Trucking Companies	• Attend training sessions • Receive optional finance and incentive package • Procure equipment and have installed • Participate in periodic surveys
Participating Vehicle Dealers	• Receive optional finance and incentive package • Procure equipment and have installed • Participate in periodic surveys
Participating Technology Suppliers	• Receive optional subsidy (or other incentive) for introducing new Smart-Way or similarly certified technology to Guangdong Province • Participate in periodic surveys

B. Project Administration Mechanisms

1. The Guangdong Provincial government has designated the Department of Transport (DoT) as the leading agency for preparation and implementation of the Project. A Project Management Office (PMO) has been established at the Comprehensive Transport Division of the DoT and staffed with nine officers responsible for different aspects of the project. Similar to other Bank-supported projects in China, a Project Leading Group (PLG) has also been established to oversee and coordinate the project. The PLG consists of senior officials from the Department of Transport, the Development and Reform Commission, the Department of Finance, the Department of Public Security, the Environment Protection Bureau, and the Economic Information Commission. Procurement assessment and FM assessment of the PMO have been completed, with satisfactory findings.

2. The PMO was established by the Provincial Government in December 2010, when the government designated the Transport Department as the leading agency for preparation and implementation of the Project. The Project Leading Group was established by the Provincial Government on April 1, 21010, to oversee the preparation and implementation of the Project. The World Bank team agrees with these decisions.

3. Some members of the PMO were involved in the pilot Green Freight Demonstration Project in Guangzhou, Guangdong Province and are thus familiar with the technologies, techniques, and objectives of the Project. In May 2010, additional PMO and PLG members were taken on an international study tour to learn first-hand about best practices in green freight technologies and methods.

4. The officers in charge of procurement, financial management (FM) and environmental management have been transferred from the PMO for the Bank-funded Inland Waterway Project II and IV and are already familiar with the Bank's policy requirements.

C. Financial Management, Disbursements and Procurement

Financial Management

5. **Risks and Mitigation:** The FM capacity assessment identified the following key risks: a) The current accountant in the Finance Division of DoT has not managed a Bank financed project before; and b) most of the grant will be disbursed as subsidies based on agreed milestones, which brings complexity in disbursement management.

6. Mitigation measures agreed include: a) one more financial staff with Bank project experience will be assigned to the PMO before project starts; and b) a project Financial Management Manual (FMM) will be prepared and issued to standardize the FM and disbursement procedures. This will also include the milestone verification and disbursement process.

7. **Budget:** The overall project budget has been well prepared and agreed with the task team. For budget variances arising during execution, necessary authorization and close monitoring should be established. Timely and accurate information on variances should be used as the basis for mid-term adjustments.

8. **Funds Flow:** The grant will flow from the Bank into a project designated account (DA) to be set up at and managed by GPFB. Further advance from the DA will be made into the operating account (OA) established at the Finance Division of DoT. The grant will then be disbursed to contractors through the OA for due payments.

9. **Accounting and Financial Reporting:** The administration, accounting and reporting of the project will be set up in accordance with Circular #13: "Accounting Regulations for World Bank Financed Projects" issued in January 2000 by MOF. The standard set of project financial statements has been agreed between the Bank and MOF.

10. The Finance Division of DoT will be managing, monitoring and maintaining respective project accounting records and retaining original supporting documents. The Finance Division will also prepare the unaudited interim financial reports (format in accordance with the aforementioned Circular #13 agreed with MOF) as part of the Progress Report and it will be submitted to the Bank no later than 45 days following each semester (the due dates will be August 15th and February 15th), in form and substance satisfactory to the Bank.

11. **Internal Control:** The related accounting policy, procedures and regulations were issued by MOF and the FMM will be prepared and issued to uniformly align the financial management and disbursement requirements among all concerned parties.

12. **Audit:** Guangdong Provincial Audit Office (GPAO) has been identified as the auditor for this project. The annual audit report will be issued in the name of GPAO and will be due to the Bank within 6 months after the end of each calendar year.

Disbursement

13. Three disbursement methods: advance, reimbursement, direct payment are all available for the project. Supporting documents required for different disbursement methods will be documented in the Disbursement Letter issued by the Bank.

