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IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF099421)

ON A

GRANT

FROM THE GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF US$4.8 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

GEF CITY CLUSTER ECO-TRANSPORT PROJECT

December 26, 2016

Transport and ICT Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective September 28, 2016)

Currency Unit = RMB
US$ 1.00 = RMB 6.67

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

BAU	Business as Usual	MOF	Ministry of Finance
CZT	Changsha-Zhuzhou-Xiangtan	MOT	Ministry of Transport
CQS	Consultant Qualifications Selection	M&E	Monitoring and Evaluation
DA	Designated Account	NCB	National Competitive Bidding
EA	Environmental Assessment	NPV	Net Present Value
EIA	Environmental Impact Assessment	PDO	Project Development Objective
EIRR	Economic Internal Rate of Return	PMO	Project Management Office
EMP	Environmental Management Plan	PPG	Project Preparation Grant
FM	Financial Management	PSC	Project Steering Committee
FMM	Financial Management Manual	QBS	Quality-Based Selection
GEF	Global Environment Facility	QCBS	Quality- and Cost-Based Selection
GoC	Government of China	RAP	Resettlement Action Plan
GDP	Gross Domestic Product	RS-EF	Resource Saving-Environmentally Friendly
HDOT	Hunan Provincial Department of Transport	SBD	Standard Bidding Document
		SEA	Strategic Environmental Assessment
ICB	International Competitive Bidding		
IUFR	Interim Unaudited Financial Report		
ITS	Intelligent Transport System	TA	Technical Assistance
MBD	Model Bidding Documents	TOR	Terms of Reference
ChengYu	Chengdu and Chongqing	JingJinJi	Beijing, Tianjin and Hebei Province

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PEOPLE'S REPUBLIC OF CHINA
GEF City Cluster Eco-transport Project

CONTENTS

A. Basic Information			
Country:	China	Project Name:	China GEF City Cluster Eco-Transport Project
Project ID:	P121263	L/C/TF Number(s):	TF-99421
ICR Date:	09/28/2016	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	People's Republic of China
Original Total Commitment:	USD 4.80M	Disbursed Amount:	USD 4.53 M
Revised Amount:	USD 4.80M		
Environmental Category: B		**Global Focal Area: C**	
Implementing Agencies: Ministry of Transport			
Cofinanciers and Other External Partners: None			

B. Key Dates				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	06/08/2010	Effectiveness:	06/20/2012	06/20/2012
Appraisal:	02/28/2011	Restructuring(s):		12/18/2014
Approval:	03/29/2012	Mid-term Review:	07/01/2014	07/02/2014
		Closing:	06/30/2015	06/30/2016

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Satisfactory
Risk to Global Environment Outcome	Moderate
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry:	Satisfactory	Government:	Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance:	Satisfactory	**Overall Borrower Performance:**	Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	None
GEO rating before Closing/Inactive status	Satisfactory		

D. Sector and Theme Codes		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
General transportation sector	32	32
Public administration- Transportation	11	11
Urban Transport	57	57

Theme Code (as % of total Bank financing)		
City-wide Infrastructure and Service Delivery	44	44
Climate change	48	48
Urban Economic Development	8	8

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	Victoria Kwakwa	Pamela Cox
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F. Results Framework Analysis
Global Environment Objectives (GEO) and Key Indicators (as approved)

The Global Environment Objective is to assist the Government of China in enhancing transport efficiency, energy saving, and CO_2 emission reduction by promoting and demonstrating multi-modal transport integration in city clusters.

Revised Global Environment Objectives (as approved by original approving authority) and Key Indicators and reasons/justifications

The GEO was not changed. The PDO Level Result Indicator 1 was changed to read: "Integrated eco-transport strategic planning guidelines developed and adopted by MOT".

(a) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Integrated eco-transport strategic planning guidelines developed and adopted by MOT			
Value (quantitative or Qualitative)	Not yet existed	Endorsement by MOT	Guidelines for terminal design dropped.	Endorsement by MOT
Date achieved	02/22/2012	06/30/2015	06/30/2016	06/30/2016
Comments (incl. % achievement)	This indicator was modified during restructuring. The target was fully achieved. 'A Study and Practice on China City Cluster Integrated Ecological Transport Planning Guideline,' was approved by MOT and published as a book in June 2016 in China. Terminal design guidelines were done under a different GEF project.			
Indicator 2:	Annual transport CO2 emissions of local trips via the two project terminals at least 5% lower than BAU scenario			
Value (quantitative or qualitative)	0 (BAU: 67,482 tons)	5% (against BAU 76,027 tons in Yr 3)		49% (against BAU 81,922 tons)
Date achieved	02/22/2012	06/30/2015		06/30/2016
Value (quantitative or qualitative)	The target was surpassed by 962%. Compared to BAU scenario CO_2 reduction of local trips via the two terminals was 40,369 tons, which is much higher than the 5% target (5% reduction of BAU 76,027 tons for CO_2 emissions of local trips is 3801 tons).			
Indicator 3:	Level of passenger satisfaction for the use of multi-modal terminals for the pilot demonstration reported as higher than similar facilities around the country			
Value (quantitative or Qualitative)	To be available in early 2015			Lituo: 4.3; Changsha: 4.4; Other similar terminals: 3.7
Date achieved	02/22/2012			06/30/2016
Comments (incl. % achievement)	The indicator was fully achieved. Satisfaction level (on a scale from 1 to 5) for the Lituo hub was 4.3 and for Western Changsha terminal 4.4. The average for Chengdu and Harbin terminals was 3.7.			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Eco-transport development strategies for city clusters proposed			
Value (quantitative or Qualitative)	Not yet available	Completed		Completed and accepted.
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	Target was achieved. Report 'Eco-transport development strategies for city clusters'. Was reviewed and approved by the MOT expert panel.			
Indicator 2:	Technical guidelines for integrated eco-transport planning for city clusters prepared			
Value (quantitative or Qualitative)	Not yet available	Completion		Completion
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	Target was achieved. MOT panel approved the technical eco-transport planning guidelines. This indicator monitored PDO progress indicator 1.			
Indicator 3:	M&E methodologies established and used for measuring energy savings and CO2 emission reduction			
Value (quantitative or Qualitative)	Not yet available	Completion		Completion
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	Target was achieved. M&E method for CO2 emission reduction of integrated transport hubs was applied for PDO 2. The method was published in a book in June 2016 in China.			
Indicator 4:	CZT Comprehensive Transport Integration Implementation Plan prepared			
Value (quantitative or Qualitative)	A sketchy plan available	Completion		Completion
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	Target was achieved. The plan was reviewed by the Hunan province transport department and adopted for the CZT city cluster.			
Indicator 5:	Two multi-modal passenger terminals completed per technical specifications			

Value (quantitative or Qualitative)	Not yet built	Completion and demonstration		Completion and demonstration
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	The multi-modal passenger terminals were completed on time. Lituo Terminal in April 2014 and Western Changsha Terminal in October, 2015.			
Indicator 6:	Chengdu-Chongqing (ChengYu) City Cluster Integrated Transport Plan prepared			
Value (quantitative or Qualitative)	Not yet available	Completion		Completion
Date achieved	12/18/2014	06/30/2016		06/30/2016
Comments (incl. % achievement)	This indicator was added during the project restructuring. Target was achieved. The plan was developed early 2016 and approved by MOT panel and the transport authorities in Chengdu and Chongqing.			
Indicator 7:	Beijing-Tianjin-Hebei (JingJinJi) City Cluster Transport Integration Plan prepared			
Value (quantitative or Qualitative)	Not yet available	Completion		Completion
Date achieved	12/18/2014	06/30/2016		06/30/2016
Comments (incl. % achievement)	This indicator was added during the project restructuring. Target was achieved. The plan was developed in 2016 and approved by MOT panel and the transport authorities in Beijing, Tianjin and Hubei.			
Indicator 8:	A website for city cluster eco-transport development and demonstration established and functioning			
Value (quantitative or Qualitative)	Not yet created	Functional		Functional
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	Target was achieved. The website began operating in Nov 2013 and transport news related to the GEF project are updated. The website is at: http://zizhan.mot.gov.cn/zhuantizhuanlan/qita/quanqiuhuanjingjijin/			
Indicator 9:	At least 5 national workshops for eco-transport knowledge exchange and experience dissemination held			
Value (quantitative or Qualitative)	None	5		10
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)	Target was achieved 200%. The PMO held 10 knowledge exchange and dissemination workshops. The participants included government officials, transport professionals from design institutes and consulting companies, and academia.			

Indicator 10:	At least 150 central and local government officials, planners and designers trained for integrated transport policy, planning and design			
Value (quantitative or Qualitative)	None	150		1060
Date achieved	02/22/2012	06/30/2015		06/30/2016
Comments (incl. % achievement)		100%		607%

G. Ratings of Project Performance in ISRs

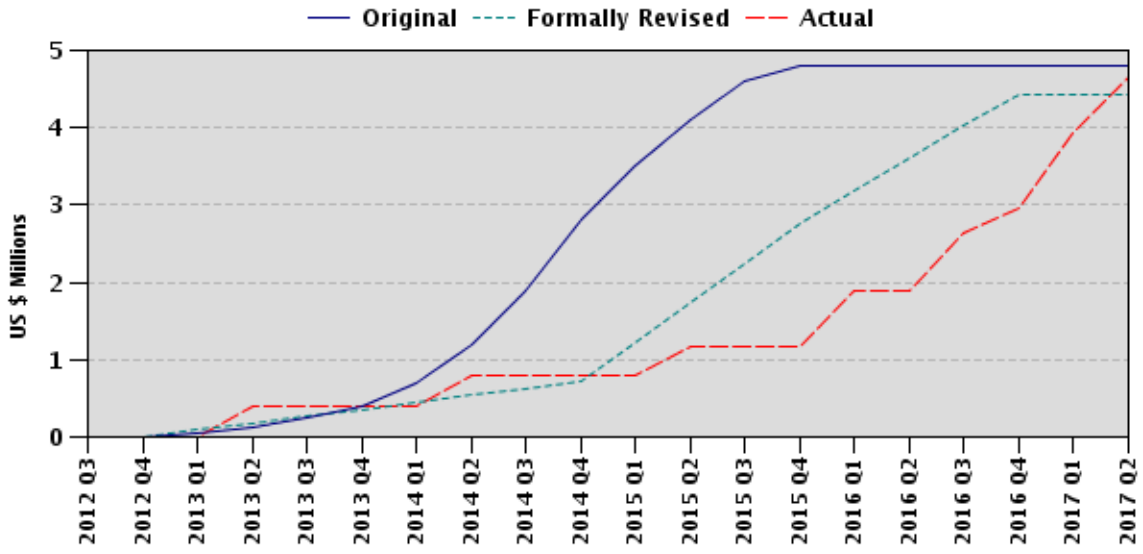
No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
1	06/16/2012	Satisfactory	Satisfactory	0.00
2	04/23/2013	Satisfactory	Satisfactory	0.40
3	10/26/2013	Satisfactory	Moderately Satisfactory	0.40
4	06/15/2014	Moderately Satisfactory	Moderately Satisfactory	0.79
5	12/07/2014	Moderately Satisfactory	Moderately Satisfactory	1.16
6	06/17/2015	Moderately Satisfactory	Moderately Satisfactory	1.16
7	12/10/2015	Moderately Satisfactory	Moderately Satisfactory	1.88
8	06/27/2016	Satisfactory	Satisfactory	2.95

H. Restructuring (if any)

Restructuring Date(s)	Board Approved GEO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		GEO	IP		
12/18/2014	N	MS	MS	1.16	Restructuring had three reasons: (i) delays in project approval and consultant procurement, and parallel preparation of GEF *Large Cities Congestion and Carbon Reduction Project* caused slow disbursement;

Restructuring Date(s)	Board Approved GEO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		GEO	IP		(ii) early completion of this Project's terminals, paid by counterpart funds, with the design financed by the counterpart; and (iii) duplication of TA. At restructuring the GEO remained the same. The restructuring: (i) removed duplicate TA from the Project; (ii) added the integrated transport planning studies of two city clusters, ChengYu and JingJinJi, and augmented the Steering Committee to represent them; (iii) granted the project one-year extension; and (iv) changed four result indicators.

