



Report No AB35

Initial Project Information Document (PID)

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1. Country and Sector Background

2.1 Issues

The Transport System and Travel Characteristics

Santiago is served by a road and public transport system, which is generally well managed and continuously being improved. Modern traffic engineering techniques – including a real-time computer controlled signal system – are applied to the street network. The 40-km metro, the first section of which was inaugurated in 1975, is an example of efficient mass transit management and serves 747,000 passenger trips per day. Most public transport passengers, about 4.5 million per day (2001), travel on the 7,635 buses which are mostly owned by individuals or very small companies. In addition, there are suburban railway lines, route taxis (colectivos) and regular taxis.

Chile's sustained rate of economic growth has a large impact on Santiago's air quality and on its aggregate environmental service capacity. With about 5.3 million inhabitants, Santiago ranks seventh among urban areas in Latin America and concentrates about 40% of Chilean population. While population growth has decelerated from 4.5% per annum during the 1950s to about 1.4%, residential settlements continue to expand over an area of more than 600 square kilometers. This adds to its intense economic activity. Transport demand grows at a high pace, inflicting pressure on the urban transport system through increased traffic and congestion, and generating increased GHG emissions and air pollution.

Between 1991 and 2001, the population increased by 30%, car registrations by 103%, and the number of person trips (by all modes including walking) by 69%. Of great concern from the viewpoint of air pollution is the growing use of the private car which has increased from 12.3% of motorized person trips in 1977 to 38.09 % in 2001. Vehicle ownership rates rose from 320 cars per 1000 household in 1977 to 360 cars per 1000 households in 1991 and 560 cars per 1000 households in 2001, with still higher figures in the up-scale districts such as Las Condes, Providencia and Vitacura.

As a whole, Santiago's transport system is much less chaotic than in other cities of Latin America and highly competent transport planning entities combined with political commitment to tackle urban transport issues have shaped a fairly well organized and reliable transport system. Nevertheless, the urban transport sector still suffers from acute problems which are still to be addressed and which can be summarized as follows :

2.1.1 Air pollution

Much of Santiago's pollution problem stems from its climate and topography. A thermal inversion acts as a cap over the city during fall and winter (April-August), inhibiting the dispersion of pollutants, which is further obstructed by the mountains surrounding the city. For more than ten years, the Government has declared pre-emergency or emergency days when ambient levels of particulate reach unhealthy levels. Fortunately, the measures taken in the last ten years have led to substantial improvements, reflected by a much lower occurrence of emergency days. Nevertheless, air pollution levels are still too high and transport is the major contributor to local emissions; in October 2000, transport accounted for 91% of CO emissions, 84% of NO_x, 48% of PM₁₀, 34% of SO_x, and 38% of VOC emissions.

The relatively high levels of emissions and concentrations of airborne pollutants affect health and quality of life. Ozone and PM_{2.5} are the pollutants of most concern in Santiago, as their concentrations still exceed the air quality norms for the city. Besides their direct effect on health, PM₁₀, NO_x and SO_x are major precursors for the formation of PM_{2.5}, which inflicts serious health impacts, including increased morbidity and mortality; and NO_x and VOCs are also precursors for ozone formation, which has in itself serious local social costs, while contributing to global warming. In addition to the global warming potential (GWP) of tropospheric ozone, transportation is a major source of GHG, mostly in the form of CO₂. In Chile, transportation is the major source of energy-related GHG emissions, accounting for about 37% of CO₂ emissions. CO₂ is emitted as a direct result of fossil fuel combustion; in Santiago, these emissions are mostly associated to the use of gasoline and diesel. Thus, measures aimed at improving efficiency of transport flows, at promoting modal shifts to non-motorized, or to less energy intensive modes of transport, and at adopting cleaner fuels and vehicles will not only help address local air pollution but will also reduce GHG emissions.

A relatively recent study estimated that the annual costs of traffic-generated air pollution exceed US\$500 million in Santiago. It discussed the relative decline of PM₁₀ and carbon monoxide emissions in recent years, but noted that ozone levels had generally been increasing. It also estimated that the transport system emitted nearly 4.2 million tons of CO₂ in 1994, of which 68% were produced by passenger cars, taxis and light trucks.