14. One designated account (DA) in US dollar will be opened at a commercial bank acceptable to the Bank and will be managed by GPFB. The ceiling of the DA will be determined and documented in the Disbursement Letter. To ensure the PMO has sufficient working capital to initiate project activities, no more than 10% of the DA could be further advanced to a segregated operating account (OA) established at a commercial bank acceptable to the Bank and managed by the Finance Division of DoT. The OA will be maintained in US dollar. The usage of the further advance and outstanding balance in the OA should be reported to GPFB on monthly basis. The supporting documentation includes but not limited to a statement of expenditure (SOE), copies of contracts and invoices, OA bank statement and other necessary documents. The outstanding balance of the OA will be reported as a separate item in the DA reconciliation statement that is submitted together with the DA withdrawal applications to the Bank.

15. The GEF grant would be disbursed against eligible expenditures (taxes inclusive) as in the following table:

Category	Amount of the Grant Allocated (expressed in USD)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Consultants' services, Training, Communications and Incremental Operating Costs	**1,280,000**	**100%**
(2) Green Freight Technology Rebates and Performance-Based Payments	**2,080,000**	100% of the amounts paid as per the respective Participation Agreement

	under Part A of the Project	
(3)	Green Freight Technology Rebates and Performance-Based Payments under Part B of the Project	**780,000**	100% of the amounts paid as per the respective Participation Agreement
(4)	Unallocated	**60,000**	
	TOTAL AMOUNT	**4,200,000**	

16. The "subsidies" refers to the Green Freight Technology Rebate and Performance-based Payments. The rates of the subsidies for various technical packages are determined jointly by the PMO and Bank's task team, and will be reviewed on an annual basis.

17. The Green Freight Technology Rebate will be disbursed against the following:
    - The Memorandum of Understanding signed by the PMO and Participating Company;
    - Participant Criteria Evidence submitted by the Participating Company and accepted by the PMO;
    - The proof of payment submitted by the Participating Company to prove its procurement of Green Freight Technology from a Verified Green Freight Technology Supplier. The proof includes but not limited to copies of procurement contract, payment statement, official invoice, and some other evidence that the technology has been physically delivered and installed. The original copy should be maintained by the Participating Company and the PMO retains the right to check them, if necessary;
    - The sales invoice sent by the Verified Green Freight Technology Supplier from which the Company has procured the Green Freight Technology;
    - The verification notice issued by the PMO that Participating Vehicles have been installed with Monitoring Equipment.

18. The Performance-Based Payments will be disbursed against the following:
    - Receipt of the Green Freight Technology Rebate;
    - The Baseline Survey form submitted by the Participating Company and accepted by the PMO;
    - A training certificate provided by the Participating Company indicating evidence of participation in the Driver Training Program.
    - The Bi-Annual Performance Survey form submitted by the Participating Company and accepted by the PMO.
    - A measurable improvement in fuel efficiency over the baseline of the Project Vehicles of the Participating Company recognized by the PMO.

19. Retroactive financing will be applied for this project. The date of eligible expenditures and the amount for the retroactive financing will be determined by the TTL and LOA according to the Bank's policy and specified in the grant agreement.

<u>Procurement</u>

20. The procurement capacity assessment concluded that the PMO has adequate experience and capacity to carry out procurement activities for the proposed Project. To strengthen the procurement capacity of the PMO, the following measures have been agreed with the PMO and DoT at appraisal:
    - DoT will assign at least one full-time procurement staff for the Project during project implementation;
    - the PMO will engage a procurement agent with rich experience in procurement in the Bank financed projects to assist in preparation of procurement documents (e.g., Request for Proposals) and organizing the bid evaluation and contract negotiations during project implementation;
    - the PMO will hire individual technical experts with rich practical experience in this area, who may assist the PMO in handing technical related issues and having dialogue on technical issues with truck companies; and
    - A mechanism with detailed processing requirements and supporting documents for disbursement has been developed in the current proposal to monitor and carry out the incentive schemes, including criteria to select the participating companies, and the conditions to be fulfilled to be eligible for Green Freight Technology Rebate and Performance-Based Payment.

21. Procurement for the Project will be carried out in accordance with the World Bank's "Guidelines: Procurement under International Bank for Reconstruction and Development (IBRD) Loans and International Development Association (IDA) Credits" dated May 2004, revised October 2006 and May 2010; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, revised October 2006 and May 2010, and the provisions stipulated in the loan agreement.

22. **Frequency of Procurement Supervision.** In addition to the prior review supervision to be carried out from the Bank offices, Bank procurement supervision missions will visit the field to carry out post review of procurement actions every 12 months. The post review sampling ratio will be one out of five contracts.

