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The World Bank

Report No: ICR00001317

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-52724)

ON A

GRANT FROM THE GLOBAL ENVIRONMENTAL FACILITY

IN THE AMOUNT OF US$ 6.98 MILLION

TO THE

REPUBLIC OF CHILE

FOR A

SUSTAINABLE TRANSPORT AND AIR QUALITY FOR SANTIAGO (GEF) PROJECT

March 24, 2010

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

CURRENCY EQUIVALENTS
(Exchange Rate Effective 02/03/2010)

Currency Unit =
1.00 CLP = US$ 0.0019
US$ 1.00 = 528.35 CPL
FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

Anillo Central	Central Ring of Santiago
3 CV	Ministry of Transport's Emissions Testing Laboratory
CAS	Country Assistance Strategy
Ceq	Carbon Equivalent
CER	Certified Emissions Reduction
CGTS	Executive Commission for Transport in Santiago (*Coordinación General de Transporte de Santiago*)
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
COMICYT	Inter-ministerial Committee for City and Territory (*Comité Interministerial Ciudad y Territorio*)
Comunas	Municipalities
CONAMA	National Commission for the Environment (*Comisión Nacional de Medio Ambiente*)
CONAMA-RM	CONAMA Metropolitan Region
CONASET	National Commission for Traffic Safety (*Comisión Nacional de Seguridad del Transito*)
CPS	Country Partnership Strategy
DPL	Santiago Urban Transport Programmatic Development Loan
EMP	Environmental Management Plan
ESCO	Energy Service Company
FMS	Financial Management Specialist
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gases
GIS	Geographical Information System
GPS	Global Positioning System
GoCH	Government of Chile
GORE	Santiago's Regional Government (*Gobierno Regional Metropolitano de Santiago*)
GWP	Global Warming Potential
IADB	Inter American Development Bank
IBRD	International Bank for Reconstruction and Development
ICR	Implementation Completion and Results Report

IFC	International Finance Corporation
IPCC	Intergovernmental Panel for Climate Change
JEC	Full-time school day (*Jornada Escolar Completa*)
MIDEPLAN	Planning Ministry (*Ministerio de Planificación*)
MINVU	Ministry of Housing and Urban Development (*Ministerio de Vivienda y Urbanismo*)
MIT	Massachusetts Institute of Technology
MOP	Public Works Ministry (*Ministerio de Obras Publicas)*
MTT	Transport Ministry (*Ministerio de Transporte y Telecomunicaciones*)
NGO	Non-governmental Organization
NMT	Non-Motorized Transport
NOx	Nitrous Oxide
PCF	Prototype Carbon Fund
PDF-B	Project Development Facility Block B
PDO	Project Development Objective
PM	Particulate Matter
PPDA	Environmental Prevention and Clean-Up Plan (*Plan de Prevención y Descontaminación Ambiental*)
PTUS	Santiago Urban Transport Plan (*Plan de Transporte Urbano para Santiago*), initially also known as TRANSANTIAGO
SECTRA	Transport Planning Secretariat (*Secretaría de Planificación de Transporte*)
SEREMITT	Regional Service of the Transport Ministry (*Servicio Regional del Ministerio de Transporte y Telecomunicaciones*)
SERVIU	Regional Service for Road and Urban Development (*Servicio Regional de Vialidad y Urbanismo*)
SOx	Sulfur Oxides
TAL	Santiago Urban Transport Technical Assistance Project
TRANSANTIAGO	Initially acronym for the Santiago Urban Transport Plan, but nowadays generally used to refer to the public transport modernization component of the Plan
UNDP	United Nations Development Program
VOC	Volatile Organic Compounds
WBI	World Bank Institute

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CHILE
SUSTAINABLE TRANSPORT AND AIR QUALITY FOR SANTIAGO (GEF) PROJECT

CONTENTS

A. Basic Information

Country:	Chile	Project Name:	Sustainable Transport and Air Quality for Santiago (GEF)
Project ID:	P073985	L/C/TF Number(s):	TF-52724
ICR Date:	03/30/2010	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	REPUBLIC OF CHILE
Original Total Commitment:	USD 7.0M	Disbursed Amount:	USD 6.7M
Revised Amount:	USD 7.0M		
Environmental Category: C		**Global Focal Area: C**	
Implementing Agencies: CGTU			
Cofinanciers and Other External Partners:			

B. Key Dates

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	12/19/2002	Effectiveness:	06/21/2004	06/18/2004
Appraisal:	08/04/2003	Restructuring(s):		04/28/2008 08/21/2009
Approval:	11/25/2003	Mid-term Review:		06/22/2007
		Closing:	06/30/2008	09/30/2009

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes:	Moderately Satisfactory
Risk to Global Environment Outcome	Moderate
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance

Bank	Ratings	Borrower	Ratings
Quality at Entry:	Satisfactory	Government:	Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance:	Satisfactory	**Overall Borrower Performance:**	Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	Satisfactory
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		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Central government administration	8	5
General transportation sector	80	75
Other social services	5	10
Sub-national government administration	7	10
Theme Code (as % of total Bank financing)		
Access to urban services and housing	24	20
Climate change	25	25
Environmental policies and institutions	13	15
Improving labor markets	13	5
Pollution management and environmental health	25	35

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	Pamela Cox	David de Ferranti
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F. Results Framework Analysis

Global Environment Objectives (GEO) and Key Indicators(as approved)

1.1. To help reduce greenhouse gases (GHG) from ground transport in Santiago through the promotion of a long-term modal shift to more efficient and less polluting forms of transport, and the adoption of sustainable low-GHG transport measures. To that end, the project will support the implementation of the 2000-2010 Urban Transport Plan for Santiago (TRANSANTIAGO, formerly known as PTUS), a comprehensive multi-sector plan, which is consistent with the overall objectives of the GEF operational program on sustainable transport.

The plan specific objectives are to (i) maintain share of public transport (60% of total trips); (ii) promote rational management of transport demand, internalizing all costs from car travel; (iii) promote land-use policies that take into account environmental and transport dimensions helping reduce the average trip length; (iv) promote better coordination between agencies dealing with transport related policies and issues; and (v) reduce emissions of air pollutants from public transport (70% of PM10 and 45% of NOx emissions from 1997 levels).

1.2. To help improve air quality of Santiago, through reducing emissions of air pollutants like SOx, CO, PM, and NOx (which together with VOCs contribute to the formation of smog or tropospheric ozone (O3)).

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

(a) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Urban Transport Plan for Santiago implemented			
Value (quantitative or Qualitative)	Plan not implemented	Plan implemented		Plan largely implemented
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome largely achieved since the most important parts of the Plan were implemented			
Indicator 2 :	Modal Share of Public Transport Maintained (% of total trips)			
Value (quantitative or Qualitative)	56.6% of total trips in public transport (2001 Origin Destination Survey)	56.6% of total trips in public transport		Data not yet available

Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome cannot yet be assessed since data will be available only after the completion of the new Origin Destination Survey planned for 2010			
Indicator 3 :	Land-use policies in place to favor reduction in average trip lengths (km/trip)			
Value (quantitative or Qualitative)	No land-use policies in place to favor average trip length reductions	Land-use policies in place to favor reduction in average trip lengths (km/trip)		Only minor progress in terms of transport and land-use coordination
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome not yet achieved because no land-use policies to favor reductions in average trip lengths have yet been implemented			
Indicator 4 :	Barriers for introducing clean technologies for transport removed/incentives introduced			
Value (quantitative or Qualitative)	No tests for commercially available bus technologies and no introduction of regulatory measure or bidding conditions to ensure clean technologies	Barriers for introducing clean technologies for transport removed/incentives introduced		Commercially available bus technologies tested and bidding conditions to favor clean technologies introduced
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome largely achieved despite the fact that CNG and diesel-electric buses were not tested mainly because they were not available in Chile and are not yet commercially attractive			
Indicator 5 :	Non-motorized trips increased (% of total trips)			
Value (quantitative or Qualitative)	No increase	Increase in non-motorized trips		23% annual increase in the winter period and 12% in the spring period for areas with bikeways
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome achieved			
Indicator 6 :	Air quality indicators improved in spite of economic growth (reduction in concentration of controlled air pollutants)			
Value (quantitative or Qualitative)	No improvement	Improved air quality indicators		Air quality indicators improved (details are in annex 2 of the main ICR text)
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome achieved			

Indicator 7 :	Reduced carbon intensity per travelled km (Ceq/km)			
Value (quantitative or Qualitative)	No reduction in carbon intensity per travelled km	Reduction in carbon intensity per travelled km		Small modal shift from cars to bicycles and public transport system that operates with fewer, larger and more efficient vehicles
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	No quantitative data exists to assess this outcome, but qualitative information suggests that it was likely reached			
Indicator 8 :	Evidence of behavioral change towards a rational transport demand			
Value (quantitative or Qualitative)	No evidence of behavioral change	Evidence of behavioral change towards a rational transport demand		Greater bicycle use is likely to indicate at least some behavioral change
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Insufficient data available to assess the achievement of this outcome because behavioral changes take time to materialize			
Indicator 9 :	Growth in cars-km reduced			
Value (quantitative or Qualitative)	No reduction in growth in cars-km	Reduction in growth in cars-km		A small modal shift from cars to bicycles, which may have slightly reduced cars-km
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Insufficient data available to assess the achievement of this outcome			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Increased no. of bicycle trips in project area			
Value (quantitative or Qualitative)	No increase	Increased no. of bicycle trips in project area		23% annual increase in the winter period and 12% in the spring period for areas with bikeways
Date achieved	09/10/2003	06/30/2008		12/31/2009

Comments (incl. % achievement)	Outcome achieved			
Indicator 2 :	Reduced no. of bicycle accidents per 1,000 trips in the project area			
Value (quantitative or Qualitative)	No baseline data on bicycle accidents per 1,000 trips available; 192 total accidents involving bicycles in 2005	No. of bicycle accidents per 1,000 trips in the project area decreased		186 total accidents involving bicycles in 2006 and 227 in 2007
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Outcome not achieved; but since data are only available for three consecutive years, it is difficult to say if the trend in bicycle accidents is increasing or decreasing			
Indicator 3 :	Upgrading of local emissions testing laboratory 3CV and implementing tests comparing economic, environmental and technical performance of 3 commercially available technologies for buses (hybrid, diesel-electric, diesel and CNG)			
Value (quantitative or Qualitative)	No updating of local emission testing laboratory and no testing of bus technologies	Upgrading of local emissions testing laboratory 3CV and testing of 3 commercially available technologies for buses (hybrid, diesel-electric, diesel and CNG)		Local emission testing laboratory updated and testing of diesel technologies carried out
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome largely achieved despite the fact that CNG and diesel-electric buses were not tested mainly because they were not available in Chile and are not yet commercially attractive			
Indicator 4 :	Review and development of business schemes and management structures for the operators of the new Santiago public transport system, including program to retrain bus drivers and operators			
Value (quantitative or Qualitative)	No review and development of business schemes and management structures	Review and development of business schemes and management structures for the operators of the new Santiago public transport system, including program to retrain bus drivers and operators		Social assessment for bus operators and drivers carried out and mitigation measures proposed Business schemes and management structures for bus operators in Santiago reviewed with local resources
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. %	Intermediate outcome achieved, partly with local resources			

achievement)				
Indicator 5 :	Program for monitoring environmental, social, and operational effects of new bus system in place			
Value (quantitative or Qualitative)	No program in place	Program for monitoring environmental, social, and operational effects of new bus system in place		Program implemented
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome achieved with local resources			
Indicator 6 :	Assessment of scrapping and reallocation options for displaced buses resulting from the bus system reform			
Value (quantitative or Qualitative)	No assessment	Assessment of scrapping and reallocation options for displaced buses resulting from the bus system reform		Assessment carried out
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome achieved, but recommendations not implemented			
Indicator 7 :	Environmental Assessment of Transantiago			
Value (quantitative or Qualitative)	No strategic environmental assessment	Environmental Assessment of Transantiago carried out		Strategic environmental assessment carried out
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome achieved, but assessment was not as successful as intended because it focused on a methodology and indicators rather than on a system and institutional setup to introduce environmental evaluation in all aspects of transport planning			
Indicator 8 :	Institutional coordination of urban transport policies, incorporating environmental and land use dimensions			
Value (quantitative or Qualitative)	No institutional coordination	Institutional coordination of urban transport policies, incorporating environmental and land use dimensions		No institutional coordination
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments	Intermediate outcome not achieved because the strategic environmental			

(incl. % achievement)	assessment was not successful as intended, thus the project did not support the achievement of this output			
Indicator 9 :	Assessment of several urban development options for the Anillo Central from a transport and global/local emissions perspective and incorporation of the results in the decision-making process regarding land-use policies in this areas			
Value (quantitative or Qualitative)	No assessment	Assessment of several urban development options from a transport and global/local emissions perspective and incorporation of the results in the decision-making process regarding land-use policies in this areas		Methodology to carry out an integrated assessment of urban and transport projects developed and several urban development options assessed
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome partially achieved since options were assessed but the results were not incorporated in the decision making process			
Indicator 10 :	Assessment of options to integrate land-use and transport policies, and re-evaluate policies for housing and school location			
Value (quantitative or Qualitative)	No assessment	Assessment of options to integrate land-use and transport policies, and re-evaluate policies for housing and school location		Assessment of options to integrate land-use and transport policies for school location carried out; no re-evaluation of policies for housing location carried out
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome only partly achieved since the housing location study was cancelled			
Indicator 11 :	Completion of engineering and regulatory studies for traffic calming measures in the city center			
Value (quantitative or Qualitative)	No engineering and regulatory studies for traffic calming measures in the city center	Engineering and regulatory studies for traffic calming measures in the city center		Engineering and regulatory studies for traffic calming measures in the city center prepared
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome achieved, but studies not yet implemented			

Indicator 12 :	Assessment of institutional, legal and technical options for congestion pricing in Santiago			
Value (quantitative or Qualitative)	No assessment	Assessment of institutional, legal and technical options for congestion pricing in Santiago		Assessment of institutional, legal and technical options for congestion pricing in Santiago
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome achieved, but congestion pricing not yet implemented			
Indicator 13 :	Feasibility assessment of travel optimization pilots and reduction in the no. of veh-km generated by the people pertaining to the sample used for the travel optimization pilot study			
Value (quantitative or Qualitative)	No assessment and no reduction in the no. of veh-km	Feasibility assessment of travel optimization pilots carried out and reduction in the no. of veh-km generated by the people pertaining to the sample used for the travel optimization pilot study		Travel optimization alternatives studied; pilots not carried out
Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome only partially achieved since pilots were not implemented and no related reduction in the no. of veh-km took place			
Indicator 14 :	Design of legal, financial and institutional options for the incorporation of GHG emission reductions into the program to trade emission reductions from mobile and point sources in Chile institutional setup clearinghouse mechanism designed			
Value (quantitative or Qualitative)	No design	Design of legal, financial and institutional options for the incorporation of GHG emission reductions into the program to trade emission reductions from mobile and point sources in Chile institutional setup clearinghouse mechanism designed		Design of an emission compensation scheme and methodologies to estimate emission reductions

Date achieved	09/10/2003	06/30/2008		12/31/2009
Comments (incl. % achievement)	Intermediate outcome partially achieved since an emission trade program is only envisaged as a second step once the emission compensation scheme is fully operational			