2.1.2 Exponential increase of car use and ownership

With about 5.3 million inhabitants, Santiago ranks seventh among urban areas in Latin America and concentrates about 40% of Chilean population. Even though population growth has decelerated, residential settlements continue to expand and to generate increasingly long trips, more and more difficult to be served satisfactorily by public transport. In addition to this, Chile's sustained rate of economic growth resulted in an increase of car ownership in Santiago from 320 cars per 1000 household in 1977 to 560 cars per 1000 households in 2001. During the same period of time, the number of person trips (by all modes including walking) went up by 69% and the average length of these trips went up as well. This growth in mobility, associated with an ever-higher share of motorized trips made by car (12.3% of motorized person trips in 1977 to 38.09 % in 2001) has been inflicting pressure on the urban transport system through ever-growing traffic and congestion. Considering the characteristic geographical conditions of the city, where the mountain chain around the city favors a thermal inversion in the colder months, this has a worrisome impact on Santiago's air quality.

2.1.3 Relative deficiencies in the organization of the current bus system

In spite of a public transport reform which took place in the 1990s (which included the introduction of bus regulated standards on age, size, and useful life), there are still many elements that can be corrected to achieve a still more efficient bus system. Presently, bus operators are still competing in the streets (competition in the market instead of for market segment through competitive bidding) on the very same routes, which generates operating inefficiencies and dangerous driving behaviors when touting for passengers. As bus ownership is quite fragmented (most owners own no more than a single bus) and as there are very few formal sizable companies, transport supply is poorly coordinated, chaotic and does not adapt to demand levels. Oversupply during off-peak hours contribute to unnecessary congestion and pollution, and increase operating costs. Also, bus routes are long and cross the city from one extreme to the other, and most of them run through the city center and the most heavily loaded axes, adding further to already high levels of congestion. Finally, there is no tariff integration between bus routes, which helps create inequities as the poorest classes get affected facing higher travel costs and less accessibility.

2.1.4 Lack of inter-agency coordination at the metropolitan level

Coordination amongst the agencies dealing with transport and air pollution issues is still incipient. This stems from the diversity of sectors and actors involved and from the absence of a coordinating transport body at the agglomeration level. However, environment and transport planning agencies have initiated a pro-active coordination around common goals and objectives, centered on the improvement in the quality of life. PTUS has incorporated both the local and global environmental dimension, and it is now clear that implementing the plan will bring about health benefits, and a less degraded city, while helping mitigate climate change.

2.2 Government Strategy

2.2.1 *Institutional Responsibilities for Urban Environmental Management*

At the national level, strategic transport investments are made by the Integrated Bank of Projects under the Ministry of Development and Planning (MIDEPLAN). The Ministry of Public Works and Transport (MOPT) is responsible for roads of national and regional importance, and the Ministry of Housing and Urban Development (MINVU) for most urban street construction and regional land-use development plans. SECTRA, subordinated to MIDEPLAN, and also responding to MOPT, and MINVU, is the agency responsible for transport planning throughout Chile, and hosts the primary role to support transport planning and investment. To address environmental issues, including traffic generated air pollution, the National Environmental Commission (CONAMA) was created in 1994, reporting directly to the President of the Republic. While MOPT, MINVU and CONAMA have policy and spending authority for most urban projects, their regionally decentralized services (SEREMITT, SEREMI and CONAMA-Metropolitan Region, respectively) are generally the executors of those projects.

At the local level, Greater Santiago is divided into 34 districts (comunas). Each of them is a relatively autonomous government entity with a Mayor and its own departments such as Public Works and Finance. Most districts fund the maintenance and construction of public spaces, including streets, bus stops, bikeways and sidewalks, with financial support from national authorities. While they have direct control over local land use, subject to MINVU approval, most investment decisions concerning the street system are taken by SEREMI. Also, an Executive Commission for the implementation of Santiago's Urban Transport Plan (CGTS) has been appointed by the President of Chile.