23. **Procurement Plan.** The PMO has developed a Procurement Plan for project implementation following the format of a Sample Procurement Plan (attached in **Appendix A to Annex 3**) provided by the Bank. The Procurement Plan provides the basis for procurement methods, and has been reviewed and cleared by the Bank at Appraisal. It is available at the PMO, and will also be available in the Project's database and in the Bank's external website during project implementation. The Procurement Plan will be updated in agreement with the Bank task team annually, or as required, to reflect the actual project implementation needs and improvements in institutional capacity.

24. One key feature of this project is that a substantial portion of the proceeds of the grant will be disbursed as incentive payments to those truck companies which meet criteria set up for the Project. Trucking companies will purchase technologies from market following established commercial procurement practices, and their procurement activities are not included in the PMO's Procurement Plan.

D. Environmental and Social (including safeguards)

25. The project is classified as Category C because of its minimal adverse environmental impacts. An environmental screening has been conducted and an Environmental Management Manual (EMM) has been prepared to provide guidance to PIUs for managing environmental issues in the construction and operation phase. The environmental screening concluded that the project will bring significant positive environmental impacts, including reduction of greenhouse gases. Possible environmental issues include noise, air pollution and solid waste during the auxiliary facility installation stage. The preventive and mitigation measures, monitoring measures and training during the construction and operational phase are noted in the EMM, and will either minimize the impacts to acceptable level or eliminate the negative impacts.

26. Public consultation, including expert consultations, questionnaires, symposia, and interviews, was conducted with stakeholders. The EMM has been disclosed at the website of the PMO and relevant government agencies. It was also disclosed at the Bank Beijing Office website and at the Infoshop in Washington, D.C. on October 10, 2010.

E. Monitoring & Evaluation

27. Data will be collected by the PMO, selected M&E consultant, and project participants, as per monitoring and evaluation procedures presented in Annex 2. PMO will submit annual monitoring reports, a mid-term evaluation report, and a project completion report to the Bank.

28. The M&E consultant will be selected through competition and should have adequate capacity to carry out required monitoring and evaluation tasks without additional capacity building assistance. The project participants will be required to make commitments to meet data collection requirements before they are selected to participate in the project. PMO will carry out regular supervision and random inspection on data collection carried out by the participating companies and the M&E consultant, and evaluation on project results. Capacity building on supervision and evaluation will be provided to PMO and participating trucking companies during project implementation.

29. Costs for M&E are already included in the program budget and partially covered by the GEF grant and by the Guangdong Provincial Government.

Appendix A to Annex 3: Procurement Plan (at Negotiations)

Annex 4: Operational Risk Assessment Framework (ORAF)

Negotiations and Board Package Version

CHINA
Guangdong Green Freight Program

Project Development Objective(s)

The **Project Development Objectives (PDO)** are to: The Project Development Objectives (PDO) of the Guangdong Green Freight Demonstration Project are to: (a) demonstrate the global and local environmental benefits of the application of energy efficiency vehicle technologies and operating techniques, and (b) support improving energy efficiency and reducing greenhouse gas emissions in the road freight transport sector in Guangdong Province.

PDO Level Results Indicators:	1. Improvement in fuel economy (km per unit of fuel combusted) of participating trucks
	2. Reduction in operating cost of truck fleets managed by participating companies (per ton-km travelled)
	3. Total amount of CO_2e emissions reduction directly generated from fuel savings through the duration of the demonstration

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures
1. Project Stakeholder Risks			
	M-L	(a) Not all eligible companies may be aware of the program. (b) Not all companies may have the capacity to monitor changes in fuel efficiency after installation of the green freight technologies.	The GEF grant will be used to support promotional activities, including a trade fair, targeted at all registered freight companies in Guangdong Province. Prior to participation, candidate companies are pre-screened to ensure all participants have the basic capacity for monitoring and verification.
2. Implementing Agency Risks (including FM & PR Risks)			