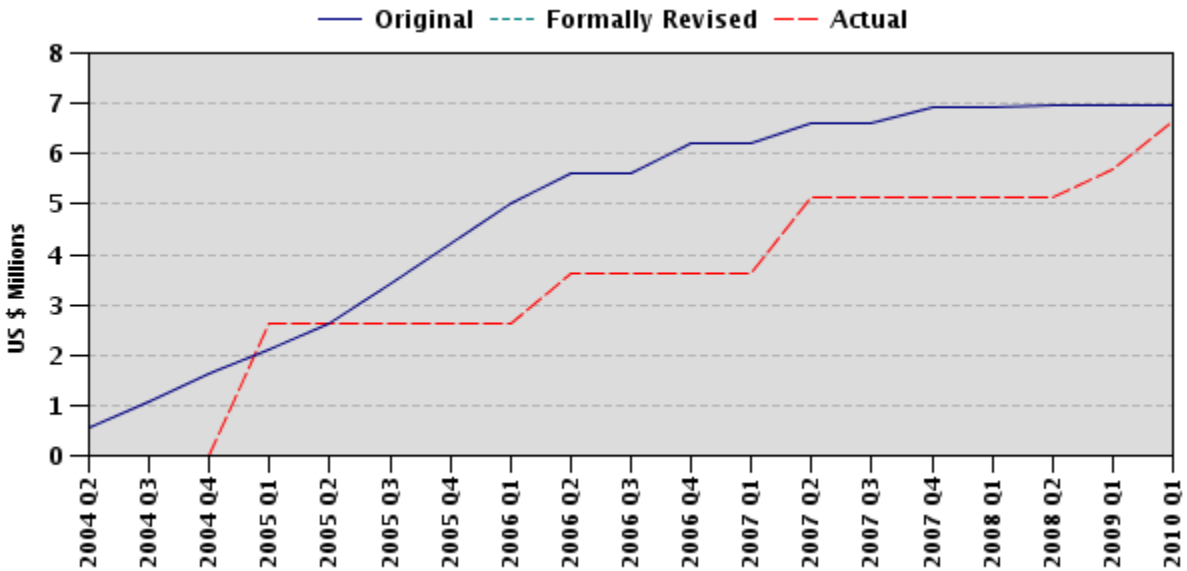
G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
1	06/18/2004	Satisfactory	Satisfactory	0.00
2	12/10/2004	Satisfactory	Satisfactory	2.61
3	04/20/2005	Satisfactory	Satisfactory	2.61
4	05/01/2006	Satisfactory	Satisfactory	3.61
5	11/20/2006	Satisfactory	Satisfactory	4.47
6	06/08/2007	Satisfactory	Satisfactory	5.13
7	10/08/2007	Satisfactory	Moderately Satisfactory	5.13
8	03/11/2008	Satisfactory	Satisfactory	5.13
9	10/22/2008	Satisfactory	Satisfactory	5.68
10	04/20/2009	Moderately Satisfactory	Moderately Satisfactory	5.68
11	09/29/2009	Moderately Satisfactory	Moderately Satisfactory	6.66

H. Restructuring (if any)

Restructuring Date(s)	Board Approved GEO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		GEO	IP		
04/28/2008	N		S	5.13	Extension of closing date and reallocation of proceed among disbursement categories
08/21/2009	N		MS	6.66	Reallocation of proceeds among disbursement categories

I. Disbursement Profile



1. Project Context, Global Environment Objectives and Design

1.1 Context at Appraisal

Country and sector background

1. Although Santiago's transport system at appraisal in 2003 was less chaotic than systems in other large Latin American cities, air pollution was acute and the transport sector suffered from a number of serious problems, which needed to be addressed. These included the following:

- High air pollution levels, with transport as the major contributor to local emissions;
- Exponential increase in car ownership and use putting pressure on the urban transport system through growing traffic and congestion (in the period between 1977 and 2001, car ownership in Santiago increased from 320 cars to 560 cars per 1000 households, the number of person trips went up by 69%, the share of motorized car trips increased from 12.3% to 38.09%, and the average length of these trips went up as well);
- Relative deficiencies in the organization of the bus system (for instance, bus operators competed for passengers in the streets, which generated operating inefficiencies and dangerous driving; fragmented bus ownership and few sizable companies, poorly coordinated and chaotic transport supply that did not adapt to demand levels, oversupply during off-peak hours contributing to unnecessary congestion, pollution and increased operating costs; long bus routes crossing the city center and the most heavily used corridors; lack of fare integration between buses and the metro increasing travel costs and reducing accessibility, especially for the poor); and
- Limited inter-agency coordination at metropolitan level (incipient coordination among the agencies dealing with transport and air pollution mainly due to the diversity of sectors and actors and the absence of a transport coordinating body at the metropolitan level).

2. At appraisal, environment and transport planning agencies had already initiated pro-active coordination around common goals and objectives through the 2000-2010 Santiago Urban Transport Plan (PTUS), at that time also known as TRANSANTIAGO. This Plan was designed as a means to reverse the previously mentioned trends and improve the urban environment. It consisted of a comprehensive and innovative multi-sector exercise that placed special attention on incorporating local and global environmental dimensions. The Plan was comprised of 12 programs,[1] of which public transport modernization was

[1] The PTUS included the following programs[0]: (1) Public Transport Modernization focusing, among others, on (i) replacing the previous approach to bus service contracting, from one with several thousand mostly informal owner-operators to one based on gross-cost contracting of 14 relatively large operators, each with 200 to 500 vehicles; (ii) providing incentives to operators to acquire high-standard low-polluting buses; (iii) redesigning the route network into a trunk and feeder system and reducing the number of buses; (iv) introducing a unified fare system; (v) separating fare collection as a competitively awarded concession and commissioning a public transport management/information center to control bus flows; (vi) limiting the number of taxis, and (vii) implementing a comprehensive infrastructure program to double the extension of the subway system and construct segregated busways, bus stops, interchange stations, terminals, and underpasses); (2) Road Investments and Traffic Control, which included constructing urban toll roads on the basis of public-private partnerships, allocating and managing road space to maximize social gains through traffic management schemes that give priority to public transport, pricing schemes and parking restrictions; (3)Location of Educational Institutions, including mainly the efficient management of school trips; (4) Promotion of New Commercial and Service Centers to reduce the length of certain trips; (5) Change in Residential Land-Use Trends

by far the most important and complex one because its design was expected to result in profound changes in the way residents moved within Santiago. For this reason, nowadays TRANSANTIAGO commonly only refers to the public transport modernization program and not to the PTUS as a whole.

3. In this ICR, we will use the term PTUS when referring to the overall Santiago Urban Transport Plan and the term TRANSANTIAGO to refer to the public transport modernization program although in the PAD and other project documents these terms were used indistinctly.

Rationale for Bank assistance

4. The Bank's support to the implementation of the PTUS, and in particular its public transport program, was expected to help address the main issues affecting transport and mobility in Santiago. In turn, this would reduce air pollution; by far the most serious environmental problem faced in the metropolitan area. It was also expected that improvements in transport and mobility would have an important effect in terms of climate change mitigation.

5. This support came in a package of three instruments: this GEF grant (P073985), the Santiago Urban Transport Programmatic Development Loan (DPL - P082412) and the Santiago Urban Transport Technical Assistance Loan (TAL - P086689).

6. The GEF grant strove to accelerate the introduction of the PTUS by concentrating on four project components, each one contributing to abate Green House Gas (GHG) emissions with different degrees of intensity and different implementation periods. The approach taken by the project was to support a multi-sector approach to improve mobility and quality of life, as opposed to focusing only on transport-specific measures. The Bank was expected to provide professional advice, facilitate coordination among actors, and ensure adequate program monitoring.

7. The DPL supported the public transport reform, including the institutional, organizational and managerial transformation of the system to ensure its continuity and sustainability. It also emphasized on fostering more integrated coordination among transport, land-use and environmental issues, including social and participatory elements, and supporting the difficult process of reallocating scarce street space to the exclusive use of non-motorized transport (NMT) and public transport. The TAL was meant to provide the necessary technical assistance and advice to support this difficult process of transformation.

8. This GEF project was consistent with the goals and strategic approach set out in the 2002 Country Assistance Strategy (CAS). Indeed, while supporting the PTUS it was expected to (a) enhance sustained economic growth and social progress; (b) foster the

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through, among others, mixed land-use and densification; (6) NMT, by improving conditions for cyclists and pedestrians; (7) Immediate Action Program to reduce the number of environmental alerts in Santiago; (8) Regulation of Urban Freight Transport to rationalize freight-related traffic and reduce its environmental footprint; (9) Monitoring and Control; (10) Financing; (11) Communication and Citizens' Participation; and (12) Other Programs, including institutional aspects, such as setting up coordinated transport and infrastructure planning mechanisms at the metropolitan level, and environmental issues, especially the first update of Environmental Prevention and Clean-Up Plan (PPDA) [0][0]launched by the National Commission for the Environment (CONAMA) in 2003 to reduce air and noise pollution from mobile and fixed emission sources.

inclusion of the most vulnerable groups through improved access at affordable prices and reasonable travel times, hence contributing to socially inclusive growth; (c) improve environmental conditions; (d) promote public-private partnerships through a concession mechanism for public transport services; and (e) modernize the State and build its technical capacity.

9. The project was also consistent with the GEF focal area of climate change, in particular with the overall objective and scope of the 2001 GEF operational program 11 on promoting environmentally sustainable transport.

1.2 Original Global Environment Objectives (GEO) and Key Indicators

10. The GEF project GEO, which are the equivalent of the Project Development Objectives (PDO), were:

- To help reduce GHG from ground transport in Santiago through the promotion of a long-term modal shift to more efficient and less polluting forms of transport, and the adoption of sustainable low-GHG transport measures. To that end, the project supported the implementation of the PTUS and its specific objectives[2]; and
- To help improve air quality of Santiago through reduced emissions of air pollutants like SOx, CO, PM, and NOx (which together with VOCs contribute to the formation of smog or tropospheric ozone (O3)).

11. This definition of the GEO needs to be seen in the context of the overall Bank support to the PTUS described in paragraphs 4 to 7. The existence of a battery of instruments to address the transport and mobility problems in Santiago explains the ambitious GEO in the light of the concrete project activities as well as their link to the implementation of the PTUS and the achievement of its specific objectives.

12. Similarly, based on this idea of a Bank support package to the PTUS, the GEF project had two types of indicators: (a) long-term performance indicators related to the implementation of the PTUS and (b) project performance indicators to measure the achievement of the GEO. The former, which were closely related to the implementation of the PTUS and so largely outside the control of the project activities, included:

- Urban Transport Plan for Santiago implemented;
- Share of public transport maintained;
- Land-use policies in place to favor the reduction of average trip length;
- Technological regulatory incentives to introduce clean technologies for transport introduced/barriers removed;
- NMT share of total trips increased;
- Growth in cars-km reduced;
- Air quality indicators improved in spite of economic and demographic growth;
- Reduced carbon intensity per travelled km; and

[2] The specific objectives of the PTUS were to (i) maintain the modal share of public transport; (ii) promote rational management of transport demand, internalizing all costs from car travel; (iii) promote land-use policies that take into account environmental and transport dimensions helping reduce the average trip length; (iv) promote better coordination between agencies dealing with transport related policies and issues; and (v) reduce emissions of air pollutants from public transport.

- Evidence of behavioral change towards more rational transport demand.

13. The project performance indicators included:

Component 1:

- Increased bicycle use as transport mode, in particular within/between the municipalities (*Comunas*) of Santiago, Providencia, and Ñuñoa; and
- Reduced number of bicycle accidents per 1,000 bicycle trips in those C*omunas*.

Component 2:

- Upgrading of local emissions testing laboratory (3CV) so that it could perform up-to-date emission testing for heavy-duty vehicles;
- Implementation of tests comparing the economic, environmental, and technical performance of three commercially available technologies for buses (hybrid diesel-electric, diesel, and compressed natural gas (CNG));
- Review and development of business schemes and management structures for the operators of the new public transport system of Santiago, including design of a program to retrain bus drivers and operators;
- Program for monitoring environmental, social, and operational effects of the new bus system in place; and
- Assessment of scrapping/relocation options for displaced buses from the bus system reform.

Component 3:

- Institutional coordination of urban transport policies, incorporating environmental, and land-use dimensions; and
- Environmental assessment of TRANSANTIAGO.

Component 4:

- Assessment of several urban development options for Santiago's central ring (*Anillo Central*) from a transport and global/local emissions perspective and incorporation of the results in the decision-making process regarding land-use policies in this area;
- Assessment of options to integrate land-use and transport policies, and re-evaluate policies for housing and school location;
- Completion of engineering and regulatory studies for traffic calming measures in the city center;
- Assessment of institutional, legal, and technical options for congestion pricing in Santiago;
- Feasibility assessment of travel optimization pilot and reduction in the number of veh-km generated by the people pertaining to the sample used for the travel optimization pilot study; and
- Design of legal, financial, and institutional options to incorporate GHG emission reductions into the nascent program to trade emission reductions from mobile and point sources in Chile.

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

14. The GEO and key indicators were not revised.

1.4 Main Beneficiaries

15. The primary target group included Santiago's residents and people living in the metropolitan region making daily trips to and within the city, and all inhabitants affected by air pollution. Additionally, since the project aimed at helping to put in place policies, institutions, and infrastructure to sustain measures to reduce GHG emissions, it was also expected to have a global impact.

1.5 Original Components (*as approved*)

16. The four project components were the following:

17. **1. Promotion of bicycle use**

The project included (a) 21.94 km of GEF-funded bikeways connecting the *Comunas* of Santiago, Providencia, and Ñuñoa; (b) 21.2 km of bikeways about to be built in the same *Comunas* with government funding and 11.6 km then recently built or under construction; (c) the implementation of a promotional strategy aiming at changing travel behavior to achieve a sustainable modal shift to bicycles; (d) a safety strategy to minimize bicycle accidents and maximize personal security; and (e) a process to monitor and evaluate the results of the pilot program.

18. **2. Modernizing the bus system**

This component aimed at supporting the development of Santiago's new bus system, which was not only expected to provide a more efficient use of buses (reducing bus fleet, higher bus occupancy, and higher average speed), but also an opportunity to renew the bus fleet both at the city and national levels. The component had three sub-components:

2.1 Technical assistance for evaluating the economic and environmental impact of clean bus technologies

This subcomponent was expected to provide technical assistance to compare the technical and environmental performance and the associated costs of hybrid-electric buses with CNG and diesel ones. It was also expected to provide information to establish more stringent emission standards to be used in the bus operation concessioning process for the restructured public transport system.

2.2 Implementation of the framework for bus reform

The technical assistance under this sub-component was expected to support a review of management and business organization measures required to effectively operate the new corridor infrastructure, including a system of business organization, the concessions for specific bus line operations, and the structuring of integrated fares. It was also expected to fund the design of a program to retrain bus drivers and insert them into other sectors. Moreover, this sub-component was expected to support the establishment of a framework to monitor the environmental, social and operational effects of the new system.

2.3 Renewal of the bus fleet

This sub-component was expected to finance a strategic study to define ways of synchronizing and coordinating the removal of "not-so-old" buses from Santiago's streets.

19. **3. Strategic Environmental Assessment**

The project was expected to fund advisory work to ensure the coordination of sector policies, programs, and projects dealing with transport, urban development, land-use and the environment. To that end, it aimed at developing tools for an upstream integration of environmental management within the scope of the development of urban transport plans and policies, including land-use pattern changes, pricing, and tariff schemes and to consider options to ensure adequate institutional coordination.

20. **4. Technical Assistance and Analytical Support: land-use patterns and internalization of costs**

This component consisted of a series of studies and technical assistance.

4.1 Assessment of land-use incentives and policies to reduce motorized travel

4.1.1 Developing the Central Ring of Santiago (Anillo Central)

This subcomponent aimed at developing a methodology to calculate the environmental impacts of urban development policies to spur the development of housing projects located on the *Anillo Central* as well as helping decision-makers to better evaluate the development of available central sites according to the expected impact on transport, air pollution and global warming.

4.1.2 School location

This subcomponent aimed at assessing the economic and environmental impact of new school facilities locations to reduce the average school trip length, especially in the light of the introduction of the full time school day (*Jornada Escolar Completa* or JEC).

4.1.3 Housing Policy

The project was expected to provide technical assistance to authorities in charge of housing policies and regulations to better integrate the transport and environment dimensions into policy making.

4.2 Reducing Motorized Traffic

4.2.1 Traffic Calming at City Center

This subcomponent consisted of studies to identify sound traffic calming measures to reduce car traffic in Santiago's historic center, including a diagnostic phase, a design phase, stakeholder consultation, and integration of GHG emission reductions into regulatory measures and the preliminary engineering designs for the civil works.

4.2.2 Congestion pricing

This sub-component aimed at reducing and rationalizing the use of private cars by means of road or congestion pricing measures which would internalize external costs imposed on society by car drivers. The grant was expected to fund a study to assess the social, environmental and economic impacts of various forms of congestion pricing, acceptability conditions and implementation mechanisms.

4.3 Travel optimization

The project was to support a pilot study to evaluate the feasibility of implementing a large scale program to make rational use of mobility options and the implementation of a medium scale pilot phase.