I. Disbursement Profile



1. Project Context, Global Environment Objectives and Design

1.1 Context at Appraisal

1. **Project preparation and design were motivated by the challenges China faced in the need to reduce transportation energy use and CO_2 emission.** In the past decade, China experienced economic growth of about 10% a year, and 6-7% annual growth in both passenger transport (passenger-km) and freight transport (ton-km). The transport sector accounted for 38% of crude oil consumption, and CO_2 emissions from transport (290 million tons in 2004) was estimated to reach 1.1 billion tons in 2030 (PAD para 1). Multi-modal integrated transport in rapidly growing cities was considered an opportunity to promote *eco-transport* that saves resources and is environment friendly.

2. **The problem was severe in City Clusters and presented complicated transport problems**. A city cluster --two or more adjacent interdependent cities-- is served by urban transport systems and intercity transport systems and shares transport connections to the country's other economic centers. City clusters also have small towns and villages within them, which require urban-rural transport integration. There are 22 city clusters in China. Examples include Beijing-Tianjin-Tangshan, the Yangtze Delta, the Pearl River Delta, Chengdu-Chongqing (Cheng-Yu economic zone) and Changsha-Zhuzhou-Xiangtan (CZT).

3. **City clusters have two main problems: institutions and infrastructure**. In China, urban transport is under the management of municipal governments and intercity transport is managed by the modal agencies.[1] There is no formal institutional framework for city cluster transport. Coordination through higher level government is difficult. Thus, transport infrastructure facilities of different modes (highways, railways, airports, and passenger terminals) within the city cluster lacked coordination, integration, and user-orientation in transport systems and services. A key infrastructure shortcoming was the absence or inconvenience of a central hub for transfers from line-haul facilities to local services and a final destination.

4. **MOT used the GEF to fund consultancy studies to develop approaches and solutions to Cluster City transport issues and selected the CZT City Cluster – Changsha, Zhuzhou, Xiangtan-- for pilot demonstration**. Two multi-modal passenger terminals were selected for pilot demonstration: (i) Expansion of the Lituo Terminal to integrate it into the Southern Changsha High Speed Rail Line Station and Bus and Urban Rail Terminal Complex, and (ii) Reconstruction of the Western Changsha Terminal to function as the hub for long- and short-distance bus, urban public bus transport and urban rail in the future. The GEF grant leveraged US$29.71 million of which US$27.27 for the construction of the pilot terminals.

5. **The project contributed achievement of higher level objectives.** The project was consistent with the 2006-10 Country Partnership Strategy (CPS). During the preparation of the Project, there was no updated CPS and the CPS 2006-10 was extended. It supported CPS (2006-2010) pillars 2 and 3 and their themes for upgrading transport infrastructure and improving quality of urban infrastructure management; and, promoting transportation options to reduce pollution and fuel consumption with multi-modal service

[1] This changed in 2008 when institutional restructuring gave all non-rail transport functions, including urban transport, to the Ministry of Transport (MOT).

integration in urban areas to manage resource scarcity and environment challenges. The project also supported China's effort to save energy and reduce CO_2 emission, the main strategic directions of the 12th National Economic and Social Development Five-Year Plan for transport.

1.2 Original Global Environment Objectives (GEO) and Key Indicators

6. The Global Environmental Objective (GEO), which is the same as the Project Development Objective (PDO), is to assist the Government of China in enhancing transport efficiency, energy saving, and CO_2 emission reduction by promoting and demonstrating multi-modal transport integration in city clusters.

7. The following three GEO indicators were introduced (in addition, there were nine (9) intermediate outcome indicators):

i. integrated eco-transport strategic planning guidelines and multi-modal passenger terminal design guidelines developed and adopted by MOT;
ii. annual transport CO_2 emission of local trips via the two project terminals at least 5% lower than the business as usual (BAU) scenario; and
iii. level of passenger satisfaction for the use of multi-modal terminals for pilot demonstration reported as higher than similar facilities around the country.

1.3 Revised GEO and Key Indicators, and reasons/justification

8. The GEO was not changed. The PDO Level Result Indicator 1 (indicator i above) was changed to read: "Integrated eco-transport strategic planning guidelines developed and adopted by MOT" (multi-modal passenger terminal design guidelines were done under a different GEF project). There also were minor changes in three intermediate results indicators to reflect the changes in restructuring. [2]

1.4 Main Beneficiaries

9. The project was a flagship activity to promote and guide multi-modal transport integration, and the MOT benefited from these activities in terms of fulfilling its mandates. For the CZT demonstration city cluster, the beneficiaries are ordinary travelers moving within as well as in and out of CZT, who experienced more efficient integration of different public transport modals, less transfer time, greater transfer convenience and better information services at terminals. Travelers in all other city clusters in China are expected to benefit indirectly from the multi-modal transport integration tested through the Project when replicated nationwide. The transport departments/commissions/bureaus in the project city clusters, CZT, JingJinJi, and ChengYu, benefited from the technical assistance activities in terms of developing high quality planning documents.

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[2] *Intermediate Result Indicator for Component 1:* "Technical guidelines for multi-modal passenger terminals prepared" was removed.
Intermediate Result Indicator 6 for Component 2: "Chengdu-Chongqing (ChengYu) City Cluster Integrated Transport Plan prepared" was added.
Intermediate Result Indicator 7 for Component 2: "Beijing-Tianjin-Hebei (JingJinJi) City Cluster Transport Integration Plan prepared" was added.

1.5 Original Components

10. ***Component 1: China City Cluster Eco-Transport Development Strategic Planning (proposed GEF grant allocation US$2.25 million and counterpart fund US$0.35 million).*** This component aimed to support consultant services to help the MOT analyze the emerging transport patterns and issues of city clusters; propose multi-modal integrated transport strategies, policies, regulations, institutional framework and coordination mechanism; and develop technical guidelines for city cluster integrated transport planning and multi-modal passenger terminal design. It is envisaged that three consultancies are required:

a) provision of technical assistance for policy analysis of emerging issues in transport development of city clusters and for developing integrated transport development strategies for city clusters;
b) provision of technical assistance for developing technical guidelines for city cluster integrated transport planning and multi-modal passenger terminal design, including guidelines for Strategic Environment Assessment (SEA); and
c) provision of technical advisory services for the establishment of a monitoring and evaluation system to measure and monitor transport energy consumption and CO_2 emissions in city clusters.

11. ***Component 2: Pilot Demonstration in CZT City Cluster (proposed GEF grant allocation US$1.3 million, counterpart co-financing US$27.27 million)***. This component aimed to support the following activities:

a) provision of technical assistance for transport integration planning and implementation plan in CZT City Cluster, including the SEA at the planning level;
b) provision of technical assistance for (i) design of integrated multi-modal transport terminals in CZT City Cluster, including two to be constructed under Component 3(c) of the Project below, and (ii) design and supervision of customer satisfaction survey; and
c) construction of two multi-modal passenger terminals and installation of Smart Transport Management System and electric bus charging facilities for pilot demonstration, including: (i) Lituo Terminal, to become an integral part of the Southern Changsha High Speed Rail Line Station cum Bus and Urban Rail Terminal Complex located at Lituo; and (ii) the Western Changsha Terminal. This was financed 100% by counterpart fund of US$ 27.27 million.

12. ***Component 3: Capacity Building (proposed GEF grant allocation US$0.95 million and counterpart fund US$1.20 million).*** Provision of support to the following training and capacity building activities:

a) development of a website for dissemination of Project design and implementation experience;
b) provision of technical advisory services for passenger demand model development and dissemination;
c) carrying out workshops for knowledge and idea exchange and CZT City Cluster experience dissemination on the topics of: (i) eco-transport development

planning for city clusters, (ii) integrated transport terminal design, and (iii) intelligent transport systems; and

d) provision of training on the topics of: (i) multi-modal integrated transport planning, (ii) planning and design of integrated multi-modal passenger terminals, (iii) institutional development for integrated transport management, and (iv) intelligent transport systems for multi-modal passenger terminals.

13. ***Component 4: Project Management (proposed GEF grant allocation US$0.3 million and counterpart fund US$0.5 million).*** Provision of support to the PMO to implement, supervise and manage the different parts of the Project.

1.6 Revised Components

14. At project restructuring in December 2014, the following changes were made to the components:

(i) deletion of a technical assistance of developing guidelines for multi-modal passenger terminal design (in TA, b) activity from Component 1,

(ii) addition of two new TA activities in Component 2 (as replacement for (i)) to support integrated transport planning studies in two additional city clusters, namely Chengdu-Chongqing (ChengYu) and Beijing-Tianjin-Hebei (JingJinJi),

1.7 Other significant changes

15. ***The project's results framework was changed and its Steering Committee augmented to reflect its larger scope, and there was some reallocation in project funding.*** The relatively minor changes in the results framework were due to the added city clusters. Assessment of these changes in the results framework is unaffected by the disbursement percentages before and after restructuring. (However, evaluation of the Bank and Borrower performances were weighted by the disbursement percentages). The implementation arrangements remained the same with the MOT being the implementing entity and responsible for financial management and disbursement, but the Project Steering Committee was augmented by representatives from the newly added city clusters.[3] Due to the delays in project approval, the counterpart provided their own funds for completing the pilot terminal designs and a review activity early so that their construction could begin as scheduled. Some of the intended TA in this project was restructured due to duplication. The resultant project savings of US$1.4 million were reallocated to finance new TA studies for integrated transport plans in the ChengYu and JingJinJi city clusters added to the project at restructuring. The name of Component 2 was changed to 'Pilot Demonstration in Chinese City Clusters'. Finally, extending the Grant closing date from June 30, 2015 to June 30, 2016.

[3] The PSC was composed of the key officials from Ministry of Transport, Ministry of Finance, Hunan Provincial Transport Department, Changsha City, Zhuzhou City, Xiangtan City, Beijing Transport Commission, Tianjin Transport Commission, Hubei Provincial Transport Department, Sichuan Provincial Transport Department, Chengdu Transport Commission, and Chongqing Transport Commission.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

16. ***The Grant financed technical assistance, advisory and capacity building services*.** Eco-transport was a new concept in China and the project faced technical challenges and placed heavy emphasis on the quality of technical assistance studies supported by the GEF grant. Multimodal transport planning, including the design of integrated passenger terminals, had limited precedent in China. The Terms of Reference (TOR) for the major consultancies under the project were prepared by international and domestic consultants funded under the GEF Project Preparation Grant (PPG), and with substantial assistance from World Bank specialists. The capacity building component was also designed to support the learning and skill development in the technical areas of integrated transport planning and design.

17. The TA consultancies consisted of the development of studies, policies and guidelines for integrated transport strategies in city clusters, for establishing a system to measure and monitor CO_2 emissions in city clusters, and to build capacity. These were to be put into practice by constructing two integrated multi-modal transport terminals in the Changsha-Zhuzhou-XiangTan city cluster, implemented by Hunan Province Transport Department (Hunan DOT), and through nationwide experiential dissemination workshops. All these issues, breaking down the content of the PDO and reflecting the objectives are covered in meticulous detail in GEO/PDO outcome and intermediate outcome indicators, whose achievement was evaluated at the level panels of MOT where the project's management was organized.

18. ***The project design was sound***. It was backed up by the Bank's extensive knowledge and experience in urban transport in China[4] and competence and experience of the project preparation team. Environmental assessment, including the EMP and its monitoring, the Resettlement Action Plan with embedded social issues, public consultations, and document disclosure were carried out per Bank policy. Appeals and grievance procedures were established for quick action. Prior experience in Hunan Province with Bank-funded projects were a solid base for capacity building by an external consultant hired for training and monitoring implementation. In procurement China's and the Bank's procurement guidelines were followed. An assessment of MOT procurement

[4] The Bank has a long history and interest in urban transport in China starting with the Shanghai urban transport projects and the 1995 Symposium in Beijing on Urban Transport Development Strategy (World Bank Discussion Paper, No. 352); Transport in China: An Evaluation of World Bank Assistance: (1998); Changzhi Sustainable Urban Transport Project; Jiaozuo Green Transport and Safety Improvement Project; Nanchang Urban Rail Project; Zhengzhou Urban Rail Project; Urumqi Urban Transport Project II, GEF projects, C*hina-GEF-World Bank Urban Transport Partnership Program* (TF-92489); concurrent GEF *Large Cities Congestion and Carbon Reduction Project* (P127036); *Transport Development Study Report on CZT City Cluster Urban-Rural Comprehensive Planning, (*September 2008); and *CZT City Cluster Related Circumstance Report* (March 22, 2010). There is a long history of academic research on the importance of transfer facilities, e.g. Zhan Guo and Nigel Wilson (2011), "Assessing the cost of transfer inconvenience in public transport system: a case of the London underground," Transportation Research Part A 45 (2011) 91-104; Rongfang Liu, Ram Pendyala, and Steven Polzin, "Simulation of the effects of intermodal transfer penalties on transit use." Transportation Research Record 1623; and Faber, Oscar. (1996). "Ameliorating the Disbenefits of Rail Interchange." Rail OR Report No. MPP018/01.

capacity was carried out with affirmative result. Training to the PMO on procurement of Bank financed projects was provided, and backed up with early procurement support missions.