	M-L	There is a potential risk in terms of PMO capacity to comply with World Bank financial management, and procurement procedures.	PMO is required to maintain adequate staffing for FM and Procurement through project implementation. A Financial Management Manuel has been developed, which provides clear guidance on FM for the project. Training on Procurement and FM has been provided to PMO during project preparation, and will continue during implementation based on actual needs.
3. Project Risks			
3.1 Design	M-I	The participating companies may not use the green technology/equipment properly, and thus may not fully achieve the fuel efficiency benefits.	A considerable amount of time is being spent up-front on project design, reaching agreement on project design between different stakeholders, and in preparing agreements between stakeholders regarding what is expected of them through the life of the program. A training curriculum and training implementation plan, developed by a third party, has been incorporated into the project. The technology providers are required to provide installation services and training on operation and maintenance. The project also includes a performance-based payment scheme that provides additional incentives for proper use of the technologies.
3.2 Social & Environmental	L	There are potential environment, health, and safety risks associated with installation and maintenance of green freight technologies on vehicles.	Project design includes Environment, Health, and Safety (EHS) measures in the Environmental Management Plan (EMP), as well as a formal Monitoring and Evaluation (M&E) system.
3.3 Program & Donor	L	GEF funding may not be available during project implementation.	n/a
3.4 Delivery Quality	M-I	(a) Some technologies may not provide expected benefits. (b) Some participating trucking companies may fail to operate the new technologies and carry out required monitoring properly.	Only technologies verified by the US EPA Smart-Way or similar national energy efficient trucking technology accreditation systems are eligible for participation in the project. Other internationally-recognized accrediting schemes may be included subsequently, based on the results of on-going research by the PMO, with assistance from local and international experts.

			Completion of the driver t raining program is a pre-requisite to participation. Also, The incentive package provided to trucking companies includes incentives for better monitoring and evaluation in the form of performance-based payments. The Project Leading Group, will oversee the monitoring and evaluation effort, and the Bank will also review the M&E results and carry out regular supervision.

Overall Risk Rating at Preparation	Overall Risk Rating During Implementation	Comments
Medium-Likelihood	**Medium-Likelihood**	Although risk ratings for Design and Delivery are rated M-I, given the strong foundation for the Project (summarized above) and that all other risk ratings, which have been assigned using ORAF criteria are "Low", the overall risk rating for the Project is Medium-Likelihood.

Annex 5: Implementation Support Plan

1. The PMO at Guangdong Provincial Department of Transport (DoT) is in charge for preparation and implementation of the Project. The PMO is overseen by a Project Leading Group (PLG) consists of senior officials from relevant departments (refer to Annex 3).

2. The objective of the implementation support plan is to ensure (i) the objectives of the project are satisfactorily achieved by project end; (ii) implementation of all project activities follows agreed procedures and complies with all fiduciary and safeguard requirements. The plan takes into consideration of the nature of the project, the identified project risks (as discussed in Annex 4 ORAF), and the cost for supervision.

Major Tasks

3. To achieve the above objective, the Bank's supervision and implementation support will focus on (i) providing technical assistance to help PMO and participating trucking companies address technical issues during project implementation; (ii) ensuring the PMO and participating trucking companies have sufficient capacity for project implementation and M & E; (iii) support project procurement and fiduciary control; and (iv) ensuring the agreed environment management procedures are followed properly. Implementation support activities are described under the heading of the risk they are designed to mitigate, below.

4. **PMO Capacity**. Capacity building has been a major focus of the project preparation, which has featured extensive direct contact between the Bank team, the PMO, and international and local consultants on issues critical to successful implementation and project management. Many capacity issues have been identified and addressed already. *During project implementation period, the Bank team will continue provide capacity building to the PMO, focusing on project management, fiduciary control, and monitoring, inspection, and evaluation. The Bank team will also carefully review and supervise the preparation and implementation of capacity building activities included in the project under Component 3 and Component 4.*

5. **Capacity of Participating Trucking Companies.** Several consultation and awareness raising workshops with trucking companies have been carried out during project preparation. The capacity building needs for trucking companies have been identified and a set of capacity building activities have been included to the project (refer to Annex 3 and 4). *The Bank team will assist PMO in making annual training plans, and preparing and delivering each training or capacity building activity in high quality.*

6. **Institutional Cooperation.** During preparation, measures have already been taken to address the risk that the variety of agencies that are required to work together on the project may not collaborate effectively. *Monitoring of this issue will continue during project implementation. The Bank supervision will ensure the institutional arrangements agreed at appraisal will maintain and continue functioning effectively.*

7. **Project Delivery Quality and Sustainability.** Ensuring sustainability has been a crucial element of project preparation. *The Bank supervision will ensure (i) selection of participating technologies and selection of participating trucking companies properly follow the procedures agreed up front; (ii) the mandatory driver training program is delivered for all participating trucking companies; and (iii) the incentive packages are delivered to the trucking companies meeting requirements in a proper and timely manner.*

8. **M & E.** In addition to review and verify the M&E reports provided by the PMO, the Bank team will carry out inspection and sample data collection during supervision missions, conduct annual evaluation of project progress and intermediate results, and maintain an internal reporting system.

