Document of
The World Bank

Report No: ICR00001373

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-72090 TF-52877 TF-52856)

ON A

LOAN
IN THE AMOUNT OF US$45 MILLION

TO THE MUNICIPALITY OF METROPOLITAN LIMA

AND A

GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF US$7.93 MILLION

TO THE GOVERNMENT OF PERU

FOR THE

LIMA TRANSPORT PROJECT

March 27, 2012

Sustainable Development Department
Bolivia, Chile, Ecuador, Peru and Venezuela Country Management Unit
Latin America and the Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 7, 2012

Currency Unit = Peruvian Sol
Sol 1.00 = US$ 0.37
US$ 1.00 = Sol 2.67

FISCAL YEAR
[January 1 – December 31]

ABBREVIATIONS AND ACRONYMS

AATE	Autonomous Authority for the Electric Mass Transit System *(Autoridad Autónoma del Sistema Eléctrico de Transporte Masivo para Lima y Callao)*
BRT	Bus Rapid Transit
CAS	Country Assistance Strategy
CFAA	Country Financial Accountability Assessment
CGC	General Control Center *(Centro General de Control)*
CNG	Compressed Natural Gas
COFIDE	Financial Development Corporation (*Corporación Financiera de Desarrollo S.A.)*
CONAM	National Council for the Environment (*Consejo Nacional del Ambiente)*
COSAC	High-Capacity Segregated Corridors *(Corredores Segregados de Alta Capacidad)*
CTU Callao	Callao Urban Transport Department (*Gerencia de Transporte Urbano*)
EA	Environmental Assessment
EFI	Economic-Financial and Institutional Modeling Study (*Estudio de los Modelos Economico-Financiero e Institucional)*
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMAPE	Lima Municipal Enterprise for Fare Management *(Empresa Municipal Administradora de Peaje de Lima)*
EMP	Environmental Management Plan
ENATRU	National Urban Transport Company *(Empresa Nacional de Transporte Urbano)*
EPA	Environment Protection Agency
FM	Financial Management
FMR	Financial Management Reports
FONAM	National Environment Fund *(Fondo Nacional del Ambiente)*

GDU Lima	Lima Urban Development Department of MML (*Gerencia de Desarrollo Urbano)*
GEF	Global Environment Facility
GEF CEO	GEF Chief Executive Officer
GEO	Global Environmental Objectives
GHG	Greenhouse Gases
GNV	Vehicular Natural Gas *(Gas Natural Vehicular)*
GoP	Government of Peru
GPS	Global Positioning System
GTU	Urban Transport Bureau *(Gerencia de Transporte Urbano)*
IBRD	International Bank for Reconstruction and Development
I-CE	Interface for Cycling Expertise
ICR	Implementation Completion and Results Report
IDB	Inter-American Development Bank
IMP	Metropolitan Planning Institute (*Instituto Metropolitano de Planificación)*
INC	National Institute of Culture *(Instituto Nacional de Cultura)*
INVERMET	Metropolitan Investment Fund *(Fondo Metropolitano de Inversiones)*
IP	Inspection Panel
ITDP	Institute for Transportation and Development Policy
JICA	Japanese International Corporation Agency
KFW	*Kreditanstalt für Wiederaufbau*
LDV	Light-Duty Vehicles
M&E	Monitoring and Evaluation
MEF	Ministry of Economy and Finance *(Ministerio de Economía y Finanzas)*
MML	Metropolitan Municipality of Lima *(Municipalidad Metropolitana de Lima)*
MPC	Provincial Municipality of Callao *(Municipalidad Provincial del Callao)*
MTC	Ministry of Transportation and Telecommunications *(Ministerio de Transportes y Comunicaciones)*
NGO	Nongovernmental Organization
NMT	Non-motorized Transport
NPV	Net Present Value
LCSDE	Development Effectiveness Unit
LCSSO	Social Development Unit
OPCQC	Safeguards Quality Assurance and Compliance Group
OSINERGMIN	Supervisory Agency for Investment in Energy and Mining (*Organismo Supervisor de la Inversión en Energía y Minería*)
PAD	Project Appraisal Document
PDF-B	Project Development and Preparation Facility Block B

PDO	Project Development Objectives
PEMTNM	Special Metropolitan Project for Non-motorized Transport *(Proyecto Especial Metropolitano de Transporte No Motorizado)*
PHRD	Japan Policy and Human Resources Development Fund (Grant)
PIU	Project Implementation Unit
PKI	Passenger Kilometer Index
PM	Particulate Matter
PPP	Public Private Partnership
PROTRANSPORTE	Project for the Preparation of the Lima Metropolitan Transport Investment Plan (*Proyecto de Preparación del Plan de Inversiones para el Transporte Metropolitano de Lima*)
PTUS	Urban Transport Plan for Santiago *(Plan de Transporte Urbano para Santiago)*
QAG	Quality Assurance Group
SAT	Safeguards Advisory Team
SIT	Integrated Public Transport System of Lima *(Sistema Integrado de Transporte de Lima)*
SEA	Strategic Environmental Assessment of the Urban Transport Program in Lima
SOE	Statement of Expenditure
ST/CTLC-MTC	Secretariat of Transport/Lima–Callao Transport Council/Ministry of Transport and Communications (*Secretaría de Transporte/Consejo de Transporte de Lima y Callao/Ministerio de Transportes y Comunicaciones*)
TMS	Traffic Management Study
UNDP	United Nations Development Program
VOC	Volatile Organic Compound

Vice President:	Hasan Tuluy
Country Director:	Susan Goldmark
Sector Manager:	Aurelio Menéndez
Project Team Leader:	Arturo Ardila-Gómez, Elisabeth Goller
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COUNTRY
Project Name

CONTENTS

A. Basic Information			
Country:	Peru	Project Name:	PE LIMA TRANSPORT PROJECT
Project ID:	P035740,P074021	L/C/TF Number(s):	IBRD-72090,TF-52856,TF-52877
ICR Date:	03/27/2012	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	MUNICIPALITY OF METROPOLITAN LIMA, GOVERNMENT OF PERU
Original Total Commitment:	USD 45.00M,USD 7.93M	Disbursed Amount:	USD 45.00M,USD 7.35M
Environmental Category: B,B		**Focal Area**: C	
Implementing Agencies: Protransporte FONAM			
Cofinanciers and Other External Partners: Interamerican Development Bank			

B. Key Dates				
PE LIMA TRANSPORT PROJECT - P035740				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	02/20/2003	Effectiveness:	12/15/2004	12/15/2004
Appraisal:	06/24/2003	Restructuring(s):		
Approval:	12/09/2003	Mid-term Review:	10/15/2007	12/07/2006
		Closing:	06/30/2009	04/30/2011

LIMA TRANSPORT - P074021				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	04/26/2001	Effectiveness:		08/31/2004
Appraisal:	06/24/2003	Restructuring(s):		03/26/2009
Approval:	12/09/2003	Mid-term Review:		12/07/2006
		Closing:	06/30/2009	06/30/2010

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes	Satisfactory
GEO Outcomes	Moderately Satisfactory
Risk to Development Outcome	Low or Negligible
Risk to GEO Outcome	Moderate
Bank Performance	Moderately Satisfactory
Borrower Performance	Moderately Satisfactory

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

C.3 Quality at Entry and Implementation Performance Indicators			
PE LIMA TRANSPORT PROJECT - P035740			
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):	Yes	Quality of Supervision (QSA)	Moderately Satisfactory
DO rating before Closing/Inactive status	Satisfactory		

LIMA TRANSPORT - P074021			
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	Moderately Satisfactory		

D. Sector and Theme Codes		
PE LIMA TRANSPORT PROJECT - P035740		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
General transportation sector	81	81
Other social services	4	4
Sub-national government administration	15	15
Theme Code (as % of total Bank financing)		
Improving labor markets	14	5
Injuries and non-communicable diseases	14	10
Municipal governance and institution building	29	25
Pollution management and environmental health	14	10
Urban services and housing for the poor	29	50

LIMA TRANSPORT - P074021		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
General transportation sector	78	80
Other social services	2	
Sub-national government administration	20	20
Theme Code (as % of total Bank financing)		
Climate change	29	70
Environmental policies and institutions	14	8
Gender	14	2
Pollution management and environmental health	29	20
State-owned enterprise restructuring and privatization	14	

E. Bank Staff		
PE LIMA TRANSPORT PROJECT - P035740		
Positions	**At ICR**	**At Approval**
Vice President:	Hasan A. Tuluy	David de Ferranti
Country Director:	Susan G. Goldmark	Marcelo Giugale
Sector Manager:	Aurelio Menendez	Jose Luis Irigoyen
Project Team Leader:	Arturo Ardila	Paul A. Guitnik
ICR Team Leader:	Arturo Ardila	
ICR Primary Author:	Oswaldo Patino	

LIMA TRANSPORT - P074021		
Positions	**At ICR**	**At Approval**
Vice President:	Hasan A. Tuluy	David de Ferranti
Country Director:	Susan G. Goldmark	Marcelo Giugale
Sector Manager:	Aurelio Menendez	Jose Luis Irigoyen
Project Team Leader:	Elisabeth Goller	Pierre Graftieaux
ICR Team Leader:	Elisabeth Goller	
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F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The main objective of the project is to assist the Municipality of Metropolitan Lima (MML) in enhancing the economic productivity and the quality of life within the Lima Metropolitan area through improving mobility and accessibility for the metropolitan population, especially in the peri-urban poor neighborhoods by establishing an efficient, reliable, cleaner and safer mass rapid transit system.

The specific project development objectives are to: (i) implement the new mass rapid transit system on the basis of a Public Private Partnership (PPP) with concessioned bus corridor/feeder routes operations and fare collection system; (ii) improve access within low income areas through facilitating the use of low cost transport alternatives, such as bicycles and walking; (iii) strengthen the local institutional capacity to regulate and manage the metropolitan transport system on a sustainable basis; and (iv) reduce the negative environmental impact of motorized transport in Lima.

Revised Project Development Objectives (as approved by original approving authority)

Global Environment Objectives (from Project Appraisal Document)

The parallel GEF funds will help facilitate greenhouse gas reduction from ground transport in the Metropolitan Area of Lima-Callao through contributing to the promotion of a long-term modal shift to more efficient and less polluting forms of transport, such as non-motorized transport and high-capacity public transport vehicles operated on segregated bus ways.

The project GEF specific objectives are:
(i) rationalization of public transport capacity by providing financial incentives (Credit Guarantee Fund) to retire old buses; (ii) rehabilitation and expansion of the existing bikeway network in Lima and Callao and promotion of bike use; (iii) delivery of an institutional strengthening program on sustainable transport, targeting municipalities and institutions dealing with environmental issues and/or transport planning; and
(iv) to assess and monitor the GEF project global consequences.

Revised Global Environment Objectives (as approved by original approving authority)

(a) PDO 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 :	% of users satified with current transport service (general perception)			
Value (quantitative or Qualitative)	13.4% of users are satisfied with current transport service	60% of users of the new system are satisfied and consider that public transport service has improved		According to a user survey, 82% of riders rate the Metropolitano service as good or very good.
Date achieved	04/29/2005	06/30/2009		03/21/2011
Comments (incl. % achievement)	Target met and exceeded.			
Indicator 2 :	Reduction in average travel times in traffic corridors intervened			
Value (quantitative or	On average, it takes 120 minutes of travel time in	Travel time for users in traffic		There has been a reduction of 34% in

Qualitative)	traffic corridors intervened	corridors intervened will be reduced at least in 25%, with respect to the baseline		the travel times as reported by Protransporte.
Date achieved	10/30/2003	06/30/2009		04/28/2011
Comments (incl. % achievement)	Target met and exceeded.			
Indicator 3 :	Reduction of fatal and serious accidents in the main corridor of COSAC			
Value (quantitative or Qualitative)	On average, there were 26 fatal or serious accidents by month in the main corridor of COSAC	Fatal and serious accidents in the main corridor of COSAC will be reduced in 40% with respect to the baseline value		Fatal and serious accidents in the main corridor of COSAC have been reduced by 65%. In 11 months of operations, there has been two fatalities and 9 accidents per month.
Date achieved	10/30/2003	06/30/2009		04/27/2011
Comments (incl. % achievement)	Target met and exceeded. In particular, accidents with deaths have been reduced well above targets.			
Indicator 4 :	Reduction in air pollution emissions from the transport sector in El Metropolitano corridor			
Value (quantitative or Qualitative)	Air pollution caused by the transport sector in El Metropolitano Corridor is of 364 tons per year of fine particulate material (FP 2.5) and 489,360 tons per year of greenhouse gases (GHG)	Air pollution caused by the transport sector in El Metropolitano Corridor will be reduced in 20% and 15% with respect to fine particulate material and GHG baseline values respectively.		Green House Gas (GHG) Emissions caused by the transport sector in El Metropolitano Corridor has been reduced by 33% respect baseline value. The system has reduced GHG in about 324,440 tons per year. The concessionaries operate with CNG buses.
Date achieved	10/30/2003	06/30/2009		04/26/2011
Comments (incl. % achievement)	Target met and exceeded.			
Indicator 5 :	Consolidated Lima Urban Transport Sector by improving planning,			

	supervision and control, and management capacity of the participating institutions			
Value (quantitative or Qualitative)	There was a lack of urban traffic and transport strategy, and a weak institutional capacity in the participating agencies and weak professional capacity of operators involved in public transport.	There is a strategic plan to increase coverage of metropolitano and to efficiently integrate it with other modes. There is a strongconsolidated institution supervising the UT sector		Protransporte's capacity to manage and operate the Metropolitano is improving. Service is improving. Routes that compete against the Metropolitano will be removed soon. A second corridor will be prepared soon. Protransporte is becoming a key authority
Date achieved	10/30/2003	06/30/2009		04/26/2011
Comments (incl. % achievement)	Project helped develop much needed institutional capacity in urban transport planning, engineering and economics.			
Indicator 6 :	% of low-income population benefited by the project, specially the low income population living in the peri-urban a			
Value (quantitative or Qualitative)	There is no formal transport system in place	10% of low income population will benefit from the project.		A survey showed that 46.8% of users of the Metropolitano come from low income areas as reported by Protransporte. A significant number of users benefit from feeder routes, particulary in the north, where the population is poorer.
Date achieved	10/30/2003	06/30/2009		04/26/2011
Comments (incl. % achievement)	Target met and exceeded.			

(b) 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 :	Concessionaires of the high-capacity segregated busway system offered buses for scrapping			
Value (quantitative or Qualitative)	0	1	1	4 Concessionaires offered financial resources to buy and scrap buses
Date achieved	10/30/2003	06/30/2009	06/30/2010	01/24/2012
Comments (incl. % achievement)	Target likely to be achieved in substance in the short run since the four concessionaires of the high-capacity segregated busway system established a trust fund to buy and scrap buses. The acquisition and scrapping of buses started in January 2012			
Indicator 2 :	Aged and polluting public transport vehicles retired through Protransporte's own scrapping scheme			
Value (quantitative or Qualitative)	0	250	250	16
Date achieved	10/30/2003	06/30/2009	06/30/2010	01/24/2012
Comments (incl. % achievement)	Target likely to be achieved in the short run since bus scrapping through the trust fund established by the concessionaires of the high-capacity segregated busway system started in January 2012			
Indicator 3 :	Bus operators displaced by the first high-capacity segregated busway system in Lima retrained or received technical and economic support to opt for new employments or new business outside the transport sector			
Value (quantitative or Qualitative)	0	50% of displaced workers by GEF grant	250	0 (no bus operator was displaced, so there was no need for this activity)
Date achieved	10/30/2003	06/30/2009	06/30/2010	01/24/2012
Comments (incl. % achievement)	Target not achieved since there was no need for this activity			
Indicator 4 :	Km of bikeway rehabilitation			
Value (quantitative or Qualitative)	0	32.5		32.2
Date achieved	10/30/2003	06/30/2009		01/01/2007
Comments (incl. % achievement)	Target achieved, partly also with local funds			
Indicator 5 :	Km of bikeways extension to connect Lima's two main universities campuses to the existing bikeway network			
Value	0	6.1		6.45 km to connect

(quantitative or Qualitative)				the two Universities of San Marco and "Catolica" to the network and 19.35 km of new bikeways
Date achieved	10/30/2003	06/30/2009		06/30/2010
Comments (incl. % achievement)	Target exceeded, partially also with local funds			
Indicator 6 :	% increase in number of bicycle trips in the Project financed bikeway in comparison to the base line			
Value (quantitative or Qualitative)	0	100		3.62
Date achieved	10/30/2003	06/30/2009		06/30/2010
Comments (incl. % achievement)	Target not achieved			
Indicator 7 :	Provincial and district municipalities as well as FONAM have benefited from institutional strengthening programs			
Value (quantitative or Qualitative)	0	11 local governments and FONAM	5 provincial and 38 district municipalities as well as FONAM	6 provincial, 39 district municipalities, FONAM, and others
Date achieved	10/30/2003	06/30/2009	06/30/2010	06/30/2010
Comments (incl. % achievement)	Target exceeded			
Indicator 8 :	No. of people among local authorities, civil servants, community leaders, civil society groups and the general population informed about sustainable transport options and their effect on air quality, GHG emissions and the environment in general			
Value (quantitative or Qualitative)	0	300	3,000	3,220 (including 2,797 participants in conferences and 423 people trained in courses)
Date achieved	10/30/2003	06/30/2009	06/30/2010	06/30/2010
Comments (incl. % achievement)	Target exceeded			
Indicator 9 :	Study to consolidate the integrated public transport system in Metropolitan Lima considered satisfactory by PROTRANSPORTE/Bank			
Value (quantitative or Qualitative)	No study	n.a.	Study carried out satisfactorily	Study carried out satisfactorily
Date achieved	03/26/2009		06/30/2010	10/03/2010

Comments (incl. % achievement)	Target achieved			
Indicator 10 :	No. of staff of PROTRANSPORTE trained in areas related to public transport integration (participation in the study and formal training through the study)			
Value (quantitative or Qualitative)	0	n.a.	3	21 (of which 7 who received on the job training)
Date achieved	03/26/2009		06/30/2010	06/30/2010
Comments (incl. % achievement)	Target exceeded			

(c) 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 :	Number of kms of high capacity bus corridors completed			
Value (quantitative or Qualitative)	High capacity bus corridors do not exist	29.4 km of high capacity bus corridors completed		100% of high capacity bus corridors have been completed. 27.48 Km were constructed. The reduction in 1.92 Km with the respect to the 29.4 km planned was the result of an environmntal reason. The original alignment ocuppied a land used by migrant birds
Date achieved	10/30/2003	06/30/2009		04/28/2011
Comments (incl. % achievement)				
Indicator 2 :	Number of bus-stops and terminals completed			
Value (quantitative or Qualitative)	Bus-stops and terminals do not exist	35 bus stops and North and South terminals in operation		All stations and terminals have been completed.
Date achieved	10/30/2003	06/30/2009		04/28/2011
Comments				

(incl. % achievement)				
Indicator 3 :	Number of passengers using the new system			
Value (quantitative or Qualitative)	There are no passengers using the BRT system since it is not yet in operation.	600,000 passengers on a typical weekday		340,000 per weekday. This is with only 176 of the 312 trunk buses and 159 of the 232 feeder buses operating.Once the entire trunk fleet and all feeder buses are operating it is expected to reach the target. We estimate this goal will be reach by Dec.2013
Date achieved	10/30/2003	06/30/2009		04/26/2011
Comments (incl. % achievement)				
Indicator 4 :	Operation of high capacity buses: through buses, fare collection and control system in place			
Value (quantitative or Qualitative)	Unplanned and unregulated route system in operation with informal transport enterprises.	Whole system covered by the Project in operation and all related concessions awarded		176 articulated buses, out of 312 are operating and 197 feeder buses, out of 232. Electronic fare collection started in June 2010 and central control system is in place and operating.
Date achieved	10/30/2003	06/30/2009		04/26/2011
Comments (incl. % achievement)				
Indicator 5 :	Recovery and improvement of public spaces and green areas			
Value (quantitative or Qualitative)	There are no areas of recovery and improvement of public spaces nor green areas	100,000 square meters of public space recuperated and improved as well as 40,000 square meters of green areas		About 50,000 square meter of public space recovered, and 100,000 of green areas improved.
Date achieved	10/30/2003	06/30/2009		04/28/2011
Comments				

(incl. % achievement)				
Indicator 6 :	Air quality monitoring and report system in place			
Value (quantitative or Qualitative)	Monitoring of air quality do not exist	Monitoring results available in Annual report to the public		There are 16 reports per month. The implementation of the environmental monitoring network is complete and network is measuring air quality and producing data.
Date achieved	10/30/2003	06/30/2009		04/28/2011
Comments (incl. % achievement)				
Indicator 7 :	Institutional strengthening of municipal transport agencies			
Value (quantitative or Qualitative)	No member of municipal staff has been trained in urban transport planning, management and control of public transport. There is no system vision, not strategic planning capacity	At least 50 municipal staff trained in urban transport planning, management and control of public transport.		58 members of the MML have been trained.
Date achieved	10/30/2003	06/30/2009		04/28/2011
Comments (incl. % achievement)				
Indicator 8 :	Social Impact Mitigation			
Value (quantitative or Qualitative)	5,942 worker from public transport were estimated to be affected by the implementation of the BRT system	At least 2,500 affected workers from public transport have benefited from micro credits or have been trained for re-insertion into the labor market		Thanks to careful studies to reorganize the old operators that will no be allowed to compete with the Metropolitano, the number of affected parties is zero. The social mitigation plan is much simpler as a result.
Date achieved	10/30/2003	06/30/2009		01/12/2011
Comments (incl. % achievement)				

G. Ratings of Project Performance in ISRs

-						
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	06/01/2004	S	S	S	0.00	0.00
2	11/30/2004	S	S	S	0.00	0.25
3	05/02/2005	S	S	S	2.12	0.61
4	12/28/2005	S	S	S	1.81	1.35
5	06/16/2006	MU	MS	MU	1.81	1.90
6	12/13/2006	MU	MS	MU	2.54	2.53
7	05/29/2007	MS	MS	MS	5.36	2.85
8	12/04/2007	MS	MS	MS	8.26	3.30
9	02/25/2008	MS	MS	MS	12.23	3.39
10	06/02/2008	MS	MS	MS	13.72	3.84
11	10/24/2008	MS	MS	MS	18.78	4.62
12	03/04/2009	MS	MS	MS	27.06	4.78
13	04/30/2009	MS	S	S	29.55	4.91
14	05/15/2009	MS	S	S	30.79	4.91
15	10/09/2009	S	S	MS	35.55	5.21
16	02/01/2010	S	MS	MS	39.08	6.09
17	04/09/2010	S	MS	MS	42.51	6.78
18	05/15/2010	S	MS	S	42.51	7.20
19	05/26/2010	S	MS	S	42.51	7.20
20	06/14/2010	S	MS	S	42.51	7.20
21	02/27/2011	S	MS	S	43.56	7.35
22	05/20/2011	S	MS	S	45.00	7.35

H. Restructuring (if any)

Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring			Amount Disbursed at Restructuring in USD millions		Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	
03/26/2009		N		MS	MS		4.78	The restructuring was necessary because PROTRANSPORTE devised a new modality to finance the implementation of the bus scrapping program, which made the GEF financing for bus scrapping and the related social mitigation activities under Component A redundant. These activities were replaced with a study to integrate and rationalize the public transport system in Metropolitan Lima. Several key indicators/targets were also refined and two new indicators were added.

I. Disbursement Profile

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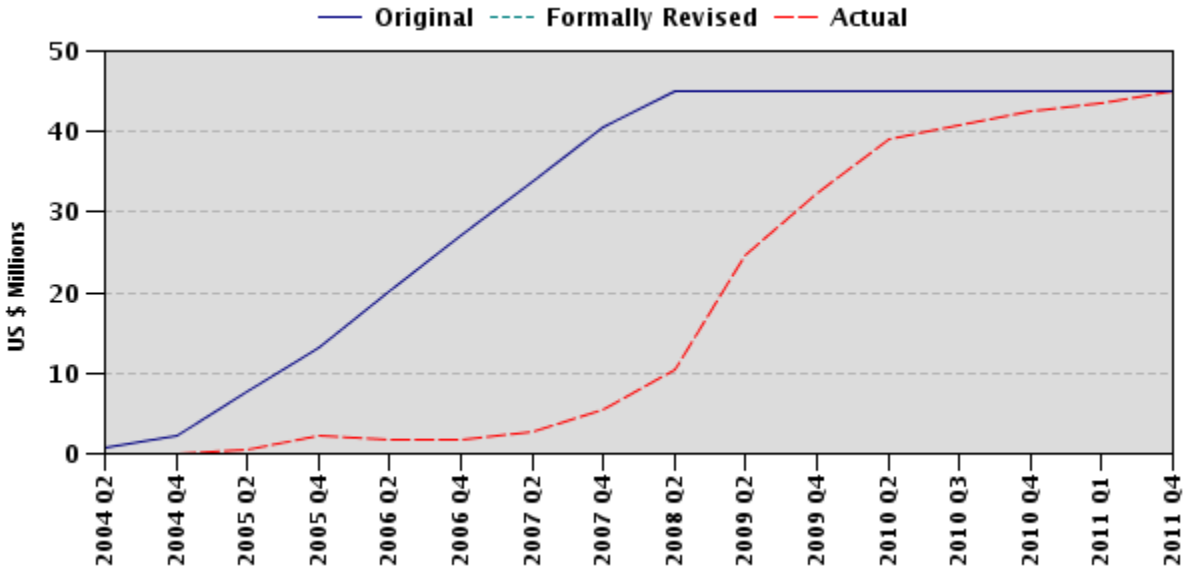

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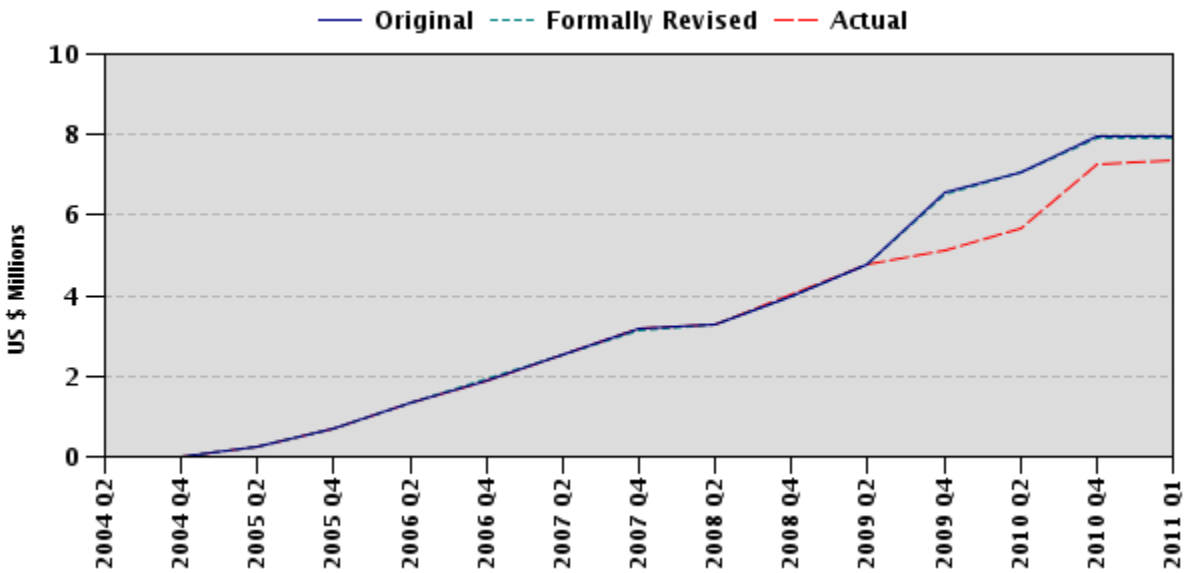

1. Project Context, Development and Global Environmental Objectives Design

1.0 Introduction

1. The Lima Transport Project consisted of two operations, one cofinanced by loans from the International Bank for Reconstruction and Development (IBRD) and the Inter-American Development Bank (IDB), hereafter called "the Loan," "the IBRD Project," or "the Bank Project," and another financed through a Global Environment Facility (GEF) grant, hereafter called "the Grant" or "the GEF Project." These operations were fully blended and shared the same project documents.[1]

2. The Loan financed the infrastructure of the first Bus Rapid Transit (BRT) corridor in Lima, hereafter also called the *Metropolitano,* North-South line, or High-Capacity Segregated Corridor (COSAC I), including corridor paving, stations, terminals, bus depots, complementary infrastructure, sidewalks and bikeways. It also financed institutional strengthening for the public transport sector. The Loan envisaged funds for the mitigation of negative social impacts from the operation of the BRT corridor. The Grant financed bicycle infrastructure and promotion activities to complement the non-motorized transport (NMT) activities of the Loan. It also financed capacity building in the area of sustainable urban transport and replication activities outside Lima and Callao. The Grant originally envisaged funds to complement the bus-scrapping scheme devised under the framework of the operation of the BRT corridor. These activities were replaced by a study to integrate and rationalize the public transport system in Metropolitan Lima. Despite the replacement of the scrapping activities, the scrapping related indicators were maintained under the Project.

3. The Loan was made to the Municipality of Lima (the Borrower) and guaranteed by the National Government. It was implemented by the Project for the Preparation of the Lima Metropolitan Transport Investment Plan (*Proyecto de Preparación del Plan de Inversiones para el Transporte Metropolitano de Lima, Protransporte*), the project executing agency. *Protransporte* is a decentralized public entity of the Metropolitan Municipality of Lima (*Municipalidad Metropolitana de Lima,* MML) created to implement and operate BRT projects in that city. The Urban Transport Bureau (*Gerencia de Transporte Urbano,* GTU) is the MML's local authority in charge of administering and supervising the concessions of transport routes and taxis.

4. The National Environment Fund (*Fondo Nacional del Ambiente,* FONAM) was the recipient and the implementation agency of the Grant. FONAM is a private and autonomous entity created to promote public and private investment in environmental projects in Peru. The members of its board of directors are representatives of public entities, and the Minister of Environment serves as its chairman. The study to integrate and rationalize the public transport system was co-implemented by *Protransporte*. *Protransporte* was also responsible to achieve the scrapping related indicators. The

[1] For example, the Project Appraisal Document (PAD), the Implementation Status Reports, and the Implementation Completion and Results Report (ICR).

bikeways and bicycle promotion activities were co-implemented by the Special Metropolitan Project for NMT (*Proyecto Especial Metropolitano de Transporte No Motorizado*, PEMTNM) of the Municipalities of Lima and Callao. These entities were also the main beneficiaries of the activities.

5. The operation financed by the Loan was subject to an Inspection Panel (IP) investigation triggered by concerns about the Bank's compliance with its Operational Policies. A summary of the process as well as the results of the proposed Management Action Plan are presented in Section 8 of this ICR report.

6. Despite being fully blended, the Loan and the Grant were implemented by separate implementation agencies and supervised by different task team leaders. Therefore, for most assessments in this ICR, which normally are conducted jointly for blended projects, it was necessary to draw clear distinctions between the two operations and elaborate on them separately. This, and the fact that the Loan was subject to an IP investigation, warranted a longer-than-normal treatment in this ICR to provide a full accounting of both operations.

1.1 Context at Appraisal

Country Background

7. The Country Assistance Strategy (CAS) report for Peru, dated August 19, 2002, spelled out the priorities of then-President Toledo's administration to address poverty: (i) competitiveness and employment generation; (ii) access to health, education, culture and basic services; and (iii) creation of a public administration that serves the people. The CAS emphasized sector-level institutional reform and demand-driven poverty reduction programs. The Bank helped the government to achieve these goals by making safety nets more efficient and creating growth opportunities that target the poor and strengthen governance and institutions.

Sector background

8. In the 1980s, public transport in Lima was completely regulated. The vehicle fleet included buses, microbuses *(micros)* generally with 26 or fewer seats, collective taxis (*colectivos)*, taxis, and private cars also operating as taxis. The largest buses belonged to the state-owned National Urban Transport Company (*Empresa Nacional de Transporte Urbano*, ENATRU), which operated more than 600 units with a single driver–fare collector. The service was generally scarce, slow, unreliable and insecure. The vehicles were old and poorly maintained. Several slums *(pueblos jóvenes)* on the periphery of Metropolitan Lima were not served by public transport, forcing passengers to use motorbike-taxis or walk considerable distances to board buses. In 1985, public transport accounted for 74 percent of motorized trips, with an average of 6 million trips daily, of which 4.4 million were served by public transport.

9. In the early 1990s, the modal share of public transport rose to an impressive 89 percent of motorized trips. The Fujimori administration's decision to deregulate urban transport in Lima in 1992–1993 created an oversupply of public transport. Between 1990 and 1999, the number of motorized vehicles in the city doubled, and the trips in public transport units decreased from 89 percent to 81 percent. As another result of deregulation,

98 percent of the public transport vehicles were independently owned and operated, at a ratio of 1.25 vehicles per owner. Vehicles were not subject to minimum emission and noise standards, and air pollution and noise became critical environmental issues. As one of Latin America's most polluted cities, Lima had to address air pollution and, as a collateral outcome, greenhouse gas (GHG) emissions caused by the transport sector.

10. In early 2000, the number of cars in Lima, which had remained stable at about 270,000 throughout most of the 1980s, increased to about 1 million. During that decade, the number of public transport vehicles increased from 10,500 units to an estimated fleet of over 60,000 units with an average age of 16 years (many exceeding 25 years). This made Lima's public transport fleet the oldest in Latin America. All motorized urban transport was by road. About one third of total daily trips were made on foot, primarily by the poor. Congestion was high, and air and noise pollution levels ranked among the highest in the region. The system faced high numbers of traffic accidents and high operating costs. Studies indicated that an estimated US$500 million were lost each year in man-hours and operating costs due to congestion and inefficiencies of the urban transport system. Over-combustion of 13.2 million liters of gasoline and over-emission of 1,000 metric tons of air pollutants by an obsolete fleet constituted a constant health threat and a major source of GHG emissions. With over 70 percent of the national vehicle fleet concentrated in the Lima Metropolitan Area, the oversupply–congestion situation prompted excessive imports of vehicle fuels, contributing significantly to the commercial balance deficit.