19. ***Transit Oriented Development and Terminal Hubs require Public-Private-Partnership***. Unlike most developed countries, China lacks a metropolitan-wide entity and private sector for urban transport functions; inter-agency coordination even among the transit modes is still relatively limited. The reports from this project discuss these issues and compare them to institutions in the USA, Europe and Japan. Recommendations were made in the 12th Five-Year Plan to prioritize public transport and leverage land use-transport infrastructure management and coordination to increase public transport usage and opportunities for Transit Oriented Development (TOD). Development of transit hub terminals is certainly one way to support TODs.[5] The PDO and the TORs for the consultancies required hiring consultants with experience in multi-modal transport-land use interface, and inter-agency and interjurisdictional experience. Due to the PMO's inexperience in multi-modal planning at the beginning of the project, there was a difficulty to refine TORs in detail and to find qualified consultants for the RFP shortlist. At the same time, the Borrower, faced with the serious problem of (cluster) cities' CO_2 emissions and congestion in general, the Bank team and the Government restructured the project and expanded the coverage of the project and strengthened the PMO's technical capacity. Project's "re-engineering", which did not require changes in the PDO, caused delays ensued and slow disbursements. The PMO and bank team agreed to rewrite the TORs for the new project environment and develop consultant capacity to move the project forward.

20. ***Project risks.*** The overall risk was assessed as moderate. There were three key risks: (i) Coordination among central, provincial and municipal entities; (ii) project design; and (iii) delivery monitoring and long-term sustainability of project objectives. Inter-agency coordination was effectively managed by the high-level Project Steering Committee (see footnote 3), the PMO and their consultants, and the Bank team; however, the project still experienced a delay in receiving the restructuring request (undoubtedly due to sorting out the overlaps with another GEF project, as explained below, and developing the new restructured project content). Project design was technically sound, prepared in accordance with all Bank policies and directives, but was somewhat weak in recognizing the difficulty of finding consultants with experience to tackle coordination among different government agencies at a practical, integrated multi-modal land-use level (risk "ii" above). This, and overlap with another GEF project (*Large City Congestion and Carbon Reduction* (P127036)) led to delays. Risk (iii) above deals with post-completion outcomes and cannot be assessed for some time, although the immediate post-project effects are positive, since the two terminals within this project are currently providing satisfactory services to passengers, and many transport professionals and decision makers benefit from the knowledge dissemination activities. MOT and local officials' commitment to public

[5] The Budget Law of 2015 prevents local governments from using urban development investment companies (UDIC) to finance urban transport infrastructure. TOD and transit hubs, although mutually reinforcing, are therefore a difficult combination for local governments and the UDICs, who have leveraged the financial resources of the UDIC-transit hub combination, and the land use powers of the local government, to expand TOD-type land use development and attractiveness of public transport. The importance of this synergy was clearly visible in the Changsha Western Terminal Hub. The Public-Private Partnership loan under development has an important task of addressing this issue.

transport and TOD, emission reductions, congestion management, and extensive project results dissemination suggest better than moderate risk assessment.[6]

2.2 Implementation

21. **Project implementation using counterpart funds started quickly but the Grant funds disbursed slowly**. The GEF City Cluster Eco-Transport project became effective in June 2012. As the implementing agency, the Ministry of Transport (MOT) was responsible for all procurement through the Project Management Office (PMO) and for coordinating the construction of the terminals financed by the counterpart funds from the Hunan Department of Transport (DOT). Due to a delay in appraisal, the design and design review of these terminals were done early using counterpart funds (para 15) with Bank oversight. The Hunan DOT was ready and proceeded to complete the Lituo terminal in April 2014 and the second Western Changsha terminal in October 2015 on schedule. The capacity building component was also on track with trainings and workshops delivered regularly as per the MOT's training plan agreed to by the Bank. However, due to the overlap and connections with the other GEF project under preparation, it took two years to sort out the implications of the overlap, receive the official restructuring request from MOF, complete the restructuring, fully staff the PMO, write TORs, and procure TA consultants after the project became effective in June 2012. In the first two years, the project disbursed only 24 percent of the original US$4.8 million Grant.

22. **Midterm review in July 2014 and Restructuring in December 2014**. In March 2013, the Bank had approved the GEF *Large Cities Congestion and Carbon Reduction Project* (P127036) with MOT as the project's implementing agency project. A year later, during the review of both GEF projects, the Bank team and the PMO concluded that there was a need to reassess the projects' content and the procurement plans to avoid duplication and create synergies between the two projects. At the midterm, a few months later, it was agreed to drop two consultancies: one duplicated a consultancy in the GEF *Large Cities* project, and the other, design review of multimodal hubs in CZT, was dropped because terminal construction had advanced quickly and MOT and Hunan DOT had already organized and completed external reviews using counterpart funds. Two city clusters, Chengdu-Chongqing (ChengYu) and Beijing-Tianjin-Hebei (JingJinJi), were added to the project. The Steering Group was augmented to include members from the transport departments of ChengYu and JingJinJi city clusters. In essence, the restructuring reinvented the project and significantly increased its coverage and directed the project's PDO more comprehensively on China's cluster cities' eco-transport issues.

23. **After restructuring, project implementation picked up pace and the project was completed on the new schedule**. Restructuring was approved in December 2014. It included cancelation of two consultancies and freed US$1.4 million, which savings were used to finance two technical assistance services to prepare integrated transport plans for the added city clusters, Chengdu-Chongqing (ChengYu) and Beijing-Tianjin-Hebei (JingJinJi). These required a 12-month extension of the Grant closing date. At closing on

[6] The comprehensive ORAF risk assessment in PAD Annex 4 assesses the project overall risk as *moderate*.

June 30, 2016, contracts for all planned projects, training and capacity building were completed, the indicators were fully met. 94.4% of the Grant funds were disbursed.

24. **Utilization of GEF Grant.** At Grant closing, US$4.53 of the 4.80 million Grant was utilized, and US$0.27 million (5.6% of the Grant) was not spent. The grant successfully attracted US$29.7 million of counterpart funding (of which US$27.27 for building the pilot terminals). The project produced five high-quality technical books (in Chinese and in English) that are available to all city clusters in China, 70 people have received overseas training, and numerous well-attended workshops have been held (over 1,000 participants). Although the focus of the project and the pilot terminals was passenger transport, the JingJinJi transport integration plan also included freight and the Tianjin port as important factors in framing the alternatives. Last, but not least, not only have the Steering Group members become aware of the issues, but also other important decision-makers are now knowledgeable of the interconnections between CO_2 emission, energy, congestion, TOD and transport alternatives.[7] The enhanced awareness stimulates the new planning and investment initiatives that follow. For example, TOD was observed in the neighborhood of the Western Changsha terminal with substantial private investments in office and residential apartment buildings.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

25. **Design.** The three GEO indicators—eco-transport planning guidelines, CO_2 reductions in local trips in the pilot terminals, and passenger satisfaction—are relevant and good measures for monitoring and evaluating the GEO achievement at completion. There were no indicators to directly measure energy savings; however, the evidence of energy savings is derived indirectly from the CO_2 reduction (para 36). Except for the planning guidelines, which can respond to changes in the environment, the other two measure the project's outcome at completion. The intermediate indicators measure technical outputs (i.e. strategy or planning guidelines), capacity building, construction of transit hubs for demonstration, and methodologies for measuring energy savings and CO_2 emission reductions. The method for calculating CO_2 reduction for multi-modal transport terminals was initially developed in the PAD for measuring CO_2 emissions from local trips (the urban area of Changsha to/from the demonstrator terminals). The total CO_2 emissions were related to the total passenger volume, transport mode shares, and the trip length. PAD used the same emission factors to generate the CO_2 emissions for the BAU scenario at project completion with updated project induced forecasts in passenger volumes and modeled changes in passenger behavior. The methodology captured the short-run effects of terminals on mode choice and public transport use, but overlooked the CO_2 emissions from the terminal construction and operations, and changes in adjacent land uses. There is no accounting of long-run technological change, type of propulsion fuel, or long-term changes in land uses and travel habits.[8] But, the method is easy to understand, concrete

[7] This question was posed in the Eco-Transport City Cluster workshop in the WCTRS conference (World Conference of the Transport Research Society) in Shanghai. The presenter described the useful dialogue that had taken place between the political and technical decision makers.

[8] The discussion on costs of reducing carbon emissions in paras 39 and 40, and the referenced footnotes, is also relevant. They show the significance of assumptions in carbon emission abatement and consequent wide range on the estimates. Long-term forecasts are subject to substantial uncertainties.

and conservative. It probably errs in underestimating the carbon reductions effected by the new terminals. In its simplicity, it is appropriate considering the long-term uncertainties and the great impact of transport terminals in the near-term. In spite of the caveats and the short-term project perspective, the method serves the chosen results indicator(s), which all are important, dynamic and appropriate for developing transport options for current problems in city clusters.

26. **Implementation.** Data for M&E required close monitoring of the consultancies, which was achieved through the MOT's review during the approval of reports. Several professionals reviewed and evaluated reports before their approval. This approach is deceptively simple—but it was an effective way to ensure national recognition of the project. The five books and their technical content are tangible evidence of the quality of the final products. The well-attended workshops and the website ensured wide dissemination. The TA of *Monitoring and Evaluation of Energy Saving and Emission Reduction of Pilot Projects* refined the M&E method of CO_2 reduction for the pilot terminals. It was initially implemented for the Lituo Terminal and later used for Western Changsha Terminal using traffic surveys and passenger volume data collection to monitor the CO_2 reduction of local trips to/from these two terminals. The high mode share (average 19%) on private cars of local trips was observed during the project preparation, and the PAD adjusted the baseline mode shares and the projected passenger volumes (baseline total around 34 million passenger throughputs in the two terminals) to forecast the CO_2 emission of the BAU scenario.[9] Ex-post, the characteristics of local trips were surveyed again. A much lower share (average 8%) of private cars, a high share (average 80%) of public transport, and somewhat longer trip lengths were observed compared to the baseline. The survey also indicated an increase in the annual passenger volume (37million passengers). The significant shift to public transport from private cars, despite longer trip length, contributed to the CO_2 reduction. The shift was much higher than the model transfer-based estimate made in the PAD. For passenger satisfaction two survey rounds were conducted in 2015 and 2016 by the PMO at both pilot terminals during the normal operation after construction. One passenger satisfaction survey (the same survey methodology) was conducted in 2016 at two like facilities (in Harbin and Chengdu) for benchmarking purpose. The level of passenger satisfaction for the demonstrator terminals was reported higher than for the comparator terminals (para 45). Overall, the M&E implementation was comprehensive, sound and useful.

27. **Utilization.** After restructuring and the pilot terminals built**,** the focus of the project was to complete the consultancies on time and to review and disseminate their outputs. The consultancies' results were used in 10 major workshops. This was an important means of M&E utilization. For calculating the CO_2 emissions the M&E method makes estimations based on surveys for which transport demand and mode share are the most important inputs. In JingJinJi city cluster, transport demand was forecast for both passengers and freight with sophisticated models; in CZT city cluster pilot terminals, emissions reductions of local trips were based on five rounds of travel surveys; in ChengYu

[9] The adjusted mode shares were calculated using a logit mode choice model with generalized cost elasticity between -0.6 and -1.0 (from experiences in developed countries) depending on the alternative modes. In the Western Changsha the modal shift to public transport was calculated to be 2.8% (1418 persons) and in Lituo 5% (2105 persons). Ex-post much higher mode shifts occurred.

city cluster, the concern was the institutional arrangements for planning for which a reference city (Tokyo) was recommended to be adopted (JingJinJi also evaluated institutional arrangements; see Volume 1 in the references). These approaches illustrate application alternatives of the M&E methods developed in the consultancies. The M&E consultancies and the EMP also suggested several practical means to reduce the emissions footprint in the design and during construction of transport hubs.