4.4 Emission compensation (Decontamination Bonds) scheme

This included a study to evaluate options to promote further local investment in sustainable transport by integrating GHG emission reductions into the new emission compensation (Decontamination Bonds) scheme, which envisaged the possibility to

compensate for NOx and PM emissions through the financing of sustainable transport measures. GEF incremental support was also expected to help raise awareness on opportunities for emission off-set investments in sustainable transport and ensure the inclusion of additional GHG benefits in the scheme.

1.6 Revised Components

21. The project components were not revised.

1.7 Other significant changes

22. Due to delays in project implementation mainly caused by the problems that accompanied the introduction of TRANSANTIAGO, the original closing date of this grant was extended by 18 months to September 30, 2009.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

23. The main aspect affecting project implementation and outcomes both positively and negatively lay in the way the project scope was defined, which was based on the policy areas of the PTUS. As such, on the one hand, the project supported activities that represented real local priorities, many of them with considerable political support, strong ownership, government commitment and some real champions. On the other hand, however, since the PTUS was wide-ranging, following this approach resulted in an overly ambitious project. This required a complex institutional arrangement with eight different government agencies involved and the need for a great amount of coordination among them.

24. The use of a PDF-B GEF project preparation grant contributed to the completeness and soundness of the project background analyses and ensured its readiness. The stakeholder involvement/participatory processes during preparation were adequate. In particular, they included a series of stakeholder workshops to fine-tune the project design and the consultation with a number of NGOs to define some of the Terms of Reference (ToR) for the project. The level of technical expertise behind the preparation of each ToR was high, and there was a sound technical reason supporting the need for undertaking the studies financed by the project. Additionally, the workshops also provided visibility to the project activities, especially to the bicycle component. This visibility at the outset was considered by some of the stakeholders as an important ingredient for the success of bicycling related activities in Santiago.

25. The great ambitions in defining of the GEO and the project outcomes made their full achievement difficult. As already mentioned, since the Bank supported the PTUS with three instruments, the GEO and outcomes were mainly linked to the implementation of the PTUS as a whole, over which the GEF project activities had little influence and no control. Indeed, most of the activities consisted in studies. Therefore, they had not a decisive role in influencing the implementation of the PTUS nor did they directly lead to

reduction in CO2 and other air pollutants. The exception was the promotion of NMT component; the only component reflecting a program of the PTUS and directly leading to emission reductions.

26. The risk assessment was rather comprehensive. However, it did not adequately take into account the innovative nature of some of the project activities and the fact the many of them resulted in tools and study recommendations, for which there was no guarantee that they would be used or implemented.

2.2 Implementation

27. There were specific factors that affected both positively and negatively the implementation of the project. Among those factors that contributed to the proper execution of the project are:

- The availability of strong champions in the National Commission for Traffic Safety (CONASET), and later in the Transport Subsecretariat, and in the National Commission for the Environment (CONAMA) for the NMT promotion activities and the emissions compensation scheme, respectively. This helped to keep up with the commitments of these activities independently of the implementation of TRANSANTIAGO and the changes in CGTS. However, the commitment of some other project agencies diminished during project implementation because their participation was small and/or the activities were no longer a priority in their busy agendas.
- The mid-term review (MTR) was thoroughly done and helped the implementation agency and project team to identify critical issues in project implementation. It also helped to assess and adapt the Bank's supervision style to better fit the reality on the ground. After the MTR, more hands-on follow-up became the norm, which included strong implementation support and regular follow-up conference calls. In hindsight, at that moment the project should have been restructured to adapt the GEO / indicators to the real project scope and replace some of the components or subcomponents that had been losing their champions with other priority activities with strong GHG emission reduction potential.

28. The main factor that played against the implementation of the project and that triggered the need for extending its closing date, was the launch of TRANSANTIAGO in February 2007. The problems faced by the government because of the implementation of the public transport system had a direct impact on the implementation of the GEF project. For nearly a year, all human resources of CGTS, including all the staff working on the GEF project, were devoted to dealing with the problems associated with TRANSANTIAGO. In this crisis situation, there was practically only one professional responsible, not even on a full time basis, for all activities under the project, except for the financial management ones. This person, independently of his great professional skills, was not able to keep all activities on track. The time needed to coordinate all agencies involved, prepare ToRs and bidding documents, review reports was not enough, especially given that this professional was also assigned emergency tasks to support the implementation of TRANSANTIAGO.

29. Other factors that gave rise to problems in project implementation included:

- The shift of priorities over time, from a broad range of topics, as shown by the different programs of the PTUS, to one program in particular, the public transport program, i.e. TRANSANTIAGO. Because of the complexity of TRANSANTIAGO itself, some studies supported by the project, although still relevant, were simply no longer a priority. This was further accentuated by the fact that the commitment and ownership of some of the activities were personified by individuals rather than the whole institutions they belonged to.
- The changes in CGTS' leadership and staff had some normal negative impacts on the project implementation pace and quality because new people needed to become familiar with the project.
- UNDP's involvement as procurement agent was justified at appraisal mainly to reduce the fiduciary related work load for CGTS and expedite contracting, compared to the standard procedures that required the participation of the *Contraloria General de la Republica* (government auditing body). Initially it worked relatively well, but later, especially with the changes in UNDP's rules and procurement procedures, it added an additional layer of bureaucracy. It therefore slowed down procurement processes without providing any real additional value because CGTS had, for most part of the project duration, the necessary capacity to carry out Bank procurement.

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

30. The M&E framework was comprehensive. It identified sector-related and CAS goals, GEF operational program objectives, the GEO, and outputs by component. It included the respective indicators, provided the data collection strategy, and mentioned the critical assumptions. At the time the project was prepared, such a level of detail and thoroughness in M&E frameworks was not common in transport projects.

31. However, the framework had limitations as far as the direct link between the GEO and the project activities is concerned. The indicators were adequate to measure the outputs of the project activities (project performance indicators), but they had shortcomings when it came to monitoring the progress toward achieving the GEO, i.e. the long-term performance or outcome indicators. This is because, as already mentioned, the latter were mainly linked to the implementation of the PTUS, over which the GEF project activities had little influence and no control.

32. Most indicators did not specify precise and/or quantitative target values. A number of them also lacked baselines or an indication on how and when these baselines would have been defined.

33. Data to assess the achievement of the GEO were collected regularly during project implementation, in particular during the midterm review. However, for some of the indicators, in particular outcome indicators, the necessary data were not available (or not available in a timely manner). Especially under the bicycle component, the monitoring and evaluation study was used to inform decision-making and partially also to guide resource reallocation.

2.4 Safeguard and Fiduciary Compliance

34. This was a category C project. The Environmental Assessment Policy (OP 4.01) was triggered because of some potential negative environmental impacts from bikeway construction, such as noise, dust, limitations to access and traffic interruptions. The project successfully avoided and/or mitigated possible negative environmental and social impacts. The bikeway construction took place in urban areas with considerable development and human activity. The local environmental rules and procedures were applied. A Bank environmental specialist participated in all supervision missions/field visits. No activities requiring involuntary resettlements took place.

35. In fiduciary terms, financial management was satisfactory. Financial management reports (FMR) and auditing reports were by and large submitted on time. None of the audit reports had a qualified opinion. Procurement was also satisfactory, except for the period from April 2008 to May 2009 covered by the last procurement ex-post review. This corresponded to a period of adaptation in CGTS because of the change in project coordinator, which temporarily weakened the capacity to handle Bank procurement. Hence, procurement was only rated moderately satisfactory.

2.5 Post-completion Operation/Next Phase

36. The continuity of the bicycle related project activities and the sustainability of the use of bikes as alternative means of transport are highly likely. The bike has taken off as means of transport in Santiago, with annual increases in bicycle use of 23% in the winter and 12% in the spring periods in the project area with bikeways. Among the users are trendy young people, including numerous women. There are many bike related initiatives going on, such a mass bike rides, street closures on Sundays, and workshops. The promotion of NMT is embedded in the agenda of the central and municipal governments. The Transport Subsecretariat, which actively participated in project implementation during the last year, recently took over the responsibility for NMT in Chile.[3] Its involvement in this area considers the participation of representatives of the many different grassroots movements that promote cycling in Chile. The Subsecretariat also hosts a national bicycle website and will continue to make use of the training material developed under the project. In addition, it is implementing a bike parking pilot for which it will use the bicycle parking facilities design specification prepared under the project. The subway operator also has a parking facility program in several stations aimed at promoting bike inter-modality, which is also of interest to the GCTS.

37. Furthermore, the Santiago Regional Government (GORE or *Intendencia Metropolitana*) launched an ambitious program aimed at the completion of 690 km of bikeways by 2012 defined in the Plan for Santiago on Bicycle (550 km in urban areas and the remaining 140 km in rural areas). This target/deadline is part of the Environmental Prevention and Clean-Up Plan (PPDA)[0] update, currently in its final stage of approval, which makes it compulsory. So far, 190 km have already been constructed. Funding is provided by the *Intendencia*, the Ministry of Public Works (MOP) and the Ministry of

[3] The second update of the PPDA, currently in its final stage of approval before becoming law, envisages the responsibility for NMT within the Study Division of the Transport Subsecretariat.

Housing (MINVU). The Plan also considers the availability of bike parking facilities. Furthermore, a "bicycle law" is pending in Congress[4].

38. Finally, a number of municipalities have been active in promoting NMT with or without the support of the GORE program described above. Ñuñoa, Providencia and some other municipalities have their own NMT/bicycle agendas. The maintenance of the project-financed bikeways is ensured by the respective municipalities, which are responsible based on an agreement signed at the beginning of the project.

39. The second component provided support to TRANSANTIAGO, which was implemented. Despite the initial start-up difficulties, the system is now stabilized. User approval ratings have increased steadily and the main differences at a political level were resolved.[5] The main project contributions consisted of co-financing the implementation of the heavy vehicles emissions testing laboratory, providing capacity building, and supporting the definition of local driving cycles. The laboratory is part of the Ministry of Transport. It has played and is expected to continue to play an important role in generating emission data for policy decision making and enforcement[6].

40. The applicability and therefore the sustainability of several of the studies financed by the project was affected by the differences between the initial design of TRANSANTIAGO and the one that is currently under operation, as far as the number of buses and the network design are concerned. Even if the results of these studies are not relevant, the methodologies behind the results are still valid and can be applied to the new reality of TRANSANTIAGO. An example of this situation is the cost-benefit analysis of the public transport system, which was part of the second project component.

41. The strategic environmental assessment prepared under the project's third component, as designed, serves more as an M&E tool for assessing the quality of the public transport system, rather than a strategic assessment. Therefore, its use as originally planned is not possible. The latter could have been because by the time the study started there was no single definition of a strategic environmental assessment, and the one selected fell short from really assessing the impacts of transport measures on other sectors and vice versa.

42. The last component of the project included a variety of studies, many generating tools for which the applicability is under consideration by the government. For instance, CGTS is about to integrate the school location software into its geographic information system (GIS) and will make it available on its website. Discussions are underway between CGTS and the Municipality of Santiago for the latter to support the implementation of the traffic calming measures in Santiago's city center developed under the project.

[4] Draft law to create incentives for the use, promotion and integration of the bicycle of 2009, which envisages, among others, the responsibilities in terms of NMT and regulates the status of the bicycle in the transit law.

[5] Users' opinions about TRANSANTIAGO have steadily been improving since the launch in 2007. According to the Collect – GfK study, in July-August 2009, the overall user satisfaction was 4.7, on a scale from 1 to 7. The January 2010 ADIMARK GfK report with the government evaluation shows that 47% of the people in Santiago approve the way the President has been handling TRANSANTIAGO, compared to 7% in October 2007. The main differences between the government and the opposition on TRANSANTIAGO were settled. In 2009, they approved a law to create a temporary and a permanent subsidy to cover the operating deficit of the system (Law no. 20378).

[6] For example, the emission data of buses with post treatment filters fed the 2009 modification of the Supreme Decree no. 130/2003 on emission standards for TRANSANTIAGO. Additionally, the laboratory is currently used in monitoring the compliance of the bus concessionaires with the emission standards/targets.

43. The pilot methodologies to evaluate emission reductions developed under the project will be part of the first phase of the implementation of an on-line emissions compensation scheme in the Santiago metropolitan region based on a study also developed by the project[7]. This scheme is expected to be later transformed into a full transaction system.

44. The results of some other studies financed under the project may be less likely to be implemented, at least in their current form. For instance, the methodology to evaluate urban development projects from a joint transport, environmental and urban perspective (M*etodolgia Anillo Centrico*) developed under the project was not validated by the Planning Ministry (MIDEPLAN) because, even if it constitutes an important milestone in the area, it cannot be directly implemented and needs additional studies. The Transport Planning Secretariat (SECTRA), the technical arm for transport planning of MIDEPLAN, has reevaluated the methodology and is currently carrying out the additional studies to develop an integrated evaluation methodology..Similarly the options to optimize or reduce the need for travel may not be implemented because this topic is rather innovative and the pilots were not carried out. The main recommendations of the study on the impact of the introduction of full-time school day on the public transport demand are not easy to implement because postponing the entry hours for schools is a decision that depends on various decision makers and has manifold implications. A need for follow-up studies was identified.

45. Finally, the congestion pricing study is ready to be implemented; however, it depends on a difficult political decision. A law to introduce congestion pricing has been pending in Congress since the late 90s. There is currently no concrete indication that this initiative will go ahead. If the implementation of the study is postponed beyond a reasonable timeframe, the background analysis and methodology will still be valid, but it will require some major updates.

46. No Bank-financed next phase/follow-up operation is envisaged. However, the ongoing TAL will provide an opportunity to follow-up on some of the above-mentioned commitments.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

47. The relevance is rated High.

48. The GEO, the design, and the implementation of this project are fully consistent with the current development priorities of the Government of Chile (GoCH). President Bachelet's Government Program[8] considers a modern, efficient, and less polluting public transport system as fundamental to creating the government's vision and desired development leap. The Program envisages the completion of the urban transport reform in Santiago. It explicitly refers to the importance of (i) air, visual and noise pollution reduction, (ii) land use planning, housing and transport coordination, (iii) increased user

[7] This is envisaged in the current update of the PPDA.
[8] Estoy Contigo, Programa de Gobierno Michelle Bachelet, 2006-2010, October 18, 2005.

participation in public transport, and (iv) a metropolitan transport authority. Additionally, the improvement of the quality of public transport systems is among the strategic objectives of the Transport Ministry.[9]

49. The GEOs remained in line with the current Country Partnership Strategy (CPS)[10] since they aim at competitiveness/growth, equality of opportunity, improved quality of life, and poverty reduction. The project also meets the current principles for Bank engagement in Chile, which are based on development needs (mainly to alleviate poverty and reduce inequalities), client demand, flexible and innovative responses to client requests, and lessons sharing with Bank member countries and the international community.

50. Finally, the GEO reflects the GEF-4 climate change strategic long-term objectives and the strategic program for the urban transport sector. [11]

3.2 Achievement of Global Environmental Objectives (GEO)

51. The achievement of the GEO to help (i) reduce GHG from ground transport in Santiago through the promotion of a long-term modal shift to more efficient and less polluting forms of transport and the adoption of sustainable low-GHG transport measures (to that end, the project supported the implementation of the PTUS and its specific objectives) and (ii) improve air quality of Santiago through reduced emissions of air pollutants is rated Moderately Satisfactory.

52. The introduction of TRANSANTIAGO alone had significant positive impacts on the air quality and reduced GHG emissions. Currently available data indicate that emissions associated with the public transport system are 122.6 tons/year of particulate matter and 3,340.3 tons/year of NOx. It is expected that by December 2010, with new changes in technology for trunk line 3 and the feeder lines, these values will be reduced by 26% and 28%, respectively, to 90 tons/year of PM and 2,406 tons/year of NOx. GHG emissions were reduced by an estimated 98,975 tons between 2006 and 2009 (with and without TRANSANTIAGO). This means a reduction of 10.5% compared to 2006.[12] These figures only consider improvements in the management of the bus system, including technological changes, fuels used, quality of bus maintenance and operation, and level of activity. They do not include modal shift in favor of public transport, on which no conclusive data are yet available (see paragraph 62). As mentioned below, long term modal shift is where several of the outputs of the project have a real potential to contribute, and it could provide even more significant reductions.

53. A modal shift from cars to bikes in the project area also led to an annual reduction of GHG emission of 1,000 tons/year. No data on the impact of increased bike use on air quality and for bike modal shift at a citywide level are available.