11. The urban transport growth pattern was not sustainable and required a restructuring of the sector. Average travel times and public transport expenditures were high, and there was no reliable alternative for poor urban commuters concentrated on the periphery of the Lima Metropolitan Area. Because of congestion, the poor urban worker's average round-trip travel time to and from work was often between 1.5 and 3 hours per day. In addition, the quality of the services provided was low; personal safety/security was a major concern, especially for women; and access to buses for mobility-constrained persons was limited at best. The worsening quality of the public transport system was also the result of a weak institutional framework and poor governance, which contributed significantly to infrastructure deficiencies. These limitations led to the deterioration of accessibility and mobility, which especially affected low-income commuters.

Rationale for Bank assistance

12. The Loan supported the CAS objectives by addressing barriers to economic and social development of the poor in an area with 3.5 million people, or 15 percent of Peru's total population, in the peri-urban neighborhoods of Metropolitan Lima. The approximately 29.4-km segregated bus corridor to be constructed under the IBRD Project was expected to lead to an improved level of service for passengers from the peri-urban neighborhoods with the highest incidence of poverty by reducing travel times, bus operating costs, traffic safety, and—especially for longer trips—transport expenditures. Through the improvement of feeder routes, sidewalks and bikeways, the IBRD Project and the GEF Grant were also expected to benefit short intra-district trips.

13. The Grant was consistent with the objectives of GEF Operational Program 11 on Transport, which stated that the GEF will facilitate "commitments to adopt sustainable

low greenhouse gas (GHG) transport measures and disengagement from present unsustainable measures" and "modal shifts from personal transport to mass transit and non-motorized modes."

1.2 Original Project Development Objectives (PDO) and Key Indicators (as approved)

14. The main objective of the IBRD Project was to assist the MML in enhancing the economic productivity and quality of life within the Lima Metropolitan Area by establishing an efficient, reliable, cleaner and safer mass rapid transit system to improve mobility and accessibility for the metropolitan population, especially in the peri-urban poor neighborhoods.

15. The specific PDOs, as reported in the PAD, were to: (i) implement the new mass rapid transit system on the basis of a Public Private Partnership (PPP) with concessions for bus corridor/feeder route operations and a fare collection system; (ii) improve access within low-income areas by facilitating the use of low-cost transport alternatives, such as bicycles and walking; (iii) strengthen the local institutional capacity to regulate and manage the metropolitan transport system on a sustainable basis; and (iv) reduce the negative environmental impact of motorized transport in Lima.

16. The Project's key indicators included:

- 29.4 km of high-capacity bus corridors completed
- 35 bus stops and North and South terminals in operation
- 600,000 passengers per typical weekday
- 100,000 square meters of public space recovered

1.3 Original Global Environmental Objectives (GEO) and Key Indicators (as approved)

17. The parallel GEF funds were expected to help facilitate GHG reductions from ground transport in the Lima–Callao Metropolitan Area by contributing to the promotion of a long-term modal shift toward more efficient and less polluting forms of transport, such as NMT and high-capacity public transport vehicles operating on segregated busways.

18. The GEF Project's specific objectives were to: (i) rationalize public transport capacity by providing financial incentives (Credit Guarantee Fund) to retire old buses; (ii) rehabilitate and expand the existing bikeway network in Lima and Callao and promote bike use; (iii) deliver an institutional strengthening program on sustainable transport, targeting municipalities and institutions that deal with environmental issues and/or transport planning; and (iv) assess and monitor the GEF Project's global consequences.

19. The key indicators included the following:

- Aged and polluting public transport vehicles were retired through the Credit Guarantee Fund.
- The number of bicycle trips on project-financed bikeways doubled.
- Local municipal and district governments and FONAM benefited from institutional strengthening programs.

1.4 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

20. The original PDO remained unchanged during the life of the Project.

1.5 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification

21. The original GEO remained unchanged, but under the framework of the 2009 project restructuring, several key indicators/targets were refined and two new indicators were added. The restructuring replaced the bus-scrapping-related activities with a study to integrate and rationalize the public transport system in Metropolitan Lima. The restructuring was necessary because *Protransporte* devised a new modality to finance the implementation of the bus-scrapping program, which made the GEF financing for bus scrapping and the related social mitigation activities under Component A redundant. The revised key indicators are included in the Data Sheet.

1.6 Main Beneficiaries

22. The IBRD Project's main beneficiaries were: (i) the peri-urban neighborhoods of the North and South cones of Lima that were served at that time by a weak public transport system with severe limitations in terms of reliability, high transport costs, poor personal security and road safety. These peri-urban neighborhoods, which are now large suburban areas with a population of over one million people, required an adequate, reliable and efficient urban transport system; and (ii) the participating institutions, MML and GTU, as a result of enhanced institutional capacity building.

23. The GEF Grant's primary target groups were: (i) bicycle users because of better and safer bicycle infrastructure and lower travel costs; (ii) the residents of the Lima Metropolitan Area because of improved air quality and travel in the city; and (iii) construction and other workers involved in the implementation of project activities. In addition, the staff of *Protransporte* and other institutions, as well as public regional, municipal and state agencies related to sustainable transport, benefited from capacity strengthening. Finally, all residents of the Lima Metropolitan Area are likely to benefit in the future from a coherent and comprehensive strategy for public transport improvement and rationalization.

1.7 Original Components (as approved)

24. The Project financed by the Loan was jointly prepared with and supervised by the IDB. The IBRD Project comprises six original components: *Component 1*: Mobility and Environmental Improvements (US$99.92 million total; US$37.94 million IBRD, US$37.94 million IDB, and US$24.04 million MML); *Component 2:* Social Mitigation and Community Participation (US$5.75 million total; US$1.63 million IBRD, US$1.63 million IDB, and US$2.49 million MML); *Component 3:* Institutional Strengthening (US$3.67 million total; US$1.5 million IBRD, US$1.5 million IDB, and US$0.7 million MML); *Component 4:* Studies and Construction Supervision (US$8.58 million total; US$3.48 million IBRD, US$3.48 million IDB, and US$1.62 million MML); *Component*

5: Program Administration (US$5.58 million, all counterpart funding); and *Component 6:* Grade Separation of Plaza Grau (US$10 million, all counterpart funding).

25. The Grant's original components were as follows: *A. Public Transport Fleet Rationalization*, essentially bus scrapping, through (i) a Credit Guarantee Fund to encourage concessionaires of the BRT system financed under the parallel loan to retire old and polluting buses, (ii) a related social mitigation program for operators and workers affected by bus scrapping, supported by the Credit Guarantee Fund, and (iii) a pilot project aimed at testing various bus-scrapping methods; *B. Rehabilitation and Expansion of the Lima–Callao Bikeway Network* to improve bikeway connectivity and bike safety and implement a bicycle promotion and education strategy; *C. Institutional Strengthening on Sustainable Transport* to increase environmental awareness and incorporate climate change and the other environmental issues into the decision-making process; *D. Management, Monitoring & Evaluation (M&E), Replication Strategy and Administrative Costs* for management, M&E, and a replication strategy and technical assistance for municipalities outside Lima and Callao.

1.8 Revised Components

26. The project components of the Loan were not revised.

27. The revised Component A of the GEF Project was as follows: *A. Rationalization of Public Transport* through the implementation of a study to integrate and rationalize the public transport system in Metropolitan Lima.

1.9 Other significant changes

28. During project implementation there were two loan amendments and three extensions of the loan closing date.

29. The first loan amendment, on August 26, 2008, included a reallocation of funds and the extension of the loan closing date, originally scheduled for June 30, 2009, to June 30, 2010. These modifications were essentially designed to continue with the construction of the trunk line and provide time for the start-up and pre-operation of the transport system. A second loan amendment was granted on December 17, 2009 to reallocate funds from the unallocated fund category to consultant services and audits. The closing date was extended on May 26, 2010 from June 30, 2010 to December 30, 2010. A third amendment on December 23, 2010 extended the closing date from December 30, 2010 to April 30, 2011 and reallocated the remaining funds among categories. The resources originally allocated for training and micro-credits were lowered to zero and reassigned to the civil works category. The purpose of the closing date extension was to assist the implementation unit, Protransporte, in finalizing work contracts and consultant services.

30. For the Grant, the 2009 project restructuring also included a 12-month closing date extension to June 30, 2010.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

Loan

31. The overall quality at entry and preparation of the Project are rated Moderately Satisfactory. The factors that affected the implementation and outcomes included the following:

32. **Adequate project design.** With respect to project design, the Project was based on BRT experiences in other Latin American countries. The project components were well targeted to accomplish the PDOs. Potential risks and measures such social mitigation for transport operators were also identified and a specific investment component was proposed.

33. **Project readiness.** At appraisal, the Bank properly analyzed the Project's technical, economic, financial and commercial aspects in compliance with Operational Manual Statement (OMS) 2.2. The Project's technical preparation had been supported by a Population and Human Resources Development (PHRD) Grant and by Bank budget during 1995–2002. The project was technically well designed and sound due to lengthy project formulation (more than seven years). Nevertheless, there were some shortcomings: (i) delays in finalizing bidding documents consistent with Bank and IDB procurement guidelines—it took over year; (ii) the cost estimates were based on prefeasibility studies; (iii) the Project had several conditions for loan effectiveness, which took a long time to fulfill.

Grant

34. The factors related to quality at entry that positively influenced grant implementation and outcomes included the following:

35. **Sound technical background analyses and participation.** The design and preparation of the GEF Grant benefited from the lessons learned from previous transport operations and sound technical background analyses partially financed through a Project Development and Preparation Facility Block B (PDF-B) Grant. A large number of participatory events helped to outline and fine-tune the project design, prepare terms of reference and technical specifications, and disseminate the planned project activities.

36. In particular, the design of the bus-scrapping component was based on the experience in Bogotá and two participatory studies on vehicle-scrapping incentives and on social mitigation for affected workers and operators. These studies also culminated in the preparation of environmental guidelines for bus scrapping. The bicycle component was based on previous Bank experience in Lima and elsewhere. It was shaped by a number of background studies and the contributions of bicycle users and other interested parties. An ongoing consultative process with municipalities and other stakeholders took place to assess their institutional capacity and training needs and to design the institutional strengthening component.

37. **Adequate and realistic design.** The degree of complexity of the GEF project design and approach was moderate. The GEO was realistic in light of the project activities because they had the potential to directly or indirectly lead to modal shift and the consequent reduction in GHG emissions. The components were well structured and the bicycle component in particular was well balanced between infrastructure and promotion.

38. The factors that negatively influenced the GEF Project included:

39. **Lack of advance definition of new bicycle infrastructure interventions.** The identification of most new bikeways was left to the bicycle master plan and other studies developed under the Project. In hindsight, this pushed the construction of new bikeways toward the Project's end and left insufficient time for their promotion. In 2009–2010, when the last user counts took place, bicycle users were not yet familiar with the new facilities. This may be one of the reasons why bicycle trips on the GEF Project-financed bikeways increased only slightly.

40. **Overly ambitious target to increase bicycle use.** In hindsight, the target to duplicate bicycle use was overly ambitious because modal shift requires a cultural change, which is complex and long-term in nature, especially in a city with violent traffic conditions and a strong perception of insecurity.[2]

2.2 Implementation

Loan

Some of the key factors that affected loan implementation include:

41. **Lack of experience in working with a municipal government**. The Bank did not have previous experience in working with municipal governments in Peru; thus, it took considerable time to prepare and comply with government financial requirements. Before this Project, Peruvian local entities were not able to have direct access to credits from multilateral institutions.

42. **Delay in loan effectiveness conditions.** The Borrower took considerable time to comply with loan effectiveness conditions. The long time to comply with the loan conditions delayed project start-up by more than a year after loan approval. The Latin America and Caribbean Region of the World Bank no longer accepts effectiveness conditions and few exceptions are granted. This practice is adequate in light of the situation presented in this project.

43. **Bank financing required the harmonization of procurement procedures and bidding documents with the IDB.** At project appraisal, there were no harmonized procurement documents for rules and processes following both Bank and IDB procedures. This procurement harmonization took time for both banks (approved documents were submitted to the Borrower in September 2004), thus delaying project implementation by nine months after loan effectiveness.

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[2] At the time of project preparation, a considerable increase in bicycle use appeared possible in light of the results in other places such as Bogotá and Santiago.

44. **Weak institutional capacity to manage a complex project.** Originally, *Protransporte* was created as a Project Implementation Unit. During its initial years, the staff hired had limited experience in the administration and execution of BRT projects. This was the first urban transport project in Lima. In addition, the low wages, established by a government policy, prevented *Protransporte* from hiring staff with experience in urban transport projects. This was coupled to job instability because the personnel hired by the agency were given contracts lasting only two months. As a result, the project start-up took longer than required due to the staff learning curve and delayed the Project's implementation during the initial years. The BRT project was not merely an infrastructure or civil works project; but an entire urban-sector transformation that included a public-private partnership for the concession of buses and the fare collection system, among other key elements. Therefore, the agency required staff with technical expertise.

45. **High personnel rotation in *Protransporte*.** During the first three years of project implementation, and due to the complexity of this type of BRT project, the mayor, after few years, was concerned about the lack of progress and results (low disbursements) and thus decided to rotate senior management teams three times, including senior and middle management and professional staff. Since August 2007 the Project had relatively stable management and staff teams.

46. **Interferences with utility service networks.** The feasibility study and the terms of reference of the final studies did not consider interferences with public utility service This situation delayed project procurement processes.

47. **Non-availability of lands.** The Borrower did not own the lands for the construction of the two transfer terminals and yards *(patios)*. The lack of land definition and its purchase delayed construction of transfer terminals and yards to the last two years prior to operation of the *Metropolitano*.

48. **Cost increases with regard to civil works**. Most of the civil works carried out under the Project experienced cost increases that were attributable to different causes: (i) changes once final engineering designs were ready; (ii) the devaluation of the dollar; (iii) the worldwide increase in the price of key construction inputs such as steel, cement and fuel; (iv) Peru's fast pace of economic growth, which strained the capacity of construction firms and diminished the supply of construction services; (v) the increase in project administration costs due to the complexity of contracting and the longer implementation period; and (vi) the cost increase of the Central Station, which was built underground instead of at ground level.

49. **Narrowly focused environmental assessment report**. The Inspection Panel's (IP's) report stated the following: "the Project had been correctly categorized as 'B' and the environmental studies on issues affecting the BRT construction and operation had complied with OP 4.01, Environmental Assessment. Project supervision, information dissemination, and consultations with the affected communities had been strengthened in early 2009, as the construction phase ended, operations began and the communities started to voice their concerns in a more organized fashion. These strengthened activities complied with OP 13.05 and OP 4.01."

50. The IP found that the initial Environmental Assessment (EA) studies did not comply with policy in terms of identification, analysis and mitigation of impact beyond the corridor itself, e.g., changes in pedestrian and vehicular traffic flows and their economic and cultural impacts in the District of Barranco. See section 8 and Annex 11.

Grant

51. The factors that positively influenced grant implementation included the following:

52. **Committed project staff.** The Grant strongly benefited from highly committed project staff, especially once the frequent staff changes in PEMTNM and *Protransporte* had ceased, and from a project coordinator in FONAM who was full of initiative, creativity and energy.

53. **In-house bicycle promotion.** The GEF Project strongly benefited from the decision to carry out the bicycle promotion activities in-house, mainly through FONAM and PEMTNM. This not only made it possible to stretch these activities over the full duration of the Project since it was considerably cheaper to do so, but it also led to the acquisition of the in-house capacity to successfully continue with these activities.

54. The factors that negatively influenced project implementation included the following:

55. **Capacity weaknesses and frictions.** At the start of grant implementation, the executing agencies had limited institutional and individual capacity, which improved strongly over time. The early departure of the project coordinator at the end of 2008 slowed down the implementation pace and dynamism. Frictions between FONAM and PEMTNM, sometimes stronger, sometimes less perceptible and often over petty matters, also made project implementation more cumbersome and difficult than necessary.

56. **Incomplete political support.** For certain project activities, full political support did not always exist. This meant, for instance, that motorized transport received priority over NMT in the allocation of scarce road space and that issues emerging during the implementation of the Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima were not immediately dealt with at the highest level.

57. **Slowness in project implementation.** The definition, bidding and implementation of bikeway works in particular, but also to a certain extent the implementation of the Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima, moved at a slower pace than expected. In some cases, the Bank team overestimated the local pace. For bicycle infrastructure works there were also: (i) a lack of experienced consultants able to prepare engineering designs for bikeways, which required frequent revisions; (ii) lengthy approval mechanisms, which eventually were overcome by the establishment of an ad hoc approval committee for this Project; and (iii) the construction industry's limited interest in bikeway works.

58. **Uncertainty about bus scrapping and lengthy project restructuring.** Due to the changes and indecision regarding the bus-scrapping mechanism, a decision on project restructuring was only possible during the Midterm Review. Although this eventually allowed the GEF Project to move out of its impasse, it took nearly three years for restructuring to be completed. This was due to the nature of the original restructuring proposals, which involved the inclusion of several new activities and beneficiaries as well

as two refusals by the GEF's Chief Executive Officer (GEF CEO) to back these proposals. This distracted efforts and resources from grant implementation. It also led to a simple restructuring proposal that basically replaced the scrapping activities with the public transport integration study. In hindsight, at least the target for increased bicycle use and the scrapping indicators/targets should also have been changed.

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

Loan

59. **M&E design for the Loan**: According to the project design, implementation progress was planned to be measured against the proposed Project Logical Framework of outcome and intermediate results indicators (outputs). These indicators were designed adequately and comprehensively from a technical, social, financial and operational standpoint.

60. The PAD included a well-designed and accurate list of key outcome indicators related to various aspects of the Project (percentage of user satisfaction with the current transport service, reduction in average travel times in affected traffic corridors, reduction in fatal and serious accidents in the main trunk corridor, etc.).

61. **Implementation and usage for the Loan:** Through *Protransporte*'s planning division in charge of collecting and analyzing project performance indicators, the Borrower and the Bank were able to monitor and assess the Project's output indicators on a regular basis. At project start-up, *Protransporte* assigned a team to collect data and report on project indicators. During the first year of implementation, a very comprehensive Baseline Impact Study was carried out in order to provide the baseline of key project indicators that enabled the analysis and comparison of the results to be envisaged under the Project. The Bank team had available the necessary data to analyze performance and detect issues. The Bank used this information to satisfactorily carry out the Midterm Review. All data needed to analyze and assess the output and outcome indicators at the time of ICR preparation was readily available. In general, the monitoring system proved useful as a basic pulse-taking tool to assess progress toward implementation.

Grant

62. **M&E design for the Grant:** The GEF Grant's project-specific M&E mechanism was simple but adequate. It was complemented by a comprehensive M&E subcomponent to monitor and evaluate the impact of project activities and other sustainable transport actions in Lima.

63. The formulation of the GEO was cautious since it emphasized "facilitating" GHG reductions by "contributing" to the promotion of a long-term modal shift toward more efficient and less polluting forms of transport. In line with this cautious GEO formulation, the type of project activities, and the Project's duration, only one indicator directly measured the modal shift toward NMT. The other indicators captured outputs that had the potential to directly or indirectly contribute to promoting long-term modal shift. The indicator looking at the number of concessionaires of the high-capacity segregated busway that offered buses for scrapping was redundant. There was no indicator that

linked the activities of the fourth project component to the GEO. The target values were realistically set, except for the increase in bicycle trips. A few target values were only defined during restructuring. Data collection for most indicators was straightforward and required limited efforts and resources.

64. **Implementation and usage for the Grant:** Whenever possible, data were regularly collected and presented during supervision missions. Bicycle counts and bicycle-use surveys were conducted at approximately bi-annual intervals due to the high cost and taking into account the progress in bicycle infrastructure provision and in promotion activities. There were some methodological shortcomings in these counts and surveys since Lima had limited capacity in this area and the size of the respective contract did not attract international competition. These shortcomings did not invalidate the final results. The information collected during project implementation was used to track project progress and assess progress toward achieving the GEO.

65. Under the framework of the M&E subcomponent, all activities carried out under the Project were regularly monitored and the outputs and outcomes were recorded in a database. In addition to bicycle counts and surveys, special attention was paid to the bicycle promotion activities, which were monitored on an ongoing basis. Periodic M&E reports were prepared. The information was used to improve the promotion strategy and activities and to keep track of the results (for details see Annex 2, Component D).

2.4 Safeguard and Fiduciary Compliance

Loan

66. **Safeguards**. Project preparation with respect to environmental assessment was carried out in accordance with World Bank Operational Policy (OP) 4.01. The Project was correctly categorized as B, given the construction of the bus corridor and stations, among other civil works. The Environmental Impact Assessment (EIA) examined the Project's potential impacts both during implementation and operation and recommended measures needed to mitigate them during construction, including carrying out more detailed studies to refine the management plans. However, disclosure of relevant documents did not always meet OP 4.01 requirements.

67. During implementation, 19 environmental impact studies relating to different segments of the BRT corridor were carried out under the Project during the preparation and implementation stages. Bank missions often did not include environmental and social specialists until late 2007. Supervision teams were focused on the Project's complex institutional and procurement issues. Nevertheless, a 2006 review by the Bank's internal Quality Assurance Group (QAG) rated the supervision of environmental and social aspects as satisfactory, but considered other aspects to be less than satisfactory.

68. The Bank's IP received a request for investigation of the Project on October 1, 2009, which contained environmental and cultural safeguards issues. The IP found eligible the request form Barranco's and Management prepared a response and an Action Plan. Section 8 of this report summarizes IP's report, Management's Action Plan and the implementation status. Annex 11 presents a more detailed analysis of the Action Plan.

69. **Social Safeguards.** The Project needed to take actions on several social issues that arose during the construction and operation of the Metropolitano. The Bank monitored compliance with the OP/BP 4.12 Involuntary Resettlement safeguard policy as well as with regard to social issues beyond this policy. Most of the social issues were resolved and the affected people were economically compensated when necessary. A summary of the current status of the key actions executed and implemented by the client with Bank support is presented below. Annex 2, Outputs by Components, describes in detail the social issues and mitigation actions taken.

70. **Resettlement issues.** The Project required the resettlement of a flower market whose merchants did not own the land where they have been located for several years. Protransporte provided generous support to those merchants who agreed to be moved to a nearby location. Protransporte went beyond policy requirements by supporting the merchants in: (i) finding credit to purchase new land, (ii) assisting them with the relocation, (iii) building a new market that included water, electricity and new infrastructure, and (iv) providing training for business management.

71. **Informal street vendors along the bus corridor.** This was an issue that was present in various sections of the bus corridor, particularly in the North segment and the downtown Lima area. In order to clear vendors out of the bus corridor, Protransporte made several agreements with the local municipalities that were responsible for managing these vendors. It also provided technical support and commercial advice to several of these street vendors who happened to be associated, helping them in their relocation to new areas and even to new marketplaces.

72. **Pedestrian crossings.** During construction there were several complaints from local neighbors who requested *Protransporte* to build and sometimes rebuild pedestrian crossings along the bus corridor. Due to the lack of an adequate social assessment study at the time of project design and the lack of a social specialist on the Bank team in that period, this implementation issue could not be foreseen and it resulted in increased project costs.

73. **Limitation of access to garages.** During project construction, it became evident that the bus corridor was going to suppress access to several garages belonging to private owners and public institutions in downtown Lima as well as in Barranco. *Protransporte* has managed to partially resolve this issue by providing new access, paying compensations and providing new parking spaces. However, solutions for some garages in downtown Lima remain pending. These cases could have been foreseen and some probably could have been avoided if an adequate social assessment had been carried out during project design and if a social specialist had been on the Bank team at that time.

74. **Transport: Social Mitigation.** *Protransporte* prepared a Social Mitigation Plan, based on the BRT technical studies, and the registration of bus or microbus operators who could be affected by the Project. This plan was called the "Employment and Entrepreneurship Promotion Plan for Transportation Workers affected by the Program."

75. The plan include several strategies: (i) reintegration into the labor market through the placement of workers in activities and jobs generated by the *Metropolitano*; (ii) development of entrepreneurs and creation of micro-enterprises outside the transport industry, including financial support through micro credits; and (iii) provision of

technical training for current transport enterprises, whether or not affected by the Project, with a vision of "future transformation" and institutional modernization as a sustainable development strategy.

76. The project loan budgeted resources for the implementation of this Mitigation Plan. However, prior to the operation of the BRT, the mayor of Lima decided to have a Zero Negative Impact Plan for transport operators and ordered GTU staff to conduct a Bus Route Rationalization study aimed at avoiding any negative impacts on bus operators competing with the proposed BRT. GTU determined that 44 routes should be rationalized and moved out of the main BRT corridor. A total of 2,434 vehicles and 4,868 transport operators were identified. Based on these results, the mayor decided to relocate routes instead of the cancelling them, thus reducing to zero the number of affected parties. Negotiations were held with each of the 44 entrepreneurs who were finally transferred to alternative routes where Lima's public transport demand was not addressed. Thus, the loan funds for training and microcredit categories were reallocated and the aforementioned mitigation plan was simplified significantly.

77. **Financial Management.** Financial management of the Project was administered in accordance with the arrangements agreed upon in the Loan Agreement. A formal external audit of the Project, with the support of the Comptroller-General of Peru, for both loans (IDB and IBRD) was carried out on an annual basis, stating the adequacy of the accounting system and internal controls, and compliance with covenants of the Loan Agreement. There were some delays in achieving the agreed deadlines for submission of audit reports.

78. **Procurement.** *Protransporte*'s management of procurement processes was satisfactory. During project preparation, the Borrower, the IDB and the World Bank worked on the harmonization of procurement procedures and standard documents. This process was not contemplated at loan appraisal and generated a delay in project start-up. Furthermore, *Protransporte*, acting as the Project Executing Unit, lacked the capacity to procure goods, works and services. Thus, the Bank requested *Protransporte* to hire two procurement specialists with good track records and experience in Bank procurement rules, especially in preparing bidding documents on civil works, among others. During the first three years of execution, the procurement processes were carried out in a satisfactory manner, following Bank and IDB procedures, with a few shortcomings such as lengthy consulting service processes (over a year) and a lengthy procurement bidding process for civil works (over 16 months) in order to grant an award. The Bank diagnosed these issues, which were promptly addressed, and then prepared an action plan in this area to reduce the bidding process periods at the Borrower's request, including the Bank's reduction in time to respond to no-objections. After this, the performance of *Protransporte*'s procurement team improved considerably and the elapsed time was shortened. Four ex post procurement reviews were conducted by the Bank during project implementation. The ex post reports and the Supervision Aide-Mémoires included recommendations that helped improve the management of procurement processes.

Grant

79. **Safeguards.** The Grant and the Loan shared a common EIA, which did not look at the potential social and environmental impacts of the Grant's bikeway component. The

environmental guidelines prepared during project preparation only covered the bus scrapping. No formal framework was prepared to deal with the design and construction impacts of bikeways. Consequently, safeguard aspects in the implementation of the bikeway component, generally limited to noise, dust, access restrictions, traffic interruptions, and some replanting of grass, bushes and trees, followed a pragmatic "learning-by-doing" process.

80. This process may have had some shortcomings in procedural terms, but it enabled the successfully avoidance and/or mitigation of negative environmental and social impacts. Bikeway work contracts included a budget for environmental mitigation and clauses that required contractors to follow adequate environmental practices in accordance with local rules. These clauses were improved over time. Work supervision was carried out by an independent supervisor as well as by FONAM and PEMTNM. In the initial stages of project implementation, social communication was limited. After a successfully handled complaint by a group of neighbors due the removal of bushes and small trees, the Project engaged in ongoing communication, consultation and mitigation activities. These activities accompanied all physical interventions during the last two years of project implementation. Bank environmental and social specialists also participated in supervision missions/field visits in these last years of project implementation.

81. The GEF project team assisted *Protransporte* in the preparation of a comprehensive environmental manual for bus-scrapping activities.

82. **Financial management (FM) and procurement.** Fiduciary aspects under the Grant were handled in a satisfactory manner despite some minor shortcomings in FM and procurement during the initial implementation period due to project staff's limited experience with Bank operations. Financial management reports (FMR) and auditing reports were by and large submitted on time, and were considered satisfactory. None of the audit reports had a qualified opinion.

2.5 Post-completion Operation/Next Phase

Loan

83. The Municipality of Lima, through *Protransporte*, is planning to invest approximately US$250 million in the expansion of urban transport services through the following projects: (i) 12 km extension of the *Metropolitano*, from the Naranjal Station (*Independencia* District) to *Chimpu Ocllo* (*Coma*s), with a total cost of US$150 million; and (ii) the development of five complementary segregated bus corridors (US$100 million). At the time of ICR preparation the extension of the first BRT line and four of the five segregated bus corridors were at the stage of feasibility designs. For the fifth East-West corridor it was not yet decided whether it would be served by bus or train.

Grant

84. The prospects for the post-completion operation of the Grant activities vary. The study to integrate and rationalize the public transport system in Metropolitan Lima looked at four of the five complementary segregated bus corridors in Lima and prepared the preliminary designs for an East-West BRT line extending approximately 30 km

(*Metropolitano* Line 2). Even if at the time of ICR preparation it was not clear whether the East-West corridor would be served by bus or train, the study laid the basis for the busway system's expansion. The implementation of the regulatory, institutional and organizational recommendations produced by the study will depend on the political will of the new administrations in Lima and Callao. [3] As the mass transport system in Lima expands, there will be a real need for coordination and integration, and the implementation of at least some of these recommendations is likely.

85. Under the framework of their road maintenance activities, the municipalities take care of the maintenance of the bikeway infrastructure financed by the GEF Project. In addition, PEMTNM has a special budget for bikeway infrastructure maintenance and construction and has continued to expand and consolidate the bikeway system. PEMTNM has also continued with the bicycle-use promotion activities in Lima,[4] and at the time of ICR preparation strong emphasis was placed on intermodality with the BRT system. International organizations active in the NMT and sustainable transport area, such as Interface for Cycling Expertise (I-CE) and the Institute for Transportation and Development Policy (ITDP), have been supporting PEMTNM in these efforts. The Municipality of Callao stopped the bicycle promotion activities, but some schools have still been carrying out bicycle activities after the termination of GEF support.

86. Finally, FONAM has been continuing, and is likely to continue, with some of the institutional and capacity strengthening activities in the area of sustainable transport.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

Loan/Grant

Rating: **High**

87. The relevance for both the Loan and Grant is rated high. The PDO/GEO designs and the implementation are in line with the 2006 Municipal Policy Guidelines for Public Transport in the Lima Metropolitan Area,[5] which refer to the importance of: (i) mass transport systems in corridors with high demand; (ii) the rationalization of public transport supply; (iii) the operational efficiency of public transport; and (iv) environmental sustainability, including the promotion of NMT. The promotion of bicycle use as an alternative mode of transport is explicitly foreseen in the Strategic Plan for Bicycle Transport [6] and the new national bicycle law.[7]

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[3] At the time of ICR preparation, in the framework of the restructuring of the Ministry of Transport and Communications (MTC), a proposal to strengthen and transform the Lima and Callao Urban Transport Council was put forward.

[4] For example, PEMTNM organized the "*Gran Caravana*", a bicycle train, on August 13, 2010 in Jesús María–Lince and the XXI "*Gran Bicicletada Metropolitana 2010*" on September 26, 2010 from the Plaza de Armas to Malecón and Larcomar in Miraflores to celebrate the approval of the law to promote bicycle use as a sustainable alternative mode of transport. In 2011, PEMTNM has been organizing the "Ciclodía" (Bikeday) in Miraflores every Sunday. It has also started carrying out road safety courses for teachers and has intensified its promotional activities in universities.

[5] *Lineamientos de Política Municipal de Transporte Público Urbano para el Área de Lima Metropolitana*, approved by Municipal Law *(Ordenanza*) No. 954 on June 22, 2006.

[6] *Plan Estratégico para el Transporte en Bicicleta 2008–2014*, approved by the Lima Municipal Council *(Acuerdo de Consejo No. 297)* on July 16, 2009.

88. Both operations meet the MML's current development priorities, which focus on the implementation of key pillars of an urban transport system that will lead to urban transport transformation in the Lima Metropolitan Area over the next decade. These priorities were presented by the newly elected mayor in the Road Map *(Hoja Ruta)* proposed in 2010 during her election campaign.

89. The PDO/GEO designs and the implementation of both operations are fully consistent with the current development priorities of the Government of Peru (GoP) since the new president mentioned that the government will support the development of urban transport activities in Lima. This was announced during his inaugural speech on July 27, 2011.

90. The PDO and GEOs remained in line with the current Country Partnership Strategy (CPS)[8], which aims at fostering environmentally sustainable economic growth by reducing urban air pollution and the transport infrastructure deficit. Finally, the GEO reflects the GEF-4 and GEF-5 strategic long-term climate change objectives and the strategic program for the urban transport sector.[9]

3.2 Achievement of Project Development Objectives and Global Environmental Objectives

Loan

Rating**: Satisfactory**

91. The achievement of the project development objectives is rated satisfactory. The Project financed the first trunk line of an integrated mass rapid transit system that uses BRT technology. This line has a 28.6-km trunk line from the District of Independencia in the north of Lima to the District of Chorrillos in the south, to which feeder lines connect at transfer terminals located at each end, and where passengers transfer from feeder buses to the trunk line. The buses operate in segregated traffic lanes that result in higher capacity (*Corredor Segregado de Alta Capacidad*, COSAC I*)*. The trunk line has 35 stations and 2 transfer terminals. The trunk line is already carrying approximately 370,000 passengers daily and ridership is expected to rise to at least 600,000 passengers on a typical weekday once the system becomes fully operational. This will make it one of the most heavily used in the world.