2.2.2 *Urban Transport Plan for Santiago*

In late 2000, the Government announced its 2000-2010 Urban Transport Plan for the City of Santiago (PTUS), which main goal is to improve the quality of life in the metropolis and the individual neighborhoods and to help in correcting social imbalances. This would be attained through a reduction in the average trip length, which in general will provide better traffic flows, lesser time of travel, improved air quality from reduced emissions of air pollutants, improved access to public transport, and improved mobility. PTUS includes the following programs: (1) Public Transport Modernization; (2) Road Investments and Traffic Control; (3) Location of Educational Institutions; (4) Promotion of New Commercial and Service Centers; (5) Change in Residential Land-Use Trends; (6) Non-Motorized Transport; (7) Immediate Action Program; (8) Urban Goods Transport; (9) Monitoring and Control; (10) Financing; (11) Communications and Citizen's Participation; (12) Institutional Aspects.

PTUS was designed in consultation with the authorities in charge of handling transport related issues, including land-use management and environmental matters (the plan is consistent with the Decontamination Plan for Santiago recently launched by CONAMA, and aimed at reducing air and noise pollution from mobile and point sources of emissions). PTUS is considered to be a major reform plan, expected to substantially change the city.

Executive Commission for Transport in Santiago – CGTE. an attempt to ensure inter-institutional coordination at the highest level, so that cross-sectoral policies and programs in PTUS could be effectively implemented, the President of Chile appointed this special commission. CGTS is chaired by the Minister of Works, Transport and Telecommunications, and includes the Minister of Housing and

urban development, the Sub secretaries of Public Works, Transport and Housing , the Intendent of the Metropolitan Region, and the Executive Director of CONAMA.

Proposed Investments Amongst the specific investments and actions proposed by PTUS are (a) the expansion of the metro system – about 6 km of line extensions have already been tendered (b) three new suburban railway services ; (c) a network of 15 segregated busways; (d) the reform of the public bus system (Annex 6 - "Preliminary elements for a new public transport system development"); (e) a taxi service reform and conversion to CNG propulsion; (f) US\$700 million program to improve the road network; (g) the application of a road pricing policy; (h) the promotion of non-motorized transport; and (i) harmonization of land-use and transport policies in order to reduce average trip lengths.

Immediate Action Program PTUS contains a program of immediate actions which are currently being implemented, comprising a package of low-cost public transport improvements operational since March 2001 and fine-tuned in early 2002:

- Exclusive public transport axes: From 7:30 to 9AM on each weekday, seven radial avenues are now reserved for buses, taxis and emergency vehicles.
- Parallel avenues operating one-way for private car traffic, to provide the needed additional traffic capacity taken away from public transport axes.
- On the ten-lane Alameda Bernardo O'Higgins near the city center, six lanes have been physically segregated and reserved full-time for buses; while only four lanes remain accessible for taxis and private cars.

The immediate action measures of PTUS have set a very interesting precedent and demonstrate that air and noise pollution, and traffic congestion can be substantially mitigated with a very limited budget : a US\$ 1.5 million package of public transport priorities has been successful, with travel time reductions in the order of 14% to 35% accruing to bus passengers without causing undue delays to car users and bus occupancy rates having increased by 16%, while PM10 concentration went down by 14%.

2. Objectives

1.1. To help reduce greenhouse gases (GHG) from ground transport in Santiago through a promotion of a long-term modal shift to more efficient and less polluting forms of transport, and 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 (PTUS), a comprehensive multi-sector plan, which is consistent with the overall objectives of the GEF operational program on sustainable transport. The plan's specific objectives are to (i) maintain share of public transport (60% of total trips); (ii) promote rational 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 air pollution from public transport by 70% (from 2000 levels). A major outcome of PTUS will be the restructuring of the city's transport system starting in 2005; the system of bus routes and the concession process will be modified, allowing substantial gains in efficiency and profitability for the bus operators. Section B.2 and Annex 6 "Preliminary elements for a new public transport system development", provide additional information about the plan's genesis, programs, and preliminary measures.

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

3. Rationale for Bank's Involvement

The World Bank has a long and proven wide world experience and technical skills related to the implementation of transport, urban development, and environmental projects. Its presence at the sector level in various countries in transport, water, energy, health, and environment oriented projects provide a unique cross-referenced perspective which allows to replicate good experiences, while learning from experience.