2.4 Safeguard and Fiduciary Compliance

28. **Social safeguards**. An RAP was prepared for Western Changsha Hub for the acquisition of 18 mu of rural land and relocation of 65 urban and 54 rural households. A due diligence review was prepared during project preparation for Lituo Hub since it was built on the site of the High- Speed Train Station. The RAP for the Changsha transport terminal was well-prepared. Post-project interviews with affected people confirmed that compensation rates, procedures, and the consultation process for land acquisition and resettlement of Lituo Terminal and Changsha Western Passenger Terminal were as promised in the RAP. No complaints were received regarding project resettlement, which confirmed the smoothness of the resettlement process and is attributable, in part, to the compensation policies of the Changsha City Government. Data from the RAP external monitoring report show that the income levels of the affected people increased after land acquisition and resettlement due to the additional lease income from the compensation apartments, and income growth for working at terminals compared to farming.

29. **The environment**. Mitigation measures were carried out to minimize construction related impacts such as dust, air pollutants, noise, solid waste, and wastewater management. Occupational health and safety concerns were properly addressed. Contractors provided channels to local communities for public communication. No complaints from affected communities were made. The construction sites were well managed. The EMP was useful for reducing the environmental and energy footprint of the terminal and its construction. Overall, the EMP implementation performance for both hubs was satisfactory.

30. **Financial management**. The GEF grant and oversight of the Designated Account (DA) were managed by the MOF. The Bank carried out a financial management capacity assessment prior to project appraisal and provided the FM Manual and training to standardize financial management and coordination between the PMO and the Hunan DOT that built the terminal and managed the counterpart funds in Changsha. The audit reports were submitted on time and no material issues were noted. Some delay submission occurred for IUFRs and were subsequently improved. FM was consistently rated satisfactory throughout the project.

31. **Procurement and contract management**. The Government's and Bank's procurement procedures and provisions in the Grant Agreement for this Project were followed. However, the procurement progress lagged until the project restructuring addressed the reasons for the delay. Several factors contributed to project delays: time-consuming modification of the TORs to reflect the expanded project coverage; lack of interest by the consultancy profession on complex TORs requiring multiple skills; labor-intensive integration and removal of overlap with another GEF project (*Large City*

Congestion and Carbon Reduction); and the deliberate process in shortlisting, proposal evaluation and contract negotiation. After restructuring the Bank's project team took a proactive role and successfully kept to the revised project time line.

2.5 Post-completion Operation/Next Phase

32. **Pilot terminals.** The two pilot terminals, Lituo and Western Changsha Hub, are both in operation. The ICR mission visited both terminals and found them to be well equipped and fit for purpose. At the Western Changsha Hub, the bus terminals for local, regional, and long-distance buses were appropriately designated with service areas for bus operators and passengers. At Lituo, a crossroads for two high-speed lines was similarly well organized. The passenger satisfaction surveys indicated acceptance of good service. Both terminals have achieved the targeted reductions in CO_2 emissions of local trips. Transition to post-completion operation of both terminals has already occurred satisfactorily. The well-connected Western Changsha terminal encouraged the developer to build office and commercial buildings adjacent to it. The businesses within these buildings are being opened, and the commuters and customers enjoyed the convenience connection with public transport (see also para 24).

33. **Cluster Cities**. Post-completion impacts of the project in the cluster cities is premature. They are likely to occur slowly and in different ways in the participating cluster cities. Plans and proposals, some of them far-reaching (e.g., policies for eco-transport development and integrated multi-modal transport planning, institutional arrangements for cluster city transport planning, and financing of facilities), and some practical and short term (e.g., implementation plan of transport integration in CZT city cluster and methodology for calculating emission reduction potential of interventions), are presented in the five books from the project studies and project experiences. There has been demonstrable outreach and dissemination of the project results through workshops, the website, reports, and books. The project was concluded with a week-long exhibition on TA outputs in Beijing Jiaotong University, reaching out to the transport academia and professionals, and the 14th World Conference on Transport Research (July 10-15, 2016) in Shanghai, China, held a dedicated session on these outputs. Similar activities are likely to continue in the participating cluster cities and elsewhere as the pressures on urban environment endure and grow.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

Relevance of objectives. Rating: **High**

34. Project objectives remain highly relevant and consistent with the government's priorities of the 12th (2011-2015) and 13th (2016-2020) Five-Year Plans that prioritize low-carbon urban transport and management of climate change. The PDO/GEO priorities are supported by the Bank's China CPS (2013-2016) theme of *Supporting Greener Growth* by promoting low-carbon urban transport; demonstrating pollution management and strengthening mechanism for climate change; transforming urban design in transport and construction to improve transport efficiency; and through *Private-Public Partnerships* and other city-specific transport investments and institutional and technological innovations.

Thus, the CPS and this project are consistent with the GEF-5 (2010-2014) strategy in the climate change focal area to promote energy efficient, low-carbon transport and urban systems.

Relevance of design and implementation
Rating: **High**

35. Project design was based on experiential and study-based learning and capacity building, each backed up by an M&E agenda to ensure consistency with and achievement of the GEO/PDO (paras 25-27). The project activities—both the studies in the cluster cities and the construction of the terminals in Changsha—were directly related to the three GEO themes: transport efficiency, energy savings, and CO_2 reduction by promoting and demonstrating multi-modal transport integration in city clusters. Component 1 and part of Component 2 delivered high quality technical assistance studies (compiled into five books) that developed paths for transport efficiency with integrated multi-modal transport facilities and services in the cluster cities, including proposals for modernized inter-jurisdictional institutions. Component 2 supported the design of two multi-modal transport terminals with 'Smart Transport Management System' (term used in the PAD), electric charging facilities, and comprehensive passenger support services with demonstrated success in CO_2 reduction through energy savings. Component 3 focused on capacity building, training, and dissemination of project results and experiences. There was real and substantive inclusion and awareness-building of high-level decision-makers in the studies. These extensive activities are detailed in Annex 2. The three project components, appropriately embodied in the Results Framework (para 26) and quantified in the Data Sheet, delivered successfully on the GEO priorities and strategic directions for GEO-5 summarized in para 34. They can be scaled up in China's cities. Finally, the multi-modal passenger terminals built in the project demonstrated the success of the approach chosen in the project (paras 37-40).

3.2 Achievement of Global Environmental Objectives
Achievement of the GEO/PDO **– Substantial**

36. It was demonstrated (paras 34 and 35) that the project was consistent with GEO/PDO. The GEO/PDO related to "**assist the Government of China in enhancing transport efficiency, energy saving and CO2 emission reduction by promoting and demonstrating multi-modal transport integration in city clusters**" and is measured by three GEO/PDO outcome indicators and 10 intermediate outcome indicators. All indicator targets were fully achieved.

- **Enhancing transport efficiency.** Comprehensive eco-transport planning guidelines were adopted and included in the multi-modal strategies in the participating city clusters. Evidence to support the improved transport efficiency is demonstrated by the higher satisfaction of the built multi-modal terminals as compared with the comparator terminals (Outcome indicators 1 and 3). Intermediate outcome indicators bear out of this claim. Eco-transport development strategies, their technical guidelines, and subsequent integrated transport plans were prepared and adopted in the participating city clusters. (Outcome indicator 2 and

Intermediate outcome indicators 1, 2, 4, 6, and 7). The GEO/PDO objective theme was achieved.

- **Energy savings**. There were no indicators to measure energy savings. However, the method to calculate CO_2 emissions first estimates travel demand from which energy consumption is derived, and the CO_2 emissions can be derived based on the energy consumption.[10] The emission reduction targets of local trips were amply achieved (Outcome indicator 2) in the two demonstration terminals. Strong evidence for transport efficiency and energy savings are supplied by the marginal abatement cost and grant efficiency (MAC and GE, paras 40). The intermediate outcome indicators reinforce the expectation that similar effects can be delivered when the planning recommendations are implemented in other cluster cities. Political and city management awareness for the GEO objectives and supporting planning processes were created (intermediate outcome indicators 8, 9, and 10). The GEO/PDO objective theme was achieved.
- **CO_2 emission reductions promoting and demonstrating multi-modal transport integration in city clusters.** The targeted CO_2 reductions were exceeded by nearly 10 times by measuring the local trips via the two terminals built in Changsha (Outcome indicator 2). The method for calculating CO_2 emissions was refined and applied in the two successfully built terminals. The method provides parameters and quantitative support to other integrated terminals. The two terminals also serve as models for the design and support services in other cluster cities. These experiences, plans and guidelines enable scaling up this objective. (Intermediate outcome indicators 3, 5, 8). The passenger satisfaction surveys are further evidence that this GEO/PDO objective theme was achieved.

3.3 Efficiency

Rating: **substantial**

37. The GEF grant of US$4.8 million (US$4.53 disbursed) paid for consultant services and IT goods. Due to its small amount, no economic analysis was carried out for the GEF supported components (PAD para 29). The GEF grant leveraged around US$27.27 million counterpart fund for the financing of the Lituo and Western Changsha terminals, which is about 5.6 times of the GEF grant. Per PAD, the internal rates of return for these terminal investments were 7.15% and 6.85%, respectively. These calculations were done outside the project appraisal and just reported in the PAD and not repeated afterward.

38. Efficiency was further enhanced during the implementation by synergizing with another GEF Project *(GEF Large City Congestion and Carbon Reduction Project P127036)* to drop duplicated activities, and through restructuring to support the integrated transport strategies in other high-profile city clusters in China: JingJinJi and ChengYu city clusters. The Project organized more workshops and training activities, and trained more local officials and planners than planned during the project preparation, but within the original fund allocation, which demonstrated the improved efficiency for the capacity

[10] The five volume series produced in the projects TA include a review of planning theories and describe a state-of-the-art travel demand models and associated transport network algorithms developed in the Project.

building component. The reasons include: (i) the China government launched the expense standards of training activities for government officials, which are lower than the estimation used during the project preparation; and (ii) the PMO carefully organized these activities strictly following the standard and according to the actually needs.

39. The annual reductions in CO_2 emissions relative to the BAU case were 40,369 tons at a cost of US$43.95/ton reduced (assuming 30-year lifetime of the terminals at 5% interest). This is within the range of the US$40-50/ton social cost of carbon from the three most–cited models.[11] Other researchers give much higher figures US$200-220/ton.[12]

40. Many assumptions condition the calculation of the GEF grant efficiency. Comparison with other GEF grants is difficult and affected by the time horizon taken. Some comparisons are helpful to gauge efficiency and cost-effectiveness of this project. In the past GEF grants efficiency has been calculated in two ways: (marginal) abatement cost efficiency (MAC) or GEF Grant efficiency (GE). The former is relative to the investments and the latter relative to the grant amount. GEF grant TF-92489 gives US$246/ton for MAC for seven cities for which data were available, and US$4.14/ton for GE for CO_2 reductions over 10-year period. In para 39 the project's CO_2 reduction and annualized costs over a (conservative) 30-year life time was used. If a 10-year lifetime is used instead, the MAC cost of CO_2 is US$67.55/ton (if the costs are discounted at 3%, MAC is US$79.2/ton). These amounts, regardless of the assumptions in the calculation, are much less than the US$246/ton for MAC in GEF Grant TF-92489. Grant efficiency (GE) is more difficult to calculate because effectiveness of technical assistance and planning studies will not be known for some time. In any case, all terminal construction costs cannot be assigned to emission reductions because there are other passenger services and public transport provider benefits, and because CO_2 reductions in the two additional ECO cities are not yet known. A very conservative assumption is to assign one-third of the grant (US$1.53M) to GZT city cluster. The resulting grant efficiency over 10 years would be US$3.79/ton. This is less than in GEF Grant TF-92489 figure of $4.14. If it is assumed that the net CO_2 efficiency improves 3% annually, combining traffic increases and CO_2 efficiency improvements then, with 10-year horizon, MAC for this project is US$77.5/ton and GE US$4.34/ton. It is concluded that both MAC and GE indicate that the GEF grant was administered efficiently and the funds were leveraged to achieve a high abatement cost efficiency. Overall the project efficiency is rated as substantial.