92. The buses are the modern articulated type, run on compressed natural gas (CNG), and are controlled by a global positioning system (GPS). Passengers pay upon entering a station and then board the bus at grade. This dramatically increases the efficiency of the automated bus fare collection system. The decision to use CNG vehicles to run the BRT system was based on Peru's large reserves of natural gas and its provision of it to the city

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[7] Law declaring bicycle use as an alternative sustainable, safe, popular, ecological, economic and healthy mode of transport of national interest and promoting its use: Bill1691-2830 of September 23, 2010. This law envisages a series of actions to plan and promote the use of this mode of transport, which requires the State to (i) promote and disseminate bicycle use as an alternative sustainable mode of transport, (ii) provide safety and security for bicycle use, (iii) report back to citizens on a yearly basis on how it is applying this law, and (iv) promote the construction of bike infrastructure and parking. It also requires local governments to promote the bicycle as a sustainable mode of transport in land-use and transport master plans as well as in health programs. Finally, it requires public and private educational institutions to promote bicycle use. In addition, the law declares September 22 as a Car-Free Day on a yearly basis.

[8] IBRD and IFC Country Partnership Strategy for the Republic of Peru for the 2007–2011 Period.

[9] GEF Focal Area Strategies and Strategic Programming for GEF-4 dated July 25, 2007 and GEF Focal Area Strategies dated October 1, 2010.

of Lima. The requirement for CNG vehicles was established in the bidding documents. In addition, the MML offered a reduced or subsidized CNG price to private operators during the life of the concession.

93. In general, the Project has achieved the key outcome indicators outlined in the PAD. The *Metropolitano* has reduced global emissions (by about 324,440 tons per year) and local pollutants. This is the result of the use of a fleet that runs on natural gas engines. The Project has also reduced travel times in the affected corridor from an average of 53 to 35 minutes and has reduced traffic congestion along the trunk corridor due to the implementation of dedicated lanes and the reduction of *micros* and buses in the corridor area. *Protransporte* is also finalizing the arrangement to begin a public transport vehicle-scrapping scheme (see details in paragraph 104). Other envisaged outcomes include a reduction in accidents and fatalities from 26 fatal or serious accidents per month to 9 accidents per month and only 2 fatalities in 11 months, and an increase in riders' satisfaction with the system (82 percent of *Metropolitano* riders were satisfied or very satisfied with the service as of December 2010). Finally, in terms of distributional impact, it is estimated that at least 50 percent of the *Metropolitano*'s users come from low-income areas, principally from the North and South cones. The set of project outcome indicators, including original and actual value achieved, is presented in the first section of this report.

94. **Specific Objective 1: Implement the new mass rapid transit system on the basis of a Public Private Partnership (PPP) with bus corridor/feeder route operations and fare collection system**. The *Metropolitano* is fully operational and all the stations and terminals are functioning. Currently, the *Metropolitano* is transporting around 370,000 passengers per weekday and system productivity is gradually increasing from a Passenger Kilometer Index (PKI) of 3 to a PKI of 6.5, which is equivalent to 600,000 trips per day. Only 212 of 312 trunk buses and 159 of 232 feeder buses are operational. The fleet in use is gradually increasing. *Protransporte* conducted a detailed study to design an improved route scheme. Because of the two lanes per direction at most stations, the *Metropolitano* can have buses that stop at all stations and express buses that stop only at key stations. Furthermore, *Protransporte* has also proposed a new fare policy that will create incentives to increase feeder-trunk trips, remove taxi routes that compete with the *Metropolitano* in the trunk corridor, create new fast and reliable transport services during rush hours, and modify access to the stations. It is expected that the *Metropolitano* will reach the targeted rides by December 2013. At this level of ridership, the financial operation of the BRT is assured. This specific objective was achieved satisfactorily**.**

95. **Specific Objective 2: Improve access within low-income areas by facilitating the use of low-cost transport alternatives such as bicycles and walking.** Under the Project, some bikeways were constructed as part of the *Metropolitano* project. Two were in Chorrillos (South cone) and were constructed as feeder bikeways. These bikeways were built on the side of the rehabilitated feeder roads on Avenida Guardia Civil, among other feeder roads. In the North cone, the MML built another bikeway perpendicular to Avenida Tupac Amaru, along Avenida Los Olivos. In addition, the Project financed three contracts to reconstruct and slightly widen sidewalks on several streets in downtown Lima and to repave road surfaces along these same streets. This specific objective is rated

moderately satisfactory because most of the project resources were assigned to corridor civil works.

96. **Specific Objective 3: Strengthen the local institutional capacity to regulate and manage the metropolitan transport system on a sustainable basis.** The Project made significant contributions to the institutional strengthening of urban transport in Lima. In particular, the Project:

(a) Provided technical assistance to strengthen procurement, planning, operation and the environment in the BRT's first line.
(b) Assisted in the preparation of the social mitigation plan for parties affected by urban transport.
(c) Improved the capacity to resolve environmental and social issues through environmental, social and communication units.
(d) Provided technical assistance in concessions for bus operators, bus control and the fare collection system. The team assisted *Protransporte* in the design of financial modeling of the BRT system and preparation of the PPP bidding documents for the three concessions.
(e) Strengthened the capacity to operate and control the *Metropolitano* and to address urban transport transformation through long-term planning and economic analysis of future urban subprojects for the Metropolitan Area, including Callao.
(f) Improved urban transport planning in Lima through the provision of key studies that defined the future main corridors in Lima. There is now a vision for expanding the *Metropolitano* beyond one corridor; four additional corridors are under conceptual planning.
(g) Strengthened the GTU's institutional and managerial capacity, including assistance for the streamlining of routes that competed with the *Metropolitano*'s main corridor.
(h) Trained 58 members of the MML in urban transport planning, management and operation of BRT systems.

97. The best institutional strengthening was the creation of *Protransporte*. With the project experience, *Protransporte*'s staff has improved its operational capacity in several areas, including: administration, BRT planning and implementation, monitoring and control of bus operators, customer services, infrastructure maintenance, procurement of consultant services, and contracting of civil works. *Protransporte* now has the capacity to administer and regulate an urban transport system in Lima. Thus, the overall achievement rate is rated satisfactory.

98. **Reduce the negative environmental impact of motorized transport in Lima.** Overall, the Project has reduced global environmental impact because the *Metropolitano* has: (i) reduced global emissions by about 324,440 tons per year as result of the use of a reduced fleet that runs on natural gas engines (articulated and feeder buses) and the approximately 12 percent of *Metropolitano* riders who used to travel by private car or taxi; (ii) contributed to reductions in air pollution that will have a direct, positive effect on public health (see table below); (iii) resulted in a 33 percent reduction in greenhouse gases with respect to the baseline values; (iv) begun to remedy many of the unsafe traffic patterns plaguing the city by redesigning key traffic nodes through the streamlining of public transport routes and the enforcement of route concessions, the improvement of flow patterns, and the restriction of illegal public transport along the corridor; and (v)

improved areas surrounding the bus corridor, including commercial improvements, green spaces and architectural facelifts. This specific objective was achieved satisfactorily.

Table 1: Particulate matter (2.5 ug/m^3) concentrations (2005–2010)

Location of Monitoring Station	Source: WALSH (2005)	Source: COSAC's Air Quality Monitoring Network (2010)	Month
Villa Wetlands	15.5	8.9	February
Municipality of Lima's Taxation Administration Service (SAT)	45.0	18.5	
National Engineering University	53.1	37.4	March

Grant

Rating**: Moderately Satisfactory**

99. The GEO of "helping to facilitate GHG reductions from ground transport in the Lima–Callao Metropolitan Area by contributing to the promotion of a long-term modal shift toward more efficient and less polluting forms of transport, such as NMT and high-capacity public transport vehicles" was partially achieved at the time of ICR preparation. At the time of ICR preparation, the planned GHG emission reductions had not yet materialized. However, the GEF Grant contributed and is still likely to contribute to the promotion of a long-term modal shift, which is expected to eventually bring about these reductions.

100. The GEF Project was the entry point for the discussions between the MML and the Bank to implement the first BRT corridor, which in December 2010 led to a 12 percent modal shift from cars and taxis.[10] The Grant also helped to lay the foundations for potential future modal shifts to public transport through the blueprint for the integration of the public transport system and preparatory work to extend the busway system.[11]

101. In terms of NMT, the GEF Project improved and extended the bikeway network in Lima–Callao and carried out an ongoing and comprehensive promotional and educational campaign to promote bicycle use. Even if in 2009–2010 these activities had not yet led to the expected modal shift and GHG emission reductions, among other reasons for those pointed out in paragraph 105 below, it is likely that since then more people have already opted and will still opt for the bicycle mode.

102. Finally, the GEF project team held ongoing dialogue with *Protransporte* on bus scrapping and assisted it in preparing the bus-scrapping manual and setting up the institutional, contractual and organizational arrangements for the system. Bus scrapping started in January 2012. 16 buses were scrapped at the time of ICR preparation. The scrapping scheme is likely to lead to significant GHG emissions reductions in the near future.

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[10] Based on the user satisfaction study carried out by PROTRANSPORTE in December 2010 (*Estudio Cuantitativo "Satisfacción de Usuario con el Metropolitano*"). This corridor's estimated GHG reductions are approximately 324,440 tons.

[11] The second East-West BRT corridor, analyzed and preliminarily designed in the Grant-financed study, if implemented, could reduce CO_2 emissions by approximately 150,000 tons annually.

103. The assessment of the achievement of specific objectives is presented below. The detailed information on project outputs by component as well as the links between the output and outcome indicators are presented in Annex 2.

104. **Specific Objective 1: Rationalization of public transport capacity by providing financial incentives to retire old buses.** The objective was partially achieved at the time of ICR preparation. It was likely to be substantially achieved in the short run. Two related indicators were in progress to be complied with. The third indicator will not be reached because the respective activity became superfluous in the light of the changed circumstances on the ground. *Protransporte* contractually obliged the concessionaires of the first BRT corridor to provide buses for scrapping. *Protransporte* designed the scrapping procedures, set up the necessary structure, and hired scrapping and supervision companies. Instead of directly providing buses for scrapping, the concessionaires established a trust fund to acquire and scrap buses. At the time of ICR preparation, *Protransporte* (i) had a special committee for bus scrapping, (ii) completed a study on bus scrapping incentives, (ii) finalized the operational arrangements for the trust fund, (iii) submitted to the Lima Municipal Council a draft order to formalize these arrangements and set aside additional funds for bus and taxi scrapping[12], and (iv) scrapped the first 16 buses on a pilot basis. In the light of these achievements, *Protransporte* is likely to rationalize the public transport capacity and contribute to the GEO by reducing CO_2 emissions between 33,130 and 43,536 tons per year.

105. **Specific Objective 2: Rehabilitation and expansion of the existing bikeway network in Lima and Callao and promotion of bicycle use.** This objective and the respective output indicators were fully achieved. The Project supported the rehabilitation of 33.2 km of bikeways, the extension of 6.45 km of bikeways to connect San Marco and Católica Universities, and the construction of 19.35 km of new bikeways. The outcome indicator of duplicating bicycle trips was not achieved. Bicycle trips only increased by 3.62 percent between 2004 and 2009–2010,[13] and the contribution to the GEO was small. Some of the reasons that explain the limited increase in bicycle use include the following: (i) major construction works on some of the main corridors with bikeways between 2006 and project end;[14] (ii) late completion of most new bikeways, meaning that when the final user counts took place, there had been no time to promote these facilities; and (iii) focus of the bicycle promotion activities on students between the ages of 8 and 13 who do not yet make their own travel decisions, so the Project's impacts should eventually be noticeable in the longer run. In fact, according to the annual perception and attitude surveys,[15] in the 2007–2009 period over 30 percent of students stated that they did not go to school by bicycle because their parents did not allow them to do so. Other promising results of these surveys indicate that during the same period the number of students who went to school by bicycle increased from 10 to 13 percent, those who used their bicycles

[12] *Ordenanza Municipal de Aprobación del Reglamento Marco de Chatarreo Vehículos de la Municipalidad Metropolitana de Lima*.

[13] Between 2004 and 2006 bicycle trips increased by 16.39% and dropped thereafter by 10.39%. The 26% increase reported in the ISRs after the 2006 bicycle counts and surveys referred to the total cyclists counted in the project area and not to bicycle trips.

[14] Av. Arequipa, Av. Universitaria, Av. Colonial and Av. Tomas Valle. See final evaluation regarding bicycle use under the framework of the GEF Lima Transport Project prepared by CIDATT, 2010, pp. 3 and 33.

[15] *Encuesta de Conocimientos, Actitudes y Prácticas*, GEF Lima Transport Project, 2007, 2008, 2009.

every day increased from 30 to 37 percent, and those who stated that bicycle use improved the environment increased from 24 to 87 percent.

106. **Specific Objective 3: Delivery of an institutional strengthening program on sustainable transport, targeting municipalities and institutions that deal with environmental issues and/or transport planning.** This objective and the respective targets were achieved. The GEF Project supported the organization of 12 conferences on different sustainable transport-related topics with the participation of international experts. These events attracted nearly 2,800 people. The GEF Project also financed 17 training courses on sustainable transport topics through which 423 people were trained. Under the framework of the Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima, over 10 *Protransporte* staff members were trained. It is impossible to determine if these activities contributed to a modal shift toward more sustainable transport and the achievement of the GEO. Nevertheless, positive indications may include the following: (i) an increasing number of municipalities are implementing their own bicycle-infrastructure[16] and traffic-calming measures;[17] (ii) increased spending to improve public transport; [18] (iii) increased participation of municipalities in the Competition for Good Administrative Practices;[19] and (iv) the National Government's legal initiative to convert diesel vehicles to CNG.[20]

107. **Specific Objective 4: Assessment and monitoring of the GEF Project's global consequences.** This objective was achieved. The GEF Project financed the assessment of the GHG impact of bicycle activities. The GEF Project also financed a GHG emission inventory for mobile sources in Metropolitan Lima and the evaluation of the GHG emission impact of the second BRT corridor. *Protransporte* assessed the GHG impact of the first BRT corridor, including the evaluation of bus scrapping.

3.3 Efficiency

Loan

108. The results of the ex post economic analysis, commissioned for this ICR, yielded a Net Present Value (NPV), at a 12 percent discount rate, of US$296 million and an Economic Internal Rate of Return (EIRR) of 20.2 percent. The sensitivity analysis indicated that the Project's expected return is particularly sensitive to changes in the benefits stream, especially annual operating costs of the system and annual time savings to users. At appraisal, the economic analysis yielded an NPV, at a 14 percent discount

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[16] For example, the Municipality of Surco implemented a bikeway on Av. Caminos del Inca, the Municipality of Miraflores on the Av. Diagonal, Malecón 28 de Julio and Melcón de la Reserva, the Municipality of San Borja on Av. San Borja Norte and Av. Aviación, the Municipality of Victoria on I Alameda del Deporte, and the Municipality of La Molina on Av. Ferrero.

[17] For example, Surco, Miraflores, San Borja and San Isidro.

[18] For instance, the Municipality of Lima implemented a first BRT corridor and plans to extend the system. The National Government provided the funds to complete the first section of the urban rail system (*Tren Eléctrico*).

[19] In 2007 the project supported the creation of a category for "Sustainable Transport" under the framework of the nationwide Competition for Good Administrative Practices (*Concurso de Buenas Prácticas Administrativas*). No one participated under this category in 2007 and 2008. In 2009 the project partially cofinanced the registration fee and five public entities participated. In 2010 there were two participants. In 2011 there were four participants.

[20] *Decreto Supremo 213-2007-EF, Régimen Temporal para la Renovación del Parque Automotor de Vehículos Diesel para el cambio de matriz energética de diesel a GNV*. This measure should encompass about 20,000 vehicles. It has not yet been implemented, but the Ministry of Environment has a budget of US$192 million for this purpose in 2011.

rate, of US$61 million and an EIRR of 20.7 percent. At that time, the benefits of the system were calculated by estimating the demand and calculating the benefits in time savings to users and savings in vehicle operating costs for the new buses. Using similar assumptions on the benefits stream for the ex post analysis; the results are an NPV, at a 14 percent discount rate, of US$175 million and an EIRR of 19.5 percent. The costs above the original estimates were all financed with funds from the Municipality.

109. As detailed in the Economic Analysis Annex, the ex post analysis includes benefits stemming from increases in trips as a result of generated demand, and calculates additional benefits from the reduction in GHG emissions and a reduction in accidents along the corridor. The sensitivity analysis carried out determined the potential effects of changes in the main drivers of the model in the NPV and EIRR of the projects. If system demand does not reach the expected target, the Project's EIRR may be impacted and may fall to close to 18 percent, which is still above the 12 percent discount rate. In addition, increases of 10 to 20 percent in the operating cost of the new buses also impact the EIRR, decreasing it to between 18 and 21 percent. A detailed analysis and the economic cost-benefit analysis can be found in Annex 4.

110. **Grant**

111. In addition to the cost-benefit analysis for the Project financed by the Loan, the PAD included an incremental cost analysis for the GEF Grant. The assumed baseline scenario for this analysis was the implementation of the first BRT corridor in Lima. The alternative or incremental scenario looked at the additional CO_2 emission reductions from the bicycle-related activities and the GEF-financed voluntary bus-scrapping scheme. Correctly, the indirect CO_2 emission reductions from the institutional strengthening and management, M&E and replication components were not considered.

112. A similar incremental cost analysis was undertaken for the project ex post and the results were compared with the appraisal scenario. The analysis included the CO2 emission reductions from the bicycle-related activities, *Protransporte*'s bus scrapping, and the implementation of an additional BRT corridor.

113. The change in scope of analysis is due to project restructuring, which replaced the GEF-financed voluntary bus-scrapping scheme with a study to identify additional BRT corridors for Lima, prepare the preliminary designs for a second East-West corridor, and advance in the integration of the system. The Project's bus-scrapping indicators were maintained because despite the cancellation of the GEF-funded voluntary scrapping activities, *Protransporte* was expected to scrap the same number of buses envisaged under the originally planned mandatory and GEF-financed voluntary scrapping schemes.

114. The appraisal and ICR scenarios are compared in the Table 2 below and the main caveats are highlighted.

Table 2: CO2 emission reduction at appraisal and at project end

Activity	CO2 reductions (tons/year)		Caveats
	According to appraisal estimates	According to ex post analysis	
Bicycle activities	879	22	The latest fieldwork for this analysis took place in 2009–2010 when most bikeways had just been completed or were about to be completed. At that time the expected increase in bike trips had not yet materialized, for the reasons explained paragraph 105.

Bus scrapping	Between 13,656 and 30,036	Between 33,130 and 43,536	*Protransporte* manages a trust fund in the amount of US$6,164,760 to buy and scrap old buses. Bus scrapping started in January 2012. 16 buses were scrapped at the time of ICR preparation. With the replacement of the voluntary bus-scrapping component, the GEF Project did not finance any scrapping-related activities. Nevertheless, the scrapping indicators were maintained and the project team supported *Protransporte* in a number of scrapping-related preparatory activities.
Implementation of a second BRT corridor in Lima	Activity not envisaged at appraisal (introduced through project restructuring)	150,000	At the time of ICR preparation, it was not yet clear if the East-West corridor analyzed in detail in the GEF financed study would be served by bus or train. The implementation of an East-West BRT corridor is expected to lead to CO2 reductions of 150,000 tons a year. The contribution of the GEF project would be small compared to the investments needed. Nevertheless, it would have acted as an initial trigger. If the corridor will be served by a train, the designs prepared by the GEF project will have to be redone. Even in such case, the study will be a valuable input for the modernization of the public transport system in Lima, which is likely to considerably reduce GHG emissions from ground transport.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Loan

Rating**: Satisfactory**

115. The proposed rating is satisfactory because the Project: (i) is fully operational; (ii) 82 percent of its riders are satisfied or very satisfied; (iii) remains highly relevant and is consistent with the current strategies of the new municipal administration; (iv) has reduced accidents and emissions significantly; and (v) has achieved not only its project development objectives but also most of the project outcome and output indicators envisaged at appraisal.

Grant

Rating**: Moderately Satisfactory**

116. The overall Global Environment Outcome rating is Moderately Satisfactory. The GEF Project remained highly relevant. At the time of ICR preparation, the GEO and the respective GHG emission reductions were partially achieved and it was likely that an additional modal shift toward public transport and NMT as well as GHG reductions from bus scrapping would take place in the short to medium term.

3.5 Overarching Themes, Other Outcomes and Impacts

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

117. By improving the conditions of the public transport system and NMT, the Project and the Grant had positive poverty impacts since poor people are those who use public transport and bicycles the most in Lima. For the Grant, even if it was mainly designed with an environmental/GHG emission-reduction focus, most of the bicycle-related activities took place in poorer areas.

118. In terms of gender aspects,[21] the GEF Project placed special emphasis on the participation of girls in the educational program to promote bicycle use in schools.[22]

[21] For the project, in terms of gender aspects, a survey done by Protransporte found that 46% of all users were women, 45% of riders that used the system more than 4 times per week were women, and 52% of occasional users were women. Women are therefore benefitting almost as much as men from the Metropolitano.

Despite this, the number of women using bicycles counted in part of the project area decreased by 14.3 percent between 2004 and 2009–2010.[23]

(b) Institutional Change/Strengthening *(particularly with reference to impacts on longer-term capacity and institutional development)*

119. Institutional development and capacity strengthening were part of the core objectives of the Loan and the Grant. The following local agencies were some of those targeted by capacity-strengthening activities: *Protransporte*, GTU, PEMTNM, FONAM, NMT grassroots organizations, and municipal, provincial and national agencies active in the area of sustainable transport. These activities were successfully completed. The results are presented in Section 3.2.

(c) Other Unintended Outcomes and Impacts

120. For the Loan, there were other positive unintended outcomes, as presented below:

121. **Private-Sector Participation.** The *Metropolitano* permitted private-sector participation in urban transport in Lima. The private sector invested over US$200 million for the provision of 312 articulated buses and 232 feeder buses and for the electronic fare-collection and smart card system. Concessions for bus operations and fare collection were awarded in separate contracts. In addition, two local intermediary financial institutions provided lines of credit to the local operators (COFIDE and Interbank), thus enabling their successful operation.

122. **Urban Revitalization.** The *Metropolitano* has attracted a new flow of local pedestrians. A new mall has been installed, revitalizing the nearby Central Station urban area.

123. **Central Station at Plaza Grau (US$10 million).** The Project's original designs envisaged a simple grade separation at Plaza Grau by partially sinking the Metropolitano busway. The MML changed these designs and converted them into a fully underground Central Station, which included also a shopping mall and capacity to manage not only the current BRT line from North to South but also future BRT lines. As a result, the cost increased from US$10 million to US$31 million, which was financed entirely by the MML.

124. **Industrialization and Economic Development.** The demand generated by the Project for modern buses induced MODASA, a local factory, to invest US$20 million in plant expansion and technological innovation. MODASA supplied close to two thirds of the buses used by the private concessionaires. MODASA is already exporting articulated buses to Colombia and Chile, for example.

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

Beneficiary Survey

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[22] For instance, in 2009, participants in schools' educational programs were 52% female and 48% male. *Encuesta de Conocimientos, Actitudes y Prácticas*, GEF Lima Transport Project, 2009.

[23] Final evaluation regarding bicycle use under the framework of the GEF Lima Transport Project, prepared by CIDATT, 2010, pages 34 and 37.

125. In November 2010, *Protransporte* conducted a Beneficiary Survey. A total of 801 surveys were conducted in the *Metropolitano*'s stations (South 1, South 2, Center and North). The target population was classified in four groups: (i) occasional users, (ii) regular users, (iii) heavy users, and (iv) non-users.

126. In general terms, the Beneficiary Survey shows that users' perception of the *Metropolitano* has a high level of acceptance. Eighty-two percent of heavy users rated the system as good or very good, whereas 84 percent of regular users and 86 percent of occasional users rated the system as good or very good. The system's best attribute is the speed of transport, since it helps users save time in getting from one place to another. The security perceived in the *Metropolitano* system, in comparison with other transport modes, is also important. Infrastructure is considered modern and suitable for Lima's transport needs.

127. In terms of users' perception of quality services, the survey shows the following results: (i) the speed of the trips is one of the main benefits perceived by users and there are some other aspects that must be improved, including the waiting time at bus stations, cleanliness within the stations, and the security of reaching the selected destination with respect to other transport services; (ii) there is a high level of satisfaction related to the services provided by staff, especially security and surveillance staff of the Customer Service Center; (iii) the buses' cleanliness and safety are the most valuable attributes rated by users; however, the large number of users and the poor ventilation in the buses are the main negative aspects perceived by users; and (iv) the work performed by bus drivers was also rated high. Finally, the study shows that, on average, 90 percent of users think that the service provided by the system is good.

128. **Stakeholder Workshop.** The project team carried out a workshop with stakeholders in order to obtain the impressions and lessons learned from them, principally with key former and current staff of *Protransporte.* This workshop had excellent outcomes because it sought to transmit the lessons learned to the current administration staff. These lessons will improve the design of a second BRT project in Lima. The main findings of this workshop are presented in Annex 6 and some of the lessons learned are reflected in this ICR. The PowerPoint presentations at the workshops are available in the project files.

4. Assessment of Risk to Development Outcome and Global Environment Outcome

Loan

Rating: **Low**

129. The risk to the Project's development outcome is rated as low because: (i) the *Metropolitano* is fully operational, and (ii) *Protransporte* has proposed an action plan that will increase ridership to at least 600,000 passengers by December 2013. This plan includes the following actions: the execution and implementation of route rationalization of buses still competing with the *Metropolitano*, the application of new fare integration, the implementation of bus scrapping and the extension of the North trunk line by 12 km. These actions will make the Project sustainable in the long term, and will cover administrative and private bus operators' operating costs.

130. The low risk rating is also justified based on the strong commitment of the new municipal administration to put additional resources in place to cover pre-operational budget expenses and to invest in infrastructure improvements in some stations. The new administration is also planning to extend the *Metropolitano*'s to the North and expand the BRT system.

Grant
Rating**: Moderate**

131. The risk to the global environment outcomes of the GEF Grant is moderate. As previously mentioned, the MML is planning to expand the busway system, but it is not yet clear if the East-West corridor analyzed in detail in the study to integrate the public transport system in Metropolitan Lima will be served by bus or train. Even if it will be served by train, the study will be a valuable input for the public transport modernization in Lima, which is likely to considerably reduce GHG emissions from ground transport.

132. *Protransporte* started bus scrapping in January 2012. At the time of ICR preparation, *Protransporte* scrapped 16 buses on a pilot basis. More substantial vehicle scrapping is expected to happen once the municipal order to regulate vehicle scrapping is approved[24]. This will lead to the expected GHG reductions.

133. After the conclusion of the GEF Project, the MML not only maintained PEMTNM[25] but also strengthened it. PEMTNM went on with many project activities and started new ones. In addition, the national bicycle law created a legal requirement for municipalities to promote bicycle use. Therefore, also considering the reasons for the limited increase in bicycle use pointed out in paragraph 105, it is likely that the expected GHG emission reductions from NMT will still materialize. Most of the bicycle promotion activities in Callao were discontinued and the expected GHG emission reductions may not be fully achieved.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Loan
Rating: **Moderately Satisfactory**

134. The overall quality at entry and preparation is rated moderately satisfactory. At appraisal, the Bank properly analyzed the Project's technical, economic, financial and commercial aspects in compliance with OMS 2.2. However, there were several conditions for loan effectiveness which the borrower took over a year to meet. LCR no longer accepts this practice of having effectiveness conditions. Rare exceptions are made.[26]

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[24] The draft order was submitted in January 2012 and is expected to be still approved in February 2012. This order will also set aside additional funds to scrap taxis and buses outside the influence area of the first BRT corridor.
[25] After the closure of the Bank's previous urban transport loan to Lima, which included an NMT component, the NMT department was dismantled.
[26] See also paragraphs 31-34 for more details.

Grant
Rating: **Moderately Satisfactory**

135. In addition to the normal preparation budget, the GEF Project was supported by a PDF-B Grant in the amount of US$350,000. The preparation lasted approximately three years and involved seasoned and experienced urban transport specialists. Frequent preparation missions were carried out and documented in the Aide-Memoires. The grant-related parts of the PAD are well written and comprehensive in their coverage. They show an in-depth knowledge of the sector issues at the time of appraisal.

136. This operation was one of the first GEF transport projects in the Bank and had a number of innovative features. The technical preparation was thorough. The Bank team ensured high-quality groundwork based on detailed background studies and multiple participatory and consultative events to inform stakeholders about the Project and fine-tune the design. The engineering designs to improve the existing bikeway network and the terms of reference for many activities were ready at the time of appraisal.

137. The GEO was realistic and the Project's complexity was adequate. The Bank team designed a simple but sound results framework complemented by an M&E subcomponent. A few indicator targets had weaknesses. As pointed out in detail in Section 2.4, the Bank team adequately handled the fiduciary aspects, but its performance in terms of safeguards had shortcomings. Due to these shortcomings, the Bank's performance in terms of ensuring quality at entry is rated moderately satisfactory.

(b) Quality of Supervision (including of fiduciary and safeguards policies)

Loan
Rating: **Satisfactory**

138. At project start-up, supervision teams were focused on the complex institutional and procurement issues and tried to move the Project forward due to high rotation of upper management in *Protransporte* and to the lack of results on the ground. With respect to fostering institutional capacity in the areas of environmental and social management, the Bank did not fully achieve this objective during the first two years of implementation. However, at this stage, project supervision continued to focus on resolving issues related to administrative, fiduciary, procurement and PPP bus and fare collection concession issues, among other aspects.

139. Since late 2007, the Bank has intensified its supervision team and the project rating was changed to satisfactory. Project supervision continued to be proactive in finding ways to accelerate project implementation and was focused on environmental safeguards compliance through the involvement of a Bank environmental specialist to supervise compliance with OP 4.01.

140. With reference to project supervision, the IP report stated the following: "once problems were identified in 2009 as a result of residents' complaints[27] and related

[27] The requesters to the Inspection Panel live in the District of Barranco in the South of Lima. This district is also served by the Metropolitano. The request for inspection, Management's response, the Panel's final Investigation Report, and the Bank's response are all public documents. The Bank's Board approved the latter two documents on June 16, 2011.

monitoring of the situation in the context of supervision missions, supervision activities strengthened and a number of actions were taken, including contracting a traffic specialist and proposing a new traffic management study. The Panel found that this was in compliance with OP 13.05 on Project Supervision, which requires Bank staff to identify problems promptly as they arise and to recommend ways to solve them, as well as to recommend changes in the project concept as appropriate as the project evolves."

141. Supervision of the *Metropolitano*'s operations was also focused on traffic safety matters and pre-operation of the system. For example, the Bank, together with local staff, carried out station-by-station analyses of pedestrian and vehicle traffic safety. To further strengthen the supervision of this area, the Bank hired an international urban road safety expert, whose plan of actions and recommendations are in the process of implementation by *Protransporte*. The result of these actions will reduce the likelihood of accidents. With respect to operations, the Bank provided technical assistance in the pre-operational stage of the *Metropolitano*, hiring consultants and ensuring that the BRT system works as an integrated transport system and was fully operational at loan closing date. Since 2010 the project team has also been working proactively in preparing and focusing on the Management's Plan of Action in response to the Inspection Panel report.

Grant

Rating: **Moderately Satisfactory**

142. The Bank team was qualified and maintained a high level of involvement throughout the lifetime of project implementation. In addition to the regular supervision missions, which took place twice a year and focused strongly on working with the client and on field visits, the Bank team provided technical implementation support nearly on a daily basis and followed up on commitments through monthly conference calls documented in detailed minutes. The Bank team helped to smooth out frictions between FONAM and PEMTNM and very strongly pushed the sustainability agenda. Each time it visited Lima, the Bank team met with different local stakeholders to promote ownership of project activities and products after grant closure.

143. In terms of safeguards, in hindsight and despite the limited supervision budget, the Bank team should have involved social and environmental specialists from the start and should have prepared environmental guidelines for bicycle works, even though there was no formal requirement to do so. Although these shortcomings may have made project implementation more difficult in some instances, they did not negatively impact the Project's outcomes. Because of the safeguard shortcomings, the quality of supervision is rated moderately satisfactory.

(c) Justification of Rating for Overall Bank Performance

Rating: **Moderately Satisfactory**

144. For the Loan, Bank performance in ensuring quality at entry was moderately satisfactory and Bank performance during supervision was satisfactory. For the Grant, Bank performance in ensuring quality at entry and quality of supervision was rated moderately satisfactory. Therefore, the Bank's overall performance was rated moderately satisfactory.

5.2 Borrower Performance

(a) Government Performance

Loan
Rating: **Moderately Satisfactory**

145. The MML (the Borrower) demonstrated support and leadership during construction and pre-operation of the *Metropolitano*. During the construction phase, the MML contributed the resources needed for project implementation, and raised its local counterpart contribution from US$44.4 million to US$171.9 million. This financial support guaranteed that the Project reached its development objectives. However, during this stage, the mayor rotated high- and middle-level managers several times due to lack of performance or results at project start-up. Project performance was rated unsatisfactory due to low disbursements. The changes in *Protransporte*'s upper management staff generated delays during the first years of project execution.

146. During pre-operation, leadership and commitment to the Project were demonstrated through the allocation of budget resources for communication campaigns and rationalization of bus operators. The new municipal administration, which took office in January 2011, is also demonstrating commitment during the operation of the Project and the continuation of key institutional reforms in Lima's transport sector. It is contributing resources to invest in the *Metropolitano*'s infrastructure improvements in order to make it fully and financially viable. This sustained level of support is a key factor in the Project's successful operation.

Grant
Rating: **Moderately Satisfactory**

147. Since FONAM, the grant recipient is a private and autonomous entity, government performance refers to the performance of the provincial and district municipalities in Lima and Callao. These municipalities provided cofinancing, and were among the main beneficiaries of the Grant and the key political actors in the Project.

148. In the project preparation phase, the provincial municipalities provided their full support to the Project and their performance is considered satisfactory.