[9] *Ficha de Identificación Año* 2007, *Definiciones Estratégicas, Ministerio de Transporte y Telecomunicaciones*.
[10] IBRD and IFC Country Partnership Strategy for the Republic of Chile for the Period 2007-2010, April 24, 2007.
[11] GEF Focal Area Strategies and Strategic Programming for GEF-4, July 25, 2007.
[12] This estimation of CO2 reductions was obtained from the application of the UNEP Clean Fleet Management toolkit.

54. These achievements need to be seen in the framework of the overall Bank support to the implementation of the PTUS and can only to a limited extent be directly attributed to project activities for a number of reasons.

55. In the first place, the GEO, as stated, depended on the implementation of the PTUS and the achievement of its long-term objectives, on which the project had little influence. That is, and as previously mentioned, only in the light of the concrete project activities, the definition of the GEO was ambitious and the achievement of the specific objectives of the PTUS fell outside the control of this project.

56. Secondly, the project outcome indicators, also called long term performance indicators in the PAD, were also linked to the specific objectives of the PTUS and the direct casual relationship between the outcomes and the project activities/outputs was often missing.

57. Thirdly, except for the bicycle component, the project outputs basically consisted in tools, such as methodologies, blue prints, instruments, and recommendations. Even if in most cases these tools responded to a real need and were developed based on sound foundations, their utilization and implementation is in some cases hindered by technical and political factors. Indeed, some of the studies undertaken were based on the original design of TRANSANTIAGO, which suffered significant modifications after its implementation mainly in terms of number of buses and network design. As such, the methodologies developed are useful, but their application requires further work to reflect the current conditions of TRANSANTIAGO (e.g., the cost-benefit analysis and the strategic environmental analysis). Also, as it is the case with congestion pricing or bus scrapping, the implementation of the results and recommendations requires strong political support and will.

58. Finally, a few of the expected outputs were not achieved because the planned activities were not completed, notably the travel optimization and housing location policy studies.

59. Based on the considerations above, the assessment of the achievement of the GEO emphasizes on the potential and real contribution of the project activities and outputs to the project outcomes. This assessment is given below. The detailed information on the links between outputs by component and outcomes as well as on the outputs' contribution to the GEO is given in annex 2.

60. **Outcome 1: Urban Transport Plan for Santiago implemented.** The achievement of this outcome is rated Satisfactory. TRANSANTIAGO, the main and most important program of the PTUS, was implemented in 2007. Although it faced serious problems at the outset, the public transport system has kept improving over time and is now one of the best systems in Latin America. The business model fully changed from several thousand mostly informal owner-operators to 14 formal large operators, operating a reduced number of buses (7,700 in 2004 to 6,400 (- 17%)) on a citywide trunk and feeder network with a unified fare system and under stringent technical requirements. Additionally, NMT boomed during the project period.

61. The project financed a number of studies linked to TRANSANTIAGO (e.g. assessment of the impact of TRANSANTIAGO on the labor market and proposal of

social mitigation measures, bus technology testing, bus scrapping study). Except for the scrapping study, the respective results were used. Despite this, the project's contribution to the implementation of TRANSANTIAGO was minor and in no case decisive.

62. **Outcome 2: Modal share of public transport maintained.** At this point in time no conclusive data are available to rate the achievement of this indicator. The most current data on modal share is from 2006, previous to the introduction of TRANSANTIAGO in 2007. It indicates a minor reduction in the public transport modal share from 56.6% in 2001, obtained from the Origin Destination Survey (OD survey), to 55% in 2006. This reduction is attributed to an increase in private means other than cars (i.e., walking, cycling, etc.).[13] More current data will only be available once the next full OD survey to take place in 2010 is completed.

63. A number of activities financed by the project have the potential to contribute to the stabilization of public transport modal share. These are those mentioned under outcome 1 that helped to modernize the public transport system as well as those that focused on integrating the transport and land-use dimensions and on congestion pricing. The activities related to TRANSANTIAGO may have contributed toward stabilizing public transport modal share, but their contribution potential is small and indirect. Congestion pricing, if implemented, could play an important if not decisive role in favor of public transport modal shift, but, as mentioned, it requires strong political will. A few of the land-use related project activities have not been successfully completed and others have not yet been implemented. In addition, their contribution potential is also small and/or indirect.

64. **Outcome 3: Land-use policies in place to favor the reduction of the average trip length.** The achievement of this indicator is rated Moderately Unsatisfactory. Only a few coordinated activities between transport and land-use agencies took place in Santiago. The current update of the PPDA includes a chapter on land-use planning and transport, which requires the preparation of an inter-institutional agreement to integrate Santiago's territorial planning instruments, the PTUS and the environmental objectives of the metropolitan region. The transport sector agencies participated in the preparation/revision of various land use planning related instruments, such as (i) the Metropolitan Zoning Plan for Santiago, (ii) the law on the impact of urban development on the road system, which requires the internalizing of urban development impacts on the road system, and (iii) the law on urban planning, which will make the impact assessment of infrastructure projects on the road system compulsory. These documents have not yet been approved.

65. Within the framework of the project, the study to assess the impact of the full-time school day on the transport system provided the basis for another study that will be carried out by CGTS and SECTRA. The aim is to forecast the public transport demand generated by the extension of Santiago's urban area proposed by MINVU in the modification to the Santiago Metropolitan Zoning Plan. The other project financed land-use related activities with a potential to reduce vehicle km travelled included (i) preliminary engineering designs for the conversion of the central area of Santiago, (ii) a

[13] The 2006 data was obtained from a partial survey and an update of the information from the 2001 OD survey based on the recompilation of several mobility surveys until 2006. So, the 2006 data is not necessarily comparable with the 2001 data.

methodology to include transport and land-use considerations in investment decision making, (iii) tools to optimize school mobility, and (iv) a study to optimize travel demand. Not all these activities were successfully completed, such as, for instance, a study on housing location policies, and the recommendations/tools of the others have not been implemented so far. The prospect of their implementation requires additional work, in some cases already underway, or political will, which has not yet been assured. However, if these tools are used and the recommendations of several of these studies are implemented, the km travelled could be decreased.

66. **Outcome 4: Barriers for introducing clean technologies for transport removed/incentives introduced.** The achievement of this indicator is rated Satisfactory. The 2003 bidding documents for TRANSANTIAGO's bus concessions required a certain amount of new buses with EURO III standard and post treatment filters for old buses with lower standard. They also included a provision to extend the concession period in case of anticipated fleet renewal. Nevertheless, due to TRANSANTIAGO's startup problems and the consequent need to renegotiate the concessions, the filter requirements were omitted.

67. The current bidding documents for the renewal of the concessions include even stricter emission standards and a provision to extend the concession period if cleaner technologies are introduced.[14] In November 2009, 72% of TRANSANTIAGO's bus fleet was new and had Euro III standard, with about 100 vehicles with post treatment filters. The target of the Transport Ministry is to have a close to 100% Euro III standard fleet by May 2010, with 30% incorporating post treatment filters. Furthermore, the PPDA update requires the Ministry of Transport to continue setting more stringent technical requirements for the adoption of cleaner technologies in the Santiago metropolitan region. However, while the [0]removal of barriers for cleaner technologies embedded in the requirements for TRANSANTIAGO's concessions is mainly focused on local air pollutants, it provides the basis for the introduction of low carbon technology requirements once these will become affordable[15].

68. The project study tested and compared the different commercially available bus technologies in the metropolitan region using local driving cycles. This study was the basis for a regulation with new bus standards for Santiago.[16] The study did not include CNG and hybrid diesel-electric technologies as planned since they were not available in the market in Chile and their commercial potential is still questionable. [17] Hence, the study focus was also on local air pollutants. Despite this difference from what was

[14] The technologies considered include Euro III or EPA98 Diesel with filter for particulate matter, Euro IV Diesel, CNG Euro III or EPA 98, Hybrid (diesel-electric) Euro III o EPA 98, and electric buses.

[15] Currently, low carbon technologies are still not available at a price to make them financially attractive without subsidies.

[16] Supreme Decree No. 42 of July 24, 2009, modifying Supreme Decree no. 130 of 2001, which states the emission standards for public transport buses in the Santiago metropolitan area.

[17] CNG technology was not tested since it does not seem to be viable in Chile because of the dependency from foreign CNG supply. A PHRD trust fund was prepared to finance the costs of temporarily importing hybrid buses. However, the grant was not signed because CGTS was fully absorbed with solving the problems faced by TRANSANTIAGO at its inception. Nevertheless, the private sector in Chile temporarily imported a hybrid bus and tested its fuel savings (about 25%) and emission reduction potential. The cost of such buses is still too high to financially justify its deployment.

originally envisaged, the study still provided a contribution to the introduction of clean technologies and a tool from compliance monitoring/enforcement.

69. **Outcome 5: NMT trips increased.** The achievement of this indicator is rated Highly Satisfactory. Over the project period bicycle use in the project area on sections with bikeways increased significantly, namely 23% per year in the winter period and 12% per year in the spring period, and modal shift from cars to bicycles was between 3% and 6% depending on the season. Additionally, catalyzed by the project and as a result of strong interest from civil society and government officials (GORE, Ministry of Transport, House of Representatives, mayors), NMT is well incorporated into the government's agenda.

70. The activities to promote NMT have been the most successful project activities, and the project achieved more outputs than planned. As such, it is likely that the project contributed to the increase of bicycle use in Santiago, especially considering that it financed, among others, bikeways and that the bicycle use increase in areas with bikeways was nearly twice as high as in areas without bikeways. Nevertheless, there is no way to assess the exact extent of the project's contribution.

71. **Outcome 6: Growth in cars-km reduced.** No quantitative or qualitative data on cars-km in Santiago are available, so the achievement of this indicator cannot be rated. The only indication that there may have been some project-related reductions in cars-km is the small modal shift from cars to bicycles observed in the project area. The project also supported activities associated with public transport modernization. However, as seen in relation to outcome 1, no information on a possible shift from public transport to cars is yet available, and in any case, the contribution of these activities would have been minor and indirect. Finally, the project financed studies/tools, notably those that focused on integrating the transport and land-use dimensions and internalizing transport costs, which if implemented, could reduce cars-km. Nevertheless, as already mentioned, while a few of these activities were not successfully completed, in several cases the implementation of the respective tools is dependent on further work or political will.

72. **Outcome 7: Air quality indicators improved in spite of economic growth.** The achievement of this indicator is rated Satisfactory. Overall, air quality in Santiago improved since 2003, but the project was certainly not decisive in this outcome. [18]

73. The project contributed to this outcome through, among others, the activities that helped to improve the technological requirements of TRANSANTIAGO's bus fleet, the studies that supported TRANSANTIAGO's introduction and the bicycle related activities. Again, this contribution was in no way decisive. The project also financed studies to improve the decision making process by integrating transport and land use considerations and define the conditions for the formal introduction of transport related emissions reduction projects and the modernization of the existent emissions

[18] According to the January 2009 draft of the updated PPDA, the annual concentrations of MP10 (annual) decreased from 75 µg/m3 in 2003 to 70 in 2007, of Ozone (8 hrs. P99) from 182 µg/m3 in 2003 to 172 in 2006, of NO2 (1 hr. P99) from 320 µg/m3 in 2003 to 261 in 2006, of NO2 (annual) from 53 µg/m3 in 2003 to 41 in 2006, of CO (1 h P99) from 16 µg/m3 to 12 in 2006, and of SO2 (24 hrs. P99) from 40µg/m3 in 2003 to 37 in 2006. Only the concentrations of SO2 (annual) increased slightly from 9 µg/m3 in 2003 to 10 in 2006 and of MP10 (24 hrs. P98) from 219 µg/m3 in 2003 to 233 in 2006. No more recent data are available; however, the trend for all pollutant since 2003 has been a decreasing one.

compensation market. These studies together with the one on congestion pricing, if implemented, could make further substantial contributions to air quality improvements.

74. **Outcome 8: Reduced carbon intensity per travelled km.** No quantitative data exist to rate the achievement of this indicator, but qualitative information indicates that the outcome was likely reached. As seen under outcome 1 and 4, TRANSANTIAGO largely operates with fewer, larger and more efficient vehicles; consequently it can be assumed that the carbon intensity of km traveled in public transport was reduced. There was also a small model shift from motorized to non-motorized travel; hence a consequent reduction in carbon intensity. Finally, if some of the previously mentioned studies, notably congestion pricing, are implemented, there is still an important potential for reductions in the carbon intensity per travelled km.

75. **Outcome 9: Evidence of behavioral change towards a rational transport demand.** There are insufficient data available to rate the achievement of this indicator as behavioral changes take time to materialize. The only observed change so far consists in a greater bicycle use in the project area (and elsewhere, although no survey exists).

76. As seen under outcome 2, there are no data available yet on the current public transport modal share. Nevertheless, a well functioning TRANSANTIAGO, as it is now, coupled with the introduction of congestion pricing could induce an important long term modal shift in favor of public transport. The project financed a few other studies, such as those on travel optimization and the revitalization of the city center. If implemented, these studies could lead to decreases in motorized transport demand and more walking and cycling. However, while the pilot projects for the first study have not been carried out, the implementation of the others need political will.

77. In summary, five project outcome indicators, for which there are sufficient data available to assess them, overall are considered reached. The achievement of the remaining four outcomes mainly related to modal shift is not rated because there is no (not yet) conclusive data available. Consequently, taking a conservative stance and considering that (i) most of the outcomes cannot be directly attributed to the project activities, (ii) not all project activities were carried out as planned and (iii) for many of the project outputs there is still uncertainty regarding their implementation and use, the achievement of the GEO is rated Moderately Satisfactory.

3.3 Efficiency

78. The economic assessment of the project at appraisal was based on an incremental cost analysis. The assumed baseline scenario was the implementation of measures aimed at public transport system modernization, namely the implementation of TRANSANTIAGO that focused on reducing air pollution and improving transport, without considering GHG emission reductions. The alternative scenario included complementary activities that would introduce climate change considerations, i.e., congestion pricing, land-use incentives to promote a more rational demand for transport in order to reduce average travelled km, and an accelerated promotion and development of alternatives means of NMT, among others. Even though the line of thought was correct, the incremental cost analysis had a number of flaws. In the first place, the relevant incremental costs to achieve the estimated emission reductions should have been the implementation costs of

the different measures and not just the cost of the studies as it was done. The only exception to this was the incremental cost estimate for the construction of bikeways. In the second place, there was no explanation of the methodologies used to estimate the emission reductions. Thirdly, for a number of measures, the emission reduction estimate appeared to be ambitious.

79. Because of the previous reasons and given the fact that actual CO2 reduction data or estimates are only available for a limited number of project activities, it is not possible to undertake a similar incremental cost analysis to compare the appraisal scenario with the post-project one. Still, it is interesting to at least present the available information on GHG emission reductions. Utilizing the UNEP Clean Fleet Management toolkit, it has been estimated that changes in the public transport system management have generated a reduction of 98,975 tons of GHG between 2006 and 2009 (with and without TRANSANTIAGO with 6,400 versus 7,974 buses, respectively). Additionally, a modal shift from cars to bikes in the project area alone led to an annual GHG emission of 1,000 tons/year. For the other measures, estimates are only available for congestion pricing. Internalizing the cost of using private cars appears to have a significant potential in terms of GHG emission reductions. If implemented in the central area of the Municipality of Santiago, it has been estimated that GHG emissions could be reduced by approximately 200,000 tons/year, and that this number could almost double if the area is extended to cover a broader ring around the metropolitan area.

80. Consequently, while the originally envisaged amount of GHG emission reductions was not achieved because the estimates were extremely ambitious, the actual reductions seem reasonable in the light of the project design. There is also still potential for several of the project outputs to lead to additional reductions. As shown in annex 1, the investment cost was approximately the same as originally envisaged, except for the cost of bikeway construction, which was twice as estimated.

3.4 Justification of Overall Outcome Rating

Rating: Moderately Satisfactory

81. The moderately satisfactory rating is based on the combined assessment of relevance, efficiency and the achievement of the PDOs.

3.5 Overarching Themes, Other Outcomes and Impacts

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

82. The project was designed with an environmental/GHG emission reduction focus and did not have a poverty-specific emphasis. However, by supporting the improvement of the public transport system, the project had positive poverty impacts since poor people are those which use public transport most. The gender and social development contributions of the project include:

- Increase in the number of women using bicycles (from 8% to 20%);
- Improvement of the image of NMT and possibly public transport; and
- Emission reductions, including CO2, from public transport vehicles.