9. **Procurement.** In addition to the prior review supervision to be carried out from the Bank offices, Bank procurement supervision missions will visit the field to carry out post review of procurement actions every 12 months. The post review sampling ratio will be one out of five contracts.

10. **Financial Management.** The supervision strategy for this project is based on its FM risk rating, which will be evaluated on regular basis by the financial management staff. The financial management staff uses periodic site visits, desk reviews, and correspondence with borrowers to provide technical support to and work closely with borrowers to resolve problems as they arise, and to monitor the continuing adequacy of the FM arrangements including accounting, auditing, budgeting, financial reporting, internal control and funds flow. Financial management staff also follows up on action plans agreed during project appraisal and negotiations, as well as on observations derived from reviews of audit reports, management letters and IFRs.

11. **Environment Management.** The project will have minimal negative impact on the environment, mainly associated with installation and maintenance of green freight technologies on vehicles. *The Bank supervision will regularly inspect whether the environmental management manual is being followed properly. Additional training may be provided if necessary.*

12. **Supervision Teams and Budget**

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	• Project Design and Pre-implementation • FM and Procurement • Environment • Capacity building • M&E	Technical Skills Bank policies Bank policies Technical Skills Technical Skills	$60,000	
12-48 months	• Project Quality / Sustainability • Capacity building • M&E	Technical Skills Technical Skills Technical Skills	$120,000	

13. **Skills Mix Required**

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
• Green Truck Technology • Logistics Management • Capacity building and communication • Bank Safeguard Policy • Bank FM Policy • Bank Procurement Policy	10 8 8 3 3 6	6 4 4 2 3 3	

Annex 6: Team Composition

World Bank staff and consultants who worked on the project:

Name	Title	Bank Unit
World Bank Staff		
Ke Fang	Senior Urban Transport Specialist, TTL	EASIN
Shomik Raj Mehndiratta	Senior Transport Specialist	EASCS
Holly Krambeck	Transport Economist	EASIN
Dhruva Sahai	Senior Financial Analyst	EASIN
Andrew Salzberg	Transport Specialist	EASIN
Wei Winnie Wang	Transport Specialist/JPA	EASIN
Yiren Feng	Environment Specialist	EASCS
Yi Geng	Senior Financial Management Specialist	EASCS
Guoping Yu	Procurement Specialist	EASCS
Consultants		
Ron Kopicki	Freight Logistics Specialist	
Yan Peng	Air Quality and Freight Specialist	
Joel Smith	Freight Logistics Specialist	
Su Song	Transport Specialist	
Xi Zhao	Research Associate	
Shan Huang	Research Associate	
Peer Reviewers		
Buddy Polovick	Manager, SmartWay Program, US Environment Protection Agency	
Sophie Punte	Director, CAI-Asia Center	
Georges Darido	Transport Specialist	LCSTR
Gerald Paul Ollivier	Senior Transport Specialist	EASCS

Annex 7: GEF Incremental Cost Analysis

A. Analysis of Business-as-Usual Scenario

1. Since 2000, total freight traffic, in tons, moved by truck in Guangdong Province increased by more than 125%.[13] Over that same period, the provincial highway network grew at an average rate of 11% per year,[14] and the number of registered trucks grew by 56%.[15]

Figure 1: Total Freight Ton-Kilometers Transported by Road in Guangdong Province (1985 - 2008)[16]