149. During project implementation, the MML provided adequate financing for PEMTNM, which supported project implementation on a daily basis, maintained and extended the existing bikeway network, and promoted separate NMT initiatives. Cities such as Lima with departments exclusively dedicated to NMT are rare in Latin America and in the developing world in general. Despite the Project's termination, PEMTNM continued to do an excellent job (for details see Sections 2.5 and 4). The MML also provided the necessary cofinancing for the Project. In terms of bus scrapping, a difficult political issue, the MML changed its mind several times on how to proceed, thus delaying project implementation. During the implementation of the Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima, some of the issues did not receive immediate attention at the highest level.

150. The Provincial Municipality of Callao strongly supported the bicycle promotion activities throughout project implementation, but invested less in NMT than it had

originally committed to. This delayed the approval and completion of GEF-financed bikeways in Callao.

151. All municipalities benefitting from the Project tended to favor motorized transport over NMT when it came to allocating scarce road space for bikeway construction. A few district municipalities in Lima delayed authorizations for bikeway works or changed their minds when the bikeway design was ready to be implemented. In addition, although they generally supported bikeway construction, the municipalities did not always make sufficient efforts to keep parked cars off the bikeways. Based on the above, government performance overall is rated moderately satisfactory.

(b) Implementing Agency or Agencies' Performance

Loan
Rating: **Satisfactory**

152. The Municipality of Lima delegated project implementation to a Project Implementation Unit (PIU), which later turned into an executing agency called *Protransporte*. Due to its lack of experience in managing BRT projects financed by multilateral banks, this agency experienced difficulties in achieving results during the first three years of project execution. The high turnover of key staff hurt the agency's implementation capacity; in 2006, more than 50 staff members were changed, thus delaying project implementation. During this period the Project was at risk.

153. However, since 2007, with a new board of directors and new upper management staff in *Protransporte*, the agency has demonstrated a good capacity to implement the Project by: (i) carrying out large and complex civil works, bus-concession and fare-collection bidding processes; (ii) assisting in obtaining a line of credit from the Financial Development Corporation (*Corporación Financiera de Desarrollo S.A.*, COFIDE), a local development bank in Peru, to the bus concessionaires; (iii) coordinating project implementation with GTU and the Lima Municipal Enterprise for Fare Management (*Empresa Municipal Administradora de Peaje de Lima*, EMAPE) to execute some of the project component activities with Bank funds or local funds; and (iii) leveraging the additional funds required to successfully complete the operation of the *Metropolitano*. Based on these actions, *Protransporte*'s performance is rated satisfactory.

Grant
Rating: **Satisfactory**

154. During project preparation, the institutional and individual capacity of FONAM and the other co-implementation agencies was weak, but they actively and fully participated in project design and their performance was satisfactory.

155. Their institutional, technical and managerial capacity improved strongly during implementation. Eventually, the commitment of the project staff in FONAM and PEMTNM and the strong personality of the project coordinator became some of the Project's key assets.

156. FONAM and PEMTNM carried out the NMT and institutional strengthening activities with minor problems and delays. Their capacity, including the ability to handle safeguard issues, grew considerably over the lifetime of the Project. The collaboration between the two agencies initially had some shaky moments and continued with

occasional frictions throughout the Project's entire duration. Nevertheless, their overall performance was satisfactory.

157. The cooperation between FONAM and the implementation agency in Callao was smooth and the latter's performance was satisfactory.

158. The performance of *Protransporte* in implementing the Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima was satisfactory, despite some delays in making decisions and reviewing the respective deliverables. In terms of bus scrapping, *Protransporte* carried out all activities to put the scrapping system in place, including the preparation of a scrapping manual that was considered satisfactory by the Bank.

159. FONAM's performance in terms of overall project management, procurement, FM and safeguards was satisfactory.

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

Rating: **Moderately Satisfactory**

160. Since the performance of the implementation agencies for both the Loan and the Grant was satisfactory and the Government's performance was moderately satisfactory, the overall performance is rated moderately satisfactory.

6. Lessons Learned

Loan

161. ***Strengthen Project Implementation Agency's capacity for mainstreaming environmental and social management into urban transport project preparation and supervision***. Given the issues encountered during project preparation and implementation as well as the high number of EIA/EMPs that had to be prepared, reviewed and supervised, as well as the social mitigation plans, a dedicated full-time and well-equipped environmental and social management team should have been set up in *Protransporte* since the very beginning of the Project (after Board approval) to ensure due diligence in terms of: (i) quality assurance of EIA/EMP and social mitigation plans, (ii) supervision of the implementation of environmental and social management plans, (iii) sound legal analysis to establish the local environmental authority and find any legal vacuum in the local legislation, and (iv) timely and systematic reporting of main findings to *Protransporte*'s senior management and to the Bank team. Thus, the Bank should undertake a detailed institutional assessment of the counterpart's environmental and social management capacity.

162. ***Enhance the Bank's due diligence on compliance with environmental and social safeguard policies, including consultation and communications, during supervision.*** On the Bank's side, supervision of environmental and social safeguard policy compliance by *Protransporte* intensified in 2007 but was very intermittent before that year. A task team with adequate mix of expertise is needed for adequate supervision. Therefore, in the future, preparation and implementation of similar urban transport projects should include Bank environmental and social specialists earlier in order to assist the Bank technical team and the Borrower in supervising compliance with environmental and social

safeguard policies. This will also allow continuing the consultation process from preparation into implementation. Consultations, including general communication on project scope and evolution, should be seen as a continuous process that evolves as the project moves from preparation into implementation and not just as events to consult on the EIA or RAP.

163. ***Consider at appraisal key elements that are likely to facilitate the successful implementation of complex BRT projects.*** These are: (i) emphasize project readiness and complete engineering designs and environmental and social studies; (ii) for BRT projects, consider the cost of interferences (with utility networks) and time to execute such civil works; (iii) due to unexpected or unforeseen factors related to the cost of civil works, carefully study the cost estimate for unallocated funds; (iv) consider the transformation of the PIU into an entity in charge of the BRT operation in the institutional strengthening component; (v) carefully analyze the procurement plan for civil works, reducing bids to two or three contracts; (vi) include an estimate of pre-operational and operational costs for running BRT projects in the loan financing scheme; (vii) analyze at appraisal the models and contracts to be used for private sector participation; (viii) strengthen project teams—Borrower and Bank—in environmental and social safeguards to reduce risks during implementation; and (ix) consider and monitor traffic management and traffic safety studies along the busway corridor. These were the key elements mentioned during the stakeholders' workshop with *Protransporte* staff and they are important for any similar project in the future.

164. ***Focus on the ridership target strategy in order to achieve financial sustainability prior to pre-operation of the system or during the first year of operation***. The project component did not include investment activities or an action plan that could be implemented to reach the adequate level or volume of passengers. The Project assumed this as a given because several demand studies had indicated that the *Metropolitano* would have a ridership of at least 600,000 passengers at the start of operations. However, after one year of operation ridership is reaching only 370,000. Experience shows that the passengers will not use the BRT system right away or during the first year of operation. Thus, the future BRT project design should consider allocating resources for: (i) a communication campaign on a modal shift as early as possible prior to operations; (ii) enforcement of rationalization of bus routes and implementation of bus scrapping, stipulating it in the Loan Agreement, and including technical assistance that provides high-level advice on how to address bus-route organization; (iii) budget allocation for pre-operational costs as part of the counterpart funding; (iv) analysis of competition for feeder routes and taxis that compete with the proposed system with the purpose of having an urban transport policy in place prior to operations; (v) reduction in the purchase of new buses in accordance with demand; the bidding documents required that all 300 new buses should be purchased and ready for operation, but this is a high financial burden for the agency; (vi) careful analysis of service demand at bus stations to adequately design access to the BRT system (not all stations have the same demand); and (vii) study of fare integration to attract more users. All of these activities must be incorporated in the Economic-Financial and Institutional Modeling Study (*Estudio de los Modelos Economico-Financiero e Institucional*, EFI) in order to carry out an action plan during implementation, together with the required investments. Thus, at appraisal, the ridership target should have been more conservative.

165. ***The World Bank – IDB partnership in a complex project can be successful if:*** (i) the preparation cost is shared by both institutions; (ii) complementary skills provided by both banks during identification and supervision missions assist the Borrower and agency in improving the design and performance of this complex project; and (iii) there is good interpersonal relations among staff of both multilateral organizations and those of the Borrower and agency.

166. ***Project design should not be focused on a single BRT line: it must contain a broader sectoral approach that considers a long-term vision of the urban transport sector in the city.*** The Project was designed principally as a single BRT line, without an urban transport strategic plan that focused on developing a mass transit system and considered the effects of GHG emissions or sought a modal shift. Thus, it should contain not only the urban transport strategy plan (number of corridors and integration with electric train, non-motorized transport, etc.) but also a detailed analysis of parallel key pillar reforms in the city's urban transport sector, such as bus scrapping, reduction in the number of old buses, taxis and other transport vehicles as soon as possible, together with the strengthening of the urban transport authority and the provision of institutional capacity training to transport institutions and private operators.

167. ***Project design should reflect the agreements with the Borrower and include studies to examine possibly complex policy issues.*** The design should be flexible enough to adapt individual components to respond to changing political realities, within the stated project objectives. Thanks to this flexibility, the Project achieved the establishment of a mass transit system—something that Lima had tried in vain to achieve for several decades—and (through the GEF-sponsored study) set out guidelines for future public transport development in Lima.

Grant

168. The GEF Project provided a rich amount of lessons that are relevant for the design and implementation of similar future operations. Many of the bicycle-related lessons take into account the experience of a project with similar characteristics carried out a few years earlier in Santiago, Chile (GEF Sustainable Transport and Air Quality for Santiago Project – P073985). This project was more successful in attracting new cyclists. Some of these lessons are presented below. The full account of the lessons learned is presented in Annex 10.

169. ***The choice of the right implementation agency is difficult but crucial.*** FONAM was agile in handling the management aspects of the GEF Grant because it operated in accordance with commercial law and did not have as many bureaucratic hurdles as those of the public administration. FONAM was also sheltered from political influence on decision making and frequent staff changes. It did an excellent job in terms of institutional strengthening. However, other project activities, such as bikeway construction and bus scrapping, were outside its sphere of responsibility. This made project implementation more difficult and had an impact on the final results.

170. ***Modal shift requires a complex cultural change and thus a long-term engagement.*** Successful bicycle-use promotion requires a long-term engagement, which cannot be ensured through a single externally financed project. Since isolated and short-

term campaigns have limited impacts, a project should ideally only support bicycle promotion if there is an established institution in charge of NMT that is likely to continue with the promotion activities after project completion. In addition, the external support should focus on the design of the promotion strategy and the training of trainers, including training materials and possibly bicycles, while the promotion activities themselves should be part of the country's own commitment.

171. ***Reaching out to employers and employees is difficult but important for short-term results.*** The experience in Lima and in Santiago showed that it is not easy to convince private and public firms to participate in promotional programs and foster bicycle use among employees. Both projects envisaged involving employees, and both had limited success. Consequently, the main focus was on schools and universities and on events in public spaces. However, to see more immediate results in terms of increased ridership, bicycle promotion needs to reach out to the adult population, which makes its own travel decisions.

172. ***In a large city such as Lima, with a relatively low population density, it is recommendable to work with a few districts instead of the city as a whole.*** By nature, the bicycle is a mode of transport for relatively short trips, while a large and dispersed city necessarily requires longer trips. In Lima, prioritizing bicycle interventions based mainly on real and potential demand initially resulted in dispersion all over the city. Little focus was placed on the idea of creating a network, which at a citywide level would have been difficult and costly anyway. Instead, in Santiago the project only supported activities in a small area, and this may have paid off in terms of the increase in bicycle use.

173. ***If the objective is to reduce GHG emissions, project interventions in developing countries should focus on wealthier areas, where people with access to individual transport live.*** Such a focus, if successful, may create a fashion that reduces the urge in lower-income people to switch to a motorized mode as soon as they have the means to do so. From this perspective, an indicator of success in developing countries would be the presence of middle- and upper-class professionals on bikes, including women. Instead, in countries such as the US, where the typical bicycle user is a middle- to higher-income white-collar worker, now the marketing focus is often on lower-income blue-collar workers with access to cars.

174. ***Although it is obvious that successful bicycle promotion requires safe parking facilities, these are not easy to achieve.*** Lima pushed for a regulation to make the provision of bicycle parking in public buildings mandatory and studied the financial viability of different safe bicycle parking schemes. Lima did not find a perfect solution and most of its efforts eventually went into installing parking facilities in public places near security staff, such as close to financial institutions or the municipal police.

175. ***Bikeways are generally welcome as long as there is surplus road space that is not needed for car parking.*** The experience in Lima showed that it is difficult for decision makers to treat parking spaces for a bike facility and even more difficult to allocate scarce road space from cars to bikes. However, not all reductions in road space mean reductions in traffic flows. An urban road with two lanes in both directions may be converted to a road with one lane per direction and a middle lane for left turns without

losing capacity. This frees the space for a bi-directional bikeway. Consequently, traffic engineering solutions should be considered as part of bicycle facility planning, and small studies to convince decision makers may be necessary.

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

(a) Borrower/implementing agencies

176. The ICR of the Loan was prepared in coordination with *Protransporte*. A draft final report was shared with *Protransporte* for comments on October 5, 2011 and the entity has informed the Bank team that it has no further comments on the report.

177. The GEF Grant recipient asked that the following be added in Section 2.2 Implementation, among the other factors that positively influenced grant implementation: "The project led to successful capacity development of professional staff of the municipalities in the areas of transport engineering, planning and urban development. This allowed for the development of new project initiatives or activities related to sustainable transport in other municipalities: new bikeways and/or pedestrian infrastructure, the scrapping activities in the Municipalities of Lima and Callao and their inclusion in the agenda of the Ministry of Transport. The GEF Project strengthened FONAM as the fund-managing entity, allowing it to have financial management software in place to manage up to 100 projects. It helped FONAM to develop institutional know-how to implement projects directly or on behalf of others, including the management of funds and trust funds, and procurement and contracting for multilateral financial institutions such as the World Bank, the Inter-American Development Bank, *Kreditanstalt für Wiederaufbau* (KfW) and others."

178. The recipient had no other comments on this ICR.

(b) Cofinanciers

179. Not available.

(c) Other partners and stakeholders

(e.g., NGOs/private sector/civil society)

180. Not applicable.

8. Additional Information

181. ***Request for Inspection.*** On October 1, 2009, the World Bank Inspection Panel (IP) received a Request from a group of residents of the District of Barranco within the Lima Metropolitan area (the Requesters). The Requesters raised concerns that the Project had: (i) significantly worsened traffic conditions in Barranco; (ii) caused negative environmental and social impacts that had not been adequately mitigated; (iii) failed to inform and consult the affected communities appropriately; (iv) caused irreparable adverse impacts to Barranco's designated buildings and areas of historic value; and (v) been poorly prepared and inadequately supervised. This section summarizes the Inspection Panel's findings, Management's Response to the Board including Management's Action Plan, which was completed by February 2012.

182. ***Inspection Panel Report.*** On January 18, 2011, the Inspection Panel submitted its report on its investigation of the Lima Urban Transport Project (the "Project"). The Panel

found that the Project had been correctly categorized as "B" and that the environmental studies on issues directly affecting BRT construction and operation had complied with OP 4.01, Environmental Assessment. Project supervision, information dissemination, and consultations with the affected communities had been strengthened in early 2009, as the construction phase ended, operations began, and the communities started to communicate their concerns in a more organized fashion. These strengthened activities complied with OP 13.05, Supervision, and OP 4.01.

183. The Panel also found that the initial Environmental Assessment (EA) studies did not comply with respect to identification, analysis, and mitigation of impacts beyond the corridor itself, e.g., changes in pedestrian and vehicular traffic flows and their economic and cultural impacts in Barranco. The Panel was of the view that the 2005 Traffic Management Study (TMS) could have analyzed these matters, but did not and that this lack of analysis did not comply with OPN 11.03, Management of Cultural Property. While commending Management for bringing supervision and Project performance into compliance with Bank policy from 2009 onward, the Panel found that during the earlier critical phase of Project preparation and the construction phase, dissemination of information, consultations with residents of Barranco, and supervision had not complied with OP 13.05 and OP 4.01.

184. The Panel concluded that the changes in traffic in Barranco resulting from the Project and the general disruption caused by the BRT-related construction work had caused deterioration in the quality of life of many residents in the District and posed a threat to its historic character. The Panel recognized, however, that these alleged adverse impacts, could not be attributed solely to the Project**.** One of the reasons for this important finding was that substantial increases in traffic volume had already been occurring throughout Lima, including Barranco before the start of the project. Barranco had already been experiencing an increase in residential and commercial construction that marked its transformation from a predominately residential area into a quarter for recreation and entertainment. Finally, the Panel recognized that some of the Requesters' complaints were temporary as they were related to construction works and would recede once the *Metropolitano* became fully operational.

185. ***Management's Response and Recommendations.*** Management appreciated the Panel's findings and its concurrence with the Project's importance and complexity and, thus, the value of the Bank's engagement. Management acknowledged the Panel's findings of non-compliance and welcomed the Panel's finding that Management's actions since early 2009 had already brought Project supervision, dissemination of information, and consultations with the Requesters and other affected persons into compliance. Management also concurred with the Panel's conclusion that the alleged adverse impacts it found could not be attributed solely to the Project.

186. ***Management Action Plan.*** Management prepared an Action Plan in December 2009 as part of its initial response to the Request for Inspection and began immediately with its implementation. When the Inspection Panel submitted its Investigation Report in January 2011, Management updated the Action Plan and continued with its implementation. The matrix at the end of this section presents the Action Plan, as approved by the Board in June 2011, and summarizes the results. The focus of Management's Action Plan was on further strengthening the Project's development

outcomes through compliance with Bank policies. The Action Plan supported strengthening *Protransporte*'s dialogue and consultations with residents of Barranco and other stakeholders. It provided technical assistance to *Protransporte and the Municipality of Barranco* on how to advance consultative practices and processes to receive and address residents' grievances regarding the Project. Management also continued to closely supervise the environmental, cultural heritage and social aspects during and beyond Project implementation (up to March 2012).

187. In addition, Management financed a Traffic Management Study (TMS 2011) to analyze the impact of the project in Barranco and propose solutions through improved traffic management. This study was completed in December 2011 and proposed several actions and minor civil works to mitigate the adverse impacts of the altered traffic flow. The Task Team held consultations with residents of Barranco on the draft's proposals for the Barranco District in December 2010. Consultations with stakeholders and authorities continued until June 2011. The feedback received during the consultations was incorporated into the final version of the TMS 2011. Currently, *Protransporte* is carrying out additional consultations with key stakeholders and staff of the municipality of Barranco on additional proposals for improving traffic management in Barranco. These proposals draw heavily on the results of the TMS 2011. *Protransporte* has assigned budget for implementation and is expecting to implement the traffic management measures after the feedback received, in the consultations, has been reviewed and incorporated.

188. Finally, responding to a request by the Municipality of Barranco, Management provided as part of the Action Plan technical assistance to incorporate an analysis of Barranco's historical buildings and monumental areas into the District's Development Plan. The assistance also included recommendations on measures to preserve historical sites and buildings.

189. The following matrix (Table 1) summarizes Management's Action Plan and the implementation status. Annex 11 presents a more detailed analysis of the implementation of the Action Plan and the results achieved.

Table 3 Management's Action Plan

ACTIONS	STATUS
Traffic Management	
Management will supervise finalization of the 2011 TMS, taking into account the results of the consultation with the Municipality and community in Barranco and comments from *Protransporte*.	***Completed.*** The study was completed in December 2011, after extensive consultations, and handed over to the Mayor of Lima, the Mayor of Barranco and to *Protransporte*. *Protransporte* wants to implement the main recommendations of the study and it is carrying out further consultations prior to final implementation to ultimate detailed designs. *Protransporte* has assigned budget for works and consultations.
Protransporte will retain a consultant specializing in micro-design of urban intersections. This consultant will review the entire Project alignment, with an emphasis on Barranco and historic downtown Lima, and recommend solutions to any identified problems. The report will be consulted upon with the community.	***Completed.*** *Protransporte* hired an international consultant who prepared a technical report. *Protransporte* carried out consultations with the relevant stakeholders along the corridor on the recommendations contained in the report. Some works have been already implemented. Protransporte has assigned budget for additional works and consultations.
Management will supervise *Protransporte's* implementation of the traffic safety action plan. *Protransporte* will report publicly on the progress achieved.	***Completed.*** Management supervised *Protransporte* through missions and local staff. Management offered technical advice and support on how to carry out consultations and dissemination. Management secured a US$ 2.5 million PHRD Grant to support improvements to the project that facilitate accessibility by the disabled and that improve traffic safety.
Environmental Management	
Management will provide technical support to help carry out the *ex post* environmental audit of the Project.	***Completed.*** Management provided draft TOR to *Protransporte.* Management has indicated that it is prepared to offer additional technical support, should *Protransporte* find it useful.
Consultation and Communications Strategy	
Management will support *Protransporte* as it organizes, carries out, and records the results of consultations prior to adoption and implementation of any solutions to traffic management issues.	***Completed.*** Management assisted *Protransporte* to improve its consultation and communication strategy. *Protransporte*'s ability to carry out consultations improved significantly. For example, the study on micro-design of intersections led to consultations that in turn resulted in the implementation of an additional intersection in the in the north part of the Metropolitano. This new intersection relieved through traffic flow and did not lower the level of service of the Metropolitano.
Management will continue to emphasize to *Protransporte* and the authorities in Barranco the importance of an effectively functioning grievance and redress mechanism.	***Completed.*** Management assisted in the design and implementation of grievance and redress mechanism for the authorities of the municipality of Barranco and Protransporte. Both mechanisms are in place and operating.
Management will provide enhanced learning opportunities for staff to help improve their awareness of, and skills related to, stakeholder consultations.	***Completed.*** Management has provided the learning opportunities to staff. OPCQC has intensified its regular training on safeguards and consultations. LCSSO conducts periodic clinics on consultations and social safeguards. LCSDE also holds workshops to improve project preparation and implementation, including safeguards. LSCDE's Safeguards Advisory Team also conducts training for staff. Finally, the task team organized a workshop open to the entire LAC region on

ACTIONS	STATUS
	consultations for transport projects.
Supervision	
Management will continue intensive supervision.	***Completed.*** Management provided intensive supervision of the Project and implementation of the actions in this Plan until February 2012. Supervision took place through seven missions. In addition, three local staff – social, environmental, and transport specialists— provided *Protransporte* with real time technical support and constant supervision. This approach facilitated completing the Action Plan. Results of this supervision have been appropriately recorded in ISRs and other supervision documents.
Physical Cultural Resources	
In addition to supervising completion of, and consultations on, the 2011 TMS, Management will advise the Municipality of Barranco on how to incorporate in the District's Participatory Development Plan 2011-2021 and analysis of Barranco's historic buildings and monumental areas and measures to preserve that patrimony in the service of a long-term dynamic economic and social development of the District.	***Completed.*** Management provided advice to Barranco's Municipality on Physical Cultural Resources by carrying out: (i) missions by the urban planning and heritage specialist; (ii) working meetings to present the region's issues and experiences in the management of cultural heritage; (iii) meetings with the municipality's specialized staff; (iv) a Workshop on Management and Planning on Monumental Heritage in Barranco; and (v) by hiring a consultant specializing in heritage management and planning to improve cultural policy making in Barranco.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in US$ million equivalent)

PE LIMA TRANSPORT PROJECT - P035740			
Components	**Appraisal Estimate (US$ millions)**	**Actual/Latest Estimate (US$ millions)**	**Percentage of Appraisal**
MOBILITY AND ENVIRONMENTAL IMPROVEMENTS	99.92	203.30	203%
SOCIAL MITIGATION AND COMMUNITY PARTICIPATION	5.75	2.42	42%
INSTITUTIONAL STRENGTHENING	3.67	1.35	37%
STUDIES AND CONSTRUCTION SUPERVISION	8.58	11.11	129%
PROGRAM ADMINISTRATION	5.58	12.00	215%
GRADE SEPARATION OF PLAZA GRAU	10.00	30.82	308%
Total Baseline Cost	**133.50**	**261.00**	196%
Physical Contingencies	0.00		
Price Contingencies	0.00		
Total Project Costs			
PPF	0.00		
Front-end fee IBRD	0.90	0.90	
Total Financing Required	**134.43**	**261.90**	195%

LIMA TRANSPORT - P074021					
Components	**Appraisal Estimate (US$ millions)**	**Estimate at Restructuring (US$ millions)**	**Actual (US$ millions)**	**Percentage of Appraisal**	**Percentage of Restructuring**
RATIONALIZATION OF PUBLIC TRANSPORT	1.70	1.55	1.26	74%	81%
BIKEWAYS COMPONENT	4.18	4.18	4.06	97%	97%
CARRY OUT INSTITUTIONAL STRENGTHENING PROGRAM ON SUSTAINABLE TRANSPORT	1.10	1.10	0.98	89%	89%
MANAGEMENT,	0.86	0.90	0.89	103%	99%

MONITORING AND EVALUATION					
OPERATING COST	0.09	0.16	0.16	178%	100%
Total Baseline Cost	**7.93**	**7.89**	**7.35**	**93%**	**93%**
Physical Contingencies	0.00				
Contingencies	0.00	0.04	0.01		25%
Total Project Costs*	**7.93**	**7.93**	**7.35**	**93%**	**93%**
PPF	0.00	0.00			
Front-end fee IBRD	0.00	0.00			
Total Financing Required	**7.93**	**7.93**	**7.35**	**93%**	**93%**

(b) Financing

P035740 - PE LIMA TRANSPORT PROJECT				
Source of Funds	**Type of Financing**	**Appraisal Estimate (US$ millions)**	**Actual/Latest Estimate (US$ millions)**	**Percentage of Appraisal**
Borrower		44.40	171.90	1.76
Global Environment Facility (GEF)		7.93	7.35	0.93
Inter-American Development Bank (IDB)		45.00	45.00	1.00
International Bank for Reconstruction and Development (IBRD)		45.00	45.00	1.00
P074021 - LIMA TRANSPORT				
Source of Funds	**Type of Financing**	**Appraisal Estimate (US$ millions)**	**Actual/Latest Estimate (US$ millions)**	**Percentage of Appraisal**
Borrower		0.00	0.00	.00
Global Environment Facility (GEF)	Grant	7.93	7.35	0.93

(c) IBRD Project Cost by Sources of Funds and Component (in US$ million equivalent)

PE LIMA TRANSPORT PROJECT - P03570									
Components	Appraisal Estimate (USD millions)				Actual/Latest Estimate (USD millions)				Percentage of Total At Appraisal
	Total	BM	BID	MML	Total	BM	BID	MML	
1. Mobility and Environmental Improvements	99.92	37.94	37.94	24.04	203.30	37.90	37.66	127.74	203%
2. Social Mitigation and Community Participation	5.75	1.63	1.63	2.49	2.42	0.80	1.40	0.22	42%
3. Institutional Strengthening	3.67	1.50	1.50	0.70	1.35	0.70	0.53	0.12	37%
4. Studies and construction supervision and auditing	8.58	3.48	3.48	1.62	11.11	5.15	4.96	1.00	129%
5. Program administration	5.58	0.00	0.00	5.58	12.00	0.00	0.00	12.00	215%
Total Project Costs	123.53	44.55	44.55	34.43	230.18	44.55	44.55	141.08	186%
Front-end fee	0.90	0.45	0.45	0.00	0.90	0.45	0.45	0.00	100%
Total Financing Requirement	124.43	45.00	45.00	34.43	231.08	45.00	45.00	141.08	186%
6. Grade separation of Plaza Grau	10.00	0.00	0.00	10.00	30.82	0.00	0.00	30.82	308%
Total	134.43	45.00	45.00	44.43	261.90	45.00	45.00	171.90	195%

Annex 2. Outputs by Component

LOAN

Component 1. Mobility and Environmental Improvements – US$37.94 million	
Cost: US$203.3 million, of which the Bank financed only US$37.90 million	
General: This component primarily comprises infrastructure works to implement the busways along existing road corridors: (i) construction of 28.6 km of segregated busways; (ii) repaving of mixed-traffic lanes adjacent to the new busways; (iii) traffic signal improvements, signposting and road markings along the corridors; (iv) bus stations and terminals; (v) bus depots and workshops, excluding equipment that will be financed by bus concessionaires; (vi) a control center to monitor and direct operations on the busways; (vii) paving and other improvements of feeder roads to the two bus terminals, with an approximate length of about 50 km; this will include the construction of sidewalks and bicycle paths to improve access conditions for non-motorized movement, complementing the NMT investment under the GEF Grant; (viii) road safety measures along the corridors, their feeder roads, and the streets in their area of direct influence; and (ix) improvements to pedestrian and vehicular corridors, for pedestrians and busway users. ***Level of Achievement: Satisfactory.*** The Project financed the first line of an integrated mass rapid transit system that uses BRT technology. This line has a trunk of 28.6 km to which feeder lines are connected. The buses are operating in segregated traffic lanes. The line has 35 stations and 2 transfer terminals where passengers change from feeder buses to the trunk line. The BRT—the *Metropolitano*—is already in operation and is carrying approximately 370,000 passengers per weekday after the first year of operation; it is expected to carry more than 600,000 passengers by the end of 2013.	
Outputs Envisaged at Appraisal	**Status**
29.4 km of high-capacity bus corridors completed. The high-capacity bus corridors have been completed. It is important to mention that only 27.48 km were constructed. The reduction of 1.92 km with respect to the envisaged 29.4 km was due to environmental reasons. The original alignment occupied land used by migrant birds that arrive during the winter. This land was planned to be used for constructing the Matellini Terminal located in the South. However, this reduction did not affect the operation of the Project.	**Achieved**
35 bus stops and North and South Terminals in operation. All the stations and terminals have been completed as planned; the Project added one more station.	**Achieved**
32 km of feeder roads. The Project constructed 34 km of feeder roads.	**Achieved**
600,000 passengers per typical weekday using the new system. The BRT is carrying 370,000 with only 212 of 312 trunk buses and 159 of 232 feeder buses operating. Once the entire trunk fleet and all the feeder buses are operating, it is expected to reach 600,000 passengers per day (ppd). It is estimated that the goal will be reached in December 2013, for the following reasons: (i) the new administration is highly committed to removing the traditional buses on parallel routes to the *Metropolitano* (about 40 routes); (ii) a new fare policy will create incentives for the feeder-trunk trips. Currently only 10% of the feeder trips are transferred to the trunk corridor; (iii) *Protransporte* is implementing a new route design to improve quality of services; and (iv) current demand is naturally increasing each month at a rate of 2% in the trunk corridor and 10% in the feeder corridors.	**Partially achieved. It is estimated that this output will be achieved by December 2013.**
Entire system covered by the Project in operation and all related concessions awarded. The high-capacity bus corridor system is fully operational with 212 articulated buses and 197 feeder buses. Electronic fare collection was also awarded and began in June 2010, and the central control system is in place and operating.	**Achieved**

About 100,000 m^2 of public space recovered and improved, as well as 40,000 m^2 of green areas. At closing date, the Project had recovered 100,000 m^2 of green areas: 60,000 m^2 within the corridor, and 40,000 m^2 of improved areas that were given to the municipalities where the truck corridor crosses. The recovered public space comprises: 13,475 m^2 in the North Terminal and 3,855 m^2 in the South Terminal. There was an overestimate of recovered public space.	**Achieved**
3 air quality monitoring stations; monitoring results made available in the annual report to the public. The implementation of the environmental monitoring network is complete and the network is measuring air quality and producing data. Reports will be published starting October 2011.	**Achieved**
Other Outputs	
Private Sector Participation. The *Metropolitano* permitted private sector participation in urban transport in Lima. The private sector invested more than US$200 million for the provision of 312 articulated buses and 232 feeder buses and for the electronic fare-collection and smart-card system. Bus operations and fare collection were awarded in separate contracts. In addition, two local intermediary financial institutions (COFIDE and Interbank) provided lines of credit to local operators; this helped make the operation successful.	
Urban Revitalization. The *Metropolitano* has attracted a new flow of local pedestrians with the installation of a new mall, thus revitalizing the nearby urban area of the Central Station.	
Grade Separation of the Plaza Grau or Central Station (US$10 million). The original project designs envisaged a grade separation of the Plaza Grau at road level to reduce conflicting traffic movements, and required the busway to be installed on the northernmost end of the Paseo de la República. The MML changed these designs and converted it into a Central Station, whose designs could absorb and manage not only the current BRT line from North to South but also future new BRT lines, thus generating an integrated transport corridor system in the city. The original cost increased from US$10 million to US$31 million, which was financed entirely by the MML.	
Industrialization and Economic Development. The demand generated by the Project for modern buses induced MODASA (a local factory) to invest US$20 million in plant expansion and technological innovation. MODASA supplied close to two thirds of the buses used by the private concessionaires. MODASA is already exporting articulated buses to Colombia and Chile, for example.	
Component 2. Social Mitigation and Community Participation – US$1.63 million	
Cost: US$2.42 million, of which the Loan financed only US$0.8 million	
General: This component comprises three areas of activity: (i) community consultation and education during the implementation and early phases of the busway; (ii) mitigation of the negative impacts on some current bus operators through retraining and small-scale enterprise microcredits in collaboration with existing programs of the Ministry of Labor; and (iii) financial support during the initial months of busway operations, to be provided entirely by counterpart funds. ***Level of Achievement: Satisfactory.*** *Protransporte* proposed a detailed "Social Mitigation Plan for Operators and Transport Workers to be displaced by the *Metropolitano*," whose objectives were to reduce the impact on transport workers. The design and initial actions of the plan were carefully monitored and followed by the Bank team throughout project implementation until *Protransporte* awarded the bus concession. However, the mayor of Lima decided to have zero affected parties and proposed to remove out of the zone those routes that compete with *Metropolitano*. This approach was successfully carried out through a study of route rationalization by GTU. The study's recommendations were implemented; as a result, no bus operators or people are currently affected. However, its negative policy effect, in terms of transport efficiency, could not be estimated during project implementation. Therefore, loan resources allocated for training and microcredits were reallocated for civil works.	
Outputs Envisaged at Appraisal	**Status**
At least 2,500 affected public transport workers have benefited from microcredits or have received training for reinsertion in the labor market. **Social Mitigation Plan at project appraisal**. In May 2003, a Social Mitigation Plan was prepared as part as the project appraisal strategy in order to reduce bus operator competition near the operation of the *Metropolitano*. The objective of this plan was to assist operators, bus drivers and workers affected by the new transport	**Achieved**

system. This plan had an original target population of 5,000 people and also included transport workers affected by the Public Transport Fleet Reduction Program promoted by the GEF–FONAM Project. At that time, there was not enough statistical information about the affected population since the routes that were going to be relocated or cancelled were not yet defined. This plan considered the effects on the reallocation of routes that competed with or affected the financial performance of the proposed transport system, the *Metropolitano*. The Project's original performance indicator, under social impact mitigation, was that at least 2,500 affected public transport workers would have benefited from microcredits or received training for reinsertion in labor market.