(b) Institutional Change/Strengthening

83. The project contributed to institutional strengthening/changes in the following way:

- Designing the blueprint and the emission estimation methodologies for the emission compensation scheme;
- Designing the institutional setup for congestion pricing;
- Strengthening bicycle grassroots movements and supporting the Transport Subsecretariat, who assumed the leadership in terms of NMT; and
- Strengthening the government's capacity to carry out emission testing for heavy vehicles.

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

84. None.

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

85. As per ICR guidelines, this is mandatory for Intensive Learning ICRs. As such, no surveys or workshops were conducted in the framework of this ICR preparation.

4. Assessment of Risk to Development Outcome

Rating: Moderate

86. The long term sustainability of the principal development outcomes is expected mainly because they are linked to the successful implementation of TRANSANTIAGO and other programs of the PTUS, such as NMT. As discussed earlier in section 2.5, the bikeway and the public transport related activities have already been significantly scaled up, so the long term sustainability of the related project outcomes is likely. The removal of barriers for cleaner technologies is embedded in the requirements set for TRANSANTIAGO's new concessions. Although they are mainly focused on local air pollutants, they provide the basis for the introduction of low carbon technology requirements once these become affordable.

87. Several government initiatives show a trend toward the definition of more integrated land-use, transport and environmental decision-making processes as described in paragraph 64 and annex 2. While these initiatives, with the exception of the PPDA, are still incipient, they support the achievement and hopefully the sustainability of the associated outcomes. As far as the role of the project outputs in the sustainability of land-use and cost internalization related outcomes is concerned, this is mixed mainly because of the uncertainty linked to their implementation. The emission compensation scheme is envisaged in the draft PPDA update, so the implementation of this study is likely. Once mature, a compensation/trading scheme could play a decisive role in the reduction of both local air pollutants and GHG emissions.

88. Some project outputs, such as the integrated land use and transport evaluation and the Strategic Environmental Assessment methodologies, may or may not find some future application. For other outputs, such as the revitalization projects for Santiago's city center and the congestion pricing study, despite the fact that there is a real interest of a number

of people/institutions to move ahead, all will depend on the political constellation of the moment.

5. Assessment of Bank and Borrower Performance

5.1 Bank

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

89. Project preparation was thoroughly carried out. It was supported by a PDF-B grant and lasted over three years. The budget for project preparation was adequate (US$ 293,000). The Bank team had the right skill mix, including various seasoned environmental and urban transport specialists as well as safeguard and fiduciary specialists. Project preparation was based on detailed background studies. As previously mentioned, the ToR for the project activities and the technical specifications for the bikeways were ready at the time of appraisal. A number of participatory events (consultative workshop) to fine-tune project design were held, and NGOs were consulted in the definition of the ToR. Frequent preparation missions were carried out. These missions were documented in detailed Aide Memoires.

90. The PAD is well-written and comprehensive in its coverage. It shows an in-depth knowledge of the sector issues at the time of appraisal. The PAD carefully takes into account the safeguard policies and fiduciary aspects of Bank projects. Much detail went also in the design of the M&E framework, something not yet common at the time the project was prepared.

91. For all these reasons, Bank performance at ensuring quality at entry would be highly satisfactory. In hindsight, however, it appears that the project scope was broad, focusing on too many different areas and including too many implementation agencies. This made project implementation difficult. Moreover, even if this project is part of a larger Bank support package to the implementation of the PTUS, the GEO were overly ambitious since the project activities had little influence and no control over them. Consequently, because of this and some other shortcomings in M&E design pointed out in sections 2.1 and 2.3, Bank performance in ensuring quality at entry is only considered satisfactory. This rating is confirmed in the Quality at Entry Assessment (QEA7) carried out in September 2005, which rated the project satisfactory overall, as well as in each of the dimensions reviewed. The only concern raised related to “the manner in which the PAD articulated the GEO of the project”.

(b) Quality of Supervision
Rating: Satisfactory

92. The Bank supervision team had an adequate skill mix. It included a transport and an environmental specialist as well as fiduciary specialists. Regular supervision missions to Santiago took place, during which the Bank team met with the project implementation agencies and different stakeholders, including government officials, civil society representatives, decision makers at local and national level, and project consultants. The

missions included site visits. Safeguard and fiduciary aspects were adequately taken into account. The results of the missions were documented in detailed aide memories.

93. The project team reviewed ToR and project reports, provided technical advice and helped addressing implementation issues. Despite a relatively rigid description of the project activities, the team showed creativity to solve implementation problems and adapt the project activities to changed local conditions. After the introduction of TRANSANTIAGO, which almost totally stopped project implementation during one year, Bank supervision was intensified through nearly monthly virtual supervisions via conference calls. This together with a closing date extension helped to bring project implementation again under control. During the last few years of project implementation, Bank supervision put a lot of effort into ensuring the use and sustainability of the outputs created by the project. The project team together with CGTS discussed different sustainability options and met with key stakeholders, such as the Major of Santiago and the *Intendente* (Head of the GORE).

94. As such, Bank supervision was highly satisfactory. However, the two changes in task team leader (TTL) during project supervision may have temporarily loosened Bank attention and guidance for some innovative project activities, such as the strategic environmental assessment. In hindsight, it also seems clear that after the mid-term review, which clearly identified the disconnect between project scope/activities and the GEO/specific objectives, the project should have been restructured to ensure a better alignment. Therefore, the Bank's performance during this phase is rated satisfactory.

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

95. Since Bank performance in ensuring quality at entry and quality of supervision are considered satisfactory, the overall Bank performance is also considered satisfactory.

5.2 Borrower

(a) Government Performance
Rating: Satisfactory

96. The GoCH participated in project preparation mainly through a number of government agencies, such as SECTRA, CONAMA and CGTS, but representatives of the Transport and Finance Ministries interacted also directly with the Bank team. The GoCH supported the PTUS at the highest level, put in place an enabling environment for the project, and involved the respective stakeholders. Hence, the GoCH's contribution to project preparation was adequate. During project implementation, the GoCH provided the necessary counterpart funds in a timely manner and stuck to the institutional arrangements defined and agreements taken at appraisal. The high level commitment to the PTUS, thus to the GEO and the stated project outcomes, grew even stronger over the lifetime of this project, with the GoCH doing everything possible to make TRANSANTIAGO work. As such, on the one hand, channeling most of the efforts to TRANSANTIAGO at a moment when implementation problems of the new system caused enormous distress to the users and risked to collapse the government was essential to save TRANSANTIAGO and to achieve the project outcomes related to the

implementation of the PTUS. On the other hand, it slowed down project implementation and negatively impacted some activities.

97. Therefore, while the performance of the GoCH in terms of commitment to the PTUS and hence the project GEO and outcomes was highly satisfactory, its immediate attention to the implementation of the project activities had shortcomings. Consequently, the overall government performance is rated only satisfactory.

(b) Implementing Agency or Agencies Performance
Rating: Satisfactory

98. Especially SECTRA, the implementation agency of the PDF-B grant and the main Bank interlocutor during project preparation, CGTS and CONAMA contributed significantly to the design of the project. All three institutions were actively involved in project preparation, and their technical knowledge and experience was fundamental to prepare a technically robust and sound operation. The other technical project counterparts and a number of civil society representatives also had an active involvement in project design. The involvement and coordination of a large number of actors was facilitated by the existence of the PDF-B grant, which had already brought together many of them.

99. Initially the project implementation team within CGTS was small and not exclusively dedicated to the project. Despite this, they did a great job to coordinate the large number of technical implementation agencies. The team had the adequate technical knowledge and experience and the fiduciary aspects were carried out in a satisfactory manner. The delays that occurred during the first years of project implementation were mainly due to lengthy procurement procedures and difficulties, such as the lack of bidders, as well as problems with the quality of consultants.

100. As mentioned in paragraph 28, during the TRANSANTIAGO crisis the only professional assigned to the project was not able to keep up with the ongoing activities and no new activities took place. This brought project implementation nearly to a still stand. Once the crisis was over, the project implementation team was again adequately staffed. However, about a year and a half before project completion, the coordinator left. Even if a few members of the implementation team had already been involved in some of the project implementation activities since 2007, this momentarily weakened the team, especially in terms of Bank procurement. Indeed, this was when some relatively minor shortcomings mainly due to the unfamiliarity with Bank procurement rules and procedures became evident (see paragraph 35). It is necessary to point out that the moderately satisfactory project implementation ratings during the last year of project supervision were due to difficulties/delays in completing procurement processes and ongoing studies. However, once the new project implementation team went through the phase of adaptation and adjustment, they managed to give the ongoing project activities an important final push. This eventually led to the timely conclusion of these activities before project end and the achievement of the parts of the objectives under their control. Finally, it is also necessary to highlight the exceptional efforts made by this implementation team to ensure the application and sustainability of project products and recommendations, which were outside their direct sphere of responsibility.

101. In general, the technical agencies did an exemplary job in terms of ToR preparation and study supervision. Reports were thoroughly reviewed normally by at least three

agencies. They provided excellent comments and high-quality technical contributions and requested further analyses for nearly all reports, even if this implied additional supervision work.

102. Overall, while under the given conditions the implementation unit and most of the technical agencies did a highly satisfactory job in terms of project implementation, some implementation processes took longer than originally envisaged, toward project end there were weaknesses in the capacity to carry out Bank procurement, and the commitment of a few technical agencies did fade over time. Hence, the on the whole performance of the implementation agencies is considered satisfactory.

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

103. Given the satisfactory rating for both the government and the implementation agency performances, the overall Borrower performance is also rated satisfactory.

6. Lessons Learned

104. In addition to the recurring operational lessons that can be drawn from most Bank projects, this GEF intervention provided some strategic and technical lessons. These lessons, which are presented in the next paragraphs, can inform the design of similar operations and the preparation of the next CPS for Chile.

105. Recurring operational lessons learned include the following:

106. **There is a need to be realistic when defining the GEO and to ensure good monitoring and evaluation**. The GEO should be closely linked to the project activities, and indicators should be designed so as to ensure that they serve as good monitoring tools for the project activities, i.e. indicators with a solid link to both the project activities and the GEO, that set clear quantitative target values and that are measurable. Good monitoring and evaluation (a) provides sound information for the redesign of activities during implementation, which, for instance, was the case with the design of the bicycle promotion campaign, (b) helps policy makers justify their own interventions, which in this operation probably fostered the wave of other investments in bike infrastructure, and (c) is very useful for ICR preparation. More training for Bank operational staff and/or the dedication of a specialist who supports Bank teams in the design of the monitoring and evaluation framework is highly recommended.

107. **The project team and Bank management should have taken advantage of the assessment carried out during the mid-term review and project restructuring should have taken place, independently of the workload this implies, especially for GEF projects.** This would have helped to better match the GEO with the project activities.

108. **The choice of the implementation agency and the technical counterparts is crucial for a multisectorial project**. The implementation of a multisectorial project would be facilitated if the agency in charge of project implementation is hierarchically

above the technical counterparts and has a direct saying or strong leverage over the implementation of project outputs.

109. The more strategic lessons include the following:

110. **A project supporting a broad government program, such as the PTUS, is more difficult to implement and hence more risky. Therefore, the Bank should be more selective in terms of the areas to be supported, limiting support to a small number of areas or activities, possibly inter-related and/or reinforcing each another.** The design of this project followed the PTUS, which is a broad and ambitious urban transport agenda. Hence, it included activities that involved not only the transport sector at different levels (CGTS, Transport Subsecretariat, municipalities), but also the urban planning, housing, education, environmental and other sectors. This made the project more complex, more difficult to implement and riskier. Hence, in hindsight, it would have been preferable to limit the project scope to the parts of the PTUS with the strongest ownership and commitment. Otherwise, the project should have accounted for the additional complexity and riskiness through additional mitigation measures as well as the definition of less ambitious objectives and outcomes.

111. **The involvement of champions and decision makers during project implementation is fundamental, but not sufficient.** Although the emphasis of the project was on broad stakeholder participation, the inclusion in the implementation process of real decision makers fell short because in many cases the counterparts only included technicians. The inclusion of real decision makers, however, is not sufficient since their participation must also be representative of the role they play in the decision making process. For instance, an important reason why the revitalization measures for downtown Santiago have not yet been implemented is the relatively small weight given to the Municipality of Santiago's opinion on this topic. Indeed, the Municipality of Santiago was one of several consulted stakeholders, all with equal weight, while in reality the decision to implement these measures is completely in the hands of the Municipality.

112. **Regular virtual supervision via conference calls has proven very useful in this project.** After the problems with TRANSANTIAGO, the project implementation rhythm and quality greatly benefited from the monthly virtual supervision via conference calls.

113. Finally, the project also provided a number of technical lessons:

114. **The Bank can play an important role in the transport sector even in countries with an advanced stage of development like Chile.** Despite the sophistication of the urban transport sector in Chile, which is certainly one of the most modern and efficient in Latin America, the Bank still can provide value added. As an example, by analyzing congestion pricing from all different angles, the GEF project was able to bring this topic, which historically has been politically sensitive in Chile and whose discussion had come to a standstill, back on the table. Indeed, this study provides the technical, institutional, legal and financial information needed for well-informed decision making on sound technical grounds.

115. **The success of the bicycle component was mainly the result of the high buy-in of different levels of government and the existence of a very active civil society, from which the project was able to capitalize with properly timed interventions and close**

supervision. The latter allowed for the redesign of some project activities according to real needs. NMT was a specific program of the PTUS and part of the presidential campaign of president Lagos. Champions existed at several levels: (i) municipalities, with some municipalities having their own NMT agenda; (ii) regions, with GORE's active role in promoting NMT and the availability of funding for reaching the target of 690 km of bikeways by 2012; (iii) ministries, with the active role of the Transport Subsecretariat as the entity responsible to promote NMT in the whole country; (iv) and legislature, with the draft "Bicycle Law" and the PPDA. In addition, strong grassroots movements were able to engage in the discussion at government level, becoming key members of technical working groups that helped define the future of NMT in Chile. The project was able to take advantage of this context by: (i) providing visibility to the efforts of those champions through the GEF events/bikeways, especially during the preparatory phase of the project; (ii) concentrating GEF resources on a relative small area and therefore consolidating a network of bikeways in relatively wealthy municipalities that had a NMT agenda; (iii) supporting the inclusion of grassroots movements as part of the development of the promotional campaign and definition of key interventions (e.g., educational campaign, brochures, definition of bike parking strategy, etc); (iv) financing the monitoring study that provided information to feed into the decision making process; and (v) encouraging the active involvement of the Transport Subsecretariat in the area of NMT.

116. **Promoting new technologies has its challenges and risks that must be factored in during project preparation.** The design of a relatively large project activity was based on the assumption that the availability of specific bus technologies, i.e. CNG buses and diesel-electric hybrids, could be secured during project implementation with additional resources from a separate trust fund. Eventually, however, both the temporary importation of hybrid buses for testing and the securing of trust fund resources turned out to be impossible (for further details see annex 2).

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

(a) Borrower/implementing agencies

117. As mentioned in annex 7, the Recipient considers the outcome of this operation Satisfactory. Conversely, the Bank team rates the outcome Moderately Satisfactory for the reasons pointed out in paragraphs 77 and 81.

(b) Cofinanciers

118. Not applicable.

(c) Other partners and stakeholders

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

119. Not applicable.

Annex 1. Project Costs and Financing

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

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
PROMOTION OF BICYCLE USE	**4.56**	**9.42***	**207%**
MODERNIZING BUS SYSTEM	**4.33**	**2.92****	**67%**
STRATEGIC ENVIRONMENTAL ASSESSMENT	**0.44**	**0.36****	**82%**
ASSESSMENT OF LAND USE INCENTIVES AND POLICIES TO REDUCE MOTORIZED TRAVEL	**3.34**	**1.92****	**57%**
PROJECT MANAGEMENT	**0.27**	**1.94****	**719%**
Total Baseline Cost	**12.94**	**16.56**	128%
Physical Contingencies	0.20	0.00	
Price Contingencies	0.00	0.00	
Total Project Costs	**13.14**	**16.56**	126%
Project Preparation Facility (PPF)	0.00	0.35	
Front-end fee IBRD	0.00	0.00	
Total Financing Required	**13.14**	**16.91**	129%

*This amount is much higher than envisaged because the Municipalities in the project area constructed more bikeways than planned.
** Since staff who worked in this project generally participated in activities of different components and their timesheets are not available by component, the respective salary cost was included in project management instead of allocating it to the respective components. This largely explains the cost differences between the appraisal and the actual values.