3.4 Justification of Overall Outcome Rating

Rating: **Satisfactory**

41. Relevance of project objectives, project design and its implementation are rated high. The GEO/PDO was fully achieved and remains important to current government priorities to green growth, promotion of low-carbon transport and urbanization, and

[11] William Nordhaus' **DICE model** (Yale University), Richard Tol's **FUND model** (Sussex University), and Chris Hope's **PAGE model** (Cambridge University). http://costofcarbon.org/faq and https://thinkprogress.org/the-social-cost-of-carbon-is-almost-double-what-the-government-previously-thought-893a690f62a7#.df2k38qwk (accessed Sept. 2, 2016).

[12] https://www.fastcoexist.com/3040802/the-cost-of-carbon-pollution-is-much-higher-than-the-government-thinks and http://news.stanford.edu/pr/2015/pr-emissions-social-costs-011215.html (accessed Sept. 2, 2016)

fostering eco-friendly development of city clusters' transport systems. The project had important knowledge sharing and dissemination events that promote the concept of multi-modal transport and new institutional arrangements for large metropolitan regions, drawing lessons from the US, Europe and Japan. Cost-effectiveness of the project investments was substantial and risks to development outcome are moderate.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

42. The Grant focused on transport efficiency, energy savings and CO_2 reduction. It did not aim to alleviate poverty and gender was not a concern in the PAD. Emission reductions benefited all people in Changsha cluster city. A technical assistance study in Component 1 analyzed how different development modes impact economic and social development in city clusters, how eco-transport development can be best achieved, and what are the key policy and institutional barriers that should be overcome to achieve eco-transport development. No empirical results are available from the study.

(b) Institutional Change/Strengthening

43. The project examined the institutional arrangements and financing of transport facilities in the USA, Europe and Japan. Although no decisions have been made, the ideas about metropolitan (cluster city) planning organizations have been embraced, possibly to supplement or reorganize the current 'line-block' organization structures prevalent in China. The project contributed to strengthening institutional capacity for urban transport at the national and local levels. Over 1,000 professionals attended workshops and 70 professionals and decision-makers joined foreign study tours, which has helped to create a pool of experts and consulting firms with global experience or exposure.

44. This Project, together with GEF *Large City Congestion and Carbon Emission Reduction Project* P127036, contributed to the TransFORM initiative, a knowledge platform jointly developed by the World Bank and MOT for knowledge dissemination. The aim was to integrate these two GEF projects with TransFORM to provide knowledge products and a sharing mechanism. The Project websites were integrated with TransFORM's platform. Knowledge dissemination specialists were hired to summarize knowledge from the Project and use TransFORM to disseminate information and multiply the Projects' impact.

(c) Other Unintended Outcomes and Impacts (*positive or negative, if any*)

NA

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

45. Two rounds of passenger satisfaction survey were conducted in 2015 and 2016 by the PMO for each pilot passenger terminals (Lituo Terminal and Western Changsha Terminal) after they were built and in normal operation. About 900 questionnaires for one terminal were distributed and collected for each passenger satisfaction survey. Each questionnaire included 14 questions regarding level of satisfaction (from scale 1 to 5) on the transfer distance, ticketing service, baggage service, waiting hall, information service, and other services. At the end, respondents provided their overall satisfaction about the terminal. Similar facilities of multi-modal terminals were selected in Chengdu and Harbin.

Both are the capital cities of different provinces, like Changsha City, and with comparable population. One round of passenger satisfaction survey with the same survey methodology was conducted in 2016 at the comparator facilities for benchmarking. Per the results of the surveys the satisfaction level (scale 1-5) of Lituo Terminal was 4.3 and 4.4 at Western Changsha Terminal, while the average satisfaction level at the comparator facilities was 3.7. Thus, passenger satisfaction for the demonstrator terminals was higher than that of the comparators.

4. Assessment of Risk to Development Outcome
Rating: **Moderate**

46. The risk to achievement of the PDO is moderate. The PMO developed sufficient capacity and steered all components of the project to successful completion. MOT, as the PMO's "owner", will be able to do so also in the future because energy and emissions will be an ongoing concern for the foreseeable future. The city clusters are committed to support similar objectives to this project and have the concepts and tools to develop plans that reduce energy use and carbon emissions. MOT, through its consultative approach and workshops with relevant authorities in the city clusters, has informed political leaders on the issues, alternatives and proposed strategies of the project. The Bank team has participated in several meetings with the Borrower and the participating city clusters and assessed their declarations to support the project objectives and found them to be committed to advancing the project findings.

5. Assessment of Bank and Borrower Performance

5.1 Bank

(a) Bank Performance in Ensuring Quality at Entry
Rating: **Satisfactory**

47. The Bank assessed and appraised the project in 2010-2012. It correctly gauged the importance of transport transfer facilities and negotiated with the Borrower effective instruments for learning in practice and learning from studies and decided to supervise both. The Bank team was cognizant of international studies on the topic and had extensive experience in urban transport issues in China (para 18). The project content was well thought-out, risks, and the indicators and M&E mechanism ensured that project findings were considered by high-level decision-makers and that findings were disseminated to a wide audience of professionals. The appraisal was thorough and technically well-done. Adequate training was provided for the safeguards (paras 28-31). A minor blemish in the project time table, which caused delays and ultimately restructuring (but with positive consequences), was the miscalculation of the MOT regarding the PMO's ability to develop TORs for a new eco-transport planning approach to reduce energy consumption and pollution, and to avail competent consultants for assignments in multi-modal, inter-agency and inter-jurisdictional environment (paras 21-24).

(b) Quality of Supervision

Rating: **Satisfactory**

48. In March 2013, about a year after this project was approved, the Bank approved the GEF *Large Cities Congestion and Carbon Reduction Project* (P127036), for which MOT was also the implementing agency. At mid-term review in March 2014, the content of both GEF projects was reviewed. The Bank task team and PMO reviewed together the procurement plans for both projects to avoid duplication, create synergies between the two projects, and focus directly on the GEO/PDO. After considering the facts: reporting on progress of the project and its components, the project disbursements, perceptions about the project's transport environment (re: GEF *Large Cities Project*) vis-à-vis the project timeline, the Bank team and the PMO resolved to restructure the project to address these facts. It was decided to cancel a duplicate technical assistance consultancy and transfer these funds, and those for the design of terminals in CZT City Cluster that were no longer needed, to support integrated transport planning studies in two new city clusters, ChengYu and JingJinJi. Both city clusters had abundant population and industry, including an important port, and important centers of transport. Restructuring was a good decision.[13] Physical proximity of the PMO and the Bank team made restructuring process and formalities easy by permitting frequent formal and informal supervision. In retrospect, the content of the re-invented project was self-evident: both added city clusters were truly in need of eco-transport solutions. The Project Steering Committee was augmented with representatives from the new city clusters, the Results Framework was updated, and the project closing date was extended by one year. Restructuring was highly beneficial for the new cluster cities and the project moved forward on schedule thereafter.

49. The project team and the PMO followed diligently the Bank's fiduciary and safeguards policies. The terms of references for the key consulting services were carefully reviewed and discussed by the team experts. These reviews, early in project implementation, revealed a lack of familiarity with eco-transport concept, insufficient experience and technical capacity, and overlaps with another GEF project. The Bank team worked with the PMO to refine the TORs and helped hire qualified technical individual consultants to develop PMO capacity. The procurement documents were reviewed to ensure that good TA consultants were hired. The task team also hired well-known national and international experts to review and comment on the TA reports. This assured the PMO of their high quality. Indeed, the project outputs provide significant intellectual and technical resources for the Government and Chinese professionals. Together with the GEF *Large Cities Congestion and Carbon Reduction Project* (P127036) they significantly advance the project's objectives and reduce the risk to outcome and long-term benefits. The team was also effectively involved in the preparation of workshops together with the PMO. International top experts were invited to participate and disseminate the best practices and institutional arrangements on the integrated transport strategies in city clusters. Other than the regular supervision activities and benefits from both the PMO and the task team location in Beijing, the task team also had frequent informal communication with the PMO to discuss day-to-day operations, to provide support on technical, fiduciary

[13] At restructuring only 24 per cent of the project funds were disbursed - and used in this assessment - that preserved good project ratings.

and safeguards issues, and to overcome difficulties. Good collaboration improved vastly project implementation after the start-up delays.

(c) Justification of Rating for Overall Bank Performance
Rating: **Satisfactory**

50. The Bank's overall performance is rated Satisfactory based on the ratings for Bank Performance in Ensuring Quality at Entry (satisfactory) and Quality of Supervision (satisfactory).

5.2 Borrower

(a) Government Performance
Rating: **Satisfactory**

51. The Government demonstrated commitment to the GEO/PDO during project preparation. There were initial lapses to instruct the PMO after effectiveness in coordination of the two GEF projects and in the project's PDO implementation. However, after restructuring, the project regained quickly its direction and secured quality outputs in all aspects of integrated transport planning for cluster cities. The Government exercised first-rate leadership over the consultancies to achieve the GEO/PDO. Counterpart funds were provided timely.

(b) Implementing Agency or Agencies Performance
Rating: **Satisfactory**
52. Performance of the MOT-PMO implementing agency was Satisfactory and performance of the local implementation agency (Hunan DOT) was also Satisfactory.

53. ***After restructuring, the MOT-PMO demonstrated ability and commitment***. It overcame the initial inertia and prepared TORs and procured, supervised and worked successfully with the consultancies in a strict timeline. It kept the Steering Group informed, which made a significant contribution to the achievement of the PDO/GEO. MOT-PMO organized training, study tours, and dissemination workshops and strengthened institutional capacity. All the components were completed as planned and the project was almost fully disbursed (97%) at project closing

54. ***Performance of the Local Implementing Units.*** The local developers were able and ready to begin implementation of the terminals at Changsha before effectiveness. International experts were hired to review the design of the terminals, funds were made available for construction, and necessary efforts were made to comply with the Bank's fiduciary and safeguard policies. Affected interests have filed no complaints. The local developers managed the construction of the terminals well and participated in capacity building and dissemination activities.

(c) Justification of Rating for Overall Borrower Performance
Rating: **Satisfactory**

55. The Borrower's overall performance is considered Satisfactory because the performance of both the government and the implementing agencies was also satisfactory.

6. Lessons Learned

56. ***Alert task team and awareness of other related projects makes synergy possible*.** During a review of another GEF project prepared almost concurrently with this project, the Bank and the PMO found duplication in technical assistance of the two GEF projects. Together with the national implementing agency (MOT), it was possible to hatch a creative transformation of the project under the same GEO/PDO and expand project coverage to two very important city clusters with apparent substantial positive impacts. Time taken to re-invent the project, arguably a principal cause for the delay, was well spent.

57. ***A strong authorizing environment with influence over several jurisdictions, possibly the entire country, is very useful for TA projects*.** This is particularly true if a powerful Steering Group is organized and the Results Framework vests and requires the implementing agency to review and approve the TA products. The Results Framework is very effective when it involves high level decision-makers and officials.

58. ***A combination of demonstration projects with consultancy studies makes a good platform for experiential learning*.** TA studies are important but do not deliver empirical proofs. The two terminals built in this project provided concrete evidence to show how integrated multi-modal transport works in practice.

59. ***Capacity for consultant procurement should be strengthened in TA projects.*** Delays in appointing consultants for TA consultancies affected project completion. The long refinement period of TORs and the PMO inexperience with novel consultancies caused delays in procurement. The Bank should explain the aims of the consultancies and provide training for such TA assignments during preparation, including assistance to write the TORs. At appraisal and during project implementation advice and help are provided in order to locate consultants for shortlisting.