Update of the Social Mitigation Plan. In November 2006, *Protransporte* prepared an update of the Social Mitigation Plan based on the BRT technical studies and the registration of bus or microbus operators who could be affected by the Project. This updated plan was called the "Employment Promotion and Entrepreneurship Plan for Transportation Workers affected by the Project," which more accurately defined the potential population affected by the *Metropolitano* routes, considering all the routes that should be cancelled or relocated since they competed directly or indirectly with the new BRT system. This plan established different strategies to generate income through alternative jobs for people negatively affected by the Project. These strategies included: (i) reintegration in the labor market through the placement of personnel in activities and jobs generated by the *Metropolitano*; (ii) development of entrepreneurs and micro-enterprises outside the transport industry, including financial support through microcredits, and (iii) provision of technical training for current transport enterprises, whether or not affected by the Project, with a vision of "future transformation" and institutional modernization as a sustainable development strategy. The project loan allocated resources for the implementation of the Mitigation Plan, including the line for microcredits.

Route Rationalization Study by GTU. The mayor of Lima decided to have a Plan of Zero Affected Transport Operators and ordered GTU staff to conduct a Route Rationalization Study aiming at zero the number of affected parties. The study's objectives were to: (i) identify the real route detours, (ii) establish the real demand for routes, (iii) diagnose and assess the real infrastructure of transport operators, (iv) establish the number of buses operating in the corridor zone, (v) identify the typology of operating vehicles and the number of transport operators affected by the system, and (v) finalize with agreements to move the route operators out the zones that compete with the *Metropolitano*.

The Route Rationalization Study assessed 179 routes and identified 12,000 vehicles, which included 4,468 rural minivans, 2,548 buses and 5,356 microbuses. The criteria used to rationalize the routes were: authorized travel routes, age of the vehicle fleet, infrastructure (terminal, workshops, gas stations, administrative offices, etc.) and demand for each route.

Results of GTU route assessment. GTU determined that 44 routes should be rationalized. This comprised a total of 2,434 vehicles and 4,868 transport operators affected. Based on these results, the mayor decided to relocate routes instead of cancelling routes, reducing the number of affected parties to zero. There were negotiations with each of the 44 entrepreneurs and they were finally transferred to alternative routes where Lima's public transport demand was not addressed. As a result, most of the operators were satisfied by this measure, so there was no need to implement the Social Mitigation Plan mentioned earlier, and thus the loan funds allocated to the training and microcredit categories were cancelled and reallocated.

Other Outputs

Compliance with Social Safeguards and Social Aspects at Project Completion. The Project needed to take actions on several social issues that arose during the construction and operation of the *Metropolitano*. The Bank monitored compliance with safeguard policy OP/BP 4.12 Involuntary Resettlement as well as with regard to social issues beyond this policy. This is a summary of the current status of the key actions executed and implemented by the client with Bank support.

a. Social mitigation for merchants

Flower Market in Barranco: Merchants from the Flower Market were compensated or relocated. 44 vendors were relocated in the New Flower Market on Calle Teodosio Parreño, Barranco at just one block away from the old Flower Market that had to be reclaimed as part of the corridor. 26 vendors were compensated for the involuntary displacement of their businesses (these vendors did not want to be part of the new market). *Protransporte* supported these vendors in finding a new place, obtaining credit and purchasing land, as well as in the building of the new market and capacity building for small-business management. The land where the old market was located belonged to the Municipality. The new Flower Market is fully operational and is generating income for the vendors. This activity was successfully accomplished and should be considered a best practice case since *Protransporte* went well beyond the safeguard requirements.

Informal vendors on Caquetá. During the design of the corridor, 180 informal vendors were identified on Avenida Caquetá. Their location blocked the traffic flow and obstructed the construction of the corridor. The Municipality of San Martin de Porres was provided with technical assistance by the *Protransporte* social team for their relocation to new commercial centers acquired by them. Currently, the Inspection Management Unit of the Municipality of San Martín de Porres and the police conduct daily operations from 8 a.m. to 12 p.m. in order to keep new vendors from working on the streets. However, a group of 70 vendors are still working in that area during these hours when there is no surveillance, causing problems for pedestrians. It is important that this zone be free of informal trading, so police operations are being extended until 6 p.m. The main activities have been performed, and the Municipality and *Protransporte* agreed to monitor this area. This activity is considered satisfactory due to its achievements.

Informal vendors in Lima Cercado. The Inspection Management Unit of the Municipality of Lima relocated formal vendors and removed informal vendors who lack licenses to sell in the streets. At project completion the area is under constant monitoring and, in coordination with the MML, there is a plan for the relocation of informal vendors. The main activities have been performed and they are expected to be sustainable.

Informal vendors at the National University of Engineering (UNI)-Bridge. Before the demolition of the bridge, the informal vendors located on the bridge were made aware of the safety issues of staying on the bridge in order to achieve their voluntary removal. At present, the Public Safety and the Inspection Management Units of the MML conduct monitoring activities to keep street vendors from taking over this area again. This activity was successfully accomplished.

Formal and informal trade at Naranjal Station. The Municipality of Independencia has relocated 108 vendors in different commercial centers located in that area, and with support from *Protransporte* has helped them with their formalization process. However, it is important that this Municipality consolidate the formalization process and conduct various surveillance activities. The proposed activity was achieved.

Los Incas–Sinchi Roca Fairground. Vendors were provisionally relocated in a market place granted by the Municipality of Comas while the civil works in their commercial center are finalized. Vendors own their stands and this new market is about to be inaugurated. The proposed activity was successfully achieved.

b. Social mitigation for residents close to project busway corridor

Residents from Buenos Aires de Villa complained about the construction of Patio Sur. The construction of Patio Sur affected sports and recreational areas. To compensate for this loss, *Protransporte* prepared a project to implement recreational areas. As a result, works for the artificial-grass soccer field are completed and the lighting of the area has been granted by the Project through Patio Sur. Since December 2010, this field is being used by residents of Buenos Aires de Villa. Some additional minor works in Patio

Sur started in March 2011, including a watchman's house, a children's recreational playground and green areas, as well as the emergency exit. The objective has been achieved successfully. This should also be considered a best practice case since the civil works implemented by *Protransporte* provided the local community with a fine recreational area that they did not have before Patio Sur was constructed.

Complaints about crosswalk on Avenida Los Pumas. Residents close to Avenida Los Pumas asked to keep the crosswalk that existed before the construction of the Matellini Station. At present, the technical unit of *Protransporte* is evaluating the construction of a footbridge.

Complaints about limited access to garages on Avenida Bolognesi in Barranco, and on Avenidas Lampa and Emancipación in Lima Cercado. Due to the construction of the segregated busway, some family and business garages were blocked, including 3 public institutions, 1 private institution, 2 parking lots and 2 private properties in Lima Cercado and 7 garages in Barranco. At project completion, most of these problems have been resolved, except for 2 private garages in Barranco, for which compensation payments are still pending. However, in 2011 *Protransporte* has the budget available for these payments. In Lima Cercado, the MAPFRE, MIMDES and JNE garages are still under evaluation. *Protransporte* has requested that the complete technical dossier of MAPRE's proposal be assessed. On the other hand, the Municipality's technical unit is still evaluating the best alternatives for MINDES. JNE must submit the work schedule and the technical specifications for evaluation. JNE has not yet signed the agreement. It is expected that these issues will be successfully resolved.

Complaint about damages in Mrs. Malache's house. After the technical study performed by *Protransporte*, it is not possible to state that the damages in this house can be attributed to the diversion of traffic during the construction of the *Metropolitano* corridor. According to this study, no other houses were similarly damaged, even when they had lower-quality materials and less adequate structures than Mrs. Malache's house. As a result, since there is no technical argument, *Protransporte* is unable to compensate Mrs. Malache. There is no mitigation activity for this complaint.

Complaints about restrictions for pedestrian and vehicles traffic on Avenida Tupac Amaru. Residents of La Unificada neighborhood in the District of Independencia complained about traffic restrictions in that area. *Protransporte* prepared technical studies on road safety and decided to build a pedestrian crosswalk. Works, including traffic lights, were completed by April 5, 2011. The crosswalk is currently operating, and thus the activity was successfully accomplished.

Request to implement a crosswalk on Avenida Tupac Amaru, close to the FEVACEL Market. Residents and vendors requested a crosswalk at the FEVACEL Market. *Protransporte* prepared the technical dossier, which was approved by the MML in April 2011. The procurement process is about to begin. There are still some pending negotiations with the vendors.

Request to implement a crosswalk on Avenida Tupac Amaru, close to the Scorza School. Residents close to this area requested a crosswalk. A road safety study was prepared and, as a result, *Protransporte* implemented a signalized crosswalk which is currently operating. The proposed activity was successfully accomplished.

Complaints about limited access in the urban and industrial area of the District of Independencia. Currently, several negotiations are underway between residents of this area and representatives of the Municipality of Independencia. They have signed a legal document in which they agree to share different alternatives to be analyzed and discussed. Some activities are to be implemented by *Protransporte*.

Opposition to the construction of a bridge close to the UNI. The university students opposed the construction of the UNI Bridge. *Protransporte* conducted 56 workshops with the students with the intention of raising awareness about the importance of the works. *Protransporte* gave 10,322 concession cards for students and general cards for administrative and teaching personnel. Works are already completed and students are satisfied with the design and benefits of the bridge. The proposed activity has been satisfactory achieved.

Component 3. Institutional Strengthening – US$3.67 million

Cost: US$1.35 million, of which the Bank financed US$0.70 million; funds were reallocated due to cost overruns

General: This component addresses the regulatory, monitoring and control functions of urban public transport and supports: (i) the development and implementation of a public transport policy, including its regulatory and policy-setting framework, as well as its administration, operation, monitoring and control; (ii) the formal creation, technical assistance and training of *Protransporte*, the entity responsible for implementing the busway operations; (iii) technical assistance and training of EMAPE, the entity responsible for implementing the physical works under the Project; (iii) technical assistance and training of GTU and the National Police, focusing on public transport regulations, and its monitoring, control and enforcement; and (iv) monitoring and evaluation of the busway operation and the Project.

Level of Achievement: Satisfactory. Although due to cost overruns the loan resources were not fully used for institutional strengthening as envisaged, the outputs were achieved satisfactorily. Details of the outputs are presented in Section 3.2.

Outputs Envisaged at Appraisal	Status
At least 40 municipal staff trained in planning, management and control of public transport	**Achieved**

Other Outputs

It is important to mention that *Protransporte* conducted one training course with the National University of Engineering in business management and urban transport strategic planning in 2009. This course benefited 50 transport enterprises.

Component 4. Studies and Construction Supervision - US$3.58 million

Cost: US$11.1 million, of which the Bank financed US$5.15 million

General: This includes: (i) supervision of the physical works described above; and (ii) economic feasibility and environmental studies as well as the preparation of final engineering designs to expand the busway network beyond the 28.6 km funded by the Project.

Level of Achievement: Satisfactory. The Project financed the key final engineering designs and other studies such us the EFI (financial modeling of the BRT) and supervision of civil works contracts. No output indicators were proposed for this component.

Component 5. Program Administration – US$5.58 million

Cost: US$12 million

General: This component, to be financed entirely by counterpart funds, includes the operational expenses of the institutions responsible for administering the Project and for implementing the busway operations, most likely *Protransporte* and EMAPE.

Level of Achievement: Satisfactory. The MML financed project cost administration during project implementation and pre-operation costs of the *Metropolitano*. No outputs were proposed for this component.

Component 6. Grade Separation of Plaza Grau – US$10 million

Cost: US$30.8 million

General: This investment component included the reconstruction at Plaza Grau, one of Lima's busiest intersections and a key node of the busway to be financed under the Project. A grade separation of conflicting traffic movements was required in order to insert the busway on the northernmost end of the Paseo de la República, thereby reducing the car traffic lanes from three to two in each direction. This component was funded by the Municipality, but it was part of the overall Project and a Central Station was constructed that will benefit the BRT system in the long run.

Level of Achievement: Satisfactory. This investment was successfully implemented by the MML.

GRANT

Component A: Rationalization of Public Transport	
Cost: US$1.55 million, which corresponds to 81% of the cost estimate revised during project restructuring	
General: This component was changed because *Protransporte* devised a bus-scrapping mechanism for the public transport system as a whole, independent of the scheme envisaged under the GEF Grant. The new mechanism was expected to achieve the project targets in terms of vehicle scrapping and related social mitigation. Therefore, there was no more need for the GEF Grant to finance the originally envisaged voluntary bus-scrapping scheme and the resources were reallocated to finance a study to integrate and rationalize the public transport system in Metropolitan Lima. Despite the replacement of the voluntary bus scrapping activities, the scrapping related indicators were maintained under the Project. The implementation of this component was satisfactory. The study was completed in a satisfactory manner, and the revised outputs were achieved. At the time of ICR preparation, *Protransporte* was partially complying with the scrapping related indicators and a substantial compliance was likely (for details see Data Sheet).	
Outputs Envisaged at Appraisal/under the Framework of Project Restructuring	**Status**
• Financial incentives to encourage the retirement of aged and polluting public transport vehicles were not designed because *Protransporte* devised a new financing modality for bus scrapping.	Activity cancelled under the framework of project restructuring
• The GEF-financed voluntary scrapping activities did not take place, and the implementation of Lima's first BRT corridor did not displace transport workers. Therefore, there was no need to support the preparation of migration plans aimed at offering other job opportunities to displaced transport workers.	Activity cancelled under the framework of project restructuring
• *Protransporte* prepared its own environmental manual for bus scrapping (see Other Outputs below). Therefore, the bus retirement pilot project to assess the feasibility and real cost of higher standards for bus retirement processes was not carried out.	Activity cancelled under the framework of project restructuring
• The Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima was completed. The consultants carried out fieldwork to update the transport model for Metropolitan Lima. They developed an overall vision for an integrated transport system, identified and evaluated different corridors, and used a multi-criteria analysis to select the next BRT for Lima. The consultants prepared the preliminary engineering designs, environmental and social analyses, technical specifications, operational plans, and other preparatory analyses for this corridor. They carried out a GHG emission inventory for Metropolitan Lima, recommended institutional, regulatory and legal changes to facilitate public transport integration, and highlighted related transport and land-use issues, among others.	Achieved
• As part of the Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima, *Protransporte* staff and staff of more than 10 other public transport-related institutions and entities, such as GTU Lima, GTU Callao, ST/CTLC-MTC, IMP and AATE, participated in 9 seminars on data collection and fieldwork, transport planning, demand forecasting, economic analysis and urban planning, multi-criteria analysis, public transport institutions and regulations, operational models, climate change and emission inventories, and the public transport industry in Lima–Callao. In addition, 7 staff of *Protransporte* participated in the implementation of the	Achieved

study and received on-the-job training.	
Other Outputs	
• In line with the scrapping mechanism designed by *Protransporte*, the bidding documents for the operation of Lima's first BRT corridor included an obligation to scrap a total of 1,253 buses. This is largely equivalent to the number of buses expected to be scrapped through the original mandatory and GEF-supported voluntary scrapping schemes.[28] At the time of contract signing, the concessionaires of the BRT corridor provided *Protransporte* with bank guarantees in the amount of US$4,920 for each vehicle to be scrapped. The concessionaires were required to hand over to *Protransporte* the buses to be scrapped once the operation of the new system started. At that moment, the conventional bus services in the area of influence of the BRT corridor were not canceled but instead were reallocated to other areas of the city. Without this cancellation, no old vehicles were available for sale at reasonable prices. Consequently, the concessionaires of the BRT system created a trust fund for approximately US$6.2 million to acquire and scrap old buses.	
• *Protransporte* competitively contracted a scrapping company. The company set up the scrapping facility[29] and acquired the necessary equipment. The scrapping firm is in close contact with steel-making companies, which will purchase the scrapped metal parts. *Protransporte* also contracted a company to supervise the scrapping activities.	
• *Protransporte*, with the Bank's assistance, prepared and published a comprehensive operational and environmental manual for bus scrapping.	
• At the time of ICR preparation, *Protransporte* was completing a study. • At the time of ICR preparation, *Protransporte* (i) had a special committee for bus scrapping; (ii) completed a study to identify obstacles and the interest of bus operators in selling old buses, assess selling prices, and determine the necessary incentives; (ii) finalized the operational arrangements for the trust fund, (iii) submitted to the Lima Municipal Council a draft order to formalize these arrangements and set aside additional funds for bus scrapping outside the influence area of the first BRT corridor and for taxi scrapping, and (iv) scrapped the first 16 buses on a pilot basis. More substantial vehicle scrapping is expected to happen once the municipal order to regulate vehicle scrapping is approved (likely in February 2012).	

Component B: Consolidation and Expansion of Lima Bikeway Network	
Cost: US$4.06 million, which corresponds to 97% of the original appraisal estimate	
General: The implementation of this component was satisfactory. Nearly all activities envisaged were carried out as planned. The bicycle construction activities and the bicycle promotion activities exceeded their output targets. Several additional outputs were obtained. In spite of the successful completion of this component, the outcome target of doubling bicycle ridership was not achieved.	
Outputs Envisaged at Appraisal	**Status**
• The Project contributed to the physical improvement and extension of the bikeway network in Metropolitan Lima–Callao, which has more than doubled since 2003 from 57.6 km to 117 km. 33.2 km of bikeway rehabilitation were carried out under the Project: 27.2 km financed by the Project and 6 km financed with local funds. As planned, this included Av. Colonial, Av. Guardia Chalaca, Av. Tomás Valle, Av. Universitaria and Av. Arequipa. The Project financed the extension of 6.45 km of bikeway to connect San Marco and Católica Universities to the network (Av. Universitaria[30] and Av. Habich-Granda) and the construction of 19.35 km[31] of new bikeways (Campo de Marte, Av. Mariátegui, Av. Mayolo-Av. Las Palmeras, Av. Santa Rosa, Av. Guardia Chalaca, Av. Saenz Peña, República de Panamá, Prolongación	Achieved and targets exceeded

[28] The PAD (pp. 126 and 129) envisages a ratio of 2:1 for the mandatory/voluntary scrapping elements, meaning that for two mandatorily scrapped minibuses one additional minibus was expected to be voluntarily scrapped. The total number of minibuses to be scrapped as a result of the implementation of the BRT corridor was estimated at 3,000, which is largely equivalent to 1,253 ordinary buses.
[29] The Bank team visited the scrapping facility in April 2010.
[30] This includes 1.7 km of the Av. Universitaria bikeway financed by the Project and 0.4km financed by local funds.
[31] This includes 3.33 km for which the project only financed the small raised separation devices (*tachones*).

Guardia Chalaca, Jr. Francisco Lazo, Jr. Bartolomé Herrera-B. Flores, Jr. Pachacutec, Prolongación Bartolomé Herrera, Av. Militar, Av. Cayetano Heredia, Av. Mello Franco, Av. Garzón-Canterac-Av. M. Franco, and Prolongación Av. Garzón). Whenever necessary and possible, these works included spot improvements to make cycling and walking more pleasant, easier and safer (e.g., ramps, traffic islands, separations, traffic signals, green areas, physical barriers, and a traffic light).	
• It was not possible to support the construction of cycle modules as originally planned. The municipalities were not interested in managing them and they could not be managed commercially due to the limited profit potential. Therefore, the Project placed a stronger focus on parking facilities. These facilities were installed in public institutions (e.g., schools, municipalities), near bus stops and stations, and close to areas with increased security, such as banks and areas with public security officials (*serenazgos*). The Project financed the installation of 668 parking facilities with a total of 2,573 spaces in 35 municipalities in Lima and Callao.	Achieved
• The Project financed surveys on bicycle safety and a consultant was hired to conduct a cycling safety improvement program. This consultant did not perform as expected and the contract was closed after the finalization of the diagnostic work. The results of the surveys and the diagnostic were taken into account when the engineering designs for bike rehabilitation and construction were prepared. Part of the funds freed due to the cancellation of the cycling safety improvement study were used for a legal study, which was the basis for the national law on bicycle use approved in 2010 *(Estudio de normativa para un ciclismo urbano más seguro en Lima y Callao)*. In addition, the Project financed a number of workshops to make public transport drivers aware of the presence of cyclists and the dangers they face. It also financed the production of a video on traffic safety for cyclists and pedestrians that is shown in the office where people obtain their drivers' licenses. The Project participated in demonstrations against traffic accidents (e.g., *Basta Ya*).	Achieved
• No maintenance strategy was developed by the Project because the Municipalities of Lima and Callao took care of their own bikeway maintenance.	Partially achieved with local funds
• The bicycle promotion campaign was one of the highlights of this Project. It consisted of a European experience-based educational program that focused on the bicycle as a means of transport. It was innovative in its approach and took place year-round throughout the duration of the Project from 2005 to 2010. It was carried out in schools, universities and public places, and during sustainable transport-related events. The program evolved over time. In 2005 it was carried out by a consulting firm and focused mainly on image creation and activities in schools and public places. For efficiency and effectiveness reasons, starting in 2006 the program was taken over by FONAM/PEMTNM, which decided to manage it in-house with the assistance of independent consultants. Initially, there was only a verbal agreement between the Project and the schools in which FONAM/PEMTNM carried out the educational program. This sometimes made it difficult for the Project to obtain the necessary classroom time. Starting in 2007, formal agreements were signed among the Project, the schools and the municipalities in which the schools were located. The program also evolved in terms of content. The interventions initially consisted of workshops on how to ride a bicycle, urban cycling skills and bike repair, without a systematic methodological approach. In 2007 a consultant was hired to prepare manuals for these workshops. The manuals were complemented by videos. In addition, new teaching workshops were added, such as talks on the environment and air quality and on rules for coexistence in the road transport environment. The number of schools increased gradually from 12 in 2005 to over 50 in 2009. The program was also extended to universities and expanded to activities in public spaces. Finally, in 2008, with a solid educational program and the necessary training and support materials, the focus shifted toward sustainability. Talks took place among the Ministry of Education, the Regional	Exceeded

Education Directorates of Lima and Callao, schools, and the Project. Informal agreements were reached to incorporate the educational program in the official school curricula in Lima and Callao. These agreements were facilitated by the fact that one of the schools received a prize in a national environmental competition organized by the Ministry of Education, due to the project activities. Because of the departure of the project coordinator at the end of 2008 and changes in key people in the Regional Education Directorates, the inclusion in the official school curricula did not materialize. • The activities in schools were aimed at students between the ages of 9 and 14. They included (i) the abovementioned workshops and talks, (ii) classroom theater performances using improvisation, video and other techniques to demonstrate the benefits of bicycle use and create interest, (iii) clubs to support bicycle use in schools (Zoom clubs) on topics related to the environment, the bicycle and living together in the streets, and (iv) talks and workshops with teachers and parents. • By the end of 2008, (i) about 42,000 students received classroom talks and participated in workshops on environmental and sustainable transport-related topics, (ii) about 6,000 students learned how to ride a bicycle, (iii) about 34,000 students were trained in cycling skills, and (iv) about 11,000 were trained in bicycle-repair skills. The Project also reached out to a considerable number of adults, mainly parents and teachers. In 2009, the Project was active in 71 schools and 370 teachers received training to apply the bicycle-promoting educational program through talks and practical and theoretical workshops. • The Project carried out a safe-routes-to-school program, which consisted of "bicycle trains" led by one or two consultants. The consultants picked up students on their bicycles in the morning and brought them home after school. Since these activities took place in low-income areas, the parents were not available to take over the responsibility for the "bicycle trains" as originally envisaged. • The activities in universities started in full in 2008. Previously the Project worked with individual universities on specific topics. Some of the activities were the same as in schools. They included: (i) awareness raising during events, such as the Car-Free and World Environment Days, through stands in public space and a tandem bicycle, theater presentations, communications material, etc., (ii) workshops on biking skills, bike repair and on how to ride a bike, (iii) seminars and courses on urban cycling, (vi) bike-sharing schemes, and (v) participation in sustainable transport-related events. • The Project worked with the following universities: Universidad Católica, Universidad Mayor de San Marcos, Universidad Nacional de Ingeniería, Universidad Nacional Agraria de la Molina, Universidad Nacional Federico Villarreal, Universidad Ricardo Palma, Universidad Alas Peruanas, Instituto de Educación Superior Daniel Alcides Carrión, and Universidad Norbert Wiener. The Project reached out to more than 125,000 students. Over 3,000 students participated in the workshops and over 450 students participated in seminars and courses on urban cycling. • With regard to activities for the general public, the Project (i) carried out promotional activities, bicycle workshops and other bicycle-related activities in public spaces, especially during school summer vacations; (ii) organized collective bike rides; (iii) regularly assisted and participated in the organization of events during Sunday street closures (e.g., Miraflores, Callao); (iv) carried out promotional events during the Car-Free and World Environment Days; (v) organized thematic excursions on the bicycle tandem to raise awareness about the importance of the bicycle as a sustainable means of transport; (vi) disseminated the new bikeways and the benefits of bike use through the media and leaflets; (vii) participated in events, such as *Masa Crítica* and *CicloNudista*; (viii) worked together with school environmental brigades (*Brigadas Ambientales*) and the Peruvian Scout Association to promote bicycle use; (ix) worked with neighborhood organizations to improve the image of NMT and involve more adults; and (x) promoted the national law on bicycles as sustainable mode of transport, which was approved in 2010.	

• The Project organized a bicycle credit sale event for municipal public officials, which allowed them to pay for the bicycles through a periodic deduction from their paychecks. This event was moderately successful. The MML emitted an ordinance (*ordenanza municipal*) that requires all its offices to provide bicycle parking spaces. The Project installed parking facilities in public administration offices and also worked with school and university employees to promote bicycle use. • The Project financed the purchase of bicycles, which were transferred to participating schools and universities, and financed the preparation of teaching and communication materials (videos, manuals, leaflets, etc.) to promote safe cycling. The Project established a sustainable transport website, which includes all project outputs (http://www.fonamperu.org/general/transp/bienvenida.php).	
• According to the PAD, the microcredit scheme for bicycle acquisition was expected to be financed by funds not used under the NMT component of Lima's previous Bank loan. The MML did not make these funds available. Thus, under the framework of project restructuring, FONAM proposed to use part of the funds freed by the cancelation of the scrapping activities to restart the microcredit scheme. In 2007, FONAM carried out a demand study for microcredits to buy bicycles and assessed the microcredit market in Lima. This study revealed that Lima had a liquid and well-functioning private microcredit market, and there was no need for the Project to directly provide microcredits. Instead, it was suggested that guarantees be provided to local microcredit institutions to create this new line of business and lower interest rates. The GEF CEO did not endorse this proposal and the microcredit scheme was not revived.	Not achieved
Other Outputs	
• The Project financed a comprehensive Bicycle Master Plan for Lima and Callao, which was approved by the MML. It also financed studies to compare different areas in Lima and Callao in terms of their potential to attract bicycle trips and to identify the main origins and destinations for short trips in the municipalities of Jesús María and Lince.	
• Bicycle-use surveys showed that most people in Lima owned bicycles but did not use them because they were in need of repairs. Therefore, from 2006 to 2009 the Project financed the operation of a minibus that circulated in the different districts of Lima and Callao and repaired bicycles (Bus Zoom). The service was free but spare parts needed to be paid for. The bus staff also organized bicycle-repair clinics and promoted bicycle use. During the course of the Project, over 25,000 bicycles were repaired. In the second half of 2009 a pilot was carried out to test whether the operation of the Bus Zoom could be profitable. The pilot showed that the revenues were insufficient to cover operating costs, and the MML committed itself to continuing to finance the Bus Zoom operation.	
• The Project financed the preparation of engineering designs for the Av. Arequipa bikeway and technical specifications for the Aramburú, Rímac, 28 de Julio (Central Lima), and Miraflores bikeways.	
• The Project also financed communication and social mitigation activities for the bikeway on Av. Mayolo–Av. Las Palmeras, Av. Granda/Habich, Callao and Jesús María–Lince to inform the population about the plan to construct new bikeways, disseminate the bikeways, and mitigate social conflict during construction.	

Component C: Institutional Strengthening Program for Sustainable Transport	
Cost: US$0.98 million, which corresponds to 89% of the original appraisal estimate	
General: The implementation of this component was satisfactory. All activities envisaged were implemented and the planned outputs were achieved.	
• The Project financed the design of an institutional and capacity-strengthening program for sustainable transport. This was the basis for a number of awareness-raising and capacity-building events.	Achieved
• Awareness raising: The awareness-raising activities included: (i) a bicycle parking design competition; (ii) seminars on bicycle use; (iii) the design and maintenance of a website on bicycle use; (iv) support to CicloAxión, an urban cycling activist group; (v)	Achieved

the inclusion of the topic of bicycle use in the road safety manual for teachers/professors; (vi) an event in Congress to support the national bicycle law; (v) participation in events such as the Car-Free and World Environment Days; and (vii) the creation of a category on sustainable transport in the national competition for best administrative practices (*Premios a las buenas prácticas gubernamentales*), organized by the NGO "*Cuidadanos al Día"*, which continues to attract interest.	
• Training programs and technical assistance: The Project supported the organization of 12 conferences on different sustainable transport-related topics with the participation of international experts, such as Antanas Mockus of Bogotá. Some of the topics of the conferences included: (i) How to transform a city with genius?; (ii) Sustainable Transport and Political Will; (iii) Public Space; (iv) MALECÓN 2000–GUAYAQUIL: Successful Transformation of a Public Space; (v) Transport and the Environment; (vi) Rationalization of Taxis; and (vii) Sustainable Transport in Bogotá. These events attracted 2,797 people, including local and national politicians, municipal, provincial and state employees, representatives of NGOs and civil society, urban transport professionals, and students. Together with local universities, the Project also organized 17 training courses on topics such as (i) sustainable transport planning, (ii) traffic-calming measures, (iii) sustainable transport investment planning and evaluation, and (iv) sustainable and integrated urban transport management. A total of 709 people participated in the different courses. Because some people participated at least in two courses, the number of people trained amounts to 423. The average amount of training was 39.5 hours. The participants included municipal officials from more than 40 municipalities in Lima, Callao, Trujillo, Iquitos, Cuzco and Arequipa, provincial officials, representatives of the Central Government, the National Police, other urban transport-related institutions, etc. • The Project also strengthened *Protransporte*'s capacity, especially in transport planning and modeling and environmental issues (see Component A above).	Achieved
• Capacity building: The Project financed experts to assist PEMTNM and the Municipality of Callao in the implementation of the Project, including specialists in engineering design for bikeways, bike promotion, social mitigation, social marketing, bikeway construction, etc. The Project also financed the participation of project staff in conferences and workshops and technical visits to Bogotá, Rio de Janeiro and Santiago. The Project financed a specialist in strategic planning to prepare the Strategic Plan for Bicycle Transport in Lima, which was approved by the MML.	Achieved

Component D: Management, Monitoring and Evaluation (M&E), and Replication Strategy Implementation	
Cost: US$1.05 million, which corresponds to 99% of the cost estimate revised during project restructuring	
General: The implementation of this component was satisfactory. The bicycle-related M&E activities were comprehensive and of immediate use in project implementation. Data and information on motorized transport collected under the Project were complemented by information directly collected by MML. The Project carried out a number of replication activities.[32]	
Outputs Envisaged at Appraisal	**Status**
• Among the M&E activities related to the NMT component, bicycle counts and user surveys in the project area were carried out in 2004, 2006 and 2009–2010. These studies collected the following types of information: number of bicycle trips and their characteristics, frequency of bicycle use, characteristics of cyclists and use of safety elements such as helmets and lights, reasons for and attitudes of interviewees toward bicycle use, modal shift, crossings and areas considered dangerous for cyclists, routes	Largely achieved

[32] At project end, the remaining funds from the microcredit scheme and the credit guarantee fund were expected to be used for replication activities in Peru's secondary cities. Because project restructuring replaced the microcredit scheme and the credit guarantee fund, no funds for additional replication activities were available.

for new bikeways, etc. The information was used to structure the bicycle-promotion activities, inform infrastructure activities, and assess progress toward the achievement of project objectives and outcomes. • The bicycle-promotion activities received ongoing and close follow-up, with the respective M&E activities focusing on making sure that all planned activities were carried out and on regularly measuring results. The activities consisted of field visits, interviews with school principals, teachers, parents and students, and regular meetings, among others. Regular progress reports were prepared. The results of the M&E activities were used to improve the bicycle-promotion strategy. • Results of the other project activities, such as capacity-strengthening and awareness activities, bicycle repairs, and the installation of bicycle parking facilities, were also regularly monitored and recorded. The Project structured a database with the results of the project activities and summarized the lessons learned from the bicycle promotion campaign. These lessons were used to improve and extend the bicycle promotion program. • Under the study in Component A, the Project financed the fieldwork to update the transport planning model. The same study also financed the development of a GHG inventory for the transport sector in Lima and the collection of data on the public transport industry, among others. Information on modal share and public transport trips was collected through the 2004 origin and destination survey financed by JICA.[33] • GTU/*Protransporte* collected data on public transport services/routes that competed with the services of the new BRT system to other areas of the city.[34] • As mentioned under Component B above, the Project prepared a strategy to ensure self-sustainability of the bicycle promotion program in schools. The implementation of this strategy had a very promising start, but for a number of reasons, including the early departure of the project coordinator, it did not fully succeed.	
• In terms of replication, the Project financed a study to identify the priority bikeways in various districts of Lima based on potential demand and other characteristics. This study was aimed at providing guidance to districts on how to implement their own bikeway infrastructure. A number of these districts have been planning, implementing or improving bikeways. These include: Santiago de Surco, San Borja, La Molina and Miraflores. • The project implementation team visited Cuzco twice to raise awareness about sustainable transport among municipal employees and to identify possible interventions. The Project financed a study to evaluate the impact of the creation of a pedestrian area in the "*Eje Procesional*" in the historic center of Cuzco. • The project implementation team travelled to Trujillo to present the activities carried out in Lima and assisted the municipality in the preparation of a proposal for bicycle infrastructure and the rationalization of the taxi supply. • The Project carried out a diagnostic and identified different alternatives to improve urban transport in Iquitos and Arequipa. • Representatives from various Peruvian secondary cities participated in the conferences and training activities organized by the Project. • The Project prepared a replication strategy and widely distributed the materials produced under the Project, including the bicycle promotion/education program, the manuals, the courses materials, etc.	Achieved

[33] *Plan Maestro de Transporte Urbano de Lima*, Japan International Cooperation Agency (JICA), 2004.
[34] *Programa de Racionalización de la Oferta de Transporte Público en Lima Metropolitana*, Gerencia de Transporte Urbano y el Instituto Metropolitano PROTRANSPORTE de Lima, 2005.