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		7.01	10.38	148%
Global Environment Facility (GEF)		6.98	6.53	94%

Annex 2. Outputs by Component and their Link with Project Outcomes

Component 1: Promotion of bicycle use		
Outputs	**Contribution to the achievement of the project outcomes**	**Contribution to the GEO**

Output indicators and degree of achievement	• **No. of bicycle trips in project area increased.** According to the monitoring study on bicycle use in the three municipalities where the project intervened (i.e., Ñuñoa, Providencia and Santiago)[19], in the overall project area, which includes sections with and without bikeways, the number of bicycle trips on weekdays increased by 15% annually in the winter and 8% annually in the spring period. In the project area with bikeways, the no. of bicycle trips increased by 12% annually in the spring and 23% annually in the winter period. The same study also found that modal shift from cars to bicycle was in the range of 3.8% to 4.6% during working days, and 3.4% to 6.9% on Sundays. The associated CO_2 emissions reductions under different scenarios were estimated in the amount of 881 and 1,403 tons, respectively. • **Public perception about bicycle improved.** A likely indication that the public perception about bicycle use improved is the overall increase in bicycle use coupled with a substantial increase in women bicycle use (8% at project start and 20% in 2008) due to a perception of improved safety. Additionally, more than 80% of people interviewed in the Bicycle Use Monitoring Study had a positive attitude about bikeway construction outside their homes. • **At least 15 km of additional bikeways built in Providencia, Santiago and Ñuñoa.** 18.4 kilometers of bikeways were built under the project in the three targeted municipalities[20]. The current total size of the bikeway network in these three municipalities is 42.75 km. The length of Santiago's bikeway network has increased from 20 km to over 190 km since 2003, and by 2012 it is expected that 690 kilometers of urban and rural bikeways will be available with the financial support of the Regional Government (GORE). • **Enterprises' commitment to facilitate bicycle use by means of installing parking places showers and/or lockers.** In the framework of the promotion campaign, the project collaborated with *Banco Estado*, the main public banking institution in Chile, to promote bike use. This company has been installing bike parking facilities in its premises and has developed a new personal line of credit for the purchase of bicycles. The trend to install bicycle parking is also being replicated by other companies (e.g., COPESA). Furthermore, a proposed decree, currently under review by the Controller's Office (*Contraloria General de la Republica)*, requires all buildings including among others retail facilities, offices, and educational centers, to be equipped with bicycle parking. The project did not specifically aim at the installation of showers/lockers, and there is no information about their availability in companies. • **Adoption of parking programs for bikes at Metro stations.** Metro, the subway operator, has installed bicycle parking facilities in 6 stations for about 208 bikes in total and by 2010 it is expected to reach a parking capacity for 292 bikes in a total of 9 stations. • **Reduced no. of bicycle accidents per 1,000 bicycle trips in project area.** Data on accidents per 1,000 bicycle trips are not available; therefore this indicator cannot be normalized. The available data refers to the total no. of bicycle accidents in the project area. This decreased from 192 in 2005 to 186 in 2006 and then increased to 227 in 2007. Since there are only data for three consecutive years, it is difficult to say if the trend in bicycle accidents is increasing or decreasing. It should also be noted that in 2007 Ñuñoa did not yet have its bikeways in place and that the no. of cyclists between 2005 and 2007 increased. Furthermore, a bicycle safety campaign, *"Pedalea Seguro"*, has recently been launched by the Labor Safety Institute (ISL, in Spanish), the Transport Subsecretariat, GORE and the Regional Health Secretary. During 2010 all employees affiliated to the ISL that commute by bike will be trained on bike safety.	All these outputs helped to provide an affordable and efficient alternative means of transport that that is supported by the required infrastructure. NMT has become a priority in the government's agenda and a law[21] to promote NMT is being discussed in Congress. Therefore the results of the project are expected to be vastly exceeded over time. The promotion of NMT is one of the programs of PTUS, so these outputs clearly supported its implementation (outcome 1). In addition, all outputs helped to achieve the outcome of increased non-motorized trips (outcome 5), and consequently made some contribution to outcomes 6	The outputs of this component clearly support the achievement of the GEO. Modal shift to NMT helps both to reduce local pollutants and GHG. Furthermore, activities being carried out by the central and local governments as well as those carried out by the private sector support the sustainability of the modal shift and further increase it with the consequent positive effects on reduced emissions.

[19] Plan de Seguimiento del Programa de Fomento al Uso de la Bicicleta en las Comunas de Santiago, Providencia y Ñuñoa, Informe Ejectivo – Consolidado 2005-2008, July 2009.

[20] The Project financed the construction of 9.5 km of bikeways in Providencia and Santiago and the illumination of 8.9 km of the bikeways in Ñuñoa. The Municipality of Ñuñoa bid and financed its own bikeway construction because the Bank procurement process did not attract any interested bidder.

Other Outputs	• A promotional campaign with the objective to increase bicycle use in the three targeted municipalities took place. The campaign included: (a) the development of promotional and educational material; (b) promotional events; (c) training on bicycle riding and safety in 90 schools, and (d) provision of bicycle parking facilities in 10 schools for 30 bikes each. Bicycle grassroots organizations actively participated in the development of the different components of the campaign. These same groups continue to be part of the round tables organized by the Transport Subsecretariat as part of its work to promote NMT. No information about the effectiveness of the campaign is available because it was one of the last deliverables of the project and it did not match with the timing of the monitoring study on bicycle use. The campaign was shorter and started later than originally anticipated because of problems with the consultant that had been originally hired to undertake this task. The contract with the consultant was cancelled and a new promotional strategy with the help of the grassroots organizations and a core group hired for the same tasks was developed instead. • The project financed a web server to host the bicycle webpage developed and maintained by the Transport Subsecretariat (http://mnm.subtrans.cl). • The project also financed the design of bike parking facilities. Due to procurement difficulties, the project did not finance the implementation of these facilities on a pilot basis. However, the Transport Subsecretariat, who also undertook a couple of complementary studies on bicycle parking, has launched a pilot program on bicycle parking in the metropolitan region[22]. The pilot program will include 20 sites for short-term parking and 8 for long-term parking, for a total budget of approximately US$ 270,000. The latter will use the designs generated by the project. The final target is to reach 200 sites throughout the metropolitan region. Parking facilities are also being implemented by several municipalities, such as Providencia. • Finally, the project financed an international seminar to exchange knowledge and experiences on bike infrastructure design and bike use promotion.		

[21] Draft law to create incentives for the use, promotion and integration of the bicycle (*Proyecto de Ley que Incentiva el uso, fomento e integración de la bicicleta*) 2009.
[22] Plan Piloto de Implementación y Seguimiento de Estacionamientos para Bicicletas en la Región Metropolitana.

Component 2: Bus system modernizing		
Outputs	**Contribution to the achievement of the project outcomes**	**Contribution to the GEO**

Output indicators and degree of achievement	• **Upgrading of local emissions testing laboratory 3CV and implementing tests comparing economic, environmental and technical performance of 3 commercially available technologies for buses (hybrid, diesel-electric, diesel and CNG).** The project helped to create the capacity to test bus emissions under local driving cycles, and an analysis of different bus technologies shed light on emission levels, costs and potential for emission reduction of TRANSANTIAGO buses. This information is feeding the decision-making process to set more stringent emission requirements for future bus concessions. The project co-financed the emissions testing laboratory for heavy vehicles and developed local driving cycles. All available diesel technologies were tested. CNG or hybrid diesel-electric buses were not tested in the framework of the GEF project. CNG technology does not seem to be viable in Chile because of the poor reliability of natural gas availability given Chile's dependence on imports from Argentina, which has been discontinued in the past. A PHRD trust fund was prepared to finance the costs of temporarily importing hybrid buses. However, the grant was not signed because CGTS was fully absorbed with solving the problems faced by TRANSANTIAGO at its inception. Nevertheless, subsequently the private sector in Chile temporarily imported a hybrid bus and tested its fuel savings (about 25%) and emission reduction potential. The availability of the heavy-vehicles testing laboratory helped to verify that the fuel efficiency of Euro I, II and III technologies under local conditions was not as advertised by bus producers. The laboratory is currently also used in monitoring/enforcing the compliance of the bus concessionaires with emission standards/targets. • **Personnel at relevant institutions such as 3CV to test bus technologies both in laboratory and field conditions trained**. Development of local driving cycles and testing of different diesel bus technologies in laboratory and field conditions were done by professionals from local universities and international experts from California. In addition, personnel of 3CV were trained for the emissions testing of heavy vehicles and the laboratory itself is the entity responsible for this type of testing in Chile. • **Driving cycles for Santiago developed.** Driving cycles for local conditions were developed as part of a consultancy financed by the project. These different cycles were used to compare the performance of different available technologies. • **Associated costs to compare technologies estimated.** An assessment of the economic and environmental costs and benefits of eight different diesel-fueled types of buses (i.e., different sizes of EURO I, II, III, with and without filters for particulate matter) was undertaken under local driving conditions. No testing of CNG and hybrid diesel-electric buses took place in the framework of this project, as previously explained. • **GHG emission reduction from scenario penetration of technologies estimated.** The estimation of GHG emissions under local driving cycle was estimated for the eight types of buses previously described. • **Cost-effectiveness comparison amongst technologies tested carried out.** Cost-effectiveness was carried-out for the eight tested technologies. • **Review and development of business schemes and management structures for the operators of the new Santiago public transport system, including program to retrain bus drivers and operators.** The project financed a study to analyze the impact of TRANSANTIAGO on the labor market and proposed social mitigation measures, such as training for drivers, retraining for people that left the public transport market, and assistance to create companies. These measures were implemented with local funds. • **Evaluation of business models**. The evaluation of business model for Transantiago was carried out by the Government of Chile (GoCH) because this grant came too late. Indeed, when this grant became effective, the business model was already defined and the biddings for the 15 bus service concessions were ongoing.	The outputs of this component supported the modernization of the bus system. They provided the technical background information for decision makers to set requirements for the bus system and to support the modernization of the system. The implementation of TRANSANTIAGO is the main program of the PTUS, so these outputs supported its implementation (outcome 1). In addition, these outputs contributed/or have the potential to contribute to other outcomes including 2 (Maintain modal share of public transport), 4	Fewer, new and less polluting TRANSANTIAGO buses have led to air pollution and GHG reductions. Additionally, an improved bus system, i.e., an integrated and professionally managed system, with newer buses, better service quality and specialized infrastructure, has the potential of becoming more attractive. This in turn provides the support for modal shift from private cars to public transport, resulting in better mobility and reduced levels of air pollutants and GHG.

Other Outputs	• A cost-benefit analysis of TRANSANTIAGO was completed. However, the applicability of the results was affected by the differences between the initial design of TRANSANTIAGO and the one that is currently under operation, as far as number of buses and network design are concerned. Even if the results of the studies are not relevant anymore, the methodologies behind the results are still valid and can be applied to the new reality of TRANSANTIAGO. • The 3CV laboratory developed a variety of studies with the support of the chassis dynamometer purchased by the project to complete the emissions testing laboratory for heavy duty vehicles. In conjunction with CONAMA and USA EPA, the laboratory assessed the impact on emissions of post-treatment filters on trucks, providing relevant data for the establishment of regulations required in draft Environmental Prevention and Clean-Up Plan (*Plan de Prevención y Descontaminación Ambiental* - PPDA), currently in its final stage of approval. Additional, the National Commission on Energy has assessed with the help of the laboratory the feasibility to use biodiesel in heavy trucks as part of the country program on energy efficiency. The facility is also used to test the impact on emissions of additives in different bus technologies. Finally, once the necessary financing becomes available, the 3CV laboratory will carry out the necessary tests to determine the local public transport emission factors for an innovative emission and GHG inventory.		

Component 3: Strategic Environmental Assessment			
Outputs		**Contribution to the achievement of the project outcomes**	**Contribution to the GEO**
Output indicators and degree of achievement	• **Strategic Environmental Assessment of Transantiago carried out.** The strategic environmental assessment was carried out, but it was not successful as intended. It focused on developing a methodology and a set of indicators to assess the impact of the transport system from different perspectives rather than on a system and institutional setup to introduce environmental evaluation in all aspects of transport planning, linking transport to air quality, climate change and environmental impact assessment. Still, through the PPDA, the link between transport and air quality is well established, but not to climate change yet. The differences between the result obtained and that originally planned could have been because by the time the study started there was no unique definition of a strategic environmental assessment, and the one selected fell short from really assessing the impacts of transport measures on other sectors and vice versa. Additionally, as with the cost benefit analysis, this study was based on the original design of TRANSANTIAGO, hence the respective results do not reflect the current reality. • **Identification of formal coordinating mechanisms for land-use, environment, and urban transport policy development and monitoring.** Given that the strategic environmental assessment was not successful as intended, the project did not support the achievement of this output. Nevertheless, since 2000 operates the Inter-ministerial Committee for City and Territory (COMICYT), integrated by the Ministries of Housing (MINVU), Public Works (MOP), Transport (MTT) and National Goods, which serves as the coordinating mechanism for land-use, environment, and urban transport policy development and monitoring. The main responsibility of COMICYT for the period 2006-2010 is to develop integrated investment programs in the main cities of the country, with the aim to substantially improve the social effectiveness of public investment of urban infrastructure projects.	The outcome of this component, was not as successful as intended. The study generated a tool useful assess the impact of the transport system from different perspectives rather than defining the institutional setup and an associated system for introducing environmental evaluation in all aspects of transport planning, linking transport to air quality, climate change and environmental impact assessments. As such, it can be used to evaluate and monitor the transport system over time, somewhat supporting outcome 1 (PTUS Implementation).	The tool developed under this component does not currently offer any direct or indirect contribution of to the achievement of the GEO. However, it could potentially provide some indirect contribution if it is used as monitoring tool and the monitoring results lead to improvements of the public transport system.