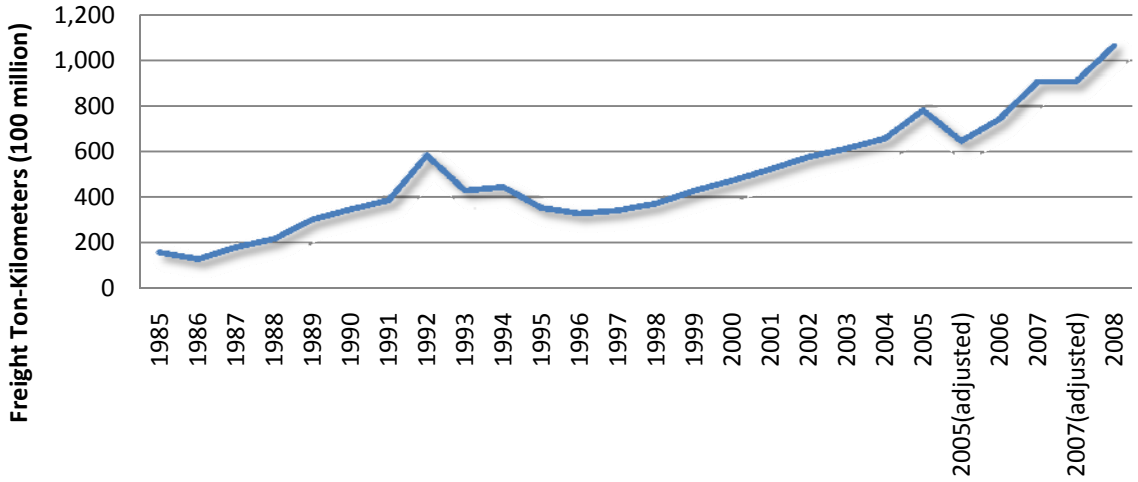
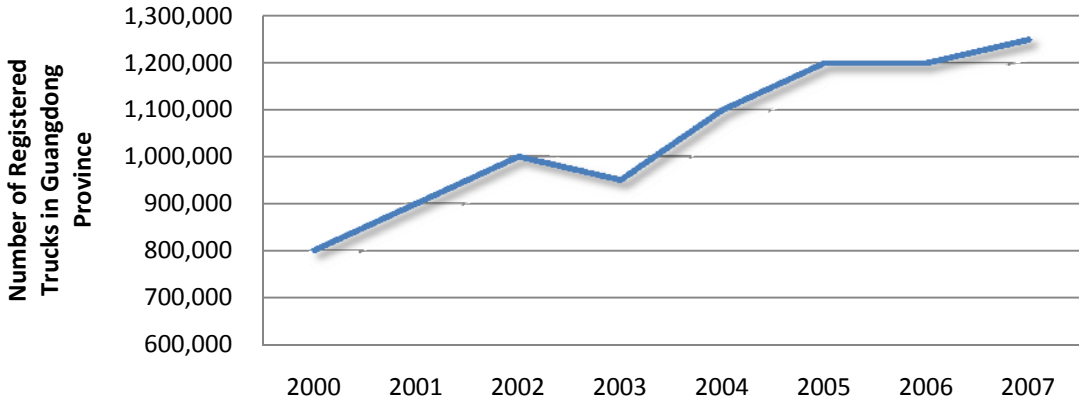


Figure 2: Number of Trucks Registered in Guangdong Province[17]



2. Despite the growing importance of this sector, according to the Ministry of Transport, energy efficiency in Chinese road freight transport remains very low – the fuel economy of trucks in China

[13] Data Source: Guangdong Statistical Yearbook. 2009. "Table 14-5 Total Freight Traffic." http://www.gdstats.gov.cn/tjnj/table/14/e14_5.htm
[14] Guangdong Statistical Yearbook. 2009. "Table 14-12: Length of Highways and Number of Bridges." http://www.gdstats.gov.cn/tjnj/table/14/e14_12.htm
[15] Clean Air Initiative. May 2010. "Guangzhou Green Trucks Pilot Project: Background Analysis Report for the World Bank -- "Truck GHG Emission Reduction Pilot Project"
[16] Data Source: Guangdong Statistical Yearbook. 2009. "Table 14-5 Total Freight Traffic." http://www.gdstats.gov.cn/tjnj/table/14/e14_5.htm
[17] Clean Air Initiative. May 2010. "Guangzhou Green Trucks Pilot Project: Background Analysis Report for the World Bank -- "Truck GHG Emission Reduction Pilot Project"

is about 30% lower than in advanced OECD countries,[18] and there is a general lack of coordinated logistics management and modern operations management practices. Under a business-as-usual scenario, these inefficiencies, combined with exponential growth in the sector, would result in significant, unnecessary energy consumption, greenhouse gas emissions, emission of pollutants, and high operating costs.

3. For example, if the number of registered trucks in Guangzhou continues to increase at an average annual rate of 7% per year (same percentage growth for small, medium, and heavy-duty vehicles), and there is no commensurate improvement in fuel economy or performance efficiency, then annual CO_2e emissions from Guangdong trucks would grow from about 19.6 million tons in 2010 to 38.7 million tons by 2020 – an increase of nearly 95%.

B. Analysis of Global Environment Benefits and Strategic Fit

4. China is responsible for up to 60% of the global increase in carbon emissions over the past ten years, and today, China is the world's largest emitter of greenhouse gases, accounting for nearly 25 percent of global carbon emissions.[19] Further, according to the Ministry of Communications "Medium and Long Term Plan for Energy Conservation in Road and Waterway Transport in China,"[20] about 290 million tons of carbon were emitted from the transport sector in 2004, and emissions are expected to grow to 522 million and 1.108 billion tons by 2015 and 2030, respectively.