Annex 3. Economic and Financial Analysis

Loan

This economic analysis and evaluation is prepared as part of the Implementation Completion Report.

a. Incremental Benefits and Costs

The methodology used to develop the economic cost-benefit analysis is the standard methodology used to estimate and evaluate the results of BRT programs. The benefits included in the analysis are derived from time savings of transit users, savings in operating costs for the replacement of buses, generated trips, accident reduction, and pollution/emission reductions. The costs associated with the Project fall into two categories: one-time investments, particularly in infrastructure development, institutional capacity building and purchase of the new bus fleet; and recurring annual costs of the system's operation and maintenance. In addition, there are one-time losses in time due to construction works.

The economic analysis encompasses the analysis of the incremental costs and benefits to the without-project situation. The without-project scenario does not assume any type of infrastructure investments, but maintains the original level of service. This assumes in both scenarios an increase in demand due to the population growth and the demand for travel in the specific corridor. The main benefits of the Project come from savings in time and optimization of bus operation.

The with-project scenario includes the effects of both the trunk lines and the feeder lines. The analysis includes the assessment of the operating costs for both services where the trunk network uses new high-capacity buses and the feeder routes are served by new regular buses. The savings in travel time for users assumes the same number of passengers with or without the project and an average value of travel time for urban transport users, based on the information provided by an MEF directive for 2011. The benefits to existing cars in the corridor are estimated to be zero since there will be a minimal change in speed for cars. This is a result of increases in car traffic speeds in some areas, but of decreases in others as a result of the new street configurations. Generated trips and modal changes are estimated and considered as additional benefits to the Project, thus increasing demand. In addition, benefits from reductions in accidents and pollutants are calculated.

Demand Estimate

Several studies previously estimated the trajectory for the demand and growth rate. Thus, this study considers that 2 percent is a reasonable rate at which the demand will be growing in the future. The latest analysis for Phase Two of the BRT program in Lima estimates that the demand should grow at about 1.2 percent.

b. Summary Results

The results of the analysis yielded a net present value (NPV), at a 12 percent discount rate, of US$296 million and an economic internal rate of return (EIRR) of 20.2 percent. The Project's expected return is particularly sensitive to changes in the benefits stream, particularly the annual operating costs of the system and annual time savings to users.

The following tables present the assumptions used for the base-case scenario. The specific calculations and estimates used are described in the economic analysis model, which is available in the project files.

c. Summary of Benefits and Costs

The annual flow of benefits and costs are shown in the following table:

Year	Investment Costs	Annual Recurring Costs	Vehicle Adquisition Costs	Net Vehicle Operating Costs	Time Savings for Users	Other Benefits	Total Net Benefits
2009	(284.23)	(5.78)	(176.72)	-	-	(16.96)	(483.68)
2010	-	(15.32)	-	81.99	14.10	3.36	84.13
2011	-	(15.32)	(3.93)	54.95	43.28	6.85	85.84
2012	-	(15.32)	(3.49)	55.88	46.04	7.02	90.14
2013	-	(15.32)	(3.93)	57.06	48.95	7.09	93.86
2014	-	(15.32)	(3.49)	58.10	52.02	7.17	98.48
2015	-	(15.32)	(3.93)	59.38	55.26	7.24	102.64
2016	-	(15.32)	(3.93)	60.52	58.69	7.32	107.28
2017	-	(15.32)	(3.93)	61.72	62.30	7.40	112.17
2018	-	(15.32)	(3.93)	62.98	66.11	7.47	117.32
2019	-	(15.32)	(108.57)	64.29	70.15	7.55	18.10
2020	-	(15.32)	(76.62)	65.61	74.41	7.64	55.71
2021	-	(15.32)	(8.03)	66.84	78.91	7.72	130.13
2022	-	(15.32)	(8.03)	68.28	83.67	7.80	136.41
2023	-	(15.32)	(8.47)	69.59	88.71	7.89	142.41
2024	-	(15.32)	(8.03)	70.96	94.05	7.98	149.64
2025	-	(15.32)	(8.47)	72.40	99.69	8.07	156.37
2026	-	(15.32)	(8.91)	73.90	105.67	8.16	163.50
2027	-	(15.32)	(8.47)	75.27	112.01	8.25	171.74
2028	-	(15.32)	(9.08)	76.91	118.72	8.35	179.58
2029	-	(15.32)	(9.08)	78.37	125.85	8.45	188.27

The table shows a 20-year horizon of analysis; benefits from time savings gradually approach the benefits from reduced vehicle operating costs. In present-value terms, benefits from time savings and net vehicle operating costs represent 95 percent of the total benefit stream. Benefits to car users from changes in speed as a result of the new, more organized bus system are negligible. As mentioned earlier, in some areas speed increased, but in other areas speed decreased. Overall, speed changes for cars were

expected to be less than 0.1 km/hr. Benefits from a reduction in GHG and air pollutants are underestimated.[35]

d. Sensitivity Analysis

The model is particularly sensitive to changes in the cost of bus operation per km and time savings to users of the system. Since this evaluation is being conducted after all investments have been made, investment costs are not sensitive to changes in the parameters of analysis.

The following sensitivity tests were performed: changes in demand, changes in social discount rate, changes in the costs of operating the system, and changes in the prices of new buses.

	NPV (12%)	IRR	NPV_B-NPV_N	Change in NPV
Base	296.98	20.2%		
Demand growth 1.2%	260.24	19.6%	36.75	14.1%
Demand growth 3%	346.80	21.1%	(49.82)	-14.4%
Value of time -10%	254.23	19.3%	42.75	16.8%
Value of time -20%	211.48	18.2%	85.50	40.4%
Demand at end of 2011 does not reach 500,000	152.95	16.7%	144.03	94.2%
Demand at end of 2011 reaches 350,000	161.95	17.0%	135.03	83.4%
Discount rate 14%	198.19	20.2%	98.79	49.8%
Discount rate 10%	421.65	20.2%	(124.67)	-29.6%
Time savings for former car users (5 mins)	295.02	20.2%	1.96	0.7%
Time savings for former car users (10 mins)	299.93	20.3%	(2.95)	-1.0%
Annual operating costs of terminals, workshops, depots 3%	290.38	20.1%	6.60	2.3%
Cost of new buses 10%	270.64	19.4%	26.34	9.7%
Cost of new buses 20%	244.29	18.5%	52.69	21.6%
Cost of operation per km 10%	240.58	18.8%	56.40	23.4%
Cost of operation per km 20%	116.49	15.6%	180.49	154.9%

The Project's internal rate of return (IRR) is particularly sensitive to changes in the operating cost of the buses, the cost of new buses, and the demand not reaching the levels expected by the end of 2011 and the life of the Project. In terms of changes in the bus acquisition cost, the model assumes that the price is higher than the increased price for all

[35] No data were available to estimate the benefits from other air pollutants.

buses. This assumption is made for ease of modeling but it must be noted that the buses entering the system in 2010 and 2011 were already purchased in 2010.

In comparison to the original project appraisal case, we have conducted a small comparison exercise. In the original appraisal document, the incremental benefits came from (1) the reduction in vehicle operating costs for both public and private vehicles, and (2) the travel-time savings and reduction in public transport user costs, due to the rationalization of public transport services and higher commercial speeds facilitated by the segregated bus corridors. The analysis below considers only the incremental benefits considered in the original PAD. In addition, two cases for measuring vehicle cost per kilometer are used for comparison purposes. In the first case we use the original costs considered in the PAD, updating them by using the inflation rate to 2010. The original analysis used a 14 percent discount rate. For comparison, we consider using both a 14 percent and a 12 percent discount rate. The second case uses the estimates for vehicle operating costs per km employed in the above analysis and estimated in the economic analysis for the second phase of the *Metropolitano*, commissioned in 2010.

Project Appraisal Benefit Stream	**NPV**	**IRR**
Case 1: (a) Project Appraisal with inflation updated VOC and 12% discount rate	**14.47**	**12.8%**
(b) Project Appraisal with inflation updated VOC and 14% discount rate	**(51.76)**	**12.8%**
Case 2: (a) Project Appraisal with updated costs estimated in 2010 and 12% discount rate	**270.14**	**19.5%**
(b) Project Appraisal with updated costs estimated in 2010 and 14% discount rate	**174.73**	**19.5%**

e. Basic Assumptions. Table 6.1 presents the basic assumptions for the economic analysis.

Table 6.1 Base Case Scenario

Annual Recurring Costs		**Note:**
1. Infrastructure Maintenance Cost (Trunk and Feeder Corridor)	2.5	% of Infrastructure Investment
2. Operation of *Protransporte* (Government Regulator/Supervision)	1.0	% of Infrastructure Investment
3. Future Investment	0.5	% of Infrastructure Investment
4. Operational Cost of Control Center	10.0	% of Investment Control Center
5. Estimate of Cost of Control Center (Capital Cost)	5	% of Infrastructure Investment
6. Operation alCost of Infrastructure (Terminals, Workshops, Depots)	2.00	% of Infrastructure Investment
7. Cost of New Buses (Articulated/Feeder)	0.44/0.17	US$ million
8. Operational Cost per Km New Buses (Articulated/Feeder)	2.83/1.53	US$
Benefits		
1. Savings in User Travel Time		

1.1. Growth of Demand for Public Transport	2%	
1.2. Current Ridership for the Metropolitano	340,000	
1.3. Estimated Ridership for the Metropolitano	500,000	End of 2011
1.4. Factor Expansion for Days of Operation	321	
1.5. Value of Time for Car Users	0.99	US$ (from MEF Directive 2011)
1.6. Value of Time for Public Transport Users	0.38	US$ (from MEF Directive 2011)
1.7. Number of Articulated Buses at Start of Operation	312	
1.8. Number of Feeder Buses at Start of Operation	232	
1.9. Length of the Metropolitano Corridor	27.48	Kms
1.10. Average Speed (without Project)	14 (31)	Buses (Cars) km/hr
1.11. Estimated Average Speed (with Project)	21 (31)	Buses (Cars) km/hr
1.12. Average Trip Time	52	Minutes
2. Savings Mixed Traffic Travel Time		
2.1. Estimated Car Trips	120,000	Trips per day
2.2. Average Passengers	1.2	Person per car
2.3. Minutes Saved from Switch from Car to Bus	7	Minutes
2.4. Average Growth Rate for Car Trips	3%	
3. Savings in Operation and Maintenance Costs Buses		
3.1. Estimate of Vehicles that Exit the Corridor	2,434	Vehicles
3.2. Average Daily Km Logged per Vehicle (Existing System)	148/170/180	Buses/coasters/rural minivans
3.3. Operating Cost per Km (Existing System) (US$)	1.03/0.93/0.89	Buses/coasters/rural minivans
4. Savings in Travel Time for Modal Switch		
4.1. Estimate of Demand Change in Mode	5%	of Metropolitano ridership
4.2. Estimate of Savings in Time Modal Shift	7	Minutes
5. Savings in O&M for Car Users		
5.1. Change in Speed	0	Km/hr
6. Benefits for Generated Trips		
6.1. Generated Demand	5%	of Metropolitano ridership
6.2. Estimated Savings in Time	7	Minutes (per trip)
7. Benefits from Accident Reduction		
7.1. Number of Accidents Baseline	26	Events per month
7.2. Number of Accidents (Fatalities/Injuries)	2/9	Events per month
7.3. Estimated Cost For Type of Event (Fatalities/Injuries)	1.09/0.02	US$ million per event
8. Benefits from Pollution Reduction		
8.1. GHG (CO_2) Emissions Baseline	489,360	Ton/year
8.2. GHG (C02) Emissions Current	324,440	Ton/Year
8.3. Estimated Cost CO_2	0.714	ton
Social Discount Rate	12%	
Exchange Rate (Average 2010)	2.83	

Grant

In addition to the cost-benefit analysis for the Project financed by the Loan, the PAD included an incremental cost analysis for the GEF Grant. The assumed baseline scenario for this analysis was the implementation of the first BRT corridor in Lima. The alternative or incremental scenario looked at the additional CO_2 emission reductions from the bicycle-related activities and the voluntary GEF-financed bus-scrapping scheme. Correctly, the indirect CO_2 emission reductions from the institutional strengthening and management, M&E and replication components were not considered.

A similar incremental cost analysis was undertaken for the project ex post and the results were compared with the appraisal scenario. The analysis included the CO_2 emission reductions from the bicycle-related activities, *Protransporte*'s bus scrapping, and the implementation of an additional BRT corridor.

The change in scope of analysis is due to project restructuring, which replaced the GEF-financed voluntary bus-scrapping scheme with a study to identify additional BRT corridors for Lima, prepare the preliminary designs for a second East-West corridor, and advance in the integration of the system. The Project's bus-scrapping indicators were maintained because despite the cancellation of the GEF-funded voluntary scrapping activities, *Protransporte* was expected to scrap the same number of buses envisaged under the originally planned mandatory and GEF-financed voluntary scrapping schemes.

Bicycle activities

The ex post analysis showed CO_2 emission reductions of 22 tons/year in the project area due to a modal shift from motorized transport to bikes. The analysis was based on information from the 2004, 2006 and 2009/2010 cyclist counts and interviews in the project area. The main assumptions and caveats of the analysis were the following:

- The duration of cyclist counts for different bikeways varied and was standardized, using vehicle counts for Lima disaggregated on an hourly basis.
- A 2004 baseline did not exist for all bikeways (total study area) because a number of interventions were only identified after the 2004 baseline was taken. If there were baseline counts in the corridor where an intervention took place, the missing baseline data were inferred from the corridor data. If there was no baseline count in the corridor, the missing baseline data were inferred from the average demand counted on adjacent intervened corridors.
- Cyclist counts do not provide information on the number of bicycle trips because of the problem of double counting. To determine the number of bicycle trips, which is necessary to assess the modal shift from the motorized mode to non-motorized transport (NMT), information on the trip length obtained through the cyclist surveys was used.
- The number of cyclist trips that were shifted from motorized to NMT was calculated based on international experience.

- The current modal share distribution in Lima, excluding cyclists, was used to estimate the amount of cyclist trips that were shifted from each mode.

Full details on the analysis are included in the Final Bicycle Evaluation Report.[36]

Bus scrapping

Protransporte manages a trust fund in the amount of approximately US$6.2 million established by the bus concessionaires to buy and scrap buses in the influence area of the first BRT corridor. Based on the prices offered by *Protransporte* for different bus types at the time of ICR preparation[37], the expected CO_2 emission reductions are between 33,130 and 43,536 tons/year. This is largely in line with the emission reductions obtained on the basis of the appraisal estimate of vehicle prices corrected by inflation, i.e. between 28,039 and 42,578 tons/year. Based on the prices estimated by *Protransporte* at the time of project restructuring, the CO_2 emission reductions from this bus scrapping scheme would have been between 77,410 and 104,729 tons/year.

The table below provides the expected CO_2 emission reductions based on the three vehicle prices and for the three types of vehicles to be scrapped.

Vehicle types	Lima public transport fleet*	Price of vehicles to be scrapped based on:			No. of vehicles to be scrapped with available resources**** based on:			gCO2/ veh-km PAD	km/ day/ veh*	CO2 reductions (tons/year) based on:		
		Estimate PROTR. during project restructuring	Apoyo Consultoria S.A. study**	Inflation-adjusted PAD estimate***	Estimate PROTR. during project restructuring	Apoyo Consultoria S.A. study	Inflation-adjusted PAD estimate			Estimate PROTR. during project restructuring	Apoyo Consultoria S.A. study	Inflation-adjusted PAD estimate
Light-duty vehicles	15,820	1,484	4,500	3,681	4,154	1,370	1,675	383	180	104,729	34,538	42,223
Microbus	13,434	2,889	6,750	7,976	2,134	913	773	604	165	77,410	33,130	28,039
Regular bus	5,218	4,920	9,000	9,203	1,253	685	670	1208	144	79,638	43,536	42,578
*No. of vehicle per vehicle type and km/day of each vehicle type based on Getinsa, Taryet, Geoconsult S.A., 2010, Volume I- 1.94, page 109 and Volume I, Component I, page 5.23												
** Average price per vehicle type based on study "Propuesta de Implementación del Plan de Chatarreo para Vehículos de Transporte Público" carried out by Apoyo Consultoria S.A. in 2011												
***Price included in Project Appraisal Document (PAD) adjusted by 22.7% inflation from 2003 to 2011 (source: http://www.usinflationcalculator.com/)												
****Available trust fund resources to buy and scrap buses set aside by the bus concessionaires (US$)							6,164,760					

The appraisal methodology was used to calculate the CO_2 emission reductions. For certain parameters, such as daily vehicle km and the number of public transport vehicles per vehicle type, the appraisal data were replaced by current data. The main caveats and assumptions were the following:

- The annual CO_2 emission reductions were based on the assumption that only one vehicle type will be scrapped, while eventually a mixture of vehicle types may be scrapped.

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[36] *Evaluación Final del Uso de la Bicicleta en el Marco del Proyecto de Transporte de Lima*, CIDATT, 2010.

[37] The prices are based on the study "*Propuesta de Implementación del Plan de Chatarreo para Vehículos de Transporte Público*" to identify obstacles to sell buses to scrap, assess selling prices, determine incentives, and prepare for the implementation of the scrapping scheme carried out in 2011 by Apoyo Consultoria S.A.. Depending on the vehicle age, the price for regular buses is between US$8,000 and US$10,000, the price for microbuses is between US$6,000 and US$7,500, and the price for light-duty vehicles *(camionetas rurales)* is between US$4,000 and US$5000.

- The daily vehicle km were obtained by dividing the total daily vehicle km per vehicle type obtained from the Getinsa, Taryet, Geoconsult S.A. study by the total number of vehicles per vehicle type obtained from the same study.
- The annual km per vehicle of a specific vehicle type were obtained by multiplying the daily km per vehicle of a specific vehicle type by 365.
- Scrapped public transport vehicles will not be replaced by new vehicles. This is envisaged under *Protransporte*'s public transport scrapping scheme.
- The additional scrapping expected to happen with the resources to be set aside by the Municipality of Lima under the proposed municipal order with the regulatory framework for vehicle scrapping in the MML (*Ordenanza Municipal de Aprobación del Reglamento Marco de Chatarreo Vehículos de la Municipalidad Metropolitana de Lima*) was not considered in this context.

Implementation of a second BRT corridor in Lima

The implementation of an East-West BRT corridor, as preliminarily designed in the GEF-financed Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima, is estimated to reduce GHG emissions by approximately 150,000 tons/year. The main caveats and assumptions of this analysis are the following:

- These emission reductions are expected to derive from changes in vehicle technology and the use of larger vehicles. The effects of a possible modal shift from cars to public transport and the reduced emissions due to the reduction in congestion in other corridors are not taken into account.
- The technology and fuel distributions of the vehicles in the BRT corridor were assumed to be the same as those of the vehicles registered in Lima.
- In the absence of disaggregated local emission factors for the Lima public transport fleet, the emission factors used came from various sources, especially from the US Environmental Protection Agency (EPA) and the GHG Protocol, which may lead to an underestimation of the CO_2 emission reductions of a second BRT corridor in Lima.

Full details on the analysis are included in the final report of the study.[38]

Comparison between the appraisal and ICR scenarios

The comparison between the appraisal and ICR scenarios is presented in the table below, together with some important caveats.

Activity	CO_2 reductions (tons/year) according to appraisal estimates	CO_2 reductions (tons/year) according to ex post analysis	Caveats
Bicycle activities	879	22	The latest fieldwork for this analysis took place in 2009–2010 when most bikeways had just been completed or were about to be completed. At that time the expected increase in bike trips had not yet materialized, for the reasons explained paragraph 105 in the main part of this report.

[38] "*Estudio para la Consolidación del Sistema Integrado de Transporte Público de Lima"*, Volume I, Component I, Getinsa, Taryet, Geoconsult S.A., 2010.

Activity	CO_2 reductions (tons/year) according to appraisal estimates	CO_2 reductions (tons/year) according to ex post analysis	Caveats
Bus scrapping	Between 13,656 and 30,036	Between 33,130 and 43,536	*Protransporte* manages a trust fund in the amount of US$6,164,760 to buy and scrap old buses. Bus scrapping started in January 2012. 16 buses were scrapped at the time of ICR preparation. With the replacement of the voluntary bus-scrapping component, the GEF Project did not finance any scrapping-related activities. Nevertheless, the scrapping indicators were maintained and the project team supported *Protransporte* in a number of scrapping-related preparatory activities.
Implementation of a second BRT corridor in Lima	Activity not envisaged at appraisal (introduced through project restructuring)	150,000	At the time of ICR preparation, it was not yet clear if the East-West corridor analyzed in detail in the GEF financed study would be served by bus or train. The implementation of an East-West BRT corridor is expected to lead to CO2 reductions of 150,000 tons a year. The contribution of the GEF project would be small compared to the investments needed. Nevertheless, it would have acted as an initial trigger. If the corridor will be served by a train, the designs prepared by the GEF project will have to be redone. Even in such case, the study will be a valuable input for the modernization of the public transport system in Lima, which is likely to considerably reduce GHG emissions from ground transport.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Andrés Pacheco	Consultant	LCSTR	Transport
Gerhard Menckhoff	Consultant	LCSTR	Urban Transport
Judy L. Baker	Lead Economist	FEUUR	Poverty
Keisner De Jesus Alfaro	Sr. Procurement Specialist	LCSPT	Procurement
Kirsten L. Oleson	Consultant	LCSEG	Consultant
Mark Delucchi	Urban Transport Consultant	LCSEN	Urban Transport
Oswaldo Patiño	Institutional Consultant	LCSTR	Economist
Patricia McKenzie	Manager Financial Management	MNAFM	Financial Management
Paul Procee	Sr. Infrastructure Specialist	EASCS	Environnent
Paulus A. Guitink	Consultant	AFTTR	Transport
Pierre Graftieaux	Sr. Transport Specialist	AFTTR	Transport
Pierre Werbrouck	Consultant	LCSAR	Consultant
Sophie Sirtaine	Sector Manager	ECSF2	Sector Manager
Walter Vergara	Lead Chemical Engineer	ENV	Environment
Supervision/ICR			
Alonso Zarzar Casis	Sr. Social Scientist	LCSSO	Social
Ana Lucia Jimenez Nieto	Financial Management Specialist	LCSFM	Financial Management
Andrés Pacheco	Consultant	LCSTR	Transport
Arturo Ardila	Sr Urban Transport Specialist	LCSTR	Urban Transport
Aura Marcela Ariza Rodriguez	Junior Professional Associate	MNCA4	Team Assistant
Carlos F. Pardo	Consultant	LCSEN	Non-motorized Transport
Cidalia Brocca	Financial Analyst	CTRDM	Disbursement
Elisabeth Goller	Sr. Transport. Spec.	LCSTR	Transport
Qays Hamad	Sr. Operation Officer	OPCS	Operations
Enrique Millones	Consultant		Environment
Oswaldo Patino	Institutional Consultant		Economist
Evelyn Villatoro	Sr. Procurement Specialist	EAPPR	Procurement
Francisco Rodriguez	Procurement Specialist	LCSPT	Procurement
Gabriela Arcos	Environmental Spec.	LCSEN	Environment
Gerhard Menckhoff	Consultant	LCSTR	Urban Transport Specialist
Harvey Manuel Scorcia	Junior Professional Associate	LCSTR	Transport
Jean-Jacques Verdeaux	Sr. Procurement Specialist	LCSPT	Procurement
Keisgner De Jesus Alfaro	Sr. Procurement Specialist	LCSPT	Procurement

Luis M. Schwarz	Sr. Finance Officer	CTRFC	Financial Management
María Catalina Ochoa	Junior Professional Associate	LCSTR	Transport
María Elizabeth Dasso	Sr. Social Development & Civil	LCSSO	Social
María Lucy Giraldo	Senior Procurement Specialist	LCSPT	Procurement
Michael J. Goldberg	Sr. Private Sector Devt. Spec.	LCSPF	Private Sector
Miriam Cespedes	Program Assistant	LCSPT	Program Assistant
Nelly Ikeda	Financial Management Analyst	LCSFM	Financial Management
Nicolas Francisco Estupinan	Junior Professional Associate	LCSTR	Transport
Oswaldo Patiño	Consultant	AFTTR	
Patricia McKenzie	Manager Financial Management	MNAFM	Financial Management
Paul Procee	Sr. Infrastructure Specialist	EASCS	Environment
Paulus A. Guitink	Consultant	AFTTR	Transport
Pierre Graftieaux	Sr. Transport Specialist	AFTTR	Transport
Pierre Werbrouck	Consultant	LCSAR	Consultant
Raul Tolmos	E T Consultant	LCSEN	Environment
Tomas Socias	Sr. Procurement Spec.	OPCPR	Procurement
Sandra Arzubiaga	Communications Officer	LCREA	Communications
Xiomara A. Morel	Sr. Financial Mgmt. Specialist	LCSFM	Financial Mgt.
Xiomara A. Morel	Sr. Financial Mgmt. Specialist	LCSFM	Financial Mgt.

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	US$ thousands (including travel and consultant costs)
Lending		
FY01	7.11	39,081.47
FY02	15.01	70,026.34
FY03	16.46	74,436.29
FY04	8.44	36,074.95
Total:	**47.02**	**219,619.05**
Supervision/ICR		
FY04	5.83	35,200.28
FY05	8.57	47,378.19
FY06	7.68	52,300.16
FY07	20.28	80,327.64
FY08	16.24	58,641.20
FY09	11.46	48,999.98
FY10	12.16	49,252.42
FY11	4.10	13,151.69
FY12	17.00	76,000.00
Total:	**103.32**	**461,251.56**

Annex 5. Beneficiary Survey Results

Beneficiary Survey Results of the Lima Metropolitan Transport System

1. **Introduction.** This annex presents a summary of the results of the Quantitative and Qualitative Beneficiary Assessment Results carried out by *Protransporte*. Fieldwork was conducted from November 19 to 25, 2010. A total of 801 surveys were conducted in the Metropolitano stations (South 1, South 2, Center and North). In addition, the target population was classified in four groups: (i) occasional users, (ii) regular users, (iii) heavy users, and (iv) non-users.

2. **Objectives of the study.** The general objective of the study was to establish the needs and expectations of users and non-users of the *Metropolitano*. The specific objectives were to: (i) establish the most relevant benefits for users, (ii) measure the level of user satisfaction, (iii) find out the reasons why potential users would not use the system, and (iv) establish the level of acceptance of payment for the *Metropolitano*'s smart cards, and determine under which circumstances potential users would be willing to pay for this new transport system.

3. **Users profile.** *Metropolitano* users can be classified in three groups: (i) heavy users, including those who use the system from four to seven days per week, who comprise 65 percent of total users; (ii) regular users who are those who use the system from two to three days per week and comprise 24 percent of total users; and (iii) occasional users, who comprise up to 11 percent of total users.

4. **User Perception of the *Metropolitano*.** In general terms, users have a high level of acceptance of the *Metropolitano* system. Eighty-two percent of heavy users rate the system as good or very good, whereas regular users and occasional users rate the system at 84 and 86 percent, respectively. The system's best feature is the speed of transport, since it helps users save time in getting from one place to another. Also important is the security perceived in the *Metropolitano* system, as compared to other transport modes. Infrastructure is considered modern and suitable for Lima's transport needs.

5. **Users' satisfaction with service.** The survey shows the following results with regard to the perception of quality services:

a) Although the speed of the trips is one of the main benefits perceived by users, several other aspects must be improved, including the waiting time at bus stations, cleanliness within the stations, and personal safety.

b) There is a high level of satisfaction related to the services provided by staff, especially security and surveillance staff of the Customer Service Center.

c) Bus cleanliness and safety are the most valuable attributes rated by users. However, the large number of users and the poor ventilation in the buses are the main negative aspects perceived by users.

d) Work performed by bus drivers was also rated high.

The following table summarizes users' satisfaction level by type of users and timetables. It shows that an average 90 percent of users think the service provided by the system is good.

Table 1. General satisfaction level of *Metropolitano* services

	User			Timetable		
	Heavy	**Regular**	**Occasional**	**07:00–09:59**	**10:00–16:59**	**17:00–late**
Highly satisfied	85%	89%	95%	88%	89%	84%
Satisfied	14%	10%	2%	13%	11%	10%
Somewhat satisfied	71%	79%	93%	75%	78%	74%
Unsatisfied	15%	10%	5%	12%	11%	15%
Very unsatisfied	-	0.5%	1%	2%	-	1%
	-	0.5%	-	-	-	-
Baseline	518	189	88	208	316	271

6. ***Metropolitano* habits and uses.** The beneficiary survey shows the following results:

a) Eight of every ten users who have ever used the regular, express or feeder line services express that they are satisfied or highly satisfied with these services, especially in the Center and North areas.

b) As of November 2010, most users had used the regular service.

c) The main reason people use the *Metropolitano* is to go to work. This explains why the system is being used mostly by people who are between the ages of 18 and 39. The second reason for using the *Metropolitano* is to go to school, mainly in the North and downtown or Center areas.

d) Eighty percent of users have only one smart card with credit to use the system, whereas only 20 percent have two or more cards with credit. The average for smart cards with credits is 1.24 per user.

7. Conclusions and recommendations for *Metropolitano*'s operation

Conclusions:

Time saving is the main feature that encourages people to use the *Metropolitano*. The travel time has decreased considerably, especially for those ones who use the system to go to work. However, waiting times at the stations are a negative feature of the system.

With respect to the target population groups, occasional users are the most satisfied with the system, whereas heavy users are more demanding. The survey also shows different results for non-users. Users in the North area express rejection and lack of identification

with the system, while users in the South area have a better perception of the system. However, all of them feel that fares are too expensive.

Fares and travel distance are key factors when deciding whether or not to use the *Metropolitano*. This explains why most people use the *Metropolitano* for long trips. No one in the survey was willing to pay S/.1.50 for short trips because they could use *combis* instead at a cost of S/.0.50. It is hard for most people to accept a single fare because this is not part of the popular culture, and it is also perceived as "unfair."

The discomfort caused by the lack of buses to meet demand is the main reason for not using the system. That is why, especially in the North and Center areas and during peak hours, many users make use of alternative transport systems.

Naranjal Station has the most problems related to infrastructure, safety and demand.

Recommendations for future project operation:

Increase the bus fleet to meet demand, especially in the North area of Lima where there is a high demand for the system. This will help to reduce the chaos and discomfort caused by the lack of buses.

Increase the quantity of advisors whose tasks include guiding and educating people on the correct use of the system. It is important to provide personalized attention, at least during the first period when it is vital for customers to become adapted to the system.

Provide information about the functioning of the system through effective publicity.

Standardize the service in all aspects (punctuality, quality of buses, and so on). It is important that users feel confident about the service they are going to receive.

Facilitate safe access to the *Metropolitano* (traffic lights to cross avenues, pedestrian pathways, police officers).

Assertively communicate the complementary benefits of using the *Metropolitano* (discounts when recharging cards), in order to reduce the sense of "high fares."

Annex 6. Stakeholder Workshop

During ICR preparation, a stakeholder workshop was held in August 24, 2011 to discuss (i) the social impact of the project in the city of Lima, (ii) the results of the Project performance along its life and (iii) to share knowledge and lessons learned from it. The results of the workshop were incorporated throughout the text of the ICR.

This Annex summarizes the main results of the workshop. The reports presented by the *Protransporte* staff are archived in the project files.

Objective. The objective of the workshop was to assess the main issues during the project implementation and to share lessons learned.

Methodology developed. The workshop used the videoconference system, between Lima and HQ. Based on an agenda previously agreed, the dialogue tackled five, (i) administration and management, (ii) planning, design and infrastructure civil works, (iii) traffic and urban transport management, (iv) social safeguards and issues and (v) institution management and human resources.

Participants. The workshop was organized with the executing agency, PROTRANSPORTE. About 28 participants attended the workshop, Protransporte (21), former managers (3) and Bank staff (4).

Results. The workshop was very successful in terms of a very active participation, discussion and knowledge sharing. Four results to highlight are, (i) dialogue policy was missed in the project implementation; (ii) there is the need for more articulated work among local governments in this complex project; (iii) the complexity of the project required a strategic management and (iv) the project required a completed social assessment and stakeholder's analysis.