Component 4: Technical Assistance and Analytical Support: land-use patterns and internalization of costs			
Outputs		**Contribution to the achievement of the project outcomes**	**Contribution to the GEO**
Output indicators and degree of achievement	• **Assessment of several urban development options for Santiago's Central Ring (*Anillo Central)* from a transport and global/local emissions perspective and incorporation of the results in the decision-making process regarding land-use policies in this areas.** A methodology to carry out an integrated assessment of urban and transport projects was developed. It considers the costs, benefits and profitability of an investment project and generates the indicators that allow for the comparison of different alternatives. Therefore it supports the investment decision from both a public and a private perspective. However, it was not validated by the Planning Ministry (MIDEPLAN) because, even if it constitutes an important milestone in the area of joint evaluation of integrated urban projects, there is still more work needed to consider such a methodology ready for implementation. CGTS was exploring the possibility to have the methodology reconsidered, and the Transport Planning Secretariat (SECTRA), the technical arm of MIDEPLAN, is currently carrying out the additional studies to come up with a valid evaluation methodology. SECTRA includes among its responsibilities the development, update and improvement of transport related social assessment methodologies. • **Design of framework for locating housing programs taking into account transport dimensions.** The study on housing location policies which was expected to look at the link between the definition of these policies and their impact on the transport system and the environment was not carried out. The contract with the consultant hired for this activity was cancelled because the quality of the work was not up to standards and there was limited interest to bid the study again. Nevertheless, the government, through MINVU, has some subsidies programs for middle income families t*hat seek to promote the revitalization o*f certain areas that take into account the transport, school location and accessibility to basic health services variables (i.e., "*Subsidio de Interés Territorial Título II"*, and the "*Subsidio de Localizacion"*). • **Assessment of school zoning and planning.** The project financed an assessment of school zoning and planning and the development of a tool for parents to take transport options into account when making school choices. This WEB and GIS based tool used the latest census on educational institutions of 2006 and can (and should) be updated based on census updates. After the closing of the project, CGTS agreed to host the tool in its own website (http://www.transantiago.cl/web2005/Transantiago_Home2005.htm) and the informational website of TRANSANTIAGO accessible by the general public (http://www.transantiagoinforma.cl/). The tool will be annually updated through a protocol of	The outputs of this component provide data, information, recommendations and tools for the implementation of transport and land-use related incentives and policies. Their use has been limited so far. However, if largely implemented, they could play a significant role in supporting all project outcomes, except outcome 4.	Significant reductions in air pollutants and GHG emissions in transport could be obtained from modal shift. All measures that look into developing a more rational decision making process for transport options have the potential of promoting modal shift, as long as a good, reliable, safe and cost-effective public transport and NMT alternatives are present. The project as a whole has supported the programs of the government that aim at this objective. In particular, this component supported the assessment of land-use alternatives and policies to promote a more rational demand for

	information sharing between CGTS and the Ministry of Education. The project also financed a study to assess the impact of the full-time school day on the transport system that aimed at determining options to manage the education-related transport demand at pick hours. This study provided the basis for another study that will be carried out by CGTU and SECTRA to forecast the public transport demand generated by the extension of Santiago's urban area proposed by MINVU in the modification to the Santiago Metropolitan Zoning Plan (*Plan Regulador Metropolitano de Santiago*). Additionally, proposed follow-up studies on the study to assess the the impact of the full-time school day on the transport system are: (1) analysis of the economic impact of postponing the school morning opening hours TRANSANTIAGO and (2) analysis of the stakeholders involved in postponing the school morning opening hours and their interests and influences as well as the proposition of an action plan to implement this measure. • **Tentative strategy and timetable proposed to introduce congestion pricing.** An important, but still controversial study undertaken was the assessment of congestion pricing, which established the area, legal, institutional and operational/technical procedures to promote internalization of costs from car travel. The study also examined the financing costs and environmental benefits of the alternative proposed. The feasibility of the recommendations of the study being adopted will largely depend on the will of the new government administration. Still, one of the positive features of the study is its focus on a pilot-area rather than a broader area, which would hopefully reduce the opposition to its implementation. Because the area affected would cover an area within the Municipality of Santiago only, a special role was given to the Municipality to provide feedback about the benefits and impacts of such measure. No definition of the position of the Municipality in reference to the implementation of congestion pricing has been determined yet. • **Traffic calming measures designed for Santiago's city center including completion of engineering and regulatory studies of the he proposed measures.** A detailed study that identified 14 traffic calming measures for Santiago's downtown was undertaken with the support of the project. Blue prints were prepared for three of these measures, with a preliminary cost estimate. An important feature of this study was the high involvement of the community through extensive citizen's consultation, formally included in the tasks to be performed by the consultant. None of the proposed measures have been implemented yet, and the prospect of their implementation requires political will, which has not yet been secured. CGTS together with the Bank team met with the Municipality of Santiago and the new Mayor to discuss the potential implementation of the proposed measures. The Mayor asked his staff to examine the proposed measures and present their opinion to the Major's Committee. CGTS will follow-up on this issue with the Municipality. • **Feasibility assessment of travel optimization pilot and reduction in the no. of veh-km generated by the people pertaining to the sample used for a travel optimization pilot study.** A study that examined different measures to make a rational use of mobility options was carried		rational demand for transport. The adoption of the tool, recommendations, etc. has been limited so far. However, if adopted, some could play an important, if not decisive role in favor of public transport modal shift (e.g., congestion pricing).

	out, and their feasibility was assessed. However, the implementation of the pilot phase was not carried out. A combination of lack of a champion for this activity and no time within CGTS because of the implementation problems of TRANSANTIAGO delayed the finalization of the ToRs and the bidding process, not allowing for sufficient time to implement this task. • **Design of legal, financial and institutional options for the incorporation of GHG emission reductions into the emission reduction trading program from mobile and fix sources in Chile and design of the institutional setup for a clearinghouse mechanism.** A study that examined this issue was supported by the project. Nevertheless, the complexities associated with the development of a "Cap and Trade" type market that also includes a voluntary market (as it is the case with transport related projects), even only for local pollutants, changed the focus of the study. The latter went towards examining and providing recommendations on how to design the local online emission compensation market first, without the additional complexities of considering GHG. Once a local operation is well established, the assessment of the feasibility of a more complex mechanism that also includes GHG could be undertaken. According to the draft PPDA, this local online emission compensation market has to be implemented within one year of the effectiveness of the PPDA. Still, the project supported the generation of five methodologies for the standardization of the identification, estimation and monitoring of emission reductions that also considered GHG from a co-benefit perspective (efficient operation of buses, vehicle scrapping, hybrid buses, post-treatment filters, and firewood stoves). An additional activity developed the software tool for the online application of the methodologies to real life projects. It is expected that these methodologies and the online computational tool will help improve the liquidity of the incipient market that currently exists. Finally, the design of the compensation scheme with the inclusion of mobile sources required a reliable way to quantify public transport emissions. This pushed CGTS to develop an innovative tool, using Airviro[24], to monitor, quantity and control local and GHG emissions of the public transport in Santiago on a continuous basis. This information will also be used to update the emission targets for public transport concessionaires.		

Annex 3. Economic and Financial Analysis

The project was thought as one that would support measures aimed at removing barriers for changing cultural behavior and transport demand patterns; improving the public transport system; and incorporating the environmental dimension in urban transport, and land-use planning. As such, all these measures would have an impact on the level of GHG emissions, and as identified at appraisal, measures promoted under the project would only be effective, in terms of reducing GHG, in the long-run, lead by the implementation of TRANSANTIAGO.

The economic assessment of the project at appraisal was based on an incremental cost analysis. The baseline scenario assumed that the implementation of measures aimed at restructuring the public transport system, namely implementing TRANSANTIAGO, focused on reducing air pollution and improving transport, without considering GHG emission reductions. The alternative scenario, therefore, included complementary activities that would introduce climate change considerations, i.e., congestion pricing, land-use incentives to promote a more rational demand for transport in order to reduce average travelled km, and an accelerated promotion and development of alternatives means of NMT, among others. Even though the line of thought was correct, the incremental cost analysis had a number of flaws. In the first place, the relevant incremental costs to achieve the estimated emission reductions should have been the implementation costs of the different measures and not just the cost of the studies as it was done. The only exception to this was the incremental cost estimate for the construction of bikeways. In second place, there was no explanation of the methodologies used to estimate the emission reductions. Thirdly, for a number of measures, the emission reduction estimate appeared to be ambitious.

Because of the previous reasons and given the fact that actual CO2 reduction data or estimates are only available for a limited number of project activities, it is not possible to undertake a similar incremental cost analysis to compare the appraisal scenario with the post-project one.

Indeed, with the exception of the NMT component, the project mainly developed tools, blue prints and methodologies that for the most part have not been implemented yet, making it difficult, at this point in time, to assess the real effectiveness of the measures in terms of reducing GHG emissions. Even if the measures were implemented, it would be difficult to isolate the impact on GHG emissions of the measure, given that its success is determined by the quality of the transport system itself. For example, congestion pricing would not work if no alternative means of transport at a minimum quality is provided. Still, it should be noted that most recommendations and tools, if implemented, have the potential to promote modal shift, where a relevant amount of GHG emission reductions could be generated.

Even if the above is true, it is interesting to at least present the available information on GHG emission reduction, namely that of the implementation of TRANSANTIAGO, the construction of bikeways and some preliminary estimates of congestion pricing.

Utilizing the UNEP Clean Fleet Management toolkit, it has been estimated that the GHG emissions were reduced by approximately 98,975 tons between 2006 and 2009 (with and

without TRANSANTIAGO with 6,400 versus 7,974 buses, respectively), that is a reduction of 10.5% compared to 2006. These figures only consider improvements in the management of the bus system including technological changes, fuels used, quality of bus maintenance and operation, and level of activity; they do not include modal shift. Additionally, a modal shift from cars to bikes in the project area led to an annual reduction of GHG emission of 1,000 tons/year (between 3-6% of bikers in the project area reported that they would have previously used their cars instead for the same trip). No data for bike modal shift on a citywide level are available. Congestion pricing appears to have a significant potential in terms of GHG emission reduction. If implemented in the central area of the Municipality of Santiago, it has been estimated that GHG emission could be reduced by approximately 200,000 tons/year, and that this number could almost double if the area is extended to cover a broader ring around the metropolitan area.

The table below summarizes the findings as well as the estimates at appraisal.

Activities	**Estimated emission at project end**	**Expected Emission Reduction at appraisal**
Promotion of bicycle use	Data are only available for the three municipalities targeted by the project (Ñuñoa, Providencia and Santiago) and not for Santiago as a whole. The available data indicate a modal shift from private cars to bicycle of between 3.4% and 6.9% (in different days under different scenarios), with an associated reduction of 1,000 tons/year of GHG. This refers to the percentage of bikers that reported that their alternative means of transport for the same trip would have been the private car. Data on car and taxi reduction is not available.	At appraisal it was assumed that a 3% decrease in vehicle-km travelled by private cars and taxis as a consequence of modal shift to bicycle trips in all metropolitan Santiago would generate a reduction of 126,000 tons/year of GHG. No description of the methodology used was available, and the estimation focused on the whole metropolitan region rather than on the three targeted municipalities.
Modernization of the bus system	It was estimated that changes in system management, i.e., technological changes, fuels used, quality of bus maintenance and operation, and level of activity, have been responsible for the reduction of 98,975 tons of CO2 between 2006 and 2009 (UNEP Clean Fleet Management toolkit). The main change is the number of buses in the fleet from 7.794 to 6,400, and the redesign of the routes decreasing the activity of each bus. No cleaner technologies in terms of GHG emission were introduced (i.e., hybrid diesel-electric).	The original design of TRANSANTIAGO considered a reduced network with fewer buses than the one that is currently in place. Based on the original design, it was estimated that a reduction of 680,000 tons/year of CO2 could be achieved. The reduction was expected to be mainly obtained from bus system restructuring (586,000 tons), followed by bus renewal (80,000 tons) and introduction of hybrid technology (23,516 tons).
Assessment of land use incentives and policies to reduce motorized travel	The study on the recovery of the Central Ring of Santiago generated a methodology that has not been approved by MIDEPLAN yet, and no GHG emission reductions are available. No estimation on GHG emission reductions is available from any of the school-related studies. Finally, the study on housing was not completed.	Estimations at appraisal indicate a potential reduction of 280,000 ton/year of CO2 from the implementation of land use incentives and policies targeted at the Central Ring of Santiago. It was expected that implementation of housing and school location policies would promote reduction in average traveled vehicle-km through a combination of lower transport demand (shorter trips) and modal shift to public

		and NMT. Also zoning policies promoting real estate development and the densification of areas in the Center of the city would generate substantial benefits in terms of travel patterns
Reducing [individual] Motorized travel	The study on congestion pricing estimates that the implementation of a pilot phase congestion pricing area in the downtown of Santiago could generate a reduction of 202,168 tons/year of CO2. The study also indicates that this value could be almost doubled if the area is extended to cover a broader ring around the metropolitan area. No estimations of GHG emission reductions of the traffic calming measures proposed under the project are available.	The PAD at appraisal estimated that 480,000 tons/year of CO2 could be obtained from mainly two types of activities: traffic calming measures in the city center promoting modal shift, and congestion pricing reducing the number of vehicle-km travelled. It was assumed that traffic calming measures in city center could have an impact on modal shift reducing the amount of motorized trips by 50%,, while congestion pricing would promote modal shift, reduce congestion increasing transport commercial speed.
Travel Optimization	No data are available. The pilot phase of this study, which could have shed some information in GHG emission reduction, was not carried out.	The PAD indicated that a previous demonstration experience (no reference is available) allowed for reductions in average travelled km by 23.3%. An estimated 340,000 ton/year of CO2 are expected then to be obtained from a 10% reduction of cars km.

Estimations cannot be compared against each other as different assumptions and implementation timeframes have been used for studying each type of measure. Furthermore, no information on the methodologies used to estimate emissions reduction at appraisal was available.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Juan Andres López-Silva	Environmental Specialist	LCSEN	TTL
Pierre Graftieaux	Urban Transport Specialist	LCRTR	Urban Transport
Gerhard Menckhoff	Urban Transport Specialist	LCRTR	Urban Transport
Antonio Blasco	Sr Financial Management Specialist	LCSFM	Financial Management
Andrés Mac Gaul	Sr Procurement Specialist	LCSPT	Procurement
José Ramón Gómez	Consultor		Environment
Supervision/ICR			
Daniel Jorge Arguindegui	ET Consultant	LCSPT	Procurement
Elisabeth Goller	Transport Specialist	LCRTR	TTL
Juan Andres López-Silva	Environmental Specialist	LCSEN	TTL
Antonio Leonardo Blasco	Sr Financial Management Specialist	LCSFM	Financial Management
Carla Della Maggiora	Consultant	LCSEN	Environment and Transport
Jose Ramon Gomez Guerrero	E T Consultant	LCSEN	Environment
Hernan M. Gonzalez Figueroa	Consultant	LCSEN	Environment
Roger Gorham	Transport. Economist	AFTTR	Transport
Pierre Graftieaux	Sr Transport. Spec.	AFTTR	Transport
Delia Beatriz Grisolia	Consultant	LCSFM	Financial Management
Ana Maria Grofsmacht	Procurement Analyst	LCSPT	Procurement
Andres Mac Gaul	Sr Procurement Specialist	LCSPT	Procurement
Gerhard Menckhoff	Consultant	LCSTR	Urban Transport
Santiago Scialabba	Program Assistant	LCC7C	Procurement
Alejandro Roger Solanot	Financial Management Specialis	LCSFM	Financial Management
Horacio Cristian Terraza	Sr Environmental Spec.	LCSEN	Former TTL

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY01		15.21
FY02		89.69
FY03		108.76

FY04		79.15
FY05		0.19
FY06		0.00
FY07		0.00
FY08		0.00
Total:		293.00
Supervision/ICR		
FY01		0.00
FY02		0.00
FY03		0.00
FY04		6.26
FY05		84.36
FY06		58.85
FY07		49.43
FY08		46.35
FY09		62.22
FY10		48.13
Total:		355.80

Annex 5. Beneficiary Survey Results
(if any)

As per ICR guidelines, this is mandatory for Intensive Learning ICRs. No beneficiary surveys were conducted in the framework of this ICR.

Annex 6. Stakeholder Workshop Report and Results
(if any)

As per ICR guidelines, this is mandatory for Intensive Learning ICRs. No stakeholder workshops were conducted in the framework of this ICR.

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

FINAL REPORT GEF PROJECT
"GLOBAL ENVIRONMENTAL FACILITY (GEF) GRANT AGREEMENT"
Nº TF020392

COORDINATION TRANSANTIAGO (CGTS)
March, 12 2010

CONTRIBUTION OF THE RECIPIENT

1. Introduction

The World Bank, in its role as Executing Agency of the Global Environment Facility, granted to the Recipient the "GEF Grant TF020392", in line with what is documented in the Grant Agreement dated January 6, 2004.

Considering the proximity of the implementation of an ambitious Transport Plan for Santiago, the Project had the following objectives: (i) to help reducing greenhouse gases (GHG) generated by land transport in Metropolitan Santiago through the promotion of a long-term shift toward more efficient and less polluting transport modes as well as through the adoption of sustainable transport measures with lower GHG, and (ii) to help improving the air quality in Santiago through reductions of emissions, such as SOx, CO, PM10 and NOx.

2. Formulation and implementation of Transantiago, GEF's role

The Santiago Urban Transport Plan 2000 to 2010 (PTUS) is a direct precursor in the design of the Transport Plan for Santiago, Transantiago. The PTUS is a proposal to implement a comprehensive public policy for the city aiming at improving the quality of life in all aspects related to transport. Its main objectives included improving transport services at lower cost, reducing significantly the environmental impacts, achieving better urban planning, optimizing travel time, and promoting personal safety.

While all programs included in the PTUS were of great importance and complementary to achieve the proposed objectives, the program with the highest priority as well as the most technical and social complexities, which formed the basis for all other programs, was the Program for the Modernization and Integration of Public Transport Services (Program 1 of PTUS). This Program 1 is what ultimately constituted the Transport Plan for Santiago, Transantiago. It focused primarily on areas such as the restructuring of bus routes and the way they operated; the introduction of a new payment system for public transport; the corporatization of the operators; the introduction of new management forms; the construction of specialized infrastructure; professional driver training; citizen participation and dialogue; and management of the environmental impacts of the transport system.

Three years after the difficult start (of Transantiago), the positive results of the public transport modernization are visible, and are being recognized by various actors of the society, both in Chile and internationally.