60. ***Effective and easy communication among all project participants is necessary for project success*.** The PMO was setup at the national level without a local PIU. The national PMO needs to have effective communication with the local authorities (in this case the developers of the two hubs) to avoid disengagement from ownership. This was accomplished. The PMO and the Bank had intensive communication and identified duplication in two projects. But, ineffective communication with MOF contributed to a delay in project restructuring request. After restructuring, and with effective communication among all parties, the project advanced quickly and achieved its objectives.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

Summary of the Borrower's ICR is in Annex 7. The Borrower reports the following key intakes and lessons:

61. **Successful Project Management Institutional Arrangement.** MOT and Project Steering Committee (PSC) from officials in MOT, MOF and the transport authorities, ensured coordination and communication among different agencies. The PMO had experienced staff in all aspects of project management. This ensured strong implementation.

62. **Enhanced Team Communication and Cooperation**. The PMO kept in regular contact with the Bank team during each step of the consultancies and hired seasoned experts in urban transport to provide technical inputs and to review project outputs.

63. **Improved Awareness of Eco-Transport through Capacity Building**. Decision-makers in the transport sector play an important role in transport development. Through technical trainings and workshops (national and overseas training programs), the capacity of decision-makers was strengthened in eco-transport policy, public transport development, public bus transport operation, supervision, and funding options.

64. **Knowledge Dissemination of the Project Outputs**. The PMO attached great importance to knowledge dissemination of the project outputs. Workshops on eco-transport were held at different cities in China on eco-transport planning concepts and integrated transport hubs.

(b) Co-financiers
NA.

(c) Other partners and stakeholders
(e.g. NGOs/private sector/civil society)
NA.

Annex 1 Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Restructure Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Component 1: China City Cluster Eco-Transport Development Strategic Planning	**2.6**	**1.62**	**1.70**	**65.4%**
a. Technical assistance for policy analysis of emerging issues in transport development of city clusters and for developing integrated transport development strategies. b. Technical assistance for developing technical guidelines for city cluster integrated transport planning.	2.2	1.10	1.32	60.0%
c. Technical assistance for the establishment of a monitoring and evaluation system to measure and monitor transport energy consumption and CO2 emissions in city clusters	0.4	0.52	0.38	95.0%
Component 2: Pilot Demonstration in Chinese City Clusters	**28.57**	**29.29**	**29.02**	**101.6%**
a. Technical assistance for transport integration planning and implementation plan in CZT City Cluster, including the SEA at the planning level	0.50	0.44	0.42	84.0%
b. Technical assistance for Chengdu-Chongqing (ChengYu) City Cluster transport integrated planning	0.00	0.75	0.64	-
c. Technical assistance for Beijing-Tianjin-Hebei (JingJinJi) City Cluster transport integration planning	0.00	0.73	0.68	-
d. Technical assistance for (i) design of integrated multi-modal transport terminals in CZT City Cluster, including two to be constructed under Component 2 (e) of the Project below, and (ii) design and supervision of customer satisfaction survey	0.80	0.10	0.01	1.3%
e. Construction of two multi-modal passenger terminals for pilot demonstration, including: (i) Lituo	27.27	27.27	27.27	100.0%

Terminal, to become an integral part of the Southern Changsha High Speed Rail Line Station cum Bus and Urban Rail Terminal Complex located at Lituo; and (ii) the Western Changsha Terminal.				
Component 3: Capacity Building	**2.15**	**2.41**	**2.62**	**121.9%**
a. Development of a website for dissemination of project design and implementation experience	0.10	0.07	0.07	70.0%
b. Passenger demand model development and dissemination	0.09	0.09	0.00	0.0%
c. Workshops for knowledge and idea exchange and City Cluster experience dissemination	0.95	0.95	1.87	196.8%
d. Training	1.00	1.30	0.44	44.0%
e. Technical Support	0.00	0.00	0.24	-
Component 4: Project Management and Monitoring & Evaluation	**0.80**	**0.80**	**0.90**	**112.5%**
a. Support the PMO for project management	0.80	0.80	0.90	112.5%
Total	**34.12**	**34.12**	**34.24**	**100.4%**

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Restructure Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		29.32	29.32	29.71	101.3%
Global Environment Facility (GEF)		4.80	4.80	4.53	94.4%

Annex 2 Outputs by Component

Note: All technical assistance outputs from the project are of high quality and published in 5 volumes in Chinese and in English. The planned TA for developing technical guidelines for multi-modal passenger terminal design was dropped because it was funded by the (almost) parallel GEF *Large Cities Congestion and Carbon Reduction Project* (P127036). At restructuring the funds freed from that TA were directed to support integrated transport planning studies in both Chengdu-Chongqing (ChengYu) and Beijing-Tianjin-Hebei (JingJinJi). GEO/PDO remained unchanged, three results indicators were changed and the project Steering Group was augmented to reflect the restructured project.

Component 1: China City Cluster Eco-Transport Development Strategic Planning: a) technical assistance for policy analysis of emerging issues in transport development of city clusters and for developing integrated transport development strategies; b) technical assistance for developing technical guidelines for city cluster integrated transport planning; and c) technical assistance for the establishment of a monitoring and evaluation system to measure and monitor transport energy consumption and CO2 emissions in city clusters. The cost of Component 1 is shrunk due to the dropping of one duplicated TA.

Outputs:

1. **China City Cluster Integrated Transport Development Strategic Planning, Policy and Integrated Transport Planning Guidelines Study**:
    a. The study summarized the existing conditions of China city clusters and relevant planning documents, analyzed the key characteristics of various city clusters in China, and provided policy analysis of emerging issues in transport development of city cluster. The study also reviewed international lessons learned regarding city cluster transport development.
    b. The study developed the integrated transport development strategies for city clusters, including the policies for eco-transport development, institutional arrangement, and financing policies. The study also proposed the evaluation index framework for China city cluster eco-transport development and the modelling methodology for integrated transport for city clusters.
    c. The technical guidelines for city cluster integrated transport planning and the guidelines for Strategic Environment Assessment (SEA) implementation are developed.
    d. The reports as study outputs include:
        i. China city cluster existing condition and planning report;
        ii. International city cluster eco-transport development experiences and lessons report;
        iii. Case study report on existing development mechanism of integrated transport development planning in China city clusters;
        iv. China city cluster integrated eco-transport indicators and evaluation methodology report;
        v. Report on transport modelling methodology for China city clusters;
        vi. Report on China city cluster ecological low-carbon and energy saving transport study and SEA;

vii. China city cluster transport planning institutional arrangement study report;
viii. Study report of financing policies of China city cluster integrated eco-transport development; and
ix. China city cluster integrated eco-transport planning guidelines.

2. **Study on Key Planning Techniques/Standards on the Bus Network and Facilities Optimization in Metropolitan Area**:
    a. The study focused on the planning standards for bus network optimization and adjustment and the design standards for bus stops and bus terminals in China's metropolitan areas in order to update existing standards, which were developed more than 10 years ago.
    b. The existing issues of bus networks in Chinese metropolitan areas were analyzed together with the diagnostics of existing issues on bus stop configuration and bus terminal design.
    c. The study analyzed the public transport network hierarchies in metropolitan areas and the strategies for bus network planning. It proposed the evaluation index framework of bus network service and the thresholds for further optimization and adjustment. The study developed the implementation guidelines for bus network optimization and adjustment. The study also discussed the development of commuter buses, as well as the customized bus.
    d. The guidelines for bus stop design and facilities and the design standards for bus terminals were developed.
    e. The reports as project outputs include:
        i. Urban bus network optimization and adjustment standard study;
        ii. Urban bus stop facilities function & requirements study; and
        iii. Urban bus terminal planning standards and design guideline study.

3. **Multi-modal Passenger Hub Carbon Emission Reduction Monitoring and Evaluation**:
    a. The study proposed the carbon emission evaluation methodology for multi-modal transport hubs. The carbon emissions could be categorized as coming from local trips and external trips. The construction and operation of multi-modal transport hubs encourage the integration of different transport modes and promote the usage of public transport for further transport carbon reduction.
    b. The study also conducted a total of five rounds of passenger volume surveys and mode share surveys at two pilot multi-modal hubs: Lituo Passenger Hub and Western Changsha Passenger Hub. The calculated carbon emission reductions contribute to the Results Framework of the GEF project.
    c. The study also proposed recommendations of further carbon reduction measures during the hub design and operation.
    d. The reports as project outputs include:
        i. Carbon emission reduction evaluation framework and methodology report;

ii. Report of recommendation for improvement of integrated transport hub design;
iii. M&E reports of Lituo passenger terminal 2014, 2015 and 2016; and
iv. M&E reports of Western Changsha terminal 2015 and 2016.

Component 2: Pilot Demonstration in Chinese City Clusters: a) technical assistance for transport integration planning of three city clusters -- ChangZhuTan (CZT) city cluster, ChengYu city cluster, and JingJinJi city cluster; b) passenger satisfaction survey for pilot passenger hubs; and c) construction of two multi-modal passenger terminals for pilot demonstration at the Lituo Terminal and the Western Changsha Terminal. The cost of Component 2 is increased due to the addition of two TAs for the integrated transport planning studies of two new city clusters.

Outputs:

1. **Optimization of Transport Integration Planning and Implementation Plan in CZT City Cluster (including Strategic Environmental Assessment)**:
    a. The study reviewed the existing transport integration plan and implementation plan of CZT city cluster, including external transport, intercity transport and intra-city transport. The study summarized the successful experiences of China city cluster transport development, which include: 1) enhancement of development of transport hubs in city clusters; 2) optimization of the major internal and external transport corridors; 3) integration of intra-city, intercity and rural-urban transport; and 4) institutional integration of transport planning, construction and operation.
    b. The existing conditions of CZT transport were analyzed and the relevant planning documents were reviewed and analyzed. Based on the diagnostics above, the optimized integrated transport plan for CZT were developed including four sections: external transport, intercity transport, intra-city transport, and intelligent transport. The updated implementation plan was also developed
    c. The study established the evaluation index framework for strategic environmental assessment and evaluated the updated CZT integrated transport plan.
    d. The report as project output includes:
        i. CZT integrated transport plan and the implementation plan.

2. **Chengdu-Chongqing (ChengYu) City Cluster Integrated Transport Planning Study**
    a. The study analyzed the existing social-economic and transport conditions of ChengYu city cluster and developed the transport development strategies and transport development evaluation index framework for the ChengYu city cluster.
    b. Based on the social-economic forecast, the transport demands of ChengYu city cluster were forecasted. Following the demand forecast, the multi-modal transport system of ChengYu city cluster was planned, including the following sections: 1) major external transport corridor planning; 2) major

intercity transport planning within ChengYu city cluster; and 3) transport hub planning of ChengYu city cluster.

c. The study also revisited the financing mechanism for transport infrastructure construction and operations and proposed measures to complement financing options. The institutional arrangement and reforms proposed for ChengYu city cluster transport development reference the coordination mechanisms of city clusters in Japan.
d. The reports as project outputs include:
    i. Existing condition analysis and planning review of ChengYu city cluster integrated transport;
    ii. Objectives and strategies on regional transport development of ChengYu city cluster;
    iii. ChengYu city cluster area economic development and traffic demand forecast report;
    iv. Transport modelling and results report;
    v. ChengYu city cluster transport mobility planning report;
    vi. Institutional recommendation and financing option report; and
    vii. Final report of ChengYu city cluster integrated transport planning.

3. Beijing-Tianjin-Hebei (JingJinJi) City Cluster Integrated Transport Planning Study:

a. The study analyzed the major issues of JingJinJi city cluster integrated transport system by considering the coordination development strategy of JingJinJi.
b. The passenger trip demand was forecasted based on the social-economic development and industry development forecast of JingJinJi city cluster, including intra-city passenger demands, intercity demands, and external demands.
c. The freight transport demand was forecasted based on the social-economic development trend, historical freight transport trend, and freight transport hubs within JingJinJi city cluster. By considering the major industries to be developed within city cluster, the forecast further analyzed the potential types of freight.
d. The integrated transport system, including passenger transport and freight transport, was planned. The low-carbon transport development strategy and development path were proposed.
e. The reports as project outputs include:
    i. Existing condition analysis of transport system and service in JingJinji city cluster and literature review on relevant planning documents;
    ii. Existing transport database and demand forecast of JingJinJi city cluster;
    iii. JingJinJi city cluster passenger transport long-term planning;
    iv. JingJinJi city cluster freight transport long-term planning;
    v. JingJinJi city cluster green and low-carbon integrated transport development planning; and

vi. Report on institutional arrangement recommendations for city cluster transport planning.