Lessons learned. The main lessons learned from the Project, as perceived by the *Protransporte* team, were:

(i) Emphasize project readiness and complete engineering designs, environmental and social studies.
(ii) A communication plan and a more systematic relation with the media.
(iii) Consultation to stakeholders in every stage of the project cycle.
(iv) Consider the cost of interferences (public services) and time to execute such civil works.
(v) Due to unexpected or unforeseen factors related to the cost of civil works, carefully study the cost estimate for unallocated funds.
(vi) Consider turning the PIU into an entity in charge of the BRT operation under the institutional strengthening component.
(vii) Carefully analyze the procurement plan for civil works, reducing bids to two or three contracts.
(viii) Include in the loan financing scheme an estimate of pre-operational and operational costs for running BRT projects.

(ix) Have ready the financial model with all activities for the system's operation.
(x) At appraisal, analyze the models and contracts to be used for private sector participation,
(xi) Strengthen project teams—Borrower and Bank—in environmental and social safeguards to reduce risks during implementation.
(xii) Consider and follow up traffic management and traffic safety studies along the busway corridor.

These were the key elements mentioned during the workshop with *Protransporte* staff. The workshop's PowerPoint presentations are available in the project files.

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR
REPORT SUBMITTED BY THE BORROWER
LOAN N° PE-7909

1. Evaluation of Objectives

The Urban Transport Program—PTUL North-South Subsystem—has the objective of improving the economic productivity and quality of life of the population in Metropolitan Lima by improving the population's mobility and accessibility, especially for the more disadvantaged population on the periphery, through the establishment of an effective, reliable, cleaner and safe transit system.

During the program's implementation stage no reviews were made of the project objectives, which continue to remain clear and unchanged.

1.1 Investment Components and Works

There has been no reformulation of the project components, although some of them have had changes regarding their scope.

The program has the following components:

1.1.1 Improving mobility and the environment

This component comprises the financing of the main infrastructure for the busway corridor, including stations, terminals and yards, as well as the paving and improvement of feeder roads. It also comprises the construction of pedestrian accesses, bicycle lanes, pedestrian overpasses, road safety measures, traffic lights, implementation of the operations control center and integrated traffic lights system for the central corridor.

Regarding environmental improvements, this component comprises financing for interventions targeting urban environmental enhancement, especially in mixed-use roads running parallel to the corridor, improvement of public spaces at some major points, organization and relocation of street vendors from the trunk roads, as well as the implementation of measures contemplated in the Program's Environmental and Social Management Plan and an air quality monitoring system.

1.1.2 Social Mitigation and Neighborhood Participation

This component comprises financing for outreach and communication actions targeted to future system users, as well as mitigation measures for the operators affected by the system's implementation.

1.1.3 Institutional Strengthening

The component contemplates financing a series of actions to improve the regulatory and legal framework, design concessions, administrative improvements and training of *Protransporte* staff and other MML agencies associated with road and transport management in the MML.

1.1.4 **Construction Studies and Supervision**

This component covers financing for all the studies required to start up the program, a monitoring and evaluation system for the program's short-term socioeconomic impacts, environmental supervision, environmental auditing of the program, and development of technical and environmental studies for the implementation of a potential second stage of the system.

1.2 Compliance with Objectives

The objective of the PTUL Program was satisfactorily achieved, with the implementation of an effective, reliable, cleaner and safe transport system that has improved the mobility and accessibility of the population in Metropolitan Lima, especially for the more disadvantaged population from the periphery.

The following table details the level of compliance with the project objectives through outcome indicators:

Outcome Indicators	Target at Project Completion	Progress To Date
% of users who are satisfied with their current transport service (overall perception)	60% of users of the new system believe that the public transport system has improved and are satisfied.	Satisfaction level of *Metropolitano* users: 82% (good and very good) Survey date: December 2010.
Reduction of users' travel time in the affected transport corridors	Users' travel time in the affected transport corridors is reduced by a minimum of 25% compared to the baseline.	Average travel time is 35 minutes. Travel time has been reduced by 34% over the baseline, exceeding the final target.
Reduction in the number of serious and fatal accidents on the COSAC trunk route	40% reduction in the number of fatal and serious accidents in the corridor compared to the baseline situation	9 accidents per month, of which 3 are serious. There have been 2 fatal accidents since the start of operations (7-28-10) to date.
Reduction in air pollution caused by vehicles in the *Metropolitano* corridor	Reduction of vehicular air pollution in the *Metropolitano* corridor compared to the baseline, as follows: 20% in fine particulate material ($PM_{2.5}$) and 15% in greenhouse gases (CO_2).	The number of tons/year of air pollution is not available. 324,440.52 ton/year of greenhouse gases, exceeding the final target.
% of low-income users benefited by the Project, especially those from the periphery	10% of low-income people benefited by the Project	*Metropolitano* low-income users: Upper low: 33.3% Bottom low: 13.5% Source: ICOM, November 2010

2. Physical Targets

Overall, the targets of the PTUL program have been complied with in a satisfactory manner. Details of the physical targets that were met are provided below, pursuant to the provisions of Loan Agreement No. PE-7209.

Performance Indicators	Target at Project Completion	Target Compliance
Number of km of mass transit busway corridors completed	29.40 km of mass transit busways were completed. Based on environmental considerations, the length of the trunk corridor was reduced to 27.48 km.	100% of the planned target.
Number of bus stations and terminals completed	35 bus stations. North and South Terminals in operation.	36 stations (including Central Station), 2 terminals (North and South). The final target was exceeded.
Number of passengers using the new system	600,000 passengers on a typical workday.	360,000, representing 60% of the final target.
Operation of the mass transit busway system	The entire system under the Project is in operation and all the pertinent concessions have been awarded.	Operation of the entire system and all concessions.
Recovery and enhancement of public spaces and green areas	100,000 m^2 of public spaces were recovered and enhanced as well as 40,000 m^2 of green areas.	Recovered public spaces: 13,475 m^2 in the North Yard and 3,855 m^2 in the South Yard. Green areas recovered: 60,000 m^2 in the Corridor and 40,000 m^2 recovered and transferred to municipal governments.
Air quality monitoring	Monitoring results publicly available in the Annual Report.	16 monthly air quality reports (Sep 2009–Dec 2010). The procurement process for the operation of the COSAC 1 monitoring network will be completed in September 2011. Starting in October the monthly reports will continue to be published on the website.
Institutional strengthening of municipal transport entities	At least 50 municipal staff trained in public transport planning, management and control.	Fideicomiso (Trust Fund): 14 staff SNIP Transporte: 24 staff Modeling: 10 staff SIT: 10 staff Total: 58 staff
Social impact mitigation	At least 2,500 affected public transport workers have benefited from microcredits or have received training to return to the labor market.	"Business Training of Transport Operators" course with 288 participants from 96 public transportation companies.

3. Factors affecting execution

a) Factors beyond the MML's control

Project execution was conducted in a generally stable social environment. In terms of the economic aspect, the country experienced significant growth, especially in the last few years. This resulted in a reactivation of production and especially of construction, generating great demand for the execution of work and a low supply of construction companies; these aspects affected project implementation.

International and domestic trends led to increased prices for the major inputs (oil, iron, cement, etc.) and a decrease in the exchange rate from the time when the agreement was signed to that of its implementation. This resulted in approximately 20 percent higher costs for the Project's civil works budget.

On the other hand, during the execution of works, archeological remains were found in certain areas of Lima, affecting the execution time of stations in the South zone (Barranco) and Center of the corridor (Jirón de la Unión), since it was necessary to complete the administrative procedures of the National Institute of Culture (*Instituto Nacional de Cultura*, INC) to obtain the permits required to continue the works.

b) Factors under the MML's control

Final Engineering Design Phase
Due to the Project's complexity, major efforts by the Department of Studies and Projects were required during the engineering design phase. It initially had limited budget resources and its staff lacked the necessary experience; this gave rise to delays in the architectural and engineering studies of the Center and North Zone Urban Insertion works, as well as in the final study for the North Yard. Furthermore, the technical dossiers were developed in stages and no integrated study for the execution of the COSAC I works was carried out. Consequently, these were reformulated several times, resulting in a disconnect among the infrastructure, social, transport and operational studies that had to be overcome during the execution of the works.

The lack of training of technical staff in the rules for international procurement also caused delays in the procurement of the studies. There were difficulties with the financial transfer to EMAPE for the final study of the institutional facilities.

Project Implementation Phase
The increased scope of the original project activities led to increased costs and longer work execution periods; for example, there was a shift from a Central Station surface design to an underground one, three new overhead crossings (España at Garcilaso, España at Washington, Lampa at Roosevelt), interconnection of the Central Station with Vía Expresa Grau, improvement in the paving from asphalt to concrete, and fiber optic ducts in the entire *Metropolitano* System.

The difficulties encountered with interferences with public utilities along the corridor; many times these interferences were very old networks and their public utility database was not updated. Consequently, public utility companies proposed various dates to change these interferences, which were not compatible with the work completion date and needed to be undertaken as additional work in order to be able to meet the operation's start-up date.

On the other hand, the delay in the works for the North Yard generated a major risk for the start of operations, since this yard has over seven hectares to store the buses belonging to three operators and it houses the North gas center. The reason for the delay

was that the zone allocated to the North Yard was located on an old trash dump, and if paved directly it would have generated high risks. Since no other site with a sufficient area was available, it was decided that earth moving would be done at a greater depth (six meters), and that led to more time being required to complete the work.

During the execution of the works in some zones, such as the districts of Barranco and Chorrillos, there were strong changes in transport patterns. In Barranco the direction of some roads was changed and some accesses were eliminated. In Chorrillos, project execution affected central shoulders that had been forested by the population and the district. These changes generated opposition from the population due to poor initial communication. Problems were also encountered in the North Leg due to the elimination of some pedestrian bridges and the relocation of some pedestrian access points, which resulted in longer access distance.

In the case of Barranco, following a recommendation from the Banks, a dialogue board with organized groups from the district was set up; this was later discontinued since the parties failed to reach agreement. This initial opposition from the population also generated delays in the execution of the Project's works. With the exception of Barranco, in the other cases the issues were resolved directly by *Protransporte* with the affected groups during project execution. After these experiences, *Protransporte* initiated prior dialogue with the population, with successful results.

Social and Environmental Impact

COSAC I lacks an Environmental Certification pursuant to the provisions of Law No. 27446 (the Law of the National Environmental Impact Evaluation System). The reason is that at the start of the Project the environmental authority to certify the Project had not yet been defined. The Ministry of Transport and Communications is currently being asked to define an environmental management instrument to adjust COSAC I in order to obtain a national document that certifies our environmental management of the completed works.

During the execution of the works, although an Environmental Impact Study was conducted in each of them to mitigate impacts, there were a number of complaints from neighbors affected by some segments of COSAC I. In each of these cases, *Protransporte* prepared a Social Mitigation Plan that was designed to mitigate the impacts generated by the Project.

Bid for Operators and Technological Aspects

Regarding the bidding processes to award the fare collection system and the bus operation, it was necessary to issue a second call for bids, since there were no adequate proposals or bids. Once the bidding for the operation of the buses was completed, the legal process and approval of the financing plan took approximately one year. In addition, bus assembly took one more year.

The installation of the turnstiles in the feeder buses was dependent on the arrival of the lots and the implementation of the validations at the stations experienced delays due to

the delay in the completion of the stations. It should be noted that *Protransporte* and the construction companies had to coordinate in order to allow the fare-collection concessionaire to work in the stations before these had been formally accepted.

Administrative Aspects
The international procurement unit initially demonstrated failures in its procedures; for that reason there were delays in awarding some international studies. Some bidding processes were also declared vacant; this had a direct effect on the time for the completion of the project schedule. The no-objection proceedings by the multilateral banks took approximately one week for the IDB and two weeks for the World Bank, since the physical documentation was sent to Washington so that the process could be completed at the World Bank.

4. Financial Return

The implementation of Lima's Urban Transport System is not yet generating returns that would allow it to be self-sustaining. This is fundamentally due to the fact that the service demand is, on average, 62% percent of the forecasted demand (600,000 passengers/day).

To date, *Protransporte* is receiving eight percent of the revenue for validated tickets for its participation in the system. This does not cover the costs for security or the system's sustainability (maintenance, cleaning, basic utilities: lighting, water, personnel, etc.). For this reason, during the current fiscal year *Protransporte* has required direct transfers from the Metropolitan Municipality of Lima (MML) in order to meet its operating costs.

In order to increase project demand, coordination with the Project's operators has been initiated to implement measures and actions to improve the system's revenues (tariff policies, service operation improvements, etc.). On the other hand, coordination is under way with the Municipality's Urban Transport Department to enforce the intangibility of the corridor with regard to conventional public transport.

5. Role of the Bank and the Borrower

5.1 Bank's Role
The performance of the World Bank has been very satisfactory throughout the stages of project preparation, implementation, monitoring and supervision, with a timely response to the needs and requirements that arose. The missions in Lima were carried out with a highly professional multidisciplinary team. From the start of the Project, the Bank has been disbursing the Project's financial and support resources in a timely manner. Its staff has participated directly in resolving some of the unexpected issues, such as the resolution of several controversies that arose with neighbors in the District of Barranco, which were overcome thanks to the advice and good will of many staff who have considerable experience in developing projects with similar characteristics in Latin America, as well as the inspection visits, which enabled us to overcome various issues in a timely manner.

5.2 Borrower's Role

We feel that our entity, which during the development of the project execution stage has managed to comply with the reformulated activity schedule, considered the Project's critical path. To this end it has been necessary to implement various corrective measures to resolve unforeseen activities, such as the bidding processes that were financed by the Banks and were declared vacant, a high turnover of professional staff, where it was necessary to contract supervision services and specialized consultants to guarantee the optimum quality of products and services in project implementation. At this time, when the project implementation phase is nearly completed, we should note that adjustments are still being introduced for the new system to operate under the best conditions.

6. Lessons Learned

- **Institutional Management of the Project**

Although the Project had a defined implementation unit, after the cost increases identified in the Project the MML decided that certain works to be financed with its own resources would be executed by another implementing unit called the Municipal Enterprise for Fare Management in Lima (*Empresa Municipal Administradora de Peaje de Lima*, EMAPE). The Bank recommended that all works be executed by *Protransporte*. However, the MML decided to have two implementing units, depending on the sources of financing. The interaction of the implementing units was not recommendable since it makes it difficult to supervise the Project as a whole and demands a greater supervision effort.

- **Development of the Project's final studies**

For the purpose of initiating several works quickly once the Loan Agreement had been signed, the development of the studies was fragmented and the trunk studies were put up for bids in segments, but they were also segmented in separate components since the final studies to improve the corridor's busway were developed separately from those corresponding to its stations, yards, terminals, and road safety works. This gave rise to disconnect in project execution and some inefficiency in work execution: after the corridor was completed the works for the stations began, generating additional earth moving and later it was the turn of the road safety works.

In addition, the fact of having the final studies developed during project execution generates considerable pressure to have them completed faster, which may affect their quality. In that sense, we recommend that a significant part of the final studies be developed during project preparation and that instead of being fragmented they be integrated.

It is necessary to have a procurement unit that is strengthened and has experience in projects of the scope of COSAC, in order to conduct the calls for bids and the contracts speedily while preserving the legal framework.

The work schedule should define dates and milestones in order to schedule the services required to comply with a project of such scope.

- **Work Execution**

It is important to conduct an ongoing analysis of the country's economic environment in order to try to forecast exchange rate behavior, especially since the loan disbursements and the loan itself were in US dollars.

It is also important to measure the supply and demand of the various goods and/or service providers, especially those involved in construction. It is important to note that the infrastructure costs represented over 70 percent of the Project's costs in the Mobility and Urban Environment Improvement Component.

It is necessary to coordinate from the outset with utilities in order to identify where there may be potential interferences and assign an economic value and time to them, so that these amounts are included in the plan's budget and, more importantly, to determine the possible dates so that these utilities can work in parallel or in advance of reaching the zone with the work execution, having them already relocated or in the process of doing so.

It is recommended that relations with the INC be improved in order to have clarity about the clearance process for archeological zones and expediting the process.

- **Operation**

It is necessary to consider the bus manufacturing period in the general schedule and the buses should be available when the infrastructure is completed; that is, they must be assembled, tested and has the necessary operating certificates; all the fare-collection and georeference systems should also be fully implemented.

It is important to consider that the acceptance of each station should be adequately scheduled since the fare-collection company needs to execute works to install cables and validators, PVAS and ticket windows at each station. A possible solution to the delays is managing a partial acceptance of stations in order to work in parallel in the technological interventions.

With regard to the General Control Center (*Centro General de Control,* CGC) and Data Center, it is necessary to take into account the time required to implement the services and the interoperability of the various fare collection operators and the multiple systems used by bus operators.

It is important to consider the time needed to develop the fare-collection software and other systems required for the CGC to comply with its functions of monitoring and controlling the operations of the COSAC System, since these systems should be tested and approved on the basis of model systems by the CGC, and also consider the aspects of interoperability across the various software packages for a single CGC. It should be noted that there is already a Data Center and a CGC implemented with capacity to support new systems. However, it is necessary to consider that this Data Center has limited space availability, which must be taken into account if the new COSAC systems or

complementary corridors entail the addition of computer equipment (servers, racks, support services, etc.).

The Project must be implemented with a comprehensive vision of its components, works, urban insertion, environmental and social impact mitigation, and mitigation for operators, in order to have a single guideline for the Project, work in a coordinated manner in the operations and infrastructure unit ,and reduce the number of reformulations of the studies.

The bidding processes for the works in the corridors and stations need to be considered in advance since there is a high probability that they cannot be awarded. This aspect needs to be considered because the selection processes take time.

It is essential to conduct an in-depth monitoring of infrastructure development, especially the yards, gas centers and stations. Any delays in these aspects could translate into delays in the start of operations. In general the critical path relies on some infrastructure work or works.

Adequate soil studies must be considered, especially in the yard zones since this is where the buses are stored, where the operators have their administrative offices, and where the gas centers are located. Even if the corridor's infrastructure is implemented, the buses cannot operate without a fuel supply.

Regarding the gas centers, it is essential to determine where they will be located in order to begin the proceedings and obtain the licenses from the Supervisory Agency for Investment in Energy and Mining (*Organismo Supervisor de la Inversión en Energía y Minería,* OSINERGMIN) and the Ministry of Transport and Communications.

- **Social and Environmental Impact**

During the development of the final study, the communication and social team should begin the process of the study's communication and dissemination in the affected areas in order to receive the views of the population and prevent generating social conflicts. When the views of the population are gathered after the study has been completed, there are greater probabilities of social conflicts. The development of the final studies should also have a broader vision and not only consider technical mobility aspects but also elements such as spaces for advertisement and service promotion, among others.

The EIAs, in their environmental social management plan, consider the development of various programs, one of which is a social affairs program. Likewise, they include a Citizen Participation Plan. The development of both in a coordinated manner with the relevant authority and stakeholders involved would greatly mitigate the barriers that arise at the various stages of development of a new project.

A percentage of the work budget should be allocated to its environmental management, on a mandatory basis.

Since a project's environmental management comprises all its stages, including operation, it essential to implement an Environmental Management System.

- **Project Communication**

The execution of BRT projects is characterized by being very intrusive in their construction, since they are executed in the city's more congested areas, due to the fact that they are precisely intended to improve mobility in the zones where there is the highest demand. For that reason, during the construction stage and even if the implementation of bypasses is considered, they generate considerable traffic congestion and major disturbances for the population. For that reason, during work execution the Project should place great emphasis on communicating with the population to explain its benefits and prevent creating a negative opinion among the population. We believe that during project execution, due to budget reasons the Project lacked sufficient communication and this generated an initial rejection of the Project. The negative opinion of the Project could only be reversed when the Project began operating and its benefits became tangible.

- **Monitoring and Control**

During the initial part of the Project it is important to prepare a schedule, using the infrastructure works as a basis, considering all their aspects as described above, and also considering the possibility of a partial acceptance of stations or the corridor in order to conduct the works connected with fare collection, electric works or other details.

Finally, it is necessary to consider a plan against risks at all project stages, including study reformulation, unsuccessful bidding processes, existence of interferences with the execution of the works, possible delays in the works, unsuitable soils, macroeconomic aspects, changing technology, delays in the availability of buses and stations, development of inadequate software, etc.

Grant

RECIPIENT'S FINAL REPORT FOR THE GEF LIMA TRANSPORT PROJECT

I. PROJECT ACTIVITIES

COMPONENT A: RATIONALIZATION OF PUBLIC TRANSPORT: This component had a budget of US$1.55 million and was initially aimed at contributing to the reduction of public transport oversupply. It was then reoriented to develop a study on the integration of the public transport system in Metropolitan Lima–Callao, based on the initial BRT line, the urban train and a possible second BRT line. In addition, this study suggested the development of proposals to implement a new institutional framework to regulate transport in the urban area of Lima and Callao.

As part of the abovementioned elements, on August 15, 2008 an Inter-institutional Cooperation Agreement was signed by FONAM and *Protransporte* to implement the study for integrating and rationalizing public transport in Lima. Subsequently, on September 23, 2009 a contract for the services was signed with an international consortium in the amount of US$1.53 million. The GEF Grant financed 80 percent of the cost of the study and *Protransporte* financed 20 percent. On October 18, 2010, the international consortium delivered the final report.

COMPONENT B: CONSOLIDATION AND EXPANSION OF THE BIKEWAY NETWORK OF LIMA AND CALLAO: This component was aimed at promoting bicycle use and improving and expanding the existing bikeways. It had a bikeway rehabilitation and construction component and a bicycle-use promotion component.

Subcomponent B.1: Bikeway Rehabilitation and Construction

Total kilometers of bikeways rehabilitated and constructed: 59.

Activity: B.1.01 Bikeway rehabilitation: The Project rehabilitated 33.2 km of bikeways in Lima–Callao.

Activity: B.1.02 Construction of new bicycle tracks: The Project constructed 18.87 km of bikeways.

Activity: B.1.04 Special studies for Lima and Callao: The following studies were developed: (i) Master Bicycle Plan for Lima and Callao; (ii) Engineering Designs for the Rehabilitation of Av. Arequipa; (iii) Comparative Study of Three Areas of Lima for Bicycle Transport; (iv) Study to Identify Bicycle Routes in Lima; (v) Identification of Priority Bikeways in Districts of Lima; (vi) Baseline and Midterm Evaluation of Bicycle Use; (vii) Strategic Bicycle Transport Plan; (viii) Study of Safer Urban Cycling in Lima and Callao; (ix) Assessment of the Impact of Pedestrianization in the Historic Center of Cuzco; and (x) Diagnostic and Identification of Alternatives to Improve Urban Transport in Iquitos.

Activity: B.1.10 Small works: The Project financed small horizontal separation devices for bikeways and vertical signs in school areas located on Av. Dansey and Pacasmayo.

Activity: B.1.17 Parking management and installation: 668 parking facilities were installed.

Activity: B.1.18 Bikeway construction in the pilot area: 3.6 km of bikeways were constructed in Lince–Jesús María. Furthermore, a traffic light at the intersection of Jr. Huiracocha, Av. Mello Franco and Av. Mariátegui was installed.

Others: Bikeways constructed by PEMTNM, with project support: 3.3 km of bikeways were constructed by PEMTNM. For these works, the Project contributed to the supply of construction materials such as speed bumps (e.g., Av. Militar, Av. Bartolomé Herrera).

Subcomponent B.2: Promotion of Bicycle Use

This subcomponent was executed in a satisfactory manner. After contracting consultants to develop the urban cycling promotion and training activities in 2005, the Project realized that, due to the characteristics of the interventions, a more efficient way was needed. The Zoom Program was created in 2006. An intervention strategy was designed with teams formed by a coordinator and promoters for each area. The team was under the supervision of a field coordinator. The monitoring of these actions was carried out by external consultants.

During 2006, the activities in various schools were carried out with difficulties due to teachers' resistance. From 2007 onward, these activities had better results and were coordinated on the basis of a written agreement with the schools and the participating municipalities. The supervision of Zoom Program activities was also added; this was carried out the Project's Marketing Department and the abovementioned field coordinators. This supervision was carried out through weekly coordination meetings and fluid communication.

This supervision model made it possible to resolve execution difficulties in the field. Furthermore, over the years the scope and complexity of the interventions increased. In 2005, the Project worked with 12 schools, in 2006 with 16 schools, in 2007 with 35 schools, and in 2008 with 40 schools. The Project's effort increased. Initially there were interventions in streets, then in schools during physical education classes, and finally a cross-sectional school curriculum, including physical education, vocational training, sciences, technology and environment, and social sciences.

The educational program was based on the European experience. A budget of US$0.82 million was allocated for the development of these activities. The program has been recognized by Dutch specialists and the World Bank as a best practice in Latin America.

The other activities carried out by the Project under this subcomponent included: (i) bicycle trains (*caravanas*), which brought students to and from school on bicycles; (ii) Bus Zoom, a traveling bicycle clinic, repairing and teaching people how to repair bicycles, in addition to raising awareness; (iii) Car-Free Day, in which the Project participated between 2006 to 2009 with various activities, such as leaflets, bike trains with a grassroots organization (CicloAxión), schools and universities, a general mobilization on bicycle to Congress to support the Law to Promote Bicycle Use as a Means of Sustainable Transport; (iv) a competition entitled "Sustainable transport as a means to take care of the environment–A new generation of urban cyclists," which was launched in 2009; (v) Environmental Brigades, which contributed to the dissemination

and execution of environmental initiatives from the grassroots level in order to promote cultural change toward sustainable mobility; (vi) activities to foster the sustainability of the Zoom Program, focusing on the training of teachers and school principals; (vii) Law to Promote Bicycle Use as a Means of Sustainable Transport, which was adopted on October 8, 2010; and (viii) an inter-institutional agreement with the Peruvian Scout Association to implement a "To Clean the World" campaign at national level.

COMPONENT C: INSTITUTION BUILDING IN SUSTAINABLE TRANSPORT: This component was aimed at the Municipalities of Lima and Callao, the district municipalities that are part of them, as well as other institutions that carry out tasks in the areas of environmental and/or transport planning. Among other activities, 12 conferences were held with the participation of international experts on various subjects related to sustainable transport, as well as 17 training courses on Sustainable Transport Planning and the Formulation of Investment Projects in Transport with a Sustainable Vision.

The following replication activities were carried out in the cities of Cuzco, Iquitos and Trujillo: (i) Assessment of the impact of pedestrianization of the historic center of Cuzco; (ii) Diagnosis of alternatives for the improvement of urban transport in the city of Iquitos; and (iii) an international consultant's visit to Trujillo to develop training and pre-appraisal for a sustainable transport program.

In 2007, as a result of coordination with the NGO "*Ciudadanos al Día,*" a category to promote sustainable transport ("Road Safety and Sustainable Transport") was incorporated in the Public Management Good Practice Award Program.

COMPONENT D: ADMINISTRATION, MONITORING, EVALUATION AND REPLICATION STRATEGY: This component included administration costs, monitoring, and replication of the Project in other provincial cities. Among other aspects, it included: (i) the bicycle-use evaluation study, (ii) financial and procurement audits, and (iii) services of the Project's accounting, financial and administrative staff, and operating expenses.

II. SUSTAINABILITY OF THE PROJECT

In the future, the four project components will be strengthened and extended to other provinces of the country, where there have already been efforts to create BRT systems, as in the case of Arequipa. This city was part of the Project's institution-building activities. Other district municipalities in Lima, such as San Borja, San Isidro, Miraflores and Santiago de Surco, have made important investments in traffic calming and management. These interventions were carried out by professionals trained by the Project and by mayors closely involved in the development of these issues.

Today it is easy to confirm that more and more political parties and elected mayors are incorporating in their political plans the development of sustainable mobility actions, such as bikeways, traffic improvements and public transport as well as measures to decrease vehicle air pollution. In this regard, the current mayor of Lima is giving an important impulse to PEMTNM with the construction of bikeways and the organization of community bike rides as a means to promote urban cycling.

Examples of the sustainability of different project components include: for Component A, the agreements between the National Government and the Municipality of Lima to use

the implementation of the second East-West BRT line to achieve physical and fare integration between the first BRT line and the urban train. This integration was analyzed in the Study for the Consolidation of the Integrated Public Transport System in Lima; and for Component B, the construction of bikeways by several district municipalities, as in the cases of Lince and San Borja, and the preparation of engineering designs for bikeways, as in the case of Santiago de Surco.

III. LESSONS LEARNED

The best achievement of the institutional capacity-building activities in the public and private sectors was to include "mobility" in the public agenda as a broader concept of "transport." In this context, based on the Project's influence, district municipalities such as San Isidro, Miraflores, San Borja, and Santiago de Surco have financed bikeways and traffic-calming measures, among others. The Project's impact extended to cities such as Arequipa, Trujillo, Cuzco and Iquitos.

COMPONENT A: Study for the Consolidation of the Integrated Public Transport System in Lima. Based on coordination carried out with the various public transport agencies in Lima and Callao, FONAM succeeded in obtaining the National Government's interest in the need to integrate the operation of the urban train with the first BRT corridor as well as in evaluating the future integration with the planned second BRT corridor. Today the need for physical and fare integration between both systems is being discussed at the highest level in the Ministry of Transport and Communication. This will be the starting point to organize the chaotic public transport system of Lima and Callao.

The Study for the Consolidation of the Integrated Public Transport System in Lima (SIT) showed the need for integrating the bikeway network with the urban train and BRT lines through integration stations or stops with bike-parking facilities, as occurs with Transmilenio in Bogotá.

COMPONENT B: Consolidation and Expansion of the Bicycle Track Network of Lima and Callao. Since the Project was designed, it was clear that to promote bicycle use as a means of transport the following barriers should be overcome: (i) absence of personal safety, (ii) long distances between home and work, and (ii) notable absence of safe parking for bicycles.

These structural urban mobility barriers could not be overcome during the project implementation period. Instead, some of these barriers, such as the lack of safety, have worsened. According to current public opinion, it is the most serious issue that the city is facing.

A significant fact is that in those areas where these barriers are less perceived, bicycle users have remained constant or have increased.

The identification of certain problems in the use of bikeways, such as their use as parking spaces and in some cases even for motor vehicle traffic, suggests that the regulatory framework regarding the related traffic fines needs to be revised.

According to the Association of Bicycle Manufacturers of the National Society of Peruvian Industries, the extension of the bikeway network requires the integration of the

different bikeways. Although there was significant progress, the network is uncoordinated and does not permit the cyclists to have access to an origin and destination for a defined trip. Furthermore, there are no specific facilities available in the public transport system. These limitations constitute opportunities that should be taken advantage of to develop a more efficient bikeway network. On the other hand, it is important to mention a new bicycle-use alternative, which is opening through the sustainable buildings that FONAM is promoting. This considers short bikeways in large housing complexes that are being constructed in Lima and Callao and throughout the country.

COMPONENT C: Institution Building in Sustainable Transport. One of the Project's greatest lessons is the need to coordinate common policies for the Metropolitan Area of Lima and Callao, which are two different administrative entities. Lack of such policies was the biggest obstacle in the development of the Project and its results. The contribution of the SIT financed by the Project proposes a number of solutions in the institutional area.

COMPONENT D: Administration, Monitoring, Evaluation, and Replication Strategy. Project monitoring highlighted the need to clearly define the Project's baseline variables. This lack of clarity made the midterm and final evaluations more difficult.

IV. PERFORMANCE OF THE WORLD BANK, OTHER PROJECT PARTNERS AND FONAM

WORLD BANK

Through its different teams, the World Bank's support for the Project was ongoing. Trust in FONAM and the Project Management Unit made it possible to advance toward project execution, carry out modifications in some subcomponents, and even incorporate changes in the first component during the last year of execution. The Bank's support for project activities was decisive in the relationship with PEMTNM and the various entities of the Metropolitan Municipality of Lima (MML).

The Bank's missions were always considered by the Project as a source of guidance and support in the resolution of implementation problems and as an opportunity for technical assistance and timely information.

During each mission, the World Bank team reviewed project progress in the field and met with the different actors, contributing its knowledge and advisory services. Technical meetings with the project team were always enriching. Communications with the World Bank were very fluid and advantageous for project development.

OTHER PROJECT PARTNERS

During project implementation, relationships with the MML, the principal beneficiary of the bicycle-use promotion activities, were relatively complicated. The MML's road development policy gave priority to cars, and despite having a special department for non-motorized transport (PEMTNM), the bikeway rehabilitation and construction work under the Project did not have the effective support of the relevant departments in the MML. However, in the last two years, PEMTNM consolidated its work in the dissemination of the proposal to use bicycles as a means of transport and invested its own resources, both in infrastructure and in promotion in schools, universities, companies and

public spaces. PEMTNM has worked in social/environmental mitigation interventions, in raising the awareness of transport operators and in media communication campaigns. The experience gained by PEMTNM during project implementation substantially enriched its work on sustainable transport.

The Provincial Municipality of Callao supported project activities and facilitated the construction of various bikeways. However, it never allocated resources for the promotion of sustainable transport. The Project paid for the monthly promotion activities carried out in public spaces in Callao for a period of three years.

In the last year of project implementation, a partnership was established at nationwide level with the Peruvian Scout Association. The Scouts supported several project activities and promoted bicycle use of part of their institutional activity. This intensified their commitment.

FONAM

At the beginning of the Project, FONAM's administrative unit lacked the necessary capacity to carry out a project of this type. In addition to hiring a proper team of specialized professionals, one of the first project activities was to contract a company specializing in the development of administrative-financial software. The implementation of this software, including staff training, took more than one year but the result was satisfactory and all World Bank requirements in this area were met.

FONAM also created a Sustainable Transport Unit. This unit has the capacity to continue with sustainable transport activities and projects. The work carried out and the Project's achievements are recognized by the different transport actors, i.e., municipalities, the Ministry of Transport, and other regions of the country.

Another positive fact during project implementation was the trust given by FONAM's Executive Director to the Project Management Unit. This delegation for the Unit to autonomously carry out project activities was necessary for the flexibility of the processes and the achievement of results.