The GEF project was an important complement to the policies and basic guidelines for the environmental sustainability of the Plan and a means to advance with the development of the additional programs of the PTUS. It also allowed, during the difficult years of the implementation of the Plan (Transantiago), to carry out a series of comprehensive and interdisciplinary studies, establishing sound foundation to advance with the proposed ambitious objectives.

3. Achievement of objectives and key developments

Given the nature of the Recipient's Contribution, only the main aspects regarding the progress in different areas and the achievement of the objectives of the Project are described. It is understood that the latter is exhaustively described in the World Bank Project Implementation and Completion Report (ICR) and in other project related documents.

The difference in the degree of compliance with the Project objectives depended on both the conditions and the circumstances of the complex implementation of Transantiago and the respective organizational priorities as well as the ambitious nature of these objectives. The objectives more favorably evaluated, mainly for its short-term results, are those related to promoting bicycle use and public transport modernization. Conversely, there are activities that while not able to fully meet the proposed objectives, such as some related to the Land Use and Transport Cost Internalization Component, they constitute a valuable foundation to progress in this direction for both the Ministry of Transport and Telecommunications and MIDEPLAN[25], especially through SECTRA[26], or to implement policies in this regard by other institutions (MINEDUC[27], MINVU[28]).

One of the historical challenges for public transport since the early days of Transantiago has been to maintain its modal share. While this will ultimately be evaluated through future origin - destination (ODS), based on the data of the 2006 ODS, it is possible to deduce that the shift of public transport trips before the implementation of Transantiago was not toward private transport, but toward "other," which considers alternatives, such as walking and bicycle use. With Transantiago already stabilized, it will be important to assess, through the above-mentioned surveys, if this trend continues and if the influence of favorable aspects, such as the above-mentioned stabilization of the system, the greater supply of Metro services or a combination of both of them, have favored it.

As for non-motorized trips, specifically bicycle trips, it is necessary to point out that there has been a steady increase in the use of this means of transport in the city of Santiago. The different stakeholder related to this topic agree that one of the initial cornerstone of this increase was the Project, which through its studies, promotion campaign and the construction of bicycle facilities was the basis of the local networks in the three participating municipalities (Santiago, Providencia y Ñuñoa).

The important work of the organizations as well as the efforts of various sectors of the Chilean Government helped to enhance such consolidation. This finally led to the allocation of the institutional coordination of the different initiatives on the topic to the Regional Government for infrastructure matters and to the Ministry of Transport and Telecommunications for matters related to policy, promotion and regulation. In this way, initiatives, such as the Santiago Bicycle Plan, considered a so-called "Bi-century Project" (*Proyecto Bicentenario*) and later the specific draft law as well as the modification on these issues in the General Law for Land Use and Construction, were created.

It is important to point out that during the 2009, the Division of Studies and Development (DED) of the Transport Subsecretariat took the leadership and the coordination of non-motorized transport for the entire country. In this context, it developed a set of initiatives to promote the construction of facilities for these transport modes in the country. In addition, SECTRA developed a simplified social assessment methodology, which was approved by MIDEPLAN. Moreover, bicycle paths are being incorporated in Urban Transport System Development Plans, prepared by SECTRA for the main cities of the country. With this, within these institutions the topic receives an active and permanent role.

As mentioned above, in addition to its participation as a counterpart to the Project studies, the Subsecretariat provided support in the technical implementation of the bicycle component under the responsibility of CONSASET[29]. Toward project end, it also played an active role in the implementation of the different contracts of this component, coordinating the activities with national guidelines and projects. It is important to note that to more adequately pursue different policies in the field of promoting bicycle use, the Ministry of Transport and Telecommunications established this year a new institutional structure within the Division of Studies and Development, called Sustainable Transport Unit, which will be responsible for further developments in this area. Among others, the promotion and implementation of bicycle parking projects are the most important tasks of this unit to guarantee the continuity of the bicycle component.

With regard to existing data, although there are no surveys for the entire city, the 2006 ODS already showed signs of increased bicycle use, with a 2% modal share in 2001, which increased to 2.9% in 2006. In the communities affected by the project, the Monitoring Plan detected an average annual growth rate of 15% since 2004 until the closing date of the project, which in the areas with bikeways increased to 23%. Additionally, there was a modal shift from the private car to the bicycle between 3% to 6%, depending on the season. This directly contributes to the objective of reducing CO2 emissions through a decrease in polluting trips compared to the baseline.

As for the reduction in bicycles accidents, CONASET records show that while accidents have increased, this is correlated to the large increase in bicycle use and not necessarily to a decrease in safety. Furthermore, studies related to the GEF project revealed that when building bicycle facilities, accidents and their severity do not increase, which is shown by comparing the results obtained by the Monitoring Plan in Providence and Ñuñoa. The

studies also showed an increase in women who ride bicycles, which is attributed to a large extent to the conditions of security and road safety in Santiago, as pointed out by the specialist and project consultant Mr. Ricardo Montezuma.

In addition to what has been developed in the GEF project, the Plan Transantiago has helped to increase bicycle use through the construction of bus corridors, which include bikeways. These constitute structural axes of the city's network, complemented by local initiatives. All this is coordinated within the city's bicycle path master plan in the framework of the Santiago Bicycle Plan.

The importance given by the Coordination Transantiago (CGTS) to the environment and the contributions to improve Santiago's air quality through the implementation of the GEF Project is seen not only in its operational management but also in the various actions it has implemented that show a permanent concern for the harmonious development between the mission of providing an efficient transport system and improving air quality in the city, in order to generate the least impact on its operations. In this context, it was establish that for Transantiago emission control and monitoring, including greenhouse gas emission, is an absolute priority, which means that it has to be considered in all its operations and that it must involve each of the operators in the system.

In line with this stated priority, Transantiago is committed to meet the emission reduction targets set for public transport in the Environmental Prevention and Clean-up Plan for the Metropolitan Region (PPDA), which set a target of 75% reductions in emissions of particulate matter (PM) and 40% reduction in nitrogen oxides (NOx), compared to the values of the 1997 emission inventory.

In 2007, the emission targets were met satisfactorily - 79.6% for PM and 66.5% for NOx[30]. At the end of 2009 the reductions continued, adding reduction of 48% in PM and 41% in NOx compared to the 2005 emissions inventory for the Metropolitan Region[31].
Since filters were not incorporated into the buses with technology Euro I and Euro II, to comply with the emission reduction targets it was decided to move ahead of the regulations. It is worthwhile pointing out that by the end of 2010 the fleet composition will consist of approximately 6,200 buses with 100% Euro III technology, of which 41% will have particulate post- treatment filters. The estimated reductions are about 66% in PM and 41% in NOx compared to the 2005 Inventory[32].

In the framework of this technological development and anticipating the environmental requirements regarding the mandatory use of filters in new vehicles entering the metropolitan area[33], CGTS has included these requirements into the bidding of the concessions for new routes. This was the case of the recent bidding for the trunk line 3, where the bidding documents required that the proposed fleet incorporated buses with Transantiago standard as well as particulate post treatment filters with an efficiency of at least 90%. The same criterion of efficiency will be included in future biddings for feeder services.

Therefore, the Project studies with an environmental focus and the subsequent studies carried out on the basis of the results of the former have been useful tools to monitor the compliance with the measures outlined in the PPDA. In this way, thanks to the improved knowledge of the technical teams and the measures implemented by the institutions involved, the contribution of public transport to the concentration of anthropogenic origin passed from 22% to 8% between 2000 and 2005.

The contribution of the GEF Project to these outcomes is related to the results obtained in the Public Transport Modernization Component. The studies carried out under this component, through the definition of driving cycles and the operational monitoring of public transport buses in Santiago, helped to obtain an economic and environmental assessment of traditional and non-traditional bus technologies that contributed to the scientific basis for decision making.

The study ‘’Integrated Design of an Emissions Compensation System for the Metropolitan Region of Santiago” deserves special attention for two reasons. It helped to generate the technical basis and fundamental guidelines for the design of a transaction market for the local market of fixed and mobile sources. It also provided an advance in the design of a computer application aiming at applying the design elements of the study in a way that both sectors, through the compensation system, will be able to compensate emissions as an alternative to comply with the targets imposed by the Plan (PPDA). For Transantiago, the development of this tool is a big advance compared to the existing methodologies to calculate emissions. The 3CV’s chassis dynamometer (financed partly through the Project and also used to carry out heavy freight vehicle tests and to develop an activity dedicated to the monitoring/supervision of buses) and the improvement of emission factors will allow to create the basis to require the compliance with (emission) targets and the development of an emission transaction/compensation market for Transantiago’s bus operators.

4. Bank performance

The Bank team for this Project was proactive and highly skilled. It was able to satisfactorily handle the Project, achieving a good balance with the local implementation team to successfully conclude it. Sometimes this was no easy task given the complexity of some issues, the institutional relations of our country as well as the aforementioned implementation of Transantiago, in relation to which it is important to mention that the Bank demonstrated at all times great support.

5. Performance of the Recipient

It is important to point out that the Recipient went ahead with the projects even in circumstances in which the Government itself recognized its responsibilities in the shortcomings for the design and implementation of Transantiago. It focused on a fast and strong reaction in order to move ahead with the operation of the (public transport) system (the respective results can be seen today). To illustrate this, at the moment when the progress in project implementation was less than expected because of the above-

mentioned circumstances, the head of CGTS gave it his complete support and priority. This new situation required an extension of the grant. The Project implementation team was strengthened, assigning professionals with exclusive or predominant dedication (to the Project) and including in the technical team experts in the environmental, social and urban areas. The implementation responsibility was assigned to a complete unit of the Technical Coordination (Environmental and Territorial Unit) and a important part to the Financial Coordination, keeping the priorities in this area of the professionals with exclusive or partial dedication, who since the beginning carried out the financial aspects of the Project. In this way, the GEF Grant Agreement as well as the other ongoing agreements were put at the same level as the other priority challenges, which CGTS needed to move ahead in a satisfactory way.

These measures came at the expense of continuity in the team, which was partly compensated by the fact that two professionals of the new team had already been working in the project for some time. In addition, there was the experience of the professionals responsible for the financial aspects. Toward the end of the project, all this was supported with training provided by Bank experts.

Furthermore, in order to successfully complete all the studies, the technical support provided by other ministries and institutions, such as the CONAMA and SECTRA, was fundamental from an institutional and professional point of view, maintaining continuity throughout the projects.

6. Lessons Learned

As pointed out previously, the greatest difficulty in ensuring the short and medium term success of the proposed objectives was the development of the projects related to integrated urban planning between the land-use and transport sectors. This required an intersectoral work that needs an institutional strength with regard to the interference on other institutions both for decision-making and for the definition of working guidelines, which does not exist today. This was the case mainly for the consultant assignments to develop an integrated evaluation methodology for urban projects (although this line of work has been continued by SECTRA, it is a long term project). It was also the case for the studies on strategic environmental assessment (SEA), efficient location of housings, travel optimization, study trips, and congestion pricing, among others. Thus, in general terms, there is a need in the stage of identification and design of a project with these characteristics to analyze how ambitious or feasible it is to achieve the proposed objective in line with the existing institutional reality.

In more specific terms, despite the good results obtained in the Bicycle Use Promotion Component, the promotion activities required additional efforts which are not the ones of an implementation team. There was a need to coordinate 9 interrelated contracts, which required a very specific expertise related to the production of campaigns. In hindsight, an analysis of this experience leads to the conclusion that these contracts should have been coordinated by a single specialized company in the area, facilitating the control of the

products. This is because this type of tasks is outside the spheres of activity of the project coordinating agency.

In short, concerning the development of the projects, among others, it can be pointed out that:

- The objectives of the projects must be realistic with regard to the implementation possibilities and institutional functions.
- The commitments of the Ministries or Services of the technical counterparts must be such that a change in the teams does not affect the normal development of the project.
- It is necessary that the implementation teams receive continuous training regarding Bank procedures.
- It is also necessary to train the support agencies (in this case the UNDP) in order to harmonize their procedures with respect to those of the Bank.

7. Conclusions

On the basis of the considerations above, the Recipient considers the overall rating of the Project “Satisfactory”." Among others, it is important to point out the following aspects:
The contribution of the Recipient in achieving the increase in bicycle use, the improvement of the citizen perception with regard to this mode, the increase of the share of women using it, the strengthening of the civil society organizations related to the urban cycling, the institutionalization of the promotion of non-motorized transport within both the Transport Subsecretariat and the Metropolitan Regional Government of Santiago, and finally a recovery of the confidence of the cyclists organizations, which had been lost with the first promotion experience in this Project.

With regard to the progress and lessons on sustainability and environmental management, due to the actions undertaken to comply with the commitments of the project, the results of the studies and the acquired knowledge base, there is currently an explicit strategic guideline in CGTS to take into account these issues. In order to develop this guideline, there are not only adequate tools, but also a professional team with the relevant experience and a line of action that goes in the above-mentioned direction. Thus, there is a proposal to set up a platform that allows integrating air quality monitoring, considering factors such as the meteorological, management, and traffic network monitoring, modeling of the in-depth contamination and noise levels, among others, as well as a general model that integrates all the previous models. All this to create a platform that allows integrating all these aspects in an effective way into a larger environmental management and of urban traffic system, similarly to what is is currently carried out in European cities that lead this topic (Rome, Paris, Berlin, etc.)

Given the stabilization of the operation of Transantiago, the satisfactory results obtained through the Project and in line the remaining challenges, both the new ones and those not completely resolved by the Project, it is recommended to think about developing a second phase of this, or in its absence, a similar project with such characteristics to tackle these challenges.

COMMENTS OF THE RECIPIENT ON THE BANK'S DRAFT ICR

The only comment received from the Recipient and not incorporated in the Bank's ICR refers to the outcome rating and is the following: "Indeed, we believe that the rating that best reflects the Project is "Satisfactory" since according to our understanding the majority of the objectives of the projects have been achieved in a satisfactory way. This is shown by the Bank's ratings assigned to each aspect and objective of the Project, with which we agree. In addition, there is the fact that this achievement was possible despite the adverse circumstances, which affected the Project in different phases."

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

There were no cofinanciers or other partners.

Annex 9. List of Supporting Documents

"Asesoría para el componente de promoción y seguimiento del proyecto de fomento del uso de la Bicicleta", Informe de misión de visita de trabajo a Santiago de Chile 14 a 19 de junio de 2009

"*Borrador del Proyecto de Revisión, Reformulación y Actualización del Plan de Prevención y de Descontaminación Atmosférica para la Región Metropolitana (PPDA*)", *Comisión Nacional del Medio Ambiente Región Metropolitana de Santiago*, Santiago, January, 2009

"Definiciones Estratégicas", Ficha de Identificación Año 2007, Ministerio de Transporte y Telecomunicaciones

Draft law to create incentives for the use, promotion and integration of the bicycle (*Proyecto de Ley que incentiva el uso, fomento e integración de la bicicleta*). 2009

"*Encuesta: Evaluación Gestión del Gobierno, Informe Mensual*", ADIMARK GfK Monthly Report, January 2010

"Estoy Contigo", Program of the Government of Michelle Bachelet 2006-2010

"*Estudio Tracking Calidad de Servicio TRANSANTIAGO*", Collect – GfK Study, July-August 2009

IBRD and IFC Country Partnership Strategy for the Republic of Chile for the Period 2007-2010, April 24, 2007

"Informe Seguimiento Plan de Prevencion y de Descontaminacion para la Region Metropolitana", 2008, CONAMA *Metropolitana de Santiago*

Law no. 20378 of 2009, criating a national subsidy for remunerated public passenger transport (*Ley que crea un subsidio nacional para el transporte público remunerado de pasajeros*)

"Memoria Anual División de Estudios y Desarrollo de la Subsecretaria de Transportes, Balance 2009 y Proyecciones 2010", Government of Chile, January 2010

"Plan de Seguimiento del Programa de Fomento al Uso de la Bicicleta en las Comunas de Santiago, Providencia y Ñuñoa", Informe Ejecutivo – Consolidado 2005-2008, July 2009

Plan for Santiago on Bicycle (*Plan Santiago en bicicleta*), 2008

Project Appraisal Document and Aide Memoires of preparation and supervision missions in IRIS

Seventh Quality at Entry Assessment (QEA7), Fiscal Year 204-2005

Santiago Urban Transport Programmatic Development Loan ICR

Supreme Decree No. 42 of July 24, 2009, modifying Supreme Decree no. 130 of 2001, which states the emission standards for public transport buses in Santiago