4. **Construction of two pilot passenger terminals: Lituo Terminal and Western Changsha Terminal:**
    a. Lituo Passenger Terminal: Lituo is located at the south-east side of Changsha, which is adjacent to the Changsha South Railway Station. The total land area of the terminal is around 12,000 m^2 with total Gross Floor Area of 31,485 m^2. The terminal includes a waiting hall area (2,600m2), a ticket hall area (850m2), coach departure/arrival areas, and supporting offices and facilities. The terminal was designed for the passenger volume of about 20,000 passengers per day. Lituo passenger terminal is fully integrated with other passenger transport mode terminals/stations in the Lituo hub, including high-speed rail station, bus terminal, Metro stop, taxi and passenger cars. The Lituo passenger terminal was completed and began operating in April 2014.
    b. Western Changsha Terminal: The terminal is located in the Yuelu district, west of Changsha city. The total land area of the terminal is 55,000m2 with total Gross Floor Area of 315,000m2. Multiple transport modes are integrated in the western Changsha terminal, including long-distance coach, Metro, urban bus, and taxi. Inter-city railway will be connected in the future. The hub demonstrates best practices of Transit-oriented-development (TOD) concepts. Office building and commercial facilities were built on top of the hub for easy access to public transport. The hub applies advanced information technology and achieves good transfer experiences for all transport modes. Passengers are able to purchase ticket online via mobile phones as well as at ticket machines. The terminal started construction on November 20, 2012 and operations started October 1, 2015.

5. **Passenger Satisfaction Survey for two pilot passenger terminals:**
    a. Two rounds of passenger satisfaction survey were conducted in 2015 and 2016 for each pilot passenger terminals (Lituo Terminal and Western Changsha Terminal). There were approximately 900 questionnaires distributed and collected for each passenger satisfaction survey. Each questionnaire included 14 questions regarding level of satisfaction on the transfer distance, ticketing service, baggage service, waiting hall, information service, and other services. At the end, respondents provided their overall satisfaction towards the terminal.
    b. The survey team also conducted passenger satisfaction surveys on two other similar passenger terminals, Chengdu eastern passenger terminal and Harbin western passenger terminal. The survey results were analyzed and compared with the satisfaction results from Lituo and Western Changsha Terminals. The comparison was presented in the Result Framework.
    c. Passenger Satisfaction Results in 2016: (5 represents most satisfied; 1 represents least satisfied)
        i. Lituo Terminal satisfaction level: 4.3

ii. Western Changsha Terminal satisfaction level: 4.4
iii. Two other similar facilities average satisfaction level: 3.7

Component 3: Capacity Building: a) development of a website for dissemination of project design and implementation experience; b) workshops for knowledge and idea exchange and City Cluster experience dissemination; and c) trainings and technical support.

Outputs:

1. **Project website development for knowledge dissemination**: The website was established in 2013 and updated the project progress, procurement information, project reports, and other related transport news.
   (http://www.moc.gov.cn/zhuantizhuanlan/qita/quanqiuhuanjingjijin/)
2. **Workshops for knowledge and idea exchange and City Cluster experience dissemination**: During implementation of the project, there were 10 major workshops/forums held on various topics with a total of 1,060 attendants, including government officials, transport planning and design professionals, academic researchers in the transport sector, and other relevant participants. The workshops included:
   a. Urban Intelligent Transport Workshop: Dec. 17-18, 2012 in Beijing;
   b. Urban Public Transport Development Workshop: May 21-22, 2012 in Beijing;
   c. City Cluster Integrated Passenger Hub Development Workshop: Dec. 8-9, 2013 in Changsha;
   d. Experience Exchange Workshop on Integrated Passenger Development: Aug. 25-26, 2014 in Chengdu;
   e. Integrated Transport Planning and Development Workshop: Nov. 4-5, 2014 in Beijing;
   f. City Cluster Integrated Transport Development Policy Workshop: Dec. 15, 2015 in Beijing;
   g. Urban Transport Development Workshop: Mar. 10-11, 2015 in Beijing;
   h. City Cluster Integrated Transport Planning Practice Experience Exchange: Apr. 21-22, 2016 in Chengdu;
   i. Multi-modal Passenger Transport Design and Development Experience Exchange: May 19-20, 2016 in Changsha; and
   j. New Book Launch and Project Study Output Exhibition: Jun. 17-24, 2016 in Beijing. Book Launch and Project Study Output Exhibition Seminar, July 11, 2016 in Shanghai (in conjunction of the World Conference of Transport Research Society).

Annex 3 Economic and Financial Analysis

(including assumptions in the analysis)

NA.

Annex 4 Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Ke Fang	Lead Transport Specialist	GTI07	
Zhi Liu	Lead Infrastructure Specialist		
Yi Geng	Sr Financial Management Specialist	GGO20	
Yi Yang	Operational Analyst	GTI10	
Yanan Li	Consultant	EASTS – HIS	
Teresita Ortega	Temporary	GTI02	
Xuan Peng	Program Assistant	EACCF	
Yunqing Tian	Program Assistant	EACCF	
Luquan Tian	Sr Transport. Spec.	GTI05	
Kishor Uprety	Senior Counsel	LEGAM	
Ning Yang	Senior Environmental Engineer	GEN2A	
Jun Zeng	Senior Social Development Spec	GSU06	
Youxuan Zhu	Consultant	GSU02	
Supervision/ICR			
Zhi Liu	Lead Infrastructure Specialist		
Binyam Reja	Lead Transport Specialist	GTI10	
Weimin Zhou	Transport Specialist	GTI10	
Antti Talvitie	Consultant	GTI10	
Yi Yang	Operational Analyst	GTI10	
Yi Geng	Sr Financial Management Specialist	GGO20	
Zheng Liu	Procurement Specialist	GGO08	
Xuan Peng	Program Assistant	EACCF	
Yunqing Tian	Program Assistant	EACCF	
Ruifeng Yuan	Program Assistant	EACCF	
Luquan Tian	Sr Transport. Spec.	GTI05	
Ning Yang	Senior Environmental Engineer	GEN2A	
Jun Zeng	Senior Social Development Spec	GSU06	
Youxuan Zhu	Consultant	GSU02	
Kuo-Ann Chiao	Consultant	GTI02	
Haixiao Pan	Consultant	GTI10	
Yuan Shao	Consultant	GTI10	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY10	5.90	44925.21
FY11	17.25	106016.71
FY12	3.13	25449.26
Total:	26.28	176,391.18
Supervision/ICR		
FY13	4.00	24326.92
FY14	6.60	38204.35
FY15	8.00	59983.36
FY16	8.00	69328.90
Total:	26.60	191,843.53

Annex 5 Beneficiary Survey Results

1 Two rounds of passenger satisfaction survey were conducted in 2015 and 2016 for each pilot passenger terminals (Lituo Terminal and Western Changsha Terminal). There were approximately 900 questionnaires distributed and collected for each passenger satisfaction survey. Each questionnaire included 14 questions regarding level of satisfaction on the transfer distance, ticketing service, baggage service, waiting hall, information service, and other services. At the end, respondents provided their overall satisfaction towards the terminal.

2 Similar facilities of multi-modal terminals were selected in Chengdu and Harbin (Chengdu eastern passenger terminal and Harbin western passenger terminal). Both are the capital cities of different provinces, like Changsha City, and with comparable population. The survey team conducted passenger satisfaction surveys (same methodology as for the pilot terminals) on these two similar passenger terminals in 2016 for benchmarking. The survey results were analyzed and compared with the satisfaction results from Lituo and Western Changsha Terminals.

3 Passenger Satisfaction Results in 2016: (5 represents most satisfied; 1 represents least satisfied)

- Lituo Terminal satisfaction level: 4.3
- Western Changsha Terminal satisfaction level: 4.4
- Two other similar facilities average satisfaction level: 3.7

Annex 6 Stakeholder Workshop Report and Results

During implementation of the project, there were 10 major workshops/forums held on various topics with a total of 1,060 attendants, including government officials, transport planning and design professionals, academic researchers in the transport sector, and other relevant participants. The workshops included:

- Urban Intelligent Transport Workshop: Dec. 17-18, 2012 in Beijing;
- Urban Public Transport Development Workshop: May 21-22, 2012 in Beijing;
- City Cluster Integrated Passenger Hub Development Workshop: Dec. 8-9, 2013 in Changsha;
- Experience Exchange Workshop on Integrated Passenger Development: August 25-26, 2014 in Chengdu;
- Integrated Transport Planning and Development Workshop: November 4-5, 2014 in Beijing;
- City Cluster Integrated Transport Development Policy Workshop: December 15, 2015 in Beijing;
- Urban Transport Development Workshop: March 10-11, 2015 in Beijing;
- City Cluster Integrated Transport Planning Practice Experience Exchange: April 21-22, 2016 in Chengdu;
- Multi-modal Passenger Transport Design and Development Experience Exchange: May 19-20, 2016 in Changsha; and
- New Book Launch and Project Study Output Exhibition: Jun. 17-24, 2016 in Beijing. Book Launch and Project Study Output Exhibition Seminar, July 11, 2016 in Shanghai (in conjunction of the World Conference of Transport Research Society).

There are five volumes published by China Communications Press Co., Ltd. June 2016:

1. 'A Study and Practice on China City Cluster Integrated Ecological Transport Planning Guideline'. June 2016
2. 'Integrated Transport Hub Energy-saving and Emission Reduction Evaluation Methodology and Practice'. June 2016
3. Report of 'Beijing-Tianjin-Hebei (JingJinJi) City Cluster Transport Integration Planning Study'. June 2016
4. Report of 'ChengYu City Cluster Integrated Transport Development Planning Study', June 2016
5. Report of 'City Cluster Integrated Transport Planning Methods (including Strategic Environmental Assessment) – A Cast Study of CZT City Cluster'. June 2016

Annex 7 Summary of Borrower's ICR and/or Comments on Draft ICRR

1. The PMO completed its own ICR, and submitted to the Bank in June, 2016, which provided comprehensive information on the project preparation, implementation and results. The draft ICRR from the Bank ICR team was provided to the PMO for review in October 2016, and the PMO agreed on the conclusions and key ratings. The Recipient's ICR from the PMO is summarized below:

2. With China's national urbanization development strategy, city clusters are a promising approach to promoting urbanization, as well as a key measure for economic transformation and integrated development in urban and rural area. Chinese governments at all levels attach great importance to eco-transport development under 'the strategy of environmentally friendly and resource-saving society'. It is important to develop an integrated transport system for city clusters with well-functioning features, well-organized structures and efficient services that ultimately enhance transport efficiency and reduce CO2 emission.

3. The GEF City Cluster Eco-Transport Project conducted comprehensive studies on strategy planning and a policy framework for ecological transport for China's city clusters. The Project focuses on three pilot city clusters, Changsha-Zhuzhou-Xiangtan (CZT), Beijing-Tianjin-Hebei (JingJinJi) and Chengdu-Chongqing (Chengyu), as well as two Integrated Transport Passenger Hubs (ITPH) in Changsha, Lituo and Western Changsha Terminals. This Project proposed a comprehensive transport development strategy and urban transport planning policy that is well suited to China's social and economic development situation and emission reduction targets. Through capacity building and knowledge dissemination activities, project outputs and reports are shared with transport authorities and academic professionals to promote environmentally-friendly transport development, energy savings, and emission reduction in the transport sector; thus, the Project contributes to addressing climate change issues.

4. As per the Grant Agreement, a Project Steering Committee (PSC) was established during project preparation to provide guidance, supervision and decision making on key issues. The PSC consisted of senior officials from the comprehensive planning department of Ministry of Transport; International Department of Ministry of Finance; transport departments in Hunan, Sichuan and Hebei provinces; as well as transport bureaus/committees in Changsha, Zhuzhou, Xiangtan, Beijing, Tianjin, and Chongqing cities.

1. Project Outputs

Consulting Tasks

5. The PMO selected qualified consulting firms to conduct consulting services as per the approved procurement plan and with procurement guidance from the Bank. Consulting firms produced the required reports with high quality. The studies and consulting firms awarded are listed in the table below.