Further, the Bank offers advantages in terms of funding leverage. Not only a loan operation would be prepared to help fund part of the infrastructure required investments for PTUS' new bus system, but also it could be potentially complemented with other services available to support the participation from the private sector, such as the IFC and MIGA products. Besides, PTUS offers opportunities for funding under the Prototype Carbon Fund (PCF). Not only Santiago has good quantitative tools in place to help measure potential impacts of transport projects in terms of GHG emissions reduced, but also, the Government commitment is very high and long-term. Potential PCF projects could be developed for (a) a light train, where measurable public transport demand would be transferred from other more polluting modes (buses and private cars); and (b) a scheme for promoting ESCO-like maintenance and servicing programs that could ensure reduced fuel use and therefore reduced GHG emissions that could be sold at the carbon market.

4. Description

The project will strive to accelerate the implementation of PTUS, by concentrating on 7 components, each one contributing to abate GHG emissions with different degrees of intensity, and with different implementation time periods. Preparatory studies under GEF funding (PDF-B) have helped specify the activities under certain components. Annex 7 - "Detailed Project Description", includes a more detailed description of each component.

1.1 Promotion of bicycle use

The objective of this pilot program is to promote the use of bicycles as a mode of transport and aims at diverting travelers from motorized modes, especially private cars, then having a direct effect in reducing GHG emissions, as less fuel would be burnt per traveled km.

The project will include (a) 19 km of GEF-funded bikeways connecting the Comunas of Santiago, Providencia, and Ñuñoa; (b) 21 km of bikeways about to be built in the same Comunas with government funding, (c) the implementation of a promotional strategy aiming at changing travel behavior to achieve a sustainable modal shift to bicycles and (d) a safety strategy to minimize bicycle accidents and to maximize personal security. As the primary aim is to reduce air pollution and GHG emissions, the component would target existing and potential car users – the number of which is rapidly increasing with generally favorable economic growth – and thus focus on zones with relatively high car ownership; this would be in contrast to similar bikeway programs elsewhere, such as Lima, which primarily addressed the transport needs of the low-income population. On the other hand, the project will help catalyze future investments and raise bicycle use in other parts of the city.

1.2 Modernizing the bus system

This component will support the development of the new bus system for Santiago, which will not only provide a more efficient use of buses (reducing bus fleet, increasing bus occupancy, and increasing average speed), but also will provide an opportunity to renew the bus fleet both at the city level (through the penetration of proven clean bus technologies), and at the national level the component is structured in 3 sub-components:

1.2.1 Technical assistance for evaluating the economic and environmental impact of clean technologies for buses

This component will provide technical assistance to compare technical and environmental performance and associated costs of hybrid-electric buses with CNG and diesel ones. The project will allow the economic and environmental evaluation of the potential introduction of the hybrid diesel-electric technology to Santiago's public bus fleet. As emissions reduction benefits and related costs will be determined, regulators will have the relevant information needed for the establishment of more stringent emission standards for Santiago. CGTS is in the process of allocating the contracts for bus operation along the major Santiago corridors under a newly restructured public transport system; in this respect, the outcomes from this project will allow the regulators to determine emission standards so that operators can be obliged to have bus fleets with a mix of conventional and cleaner vehicles.

1.2.2 Implementation Framework for Bus Reform

In order to complement the building of segregated busways, for which a complementary World Bank loan will be utilized, technical assistance under this component will support a review of management and business organization measures that are 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 will also fund the formulation of a program to retrain existing bus drivers that would leave the public transport business, and to assist them in inserting them in other sectors of the economy. Moreover, this component will support the establishment of a framework to monitor the environmental, social and operational effects of the new system.

1.2.3 Renewal of the bus fleet

The project will finance a strategic study to define ways of synchronizing and coordinating the removal of "not-so-old" buses from the streets of Santiago, which will be displaced by the new articulated EURO III buses which will run in the trunk lanes. The study will identify options for ensuring a national modernization of the bus fleet to rationalize public transport capacity.