5. Energy consumption and greenhouse gas emissions from the transport sector in China are increasing rapidly, particularly in Guangdong Province, which has the largest road-based freight transport sector by volume in the country.

6. In terms of long term, repercussive impacts of the Project, if, over time, a fleet-wide 10% fuel efficiency is achieved across 60% of registered trucks in Guangdong Province (through a combination of technology implementation, driver training, and improve logistics management) then at a constant 2009 fleet size, annual CO_2e emissions reductions would be about 1.2 million tons per year.

C. Incremental Cost Reasoning and the GEF Role

7. In terms of demonstration impacts, only *Component 1: Green Truck Technology Demonstration* is considered for this appraisal (the other components, which comprise studies, capacity building, and small scale pilots, are expected only to have longer term, repercussive impacts). During implementation, since participating truck companies will be able to voluntarily elect which technology package they would like to implement, the following analysis is based on a sample scenario, where about USD 1.8 million in GEF funding is used to leverage USD 3 million in new investment across the eight proposed technology packages (1,800 vehicles).

8. The Project includes introduction of six technologies that improve the fuel efficiency of operating vehicles: (i) Low resistance tires; (ii) Tire pressure gauges; (iii) Side skirts; (iv)Wind shield / gap fairing; (v) Nose cones; and (vi) Driver behavior diagnostic system. For Project implementation, these technologies have been bundled into eight distinct technology packages. In addition, all

[18] Ministry of Transportation. 25 September 2008. "公路水路交通节能中长期规划纲要"
http://www.moc.gov.cn/zhuzhan/jiaotongguihua/guojiaguihua/quanguojiaotong_HYGH/200811/P020081104387326543461.doc
[19] Stockholm Environment Institute (SEI). November 2009. "Going Clean – The Economics of China's Low Carbon Development." Stockholm Environment Institute and the Chinese Economists 50 Forum.
[20] Ministry of Transportation. 25 September 2008. "公路水路交通节能中长期规划纲要"
http://www.moc.gov.cn/zhuzhan/jiaotongguihua/guojiaguihua/quanguojiaotong_HYGH/200811/P020081104387326543461.doc

participating drivers will be given special training courses on energy efficient driving skills and best practices, which would further enhance the fuel efficiency of each technology package[21]. Based on US EPA SmartWay verifications and the results of the pilot testing in Guangzhou, a conservative estimation finds the efficiency gains of these packages (combined with driver training) range from 7% to 26%.

9. Based on the expected efficiency gains, combined with the financial incentives provided through the GEF grant, the direct fuel savings and GHG reductions to be achieved from Component 1 are provided in the table below:

Total Number of Vehicles participating in Component 1	1,200
Expected Savings from Fuel (8 years) in US$	**13,986,316**
Expected Savings from Fuel (8 years) in liters of fuel	14,418,882
Expected Savings from Fuel (8 years) in tons CO_2e	**39,940**
Total Package Cost in US$	**2,980,200**
Down Payment / Rebate Value in US$	596,040
Interest Payment / Performance-Based Subsidy in US$	234,347
Monitoring Equipment Cost (funded by GEF) in US$	831,600
GEF Subsidy (Subsidies + Equip) in US$	**1,661,987**
Trucking Company Contribution in US$	**2,149,813**

10. The Project net benefit (benefit, less expenditures) from fuel savings would be about US$ 14 million – *four times the total cost (including GEF grant and financial contributions from trucking companies)*. In terms of direct demonstration emissions impacts, the same set of packages would reduce greenhouse gas emissions by about 40,000 tons CO_2e (carbon-equivalent) over the same period – in effect, from an economic point of view, these emissions reductions pay for themselves.

11. When factoring in long term improvements from Component 2 of the Project, and it is expected a fleet-wide 10% fuel efficiency will be achieved across 60% registered trucks in Guangdong Province, then at a constant 2009 fleet size, annual CO_2e emissions reductions would be about 1.2 million tons per year (see table below). Considering the average life span of a truck is 8 years in China, the project would generate 9.6 million tons of CO_2e emissions reductions.