Procurement No.	Study Name	Consulting Firm	Date of Signing Contract
ET/CP1	China City Cluster Integrated Transport Development Strategic Planning, Policy and Integrated Transport Planning Guidelines Study	Shanghai WSP Consulting Ltd in association with WSP UK Ltd (Sub-consultant)	Jan. 27 2015
ET/CP2	Chengdu-Chongqing (ChengYu) City Cluster Integrated Transport Planning Study	Institute of Comprehensive Transportation of National Development and Reform Commission in association with Shenzhen Urban Transport Planning & Design Institute Co., Ltd (sub consultant)	Sep. 16 2015
ET/CP3	Monitoring and evaluation of the emission reduction of pilot projects - integrated multi-modal passenger transport terminals	Beijing Energy and Environment Development Research Center	June 10 2014
ET/CP4	Optimization of transport integration planning and implementation plan in CZT City Cluster (including Strategic Environmental Assessment)	Joint venture of Beijing Transportation Research Center (Leader) and AECOM (Shenzhen) Ltd (Member) and Beijing Energy and Environment Development Research Center (Sub-consultant)	June 10 2014
ET/CP5	Beijing-Tianjin-Hebei (JingJinJi) City Cluster Transport Integration Planning Study	Beijing Transportation Research Center in association with Shenzhen Urban Transport Planning & Design Institute Co., Ltd (sub consultant)	Sep. 14 2015
ET/CP6	Key Planning Techniques Study on the Bus network and facilities Optimization	Shenzhen Urban Transport Planning & Design Institute Co., Ltd (Leader), and Jinan Urban Transportation Research Center (sub consultant)	Dec. 31 2015

6. The successful implementation of six consulting services helped diagnose various challenges and issues in China's transport system for city clusters and provided recommendations for transport strategy, policy, regulation, implementation plan and mechanism for eco-transport development. They also provided support for the development of city cluster integrated transport planning and designs. The three pilot city clusters benefitted from the outputs of the studies for their eco-transport development strategies. Strategic environmental assessments (SEA) were conducted together with the planning process to assess the environmental impacts from different planning scenarios. Proper methodologies were used in the monitoring and evaluation of carbon emission reduction of transport hubs.

Pilot Integrated Transport Hubs

7. **Changsha Lituo Passenger Terminal:** The terminal contains a long-distance bus departure/arrival area and bus parking area. The passenger terminal was developed by Changsha Longxiang Group with a total Gross Floor Area of 31,485 m2. The Lituo Passenger Terminal is well integrated with the Changsha South Railway Station, Metro Line 2, Maglev to the airport, urban buses, taxi and passenger cars and forms an important passenger transport hub in Changsha. The Lituo passenger terminal began operating in April 2014.

8. **Changsha Western Terminal**: The Changsha Western Terminal adopted a successful concept of TOD by combining several transport modes together as well as different land uses. The terminal is well connected to Metro Line 2, short- and long-distance passenger transport, urban bus, taxi and passenger cars. Different land uses include shopping malls, commercial streets, and office buildings. Advanced technology has been used for passenger transport including online ticketing services. The terminal began operating in October 2015.

Capacity Building Activities

9. According to the Project Appraisal Document and related legal documents, the MOT/PMO organized a series of capacity building activities, and these activities achieved expected outputs (listed below). A series of workshops, knowledge sharing and dissemination activities, and oversea study tours enhanced the knowledge of officials and staff in central and local governments regarding transport planning, strategy and policy. Some of the outputs have been applied in practice. Expected outcomes of capacity building were achieved:

- Established a project website in 2013.
- Organized 10 workshops and trainings on various topics including ITS, urban public transport development seminar, integrated transport hub, integrated transport planning, and transport strategy and policy. Participants included government officials, experts, international and national consulting companies, and academic professionals. The total number of participants was approximately 1,060 people.
- Organized seven oversea study tours, including trainings on best practices in public transport; transport hubs and urban planning in Europe, Columbia and Brazil; transport financing mechanism; and transport planning and hubs in North America.
- Published two books to promote and disseminate the knowledge products of the project: *China City Cluster Integrated Transport Planning Guidance and Practice* and *Carbon Emission Evaluation Methodology and Practice for Integrated Transport Hub*. The books provide good references for technical staff in transport planning, management, and environment evaluation.

2. Environment Management

10. During project implementation, project EMP monitoring reports were developed. Based on conclusions from the reports, environment management performed quite well during implementation, in specific:

- Environmental management, including construction-related environmental impact and waste discharge, was monitored during the construction and operation periods of Lituo and Changsha West terminals. As per the World Bank policy of environment evaluation (OP4.01) and relative requirements in the Environment Management Plan (EMP), survey and monitoring results indicate that environment management actions fully complied with requirements in terms of air, water and noise. Moreover, there were no complaints from nearby residents.

3. Social Development and Resettlement

10, The construction of Lituo and Changsha West terminals involved limited resettlement. During the project preparation phase, the PMO developed a Resettlement Action Plan. The PMO engaged social and resettlement specialists to conduct regular settlement monitoring and prepared an Annual Monitoring Report from 2013 to 2015. In specific:

- According to surveys, resettled residents feel satisfied with resettlement arrangements and the household incomes of resettled households increased after the resettlement.

11. In sum, the arrangement and actions associated with resettlement in this project were implemented well. This is in line with the World Bank's policy of Involuntary Resettlement (OP/BP 4.12) and China's related social policy.

4. Carbon Emission Monitoring and Evaluation

12. The main object for this project is reducing carbon emission with more shares of public transport accessing the hubs instead of private vehicles. The main baseline information is contained in the PAD. Monitoring data were collected from sampling surveys and questionnaires.

13. The consultant monitored carbon emission in Lituo hub three times from November 2014 to February 2016 and twice for Western Changsha hub in September 2015 and February 2016. Based on these surveys, it is estimated that the annual total CO2 emission of local trips under the BAU scenario in 2016 for Lituo and Western Changsha hubs is about 81,923 tons and CO2 emission reduction is estimated to be 40,369 tons. This is about 49% of the BAU scenario and exceeds the 5% target in indicator No. 2 of PDO.

5. Project Development Objective Achievement

14. Indicator One: Integrated eco-transport strategic planning guidelines developed and adopted by the MOT.

The outputs from TAs provide strategic studies and guidelines on strategy planning, policy framework, environmental impacts, and institutional arrangement recommendations for China's city cluster eco-transport development with focus on three city clusters of Changsha-Zhuzhou-Xiangtan (CZT), Beijing-Tianjin-Hebei (JingJinJi) and Chengdu-Chongqing (ChengYu). The policy framework and eco-transport planning techniques will contribute to the sustainable development of China's transport sector, including carbon reduction through eco-transport development. MOT's expert panels reviewed and endorsed the main studies and their findings have been partially adopted by the MOT. Therefore, this indicator has been successfully achieved.

15. Indicator Two: Annual transport CO2 emissions of local trips via the two project terminals at least 5% lower than the BAU scenario.

According to the surveys and calculated results from the consultant of ET/CP3, as stated in the above section, it is estimated that the annual total CO2 emission of local trips in the BAU scenario in 2016 for Lituo and Western Changsha hubs is about 81,923 tons. CO2 emission reduction in 2016 for these two hubs is estimated to be 40,369 tons, which is about 49% of the BAU 81,923 tons in 2016. The carbon reduction result exceeds the 5% target of the indicator; therefore, indicator two has been successfully achieved.

16. Indicator Three: Level of passenger satisfaction for the use of multi-modal terminals for pilot demonstration is higher than similar facilities around the country.

The PMO conducted passenger satisfaction surveys for Lituo and Western Changsha Terminals in 2015 and 2016, as well as surveys for similar facilities in Harbin and Chengdu. The Lituo hub satisfactory level was 4.3 (from 1 to 5) and Western Changsha terminal satisfactory level was 4.4. The average level of passenger satisfaction for Chengdu and Harbin terminals was 3.7, which is lower than the satisfaction level of the two pilot terminals. Therefore, the indicator three has been successfully achieved.

6. Lessons learned

17. **Successful Project Management Institutional Arrangement.** The MOT is the Implementing Agency for this project. A Project Steering Committee (PSC) was established and included officials from the MOT, the MOF, and relevant transport authorities to ensure the smooth coordination and communication among different agencies. The Project management office (PMO) was founded with experienced staff for project management, procurement management, financing management, as well as technical supports. The institutional arrangements ensured strong communication and implementation.

18. **Enhanced Team Communication and Cooperation**. The PMO maintained close and regular contact with the Bank team from the initial formulation of terms of references for consulting services through each step of procurement, which ensured smooth communication and project progress. The PMO also hired seasoned experts in urban transport to provide technical inputs to the MOT and relevant authorities for the terms of reference. In addition, an expert panel was organized to review the reports to ensure the quality of the project outputs.

19. **Enhanced Financial Management Mechanism**. The PMO managed to improve the efficiency of the fund utilization while following financial management requirements from the MOT and the Bank. A strict financial management mechanism was adopted to ensure that all relevant costs were appropriately accounted for and approved.

20. **Improved Awareness of Eco-Transport through Capacity Building**. Decision-makers in the transport sector play an important role in transport development. Through technical trainings, workshops and other capacity building activities (national and oversea training programs), capacity of decision-makers was strengthened in terms of eco-transport policy, public transport development, public bus transport operation and supervision, and other funding options. The ecological development concept was introduced and emphasized to officials and planners. It is demonstrated during last four years that proper trainings greatly enhanced the sustainable and eco-transport concepts, which will benefit China's integrated transport development at both central and local levels.

21. **Knowledge Dissemination of project outputs**. The PMO attached great importance to knowledge disseminations of project outputs in order to promote the dissemination of advanced transport concepts to relevant authorities and institutes. Workshops on various transport topics were held at different cities in China to train relevant officials on eco-transport planning concepts and integrated transport hubs.

Annex 8 Comments of Co-financiers and Other Partners/Stakeholders

N.A.

Annex 9 List of Supporting Documents

Project Appraisal Document (PAD) No. 60254-CN dated February 22, 2012

Global Environment Facility Agreement (GEF City Cluster eco-transport project) TF Grant Number TF099421. May 18, 2012

Project Aide Memoires and ISRs

Semi-annual Progress Status Reports from the PMO

World Bank Report No. RES16117. Restructuring Paper on a Proposed Project Restructuring of GEF City Cluster ECO-Transport Project GEF {LOAN/CREDIT} TF 099421 Approved on March 29, 2014

GEF City Cluster Eco-Transport Project (GEF TF099421) *Amendment to the GEF Grant Agreement* World Bank Official Letter, December 18, 2014

China: GEF-City Cluster Eco-Transport Project (P121263, GEF TF099421) Proposed Level II Restructuring. World Bank Office Memorandum, Dec. 18, 2014

Global Environmental Facility. GEF-5 Programming Directions, Sixth Meeting for the Fifth Replenishment of the GEF Trust Fund, May 2010

Global Environmental Facility. GEF-6 Programming Directions, Third Meeting for the Sixth Replenishment of the GEF Trust Fund, November 2013

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- 'A Study and Practice on China City Cluster Integrated Ecological Transport Planning Guideline'. June 2016
- 'Integrated Transport Hub Energy-saving and Emission Reduction Evaluation Methodology and Practice'. June 2016
- Report of 'Beijing-Tianjin-Hebei (JingJinJi) City Cluster Transport Integration Planning Study'. June 2016
- Report of 'ChengYu City Cluster Integrated Transport Development Planning Study', June 2016
- Report of 'City Cluster Integrated Transport Planning Methods (including Strategic Environmental Assessment) – A Cast Study of CZT City Cluster'. June 2016

https://www.fastcoexist.com/3040802/the-cost-of-carbon-pollution-is-much-higher-than-the-government-thinks (accessed Sept 2, 2016)

https://thinkprogress.org/the-social-cost-of-carbon-is-almost-double-what-the-government-previously-thought-893a690f62a7#.df2k38qwk (accessed Sept 2, 2016)

http://news.stanford.edu/pr/2015/pr-emissions-social-costs-011215.html (accessed September 2, 2016)

http://costofcarbon.org/faq (Dice, FUND, and PAGE models)