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

This component aims at rationalizing the location of centers of activity, reducing trip lengths, improving traffic flow, and promoting modal shift. The component will be structured in 3 sub-components:

1.3.1 Developing the Central Ring of Santiago (Anillo Central)

The project will fund studies to calculate the environmental impacts of urban development policies aiming at spurring the development of housing projects located on the Anillo Central, based on potential policy options. Thus, the study will help decision-makers to better evaluate the development of currently available central sites according to the expected impact on transport, air pollution and global warming.

1.3.2 School Location

The GEF grant will fund studies to assess the economic and environmental impact of locating new school facilities so that the average trip length can be reduced. This is key now that the full school day (Jornada Escolar Completa or JEC) is being established, requiring schools to expand to attend a double student load before 2010 nationwide. In addition to this, secondary education was recently made compulsory, which further increased higher capacity requirements.

1.3.3 Housing Policy

The project will provide technical assistance to the authorities in charge of housing policies and regulations, so that the transport and environment dimensions can be better integrated into policy making. Recommendations would be aimed at the reduction of the average trip, or at a modal shift to less polluting transport modes.

1.4 Improving Traffic Flows

1.4.1 Traffic Calming at City Center

This subcomponent would fund studies to identify sound traffic calming measures to reduce car traveling at the historic center of Santiago, including a diagnostic phase, a design phase, stakeholder consultation, and integrating the need for GHG emission reductions into the specific engineering designs for the civil works.

1.4.2 Road pricing

This component aims at reducing and rationalizing the use of private vehicles, by means of road or congestion pricing measures which would internalize external costs imposed on society by car drivers. Pricing would not only help reduce traffic volumes, but could also generate additional sources of finance for transport improvements. The grant will fund a study to investigate the likely social, environmental and economic effects of various forms of road pricing, the conditions under which it is likely to be acceptable, and the best mechanism for its implementation.

1.5 Strategic environmental assessment

The project will fund advisory work to ensure coordination of sector policies, programs, and projects (ppp) dealing with transport, urban development, and environment. To that end, the project will help develop tools to integrate environmental management within the scope of the development of urban transport plans and policies, including land-use pattern changes, pricing, and tariff schemes.

1.6 Travel Harmonization

The project will support a study to evaluate the feasibility of implementing a large scale program to make a rational use of private cars and integration of travel modes in family groups, including the identification of private entities interested in co-financing and/or participating in the implementation of the overall program; and the implementation of a medium scale pilot phase. The project will draw from the successful experience of 1997 carried out by SECTRA in Santiago for a small number of households. The objective is to reduce travel frequency and time, based on the systematic record of travel needs and practice. Using the private car more efficiently according to pre-established travel plans will allow important reductions in fuel, time and emissions.

1.7 Decontamination Bonds

The project will fund a study to evaluate options for promoting further local investment in sustainable transport by integrating GHG emission reductions into the new Decontamination Bonds Program to cap air quality emissions in Chile. The initial setup will be focused in Santiago, considering that most of the transport related emissions in the country are generated in the city. This program, currently being established by CONAMA, will allow emission reductions resulting from sustainable transport measures, to compensate emissions from existing polluters exceeding the norms, and/or from new polluters required to compensate for adding new emissions into the system. The system has been devised to enable NOx and PM reductions. GEF incremental support would also help raise the awareness of the opportunities for emission off-set investments in sustainable transport, and ensure that the program can also take into consideration the additional green house gas benefits of these investments (provide extra "credit" or incentives for investments that include additional global benefits). To help the system become operative, the project will provide technical assistance to assess needs and options for including the transport related greenhouse gas benefits into the permit clearinghouse; further support for devising methodologies to measuring carbon reduction benefits in the transport sector; address aspects of integrating the transport sector into proposed financial mechanisms; and studies and awareness raising activities that promote the sustainable transport market potential. The expected result is an impact assessment in terms of potential CO2 reductions in the transport sector, a strategy for building a solid local carbon market; the identification of pilot sustainable transport projects; and technical assistance support for early transport demonstration pilots. (GEF contribution is estimated at \$500,000)