Vehicle Type	# of Registered Vehicles	Average Annual Distance Traveled per Truck (km)	Average Fuel Efficiency (L/100km)	Average Annual Fuel Consumption per Vehicle (L)	CO_2e Emissions per L Diesel Combusted (kg)	Annual CO_2e per Vehicle (tons)	Total CO_2e for Registered Fleet in 2009 (tons)	10% efficiency improvement on 60% Registered Fleet
Heavy Duty	149,522	63,451	32	20,235	2.77	56	8,380,698	502,842
Medium	46,836	64,953	25	16,550	2.77	46	2,147,117	128,827
Light	598,023	40,947	13	5,524	2.77	15	9,150,205	549,012
TOTAL							**19,678,020**	**1,180,681**

D. Determination of Results-Based Framework

12. The Project Development Objectives (PDO) of the Guangdong Green Freight Demonstration Project are to: (a) demonstrate the global and local environmental benefits of the application of energy

[21] UK Department for Transport. April 2009. "The Fuel Efficient Truck Driver's Handbook." http://postconflict.unep.ch/humanitarianaction/documents/02_08-04_06-04_02-22.pdf

efficiency vehicle technologies and operating techniques, and (b) support development of sustainable measures for improving energy efficiency in the road freight transport sector in Guangdong Province.

13. The key outcome indicators for measuring achievement of the development objectives are: (a) improvement in fuel economy (km per unit of fuel combusted) of participating trucks; (b) reduction in operating cost of truck fleets managed by participating companies (per ton-km travelled); and (c) total amount of CO_2e emissions reduction directly generated from fuel savings through the duration of the demonstration.

14. Further intermediate indicators are presented in Annex 1 of the PAD.

E. Role of Co-Finance

15. Since the sustainability of the Project hinges on more than just the demonstration of green truck technologies – the development of effective, market-based mechanisms to support financing of the equipment, as well as the development of the market for the supply of green technologies is equally critical – special consideration has been given to project financing and incentives, supported by the GEF. Specifically, the Project includes the following elements:

- Since the availability of green freight technologies is limited in China, the Project includes a rebate scheme to lower the up-front cost of procurement. As these technologies become more widely available and costs begin to fall, the rebates would eventually no longer be needed to support demand. The rebate scheme would also enable the PMO to more closely monitor leveraged investment, since participants would be obligated to submit procurement receipts from accredited green technology suppliers in order to receive the rebate.

- To provide trucking companies with an incentive to adhere to operating and maintenance principals presented in the Project training program, and to reward companies for participating in the Project reporting and monitoring scheme, the Project also includes provision of performance-based payments.

16. While energy-efficiency improvements in the vehicles will contribute to improve energy-efficiency for the sector, these improvements may be overshadowed by underlying inefficiencies associated with “empty-miles”, lack of efficient and transparent bidding platforms for linking shippers and carriers, and minimal use of “drop-and-hook” container techniques used widely in other parts of the world, which reduce over vehicle-kilometers traveled. At the request of the PMO, the GEF grant will further be utilized to jump-start reform activities related to these inefficiencies.

17. Finally, to ensure long term Project sustainability of the green freight technology Project, capacity building of both government officials and local enterprises will be critical. To this end, the following GEF-supported components are incorporated into the Project design:

- Green freight policy research – identifying current policies that support wide-scale implementation of green freight technologies and practices, as well as existing gaps;

- Training for government officials and enterprise managers; and

- Project promotion and information dissemination, including support for the Guangdong Green Freight websites.

F. Cost Effectiveness

18. The key barriers to widespread implementation of the green freight technologies are: (1) high costs due to lack of widespread availability of Smartway (and similarly verified) technologies in China; and (2) a general industry-wide lack of awareness, or trust, in the ability of these technologies to save costs in the long run.

19. The Project, which serves to overcome these two obstacles, is structured to maximize overall emissions reduction and demonstration impacts by leveraging market mechanisms to spark development of a sustainable green freight technology market. Rather than use the GEF funding to directly purchase and fully subsidize the green freight technologies, which is an alternative that had been originally proposed by the Guangdong provincial government, the GEF funding is being combined with private sector investment such that more than twice the amount of equipment can be purchased for an equivalent amount of GEF funding. Further, the GEF funding is used to support province-wide training and capacity building, as well as awareness campaigns and opportunities to link international suppliers of green freight technologies with Chinese trucking companies to ensure that after the initial Demonstration, sufficient momentum is created to ensure the market can continue to grow.

20. Given this potential for long term, repercussive impacts, the investment on a $/ton CO_2e abated is very positive. For example, given that annual emissions from the road-freight sector in Guangdong Province were about 20 million tons CO_2e in 2009, if through the Project (technology retrofits, introduction of drop-and-hook systems and a modern logistics platform) emissions reductions of 10% are achieved for 60% of the registered fleet, then emissions reductions would have been achieved in the province at only US$3.5 per ton – low for the transport sector.