It should be emphasized that, from the beginning of the Project, the project manager was fully involved in each of the activities carried out by the Project's technical units.

V. CONCLUSIONS

In addition to the direct benefits, the Project also had indirect impacts: (i) the promotion of an urban mobility strategy as a broader concept for urban transport; and (ii) the inclusion of bikeways and important traffic and transport improvements in the specific political plans of the new mayors of Lima and Callao and several district municipalities. These guarantee that the Project can be replicated.

The Project's direct achievements are the following:

- Through rehabilitation and new bikeways, the Project, jointly with PEMTNM, contributed to nearly 50 percent (59 km) of the existing bicycle infrastructure in Lima and Callao. It should be noted that PEMTNM and other municipalities plan to carry out several bikeway projects.

- The district municipalities, such as Surco and San Borja, and cities such as Arequipa and Trujillo, carried out projects and are going to implement bikeways with local funds based on studies, technical assistance and training provided by FONAM under the framework of the Project.
- Engineering designs were prepared for an additional 8.66 km of new bikeway projects.
- The institutional capacity of more than 40 municipalities in Lima, Callao, Trujillo, Iquitos, Cuzco and Arequipa was strengthened.
- More than 3,000 professionals from municipalities in Lima and Callao, the Ministry of Transport and Communications, the Ministry of Housing, universities, as well as professional associations, consultants, and policemen were trained in sustainable mobility and the use of bicycles as a means of transport, thus placing this subject on the cities' public agenda.
- 71 schools in Lima and Callao implemented the educational program as part of their curricula.
- 370 primary and secondary school teachers trained in the educational program generated dissemination effects in each school.
- The schools have the necessary tools (bicycles and accessories) to continue the courses on cycling skills.
- 66,632 schoolchildren were trained in urban cycling workshops.
- 50,383 schoolchildren were made aware of the use of bicycles as a sustainable means of transport.
- University students were adequately trained in urban cycling workshops.
- Members of the environmental brigades in Callao were trained to carry out ongoing programs in schools.
- Videos and educational manuals on urban cycling were produced.
- Communication materials for the general public were prepared.
- The Bus Zoom repaired 25,361 bicycles.
- Actions were carried out to support the approval of the Law to Promote the Use of Bicycles as a Sustainable Means of Transport. The law was approved in the Congress of the Republic and published in the Official Gazette "*El Peruano"* on October 8, 2010.
- The awareness of 2,905 people was raised through activities in public spaces.
- An inter-institutional agreement was signed with the Peruvian Scout Association.
- An inter-institutional agreement was signed with the Regional Education Director of Callao.
- The Project contributed to the strengthening of user associations (a group of urban cyclists, local district associations, local environmental and parochial brigades) and municipalities through their education and local participation departments (Lince, Jesús María, Los Olivos, Window, La Punta, Bellavista, Carmen de la Legua, La Perla, Callao and Lima).

The indirect achievements were the following:

- Generation of an active network of authorities and professionals who, through the training courses and international conferences on sustainable transport, have a new

vision of the city's development and are promoting sustainable buildings and cities. New construction projects in Lima and Callao are considering the implementation of bikeways and traffic-calming measures.

- Because of the Project's results, various public authorities have recognized the possibility of carrying out an educational proposal that encourages bicycle use as a sustainable means of transport in the coming years. It should be noted that the Ministry of Education, through the Director of Community and Environmental Education, recognized that the educational proposal for non-motorized transport has the elements to be implemented, validated and subsequently regarded as public policy upon being included in school curricula.
- In civil society, the Project received the recognition of different sector specialists who consider that bicycle promotion and the educational campaigns undertaken with project support is the "best practice" in Latin America. Members of the Bicycle Partnership Program, I-EC of the Netherlands, consider that the Zoom Program was developed successfully.
- In addition, Project has contributed to the development of capacity building among administrative and financial staff of FONAM, thus helping to position it as a financial and environmental institution.

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

N/A

Annex 9. List of Supporting Documents

IBRD and IFC Country Partnership Strategy for the Republic of Peru for the Period 2007–2010, April 24, 2007.

Project Appraisal Document and Aide-Mémoires of preparation and supervision missions in IRIS.

Seventh Quality at Entry Assessment (QEA7), Fiscal Year 2004–2005.

Plan Maestro de Transporte Urbano de Lima, Japan International Cooperation Agency (JICA), 2004.

Programa de Racionalización de la Oferta de Transporte Público en Lima Metropolitana, Gerencia de Transporte Urbano y el Instituto Metropolitano *Protransporte* de Lima, 2005.

Comparative Study "*Satisfacción de Usuario con el Metropolitano*", *Protransporte*, December 2010.

Final evaluation regarding bicycle use in the framework of the GEF Lima Transport Project prepared by CIDATT, 2010.

Surveys "*Encuesta de Conocimientos, Actitudes y Prácticas*", GEF Lima Transport Project, 2007, 2008, 2009.

Supreme Decree (*Decreto Supremo*) 213-2007-EF, "*Régimen temporal para la Renovación del Parque Automotor de Vehículos Diesel para el cambio de matriz energética de diesel a GNV*", 2007.

Study for the Consolidation of the Integrated Public Transport System in Metropolitan Lima, "*Estudio para la Consolidación del Sistema Integrado de Transporte Público de Lima*", Getinsa, Taryet, Geoconsult S.A., 2010.

Law No. 29593 declaring bicycle use of national interest and promoting its use as a sustainable mode of transport, 2010.

Ordinance (*Ordenanza*) No. 954 of MML establishing the municipal policy guidelines for urban public transport for the Lima Metropolitan Area, 2006.

Council Decision (*Acuerdo de Consejo*) No. 297 of MML approving the strategic plan for bicycle transport, July 16, 2009.

Study on a proposal to implement the public transport vehicle scrapping plan "*Propuesta de Implementación del Plan de Chatarreo para Vehículos de Transporte Público*", Apoyo Consultoria S.A., 2011.

Draft Municipal Order with regulatory framework for vehicle scrapping of Metropolitan Municipality of Lima (*Ordenanza Municipal de Aprobación del Reglamento Marco de Chatarreo Vehículos de la Municipalidad Metropolitana de Lima*), 2012.

Annex 10. Lessons Learned from the GEF Project

Many of the bicycle-related lessons described below also take into account the experience from a project with similar characteristics carried out in Santiago, Chile, a few years earlier (GEF Sustainable Transport and Air Quality for Santiago Project – P073985). This project was successful in attracting more new cyclists.

Modal shift requires a complex cultural change and thus a long-term engagement. Successful bicycle-use promotion requires a long-term engagement, which cannot be ensured through a single externally financed project. Since isolated and short-term campaigns have limited impacts, a project should ideally only support bicycle promotion if there is an established institution in charge of NMT that is likely to continue with the promotion activities after project completion. In addition, the external support should focus on the design of the promotion strategy and the training of trainers, including training materials and possibly bicycles, while the promotion activities themselves should be part of the country's own commitment.

Reaching out to employers and employees is difficult but important for short-term results. The experience in Lima and in Santiago showed that it is not easy to convince private and public firms to participate in promotional programs and foster bicycle use among their employees. Both projects envisaged the involvement of employees, and both projects had little success. Consequently, the main focus was on schools and universities and on events in public spaces. However, to see more immediate results in terms of increased ridership, bicycle promotion needs to reach out to the adult population, which makes its own travel decisions.

Bicycle-promotion programs in schools should focus right from the beginning on teaching the teachers. During the first years of project implementation in Lima, the Project financed the implementation of promotion activities. This was justified by the fact that Lima still needed to develop and test the promotion strategy, program and materials. A focus right from the beginning on training the teachers could have increased the changes in the strategy's self-sustainability in schools.

Nevertheless, the self-sustainability of bicycle-promotion programs in schools also faces practical obstacles. Once the Project had designed and tested the bicycle-promotion program, all efforts in Metropolitan Lima went toward introducing it into the school curricula to ensure self-sustainability. In Callao, the Project came very close to succeeding. However, since the Project mainly worked with public schools in poor areas, even if it had succeeded in formally including bicycle promotion in the school curricula, the problems of repairing bicycles, financing spare parts and, in the longer term, replacing bicycles and training new teachers remained unresolved. Alliances with other partners, such as the Scouts, health or environmental organizations, might have helped to overcome these problems.

Good monitoring and evaluation of bicycle promotion activities pays off. The promotion strategy included a comprehensive M&E mechanism managed by an independent consultant. It aimed at tracking the activities that were carried out, ensuring

compliance with schedules, assessing impacts, and regularly providing feedback on difficulties and problems to improve the program. Due to the early departure of the consultant and to resource constraints, in the final year the M&E mechanism was simplified and directly managed by the implementation agencies together with their other activities. This resulted in minor implementation issues, limited feedback to improve the program, and shortcomings in data availability.

In a large city such as Lima, with a relatively low population density, it is recommendable to work with a few districts instead of the city as a whole. By nature, the bicycle is a mode of transport for relatively short trips, while a large and dispersed city necessarily requires longer trips. In Lima, prioritizing bicycle interventions mainly based on real and potential demand initially resulted in dispersion all over the city. Little focus was also placed on the idea of creating a network, which at a citywide level would anyway have been difficult and costly. Instead, in Santiago the project only supported activities in a limited area, and this may have paid off in terms of increased bicycle use.

Similarly, bicycle promotion should come as a package, including different types of promotion activities as well as physical interventions, all focused on one specific area, at least initially. In Lima, the Project carried out many different activities, including various types of activities in schools, the organization of public events, bicycle repair, the promotion of legal changes, safety actions, and infrastructure improvements. These activities took place all over Lima because they were not welcome everywhere and opportunities were taken where they arose. A more selective and geographically focused approach could probably have increased the effectiveness of these activities.

If the objective is to reduce GHG emissions, project interventions in developing countries should focus on wealthier areas, where people with access to individual transport live. Such a focus, if successful, may create a fashion that reduces the urge in lower-income people to switch to a motorized mode as soon as they have the means to do so. From this perspective, an indicator of success in developing countries would be the presence of middle- and upper-class professionals on bikes, including women. Instead, in countries such as the US, where the typical bicycle user is a middle- to higher-income white-collar worker, the marketing focus is now often on lower-income blue-collar workers with access to cars.

Advocacy through grassroots movements may be an important success factor. Cities that recently succeeded in increasing bicycle use attribute an important role to grassroots movements and strong citizen advocacy. This in turn is likely to lead to strong political support at different levels, such as in Santiago where NMT was a specific program of the Urban Transport Plan (Plan de Transporte Urbano para Santiago, PTUS) and part of the presidential campaign. Santiago also had champions at the level of municipalities, and the region played an active role in promoting NMT and providing funding. In Lima, the grassroots movement was incipient. Apart from some strongly engaged individuals, the Project managed to work with and provide support to one small bicycle organization. Political support was mostly confined to some mayors' personal interest in NMT.

Although it is obvious that successful bicycle promotion requires safe parking facilities, it is not easy to achieve. Lima pushed for a regulation to make the provision of bicycle parking in public buildings mandatory and studied the financial viability of

different safe bicycle-parking schemes. Lima did not find a perfect solution and most of its efforts eventually went into installing parking facilities in public places near security staff, such as close to financial institutions or the municipal police.

Enforcement may jeopardize the success of bike lanes and not fully segregated bikeways in developing cities. In Lima, after an initial focus on fully/physically segregated bikeways, a much more flexible approach was taken, mixing physically segregated bikeways with bikeways/lanes separated by small raised devices and/or simple traffic-calming measures. The Project was particularly successful in taking advantage of ongoing road repaving works to include bike lanes separated by small raised devices. However, this approach caused frequent conflicts with car parking, and enforcement was a serious problem, often aggravated by the absence of parking regulations and the police's lack of interest.

The physical separation from general traffic makes bikeways more attractive to new users. Depending on the amount and type of traffic, a physically separated bikeway may not be required and traffic-calming measures may often be sufficient to provide a safe environment for cyclists. However, physical separation may be necessary to attract new users. Therefore, in certain situations this may justify the physical separation of bikeways, even if they are considerably more expensive and often more difficult to implement because of space restrictions.

Bikeways are generally welcome as long as there is surplus road space that is not needed for car parking. The experience in Lima showed that it is difficult for decision makers to treat parking spaces for a bike facility and even more difficult to allocate scarce road space from cars to bikes. However, not all reductions in road space mean reductions in traffic flows. An urban road with two lanes in both directions may be converted to a road with one lane per direction and a middle lane for left turns without losing capacity. This frees the space for a bi-directional bikeway. Consequently, traffic engineering solutions should be considered as part of bicycle facility planning and small studies to convince decision makers may be necessary.

Construction companies are not very keen to bid for bikeway facilities. Both in Lima and Santiago, the construction industry showed limited interest in bikeways, probably because of the small size of the works. Planning several facilities jointly and bidding the works jointly may help.

Bus scrapping needs a strong political determination. In many developing countries, bus scrapping is closely linked to bus fleet rationalization, which is not at all popular because it affects an industry with strong political power and has serious social implications. Even if bus scrapping is decoupled from bus fleet rationalization, selling old buses to operators in smaller cities or rural areas without local air pollution problems may be more attractive than providing the necessary mechanisms and incentives to scrap these vehicles.

Annex 11. The Management's Action Plan

In response to the Inspection Panels Investigation Report, Management has submitted its Report and Recommendation to the Bank's Board, and the Management Action Plan contained therein was approved by the Board. This annex describes in detail the actions contained in the Management's Action Plan.

1. Traffic Issues

Management will supervise finalization of the 2011 TMS, taking into account the results of the consultation with the Municipality and community in Barranco and comments from Protransporte.

The Traffic Management Study (TMS) financed by the Bank comprised a Traffic Management Plan for the Barranco District and also a Traffic Management Plan for Lima's Historic District. The objective of the study was to analyze the impact of the Project in Barranco and propose solutions through improved traffic management actions. The TMS was completed on December 6, 2011 by Barriga-Dall'Orto Engineering Consulting Firm. Subsequently, the Bank asked the firm to undertake a preliminary analysis of the technical feasibility and costs of extending the Expressway Paseo de la República from its current end point –at the entrance to Barranco—up to the South Pan American Highway. This analysis and additional work on the extension of the Expressway was carried out at the request of the Barranco's community.

As agreed in the Action Plan, the Bank team supervised the consultant that carried out the TMS. The drafts of the interim reports were consulted extensively by the Bank and the consulting firm. The draft reports were posted on the Bank's Lima office website and distributed to key actors and agencies. A consultation event was attended by over 80 neighbors. In addition, agencies consulted included Barranco's Municipality, the Metropolitan Municipality of Lima (MML), the Metropolitan Institute Protransporte (*Protransporte*), and the Urban Transport Department of the MML (*Gerencia de Transporte Urbano,* GTU). The consultant incorporated all the feedback received and the final report is different from the drafts. The final TMS is posted in the Bank's website for reference and further analysis by interested parties.

Finally, the traffic study, presents several proposals for improvement of traffic conditions in Barranco and Lima´s Historic District. For Barranco, the proposals include: improvement of five intersections along the Panama – Bolognesi axis, traffic calming measures through traffic light control systems, Pompeian sidewalks, and a project for traffic calming in the center of Barranco.

Protransporte gave serious considerations to the results of the TMS and used to craft its own improved proposal for Barranco. *Protransporte,* through its Studies and Projects Department, has carried out consultations on this proposal with the Barranco mayor's office, organized groups as *Decision Ciudadana, Salvamos Barranco, Pro Barranco Profesionales,* and non-organized groups of district neighbors. The objective is to receive

feedback and arrive at agreements to start executing the works and measures intended to mitigate traffic in the district.

The proposal put forth by *Protransporte* to the community of Barranco is based on the objective of "recovering and preserving" Barranco's historic and monumental heritage, by generating protected urban spaces and implementing traffic calm zones. This is the same objective of the TMS. To achieve this objective, the *Protransporte*'s proposal intends to restructure some roads and traffic flow directions, reduce public transport routes through the rationalization and reallocation of the conventional public transport lines which currently circulate through the district. This proposal reflects the various alternatives made by the stakeholders, the community and the Municipality of Barranco, as well as those developed by the consulting firm.

The activities and works being proposed are the following:

- Remodeling *Ovalo Balta* (also in the TMS),
- New pedestrian crossing for the Mercedes Indacochea School (also in the TMS),
- Restructuring urban transport routes in order to improve the public and private transit. This action includes minor works improvements and adjusting traffic lights and signaling, among others (also in the TMS).
- New left turn in Panama Av. And Souza Street, to prevent eastward traffic from entering the west zone of Barranco as it currently happens (also in the TMS).
- Project to improve and reduce the north-south bound circulation of public transportation by reducing 10 public transport routes, vehicular load and traffic calm proposal, and including restricted vehicular traffic, among others (also in the TMS).

Protransporte expects to arrive at a consensus on said proposal and to receive a formal answer from the Municipality of Barranco and its authorities, who in principle have expressed their consent verbally. *Protransporte* has already assigned budget and is planning to implement the traffic management measures.

On the other hand, the Mayor of the Metropolitan Municipality of Lima announced, on February 26, 2012, that the MML will launch a bid tender for the extension of the Expressway Paseo de la República through a private initiative process and that it will take the form of a toll concession. This, in turn, will alleviate further traffic in the Barranco District.

Protransporte will retain a consultant specializing in micro-design of urban intersections. This consultant will review the entire Project alignment, with an emphasis on Barranco and historic downtown Lima, and recommend solutions to any identified problems. The report will be consulted with the community.

An international consultant who is a transport specialist was retained with World Bank funds to support *Protransporte* in preparing a technical audit of the Metropolitano system. Such audit comprised a review of the micro-design intersections, as well as road safety spots along the segregated busway.

The audit was completed in March 2011 and recommended a series of actions and improvements from the standpoint of traffic management and road safety on the exclusive busway of the first Line of the Metropolitano, as well as the enlargement of pedestrian crossings, widening of sidewalks, reprogramming of traffic light cycles, among other things. The consultant classified them into works that can be executed immediately and others that can be implemented in the medium term; these include improvements in the station Estadio Unión-Colegio Indacochea, Balta station, Plaza Las Flores station and Bulevar station.

The international consultant hired for the micro-design of intersections also included among its recommendations road safety measures for users and pedestrians along the segregated corridor. The recommendations include measures such as opening pedestrian crossings, pedestrian overpasses, safety measures to channel pedestrian traffic (especially school-children), sidewalk widening, and modifications of risk zones or areas of road safety for pedestrians, signaling, etc. These road safety measures and actions have been incorporated in the budget for civil works in intersection improvements by Protransporte.

Protransporte, based on the consultant's recommendations, has been conducting the development of the pre-investment studies and technical bid tenders, to define the civil works package improvements along the segregated corridor. For 2012, *Protransporte* has allocated a budget of S/. 33 million for improvement works (about US$ 12 million).

The investment projects defined by *Protransporte* will be implemented in the North, Center and South segments of the corridor and have the purpose of improving accessibility to the urban system; that is, (i) improve access from the intersections in the vicinity of the stations and terminals, (ii) enhance pedestrian and vehicle safety, and (iii) signaling and sidewalk dimensions.

Protransporte already has technical studies for the following actions arising from the audit study: expansion of the Pedestrian Crossing, Sidewalks and other aspects of the Naranjal Terminal, pedestrian crossing in the street Los Pacaes – Túpac Amaru and expansion of the north entrance to the station Tomás Valle (FEVACEL market).

Management will supervise Protransporte's implementation of the traffic safety action plan. Protransporte will report publicly on the progress achieved.

Management supervised *Protransporte* through missions and local staff. Management offered technical advice and support on how to carry out consultations and dissemination. Protransporte's capacity to carry out consultations improved and the aspects of the traffic safety plan that have been implemented were consulted extensively with the neighboring communities.

The Bank has also secured a US$2.5 million PHRD Grant from the Government of Japan to the MML to be executed by *Protransporte*, which is expected to be signed in the second quarter of 2012. The Grant has the objective of funding the design, planning and implementation of urban transport subprojects to improve the mobility of pedestrians with disabilities for their inclusion in Lima's urban transport system.

2. Action on Environmental Issues

The Bank's Management will provide technical support to help carry out the ex-post environmental audit of the project.

The Bank's Management prepared and sent the terms of reference to the Municipality of Metropolitan Lima (MML) to conduct the Project's ex-post environmental audit on October 14, 2011. The General Manager of *Protransporte* answered the letter sent by the Bank with note No. 590-2011-MML dated November 11, 2011 and attached Report No. 006-2011-MML. Said report, prepared by *Protransporte*'s environmental specialists, adequately summarizes the process to conduct the ex post environmental audit of COSAC I and recommends awaiting the answer of the Ministry for the Environment regarding the selection of the competent environmental authority. Once the authority is selected, *Protransporte* will be able to obtain the approval of the terms of reference and thus conduct the COSAC I's ex post environmental audit study. The process and development of the study continue and, to that end, *Protransporte* and the Bank are seeking funding for its execution.

3. Consultation and Communications Strategy

Management will support Protransporte as it organizes, carries out, and records the results of consultations prior to the adoption and implementation of any solutions to the traffic management issues.

The Bank's Management held regular meetings with the *Protransporte* team, in order to: (i) diagnose the bottlenecks in the relations between *Protransporte* and Barranco's organized and non-organized stakeholders; (ii) facilitate a framework for dialogue and trust with the stakeholders and the establishment of Dialogue Boards (*Mesas de Diálogo*) on traffic issues in Barranco; (iii) establish a dialogue with the stakeholders at two levels, with the organized citizens of Barranco and with the authorities and opinion leaders in the district; (iv) improve the relations of the Lima Metropolitan Municipality-*Protransporte* and the Municipality of Barranco in order to continue with the execution of pending works for traffic management mitigation, with prior stakeholder consultation.

As a result of the new dialogue policy of the Municipality of Lima with the authorities and stakeholders of the district Municipalities, progress was made in establishing dialogue boards and resulted in the preparation and presentation of proposals to mitigate traffic in Barranco. This was a participatory, inclusive and open process.

As explained above in the section on the traffic management study, the Bank retained the services of the engineering consulting firm to evaluate traffic and present a proposal to improve traffic management in Barranco. The draft reports were consulted extensively with the stakeholders in Barranco and with the authorities of Municipality of Lima, Municipality of Barranco, *Protransporte* and Ministry of Culture. The consultation process was broad, participatory, inclusive and complete. It lasted eight months given the requests to extend it by several stakeholders. The consulting firm contributed with key recommendations and actions so *Protransporte* could define and present a proposal on traffic mitigation measures in Barranco which was consulted with the stakeholders. Other interested organizations were also given the opportunity to present their proposals on the subject of traffic management. Thus, proposals were received from social organizations such as *Salvemos Barranco, Decision Ciudadana, Grupo de Arquitectos Pro-Barranco* and *Universidad Nacional de Ingeniería.*

As a result of this consultation process on traffic management mitigation proposals in Barranco, *Protransporte* has prepared a plan to address traffic in Barranco which will be

executed in 2012-2013. The municipal authorities will be responsible for its follow up, monitoring and coordination.

Management will continue to emphasize to Protransporte and the authorities in Barranco the importance of an effectively functioning grievance and redress mechanism.

During the previous administration, *Protransporte* was characterized by the lack of a strategy to engage with stakeholders and for adopting a reactive behavior to events and criticism. The new *Protransporte* administration has assessed this previous situation and modified its stance. *Protransporte* has adopted a strategy of *sustained* engagement and a dialogue policy. As a result of the change, a readily accessible voice, complaints and grievances system has been designed, created and put in place, which includes: (i) an Internet platform or website for information and consultation by citizens of Barranco; (ii) a Call Center which records the calls received and answers provided to the caller; (iii) a Complaints Book at the Metropolitano Bus stations; (iv) a personalized claims office at the central station; and (v) an annual customer service survey. *Protransporte* is now a case study for good practice in terms grievance and redress mechanisms.

In Barranco, Management held working meetings with the Municipal authorities to disseminate the experiences in other towns in the region, and citizen participation techniques. It also offered documentation on good governance practices. As a result of these working meetings, the Mayor requested greater technical assistance and training for her municipal staff. In response, Management offered three training workshops: (i) "Workshop on Voice Mechanisms and Conflict Prevention for Development"; (ii) "Workshop on Good User Care Practices, Claims and Grievances" and (iii) "Workshop on a Claims and Grievances Module in the Municipal Website"

The workshops included the participation of technical teams from *Protransporte*, the MML and Barranco's Municipality and the last of the workshops was held exclusively for Barranco's IT team and its Communications and Image Office.

Additionally, Management retained the services of an IT specialist to evaluate the municipality's website, design the Claims and Grievances (C&G) Module), train the personnel in charge and install and put in operation the Module in the website.

The C&G Module is already operating smoothly. It currently allows the municipality to receive comments and complaints from the neighbors of Barranco on a menu of services being offered by the Municipality, especially on urban transport. The Mayor has approved the initiative and will monitor the results of the use of the Module closely.

Management will provide enhanced learning opportunities for the staff to help improve their awareness of and skills related to, stakeholder consultations.

Management reviewed the experiences derived from the Barranco case and identified challenges and lessons learned, comparing it to other cases in Bolivia and Peru, having identified that the matter of consultation implies key elements that need to be considered in the operations. The experience leads to conclude that consulting with stakeholders should go beyond holding a consultation meeting or event, and should rather be viewed as a two-way *process* with feedback to the project. Another finding was that consultation should constitute a dialogue and engagement process with the stakeholder involved in the

project. To that end an engaged counterpart is required, one that is committed and open to dialogue.

Management organized a training session, titled "World Bank Approach to Stakeholder Consultations – The Road to Problem Free Project Implementation? Practices and Lessons in the Sub Andean Region". It was an internal World Bank event to train staff on stakeholder consultation. The session made use of the videoconferencing network, allowing for participation of the staff in Lima, Quito, La Paz and Washington. The objective of the BBL was to share experiences and lessons learned on the subject of stakeholder consultation. The BBL was organized in partnership with the Transport and Social Development Units, and tasks team leaders and specialists in the Region were invited. The BBL disseminated a keynote presentation on social stakeholders in consultations called "Stakeholder Consultation in Investment Lending" and a panel in which cases from Bolivia and Peru were presented, as well as thoughts on lessons learned by Management.

The comments made in the BBL have enabled a reflection on the subject which is of interest in the region, even more so because of the significant presence of indigenous peoples and the subject of consultation has been included in the region's public agenda.

In Peru there is underway a consultation process for the formulation of the Previous Consultation Regulations, an instrument to implement the new Consultation Law based on Convention 169. The lessons learned in Peru will influence the Andean sub region.

4. Supervision

The Bank's Management will continue intense supervision.

The Bank's Management has been addressing the problems in Barranco long before receiving the Inspection Panel's request in October 2009. With the formulation of the Action Plan, Management has carried out a periodic and intensive supervision from headquarters in Washington DC, as well as through three local staff (social, environmental and transport specialist), from the offices in Lima, Peru, and with international consultants, as required. The Bank has carried out several missions to monitor and evaluate the proposed actions, that are the subject of this report and, as can be seen, it has been possible to execute them as planned. Since what is required, in particular, is to execute improvement works, in accordance with *Protransporte*'s investment budget, the Bank will continue supporting *Protransporte* with technical assistance, if it is requested by the institution.

5. Physical-Cultural Resources

In addition to supervising completion of, and consultations on, the 2011 TMS, Management will advise the Municipality of Barranco on how to incorporate in the District's Participatory Development Plan 2011-2021, of an analysis of Barranco's historic buildings and monumental areas and measures to preserve the patrimony in the service of a long-term dynamic economic and social development of the District.

Management has monitored and provided advice to Barranco's Municipality in response to a request from the Mayor. To this end, the following actions were organized: (i) missions by the urban planning and heritage specialist; (ii) working meetings to present

the region's issues and experiences in the management of cultural heritage; (iii) meetings with the municipality's specialized staff; (iv) a consultant specializing in heritage management and planning; and (v) a Workshop on Management and Planning on Monumental Heritage in Barranco.

The missions by the urban planning specialist led to a liaison with the Spanish Cooperation agency and engagement with the municipal administration for future support. Through working meetings with the municipality staff increased awareness and allowed, the municipality to have an historical monumental action plan. The consultant's work included an expedite mapping of the heritage and assistance in planning.

The workshop on heritage management and planning provided training to the municipality staff dealing with tourism, urban planning, marketing and institutional image. The Workshops facilitated content on strategic management as applied to cultural heritage management, Vision, Mission, successful heritage experiences in cities in the region, and contributions for cultural management planning. The Workshop identified the bottlenecks in heritage planning and actions in the municipality and to overcome them the recommendations were: (a) having a team dedicated to monumental heritage; (b) establishing a partnership plan with the private sector; (c) updating an inventory of the monumental heritage, and (d) classifying the heritage for medium and long term actions.

The Municipality of Barranco now has short and medium term strategies that will enable it to define its vision and planning for heritage management, turning the historical area of Barranco into a site with cultural and added value. The Municipality has agreed to create an Office to deal with the monumental heritage.

6. Supporting Documents

Table 1 shows the supporting documents, letters and files of the Action Plan. These documents are available in the project files.

Table No. 1
Supporting Documents of the Action Plan – February 2012

Actions	Studies completed and/or Letters	Firm/Individual Consultant	Completion Date
1. Traffic Issues			
Management will supervise finalization of the 2011 TMS, taking into account the results of the consultation with the Municipality and community in Barranco and comments from Protransporte.	Urban and traffic proposal for the Barranco district, presentation by Protransporte Study "Traffic Management in Two Lima Districts" financed by the Government of Spain/Ministry of Economy and Finance and the World Bank	Protransporte Barriga – Dall'Orto S.A. Ingenieros Consultores	October 2011 December 6, 2011
Protransporte will retain a consultant specializing in micro-design of urban intersections. This consultant will review the entire Project alignment, with an emphasis on Barranco and historic downtown Lima, and recommend solutions to any identified problems. The report will be consulted with the community.	Study "Technical Audit, Micro-design and Road Safety of Lima's Metropolitano System", financed by Protransporte and the World Bank.	ABSA Ingenieros, Eng. Carlos Valenzuela	March 2011
Management will supervise Protransporte´s implementation of the traffic safety action plan. Protransporte will report publicly on progress achieved.	Final Report on Road Safety for COSAC I. Document "Intersections of Risk for Vehicular and Pedestrian Safety detected in metropolitan corridors"	Paul Guitink, WB international consultant Protransporte, Operations Management, Safety Unit.	2010. 2011.
2. Action on Environmental Issues			
The Bank's Management will provide technical support to help carry out the ex-post environmental audit of the projects.	Terms of reference for COSAC I ex post environmental audit Letter sent by Susan Goldmark , WB Director for Peru, addressed to Mayor Susana Villarán attaching the TOR prepared by the WB for the ex post environmental audit. Letter of response from Mayor Susana Villarán	Team of WB Environmental Specialists World Bank	September 2011 October 14, 2011

Actions	Studies completed and/or Letters	Firm/Individual Consultant	Completion Date
	to Susan Goldmark, WB Director and Protransporte responsible executing the Audit.		
3. Consultation and Communications Strategy			
Management will support Protransporte as it organizes, carries out, and records the results of consultations prior to the adoption and implementation of any solutions to the traffic management issues.	Report from the Training Workshop on Conflict Management and Citizen Participation with the participation of Protransporte, MML and Municipality of Barranco. Dialogue policy, consultation meetings, e-mail communications	WB social specialist WB Communication specialist and Protransporte	May 2011 Sep. – Nov. 2011
Management will continue to emphasize to Protransporte and the authorities in Barranco the importance of an effectively functioning grievance and redress mechanism.	Report from the Training Workshop on Voice and Claims Good Practices, with the participation of Protransporte, MML, Barranco Municipality and INC. Report on advice and installation of a Claims and Grievances Module in Barranco's municipal website, with the IT team and the Image and Communications Office. Letter from Management to the Mayor of Barranco.	WB social specialist IT specialist Link to the Municipality's website Management	June 2011 Nov. 2011 – February 2012 Feb. 2012
Management will provide enhanced learning opportunities for the staff to help improve their awareness of and skills related to, stakeholder consultations.	Report BBL *"World Bank Approach to Stakeholder Consultations -The Road to Problem Free Project Implementation?, Practices and Lessons in the Sub Andean Region"*, participation of WB staff from the transport & social development units in La Paz, HQ & Lima Office .	Project team, TTL, WB specialists	Jan. 25, 2012
4. Supervision			
The Bank´s Management will continue intense supervision.	Supervision mission	World Bank	November 2009
	Supervision mission to supervise the implementation of the Action Plan	World Bank	August 8 to 14, 2010

Actions	Studies completed and/or Letters	Firm/Individual Consultant	Completion Date
	Conduct consultations on the Barranco traffic management study, as part of the World Bank's Action Plan. Also, supervise the Action Plan proposed by Management.	World Bank	December 4 to 9, 2010
	Supervision mission to monitor the execution of the Action Plan	World Bank	February 6 to 9, 2011
	Supervision mission to supervise the implementation of the Action Plan	World Bank	May 16 to 19, 2011
	Supervision mission to monitor the execution and completion of the Action Plan	World Bank	December 5 to 9, 2011 February 15 to 19, 2012
5. Physical-Cultural Resources			
In addition to supervising completion of, and consultations on, the TMS 2011, Management will advise the Municipality of Barranco on how to incorporate in the District´s Participatory Development Plan 2011-2021, of an analysis of Barranco´s historic buildings and monumental areas and measures to preserve the patrimony in the service of a long-term dynamic economic and social development of the District.	Communications with the Spanish agency. Report from the local consultant on planning the management monumental heritage in Barranco. Report of the Heritage Workshop Letter from Management to the Mayor of Barranco.	Urban planning and rearrangement specialist. Letters on this subject Team of WB Social Specialists Planning specialized consultant Task Team Leader communication	Feb. -- May 2011 Nov. 2011 – Feb. 2012. February 2012. February 2012.