Promotion of Bicycle Use

Modernization of Bus System

Assesment of Land Use Incentives and policies to reduce motorized travel

Improving Traffic Flows

Strategic Environmental Assessment

Travel Harmonization

Decontamination Bonds

Project Management

5. Financing

	Total (US\$m)
BORROWER/RECIPIENT	\$6.97
IBRD	
IDA	
GLOBAL ENVIRONMENT FACILITY	\$6.98
Total Project Cost	\$13.95

6. Implementation

The Executing Agency for the project will be the Executive Commission for Transport in Santiago which will be in charge of coordinating with other local and national agencies such as SECTRA, the Ministries of Transport and Public Works, Planning, and Housing, and the local municipalities. UNDP will continue to act as the local disbursement agent, as it has done during preparation and PDF-B implementation. With regards to the different project components, there will be different implementation arrangements as explained below.

4.1 Promotion of bicycle use

This component will be primarily implemented by the Comunas of Santiago, Ñuñoa, and Providencia, in particular in what respects to the building of bike pathways, safety devices, and connecting works. As per the implementation of the campaign to promote bicycle use, the project would be implemented by the Executive Commission for Transport in Santiago-CGTS, with the participation of public and private parties, including Metro, as relates to facilities for parking bicycles, and to shower and locker facilities.

4.2 Modernizing the Bus System

The field test will be implemented by private companies in association with 3CV. Private companies will provide the buses to be tested, as well as the routes where the tests will be run. 3CV and CONAMA-RM will coordinate the development of driving cycles for Santiago, and will oversee the field test development. The Executive Commission for Transport in Santiago-CGTS will be in charge of coordinating overall implementation of the whole component.

4.3 Land-Use Component

This component will have a diverse institutional participation. (a) *Development of Anillo Central* will be mainly implemented by private real estate companies, and with an active participation of the Ministry of Housing. (b) *School Location* will depend on close coordination with local municipalities and the Ministry of Education. (c) *Social Housing* will depend on policies and regulations by the Ministry of Housing. In all cases the Executive Commission for Transport in Santiago-CGTS will be in charge of coordinating overall implementation.

4.4 Improving Traffic Flows

This component will be implemented by the Executive Commission for Transport in Santiago-CGTS and will require a close coordination and participation of the local Comunas, the Ministries of Transport, Housing, and Planning, and the Congress.

4.5 Travel Harmonization

In this component, the Executive Commission for Transport in Santiago-CGTS will be the implementing body, although an active participation of public and private enterprises is required to be able to implement a large scale project.

4.6 Strategic Environmental Planning and Assessment

This component will be primarily implemented by the Executive Commission for Transport in Santiago-CGTS, although an active participation of the Ministries of Transport, Housing, CONAMA, and its local dependencies is also required.

4.7 Decontamination Bonds

This component will be implemented by CONAMA, and will require an active participation of market participants.

7. Sustainability

Much of the project is intended to remove barriers that prevent the pursued measures to take place in the first place, and thereafter to become sustainable. Most components depend on behavioral changes which will be triggered by the project. Financial sustainability will depend in most cases on those changes, and only the component on bicycles directly involves infrastructure development.

(i) *Promotion of bicycle use* Increased bicycle use is already part of Santiago's stated transport objectives. In view of the strong support by Government and civil society, this component is likely to sustain itself after completion of the GEF project. It is also expected that the non-motorized transport component would have a positive demonstration effect which would (a) strengthen political support for the PTUS bikeway program, (b) provide incentives for District Mayors to initiate similar programs and (c) in combination with the travel harmonization concept mentioned above, contribute to an overall modal shift which could be replicated in other cities. In addition, it is hoped that a positive outcome of this subproject will convince the Metro management to provide bicycle parking facilities at more rail rapid transit stations.

Bikeways will be maintained by the Comunas, as they not only serve the purpose of facilitating non-motorized transport but also of enhancing public space. Its use, though, will depend on cultural pattern changes to be effected by the project. The Comunas have already formally committed to invest in the bikeways that make part of the GEF co-funded network.

(ii) *Modernizing the bus system* Sustainability is one of the key elements with regards to the gradual change in bus technologies. As the routes are to be allocated for a relatively long period of time, the initial technological upgrade is guaranteed to last. In addition, the construction and use of segregated bus lanes, operated with large articulated buses running on clean technologies is a gradual process expected to expand over time until the main routes network gets rationalized and modernized; this means a sustained and growing potential demand for clean technologies. Besides, CONAMA is considering the introduction of a subsidies plan that would add a larger boost for the introduction of clean technologies to the city. Moreover, as the technologies become more commercially available, and production lines get maximized at the suppliers' end, investment and maintenance costs (batteries) for operators are expected to decrease over time. The concept of linking emission performance to routes concessions has a high potential for replicability in other Latin American cities such as Bogotá, Mexico, Sao Paulo and Lima. Emission reduction results will be key to promote the replication scheme through the Bank's Clean Air Initiative, and directly through on-going Bank operations.

In this case, the studies are aimed at promoting the modernization of the bus fleet. The laboratory at 3CV will be upgraded, and both co-funding and future maintenance will come from the government. Once the project is completed, there will be local capacity able to perform similar tests (including laboratory) for any other heavy-duty vehicles available in the future. All other elements are not dependent on financial support, but on stakeholder conduct. Bus owners will be induced to renovate their fleet based on the development of standards, and on the removal of risk barriers. Since not all routes and services are to be concessioned immediately, the project will provide for informing the bidding processes taking place from 2005 onwards. Since this is a test, the results will need to determine whether more stringent regulation on fleet emissions can be developed.

The study on options for modernizing the bus fleet in Chile is aimed at informing decision makers on options available, and on impacts and related costs. The expected follow-up is the development of policies and programs to incentivate the fleet renewal. The study to support the framework for the new bus system, will be followed by programs for drivers and bus owners reinsertion to productive activities; lines of credit, and further training are some of the options already envisioned.

(iii) *Land-use incentives*, Land-use pattern change is a long term process that is likewise expected to last. The team believes that localization of additional housing and services can be oriented towards certain goals but is also conscious that this process obviously takes time. The expected benefits to be reaped from this component will need time to materialize and the relevant time-scale is to be measured in years, if not in decades. The other side of that coin is that once the urban pattern is consolidated, and once development has materialized along certain corridors or areas that are propitious to sustainable transport behaviors, this cannot change overnight and these transport behaviors can reasonably be expected to be long-lasting, and to yield important benefits. The question is then to make sure that the same guidelines regarding land-use will be followed after the GEF grant closes. This will depend to a great extent on the success and attractiveness of the real estate developments projects to be designed under the GEF grant and this is why a lot of emphasis will be put on public outreach and on the quality of the design of these projects. The involvement of students from the Catholic University and from MIT should generate appealing and innovative proposals from an urban landscaping perspective, which will obviously increase the likelihood of success of these environment-friendly real estate development project(s), even more so since the mandate of these universities is to design projects that fits into an overall program of urban sustainability.

Here, the project will undertake studies that are expected to affect land-use policies. Financial sustainability is not a direct issue at this stage. Once the real estate options get developed, the market is expected to sustain the component.

Improving Traffic Flows:

(iv) *Road pricing* In this case, sustainability will depend on the design of the tariffication schemes, once they can take place from a legal and political perspective. The project is contributing to remove those barriers; financial sustainability is directly linked to the particular design of road pricing scheme being developed. As an example, as far as the experience in London shows, financial sustainability is not an issue. *Traffic calming*. Here, maintenance will come from the Comuna involved, as this type of measures is linked to the municipality's own public space development.

(v) *Traffic calming*. Here, maintenance will come from the Comuna involved, as this type of measures is linked to the municipality's own public space development.

(vi) *Travel harmonization*. This component requires a behavioral change that is theoretically triggered by self-interest, since participants are not forced into changing their behavior by decrees or laws, or not even induced to do so through incentives which may not be sustainable over time. Participants are expected to change their way of traveling through being provided with a more accurate and comprehensive information about available transport alternatives, that may greatly differ from their current perception which may be incomplete. If, as expected, participants reap sizable benefits, in time and/or money savings, from these changes, the sustainability of the concept can be taken for granted. The

consultants in charge of the program will need to identify for each participating household attractive alternative modes of travel, and/or alternative destinations easier to reach by clean modes and that deliver the same services as the current ones. Then, when informed about this wider array of choices regarding travel modes and destinations, the members of the participating households should adapt their travel behavior to this new information and adopt new transport-related strategies, that, for being more attractive, will be sustainable. As with the other components, once results are attained and published, replicability will be pursued in other Latin American cities mainly through the Clean Air Initiative. Financial sustainability is directly linked to the cultural change induced in the participants, and on the ability of the project to foster replicability.

(vii) *Decontamination Bonds* As with the road pricing, financial viability and sustainability strongly depends on the design. How well demand and supply can be matched will inject sustainable liquidity to the market.

8. Lessons learned from past operations in the country/sector

The Bank has a long-standing involvement in the sector of air quality management in general, and its interrelationship with urban transport in particular. The first loan in this regard, approved in 1992, had the objective of reducing traffic-generated air pollution in Mexico City. Stemming largely from that participation, the Clean Air Initiative in Latin American Cities was set up in 1997, which has been highly successful in disseminating experiences among major cities, including Santiago; similar clean air initiatives have now been started in East Europe, Asia and Africa. In addition, recent strategy papers on Pollution Management and Urban Transport discuss extensively the effects of urban traffic on air quality, and urban transport operations in Bogotá, Buenos Aires, Lima and São Paulo include air quality management components in their design. Some of the lessons learned include:

3.1 Air quality management and urban transport development involve long-term issues that require long-term responses

Changes in personal travel behavior – a key element to reduce traffic-generated air pollution – are unlikely to occur unless there is a long-term government commitment to sustainable transport. Similarly, improvements in air quality require the kind of long-term vision that has been spelled out in Mexico City with the publication of the Air Quality Management Plan for 2002-2010. The proposed project would support similar long-range plans that have already been formulated in Santiago for transport and air pollution.

3.2 Planning for the long term, however, requires flexibility

Experience in Mexico City has shown that, despite the best planning efforts in the preparatory stage, the need for adjustments in air quality activities becomes evident only during the implementation of the plan. Similarly, the Implementation Completion Report for the Bogotá Urban Transport Project states that “flexibility should be encouraged in some subcomponents, procedures or new technology areas. This occurred in the case of the Transmilenio components where adaptations had to be made in various areas (platforms, bike paths, bridges, surfacing materials, etc, and with very satisfactory results”. Therefore, while each component of the proposed project has been defined in considerable detail, the Grant Agreement should leave room for modifications during its implementation.

3.3 The Bank's involvement should support an overall Government strategy

This applies to most World Bank operations. The more successful urban transport and air quality projects, such as the one in Bogotá – and indeed the Chile Urban Streets and Transport project – confirm this maxim. The proposed GEF project would fully support the objectives of Santiago's air quality strategy and the Santiago Urban Transport Plan 2000-2010 (PTUS) by testing key elements of the existing government policies.

3.4 Community Participation is Vital For Success

The PAD for the recently approved GEF grant to support the introduction of climate friendly measures in transport of Mexico City stresses that a “participatory approach, incorporating public opinion in the project, is required to establish legitimacy of the project”. Similarly, the Bogotá experience demonstrates the importance of community involvement which contributed to the public acceptance, even pride, for several “project outputs, notably TransMilenio and the bike paths”. The proposed project – especially the components aiming at increase bicycle use – was prepared in close consultation with civil society and district governments; this collaboration would continue during project implementation.

3.5 More construction of bikeways does not ensure the increased use of bicycles

In 1996, about 46 km of Bank-financed bikeways were successfully implemented in Lima, connecting an industrial area with low-income residential zones. However, the number of cyclists did not increase significantly, as the project did not include a coherent strategy to overcome the cultural barriers inhibiting bicycle use. Even in Bogotá, where over 200 km of bikeways were built in the last four years, the growth in cycling has been modest, and the Government intends to implement – under the next Bank-financed project – a promotional strategy to raise bicycle use. Therefore, an important component of the proposed project would initiate the process of cultural change through a multi-pronged promotional strategy aimed at making bicycle use more attractive in the minds of the population.

9. Environment Aspects (including any public consultation)

Issues :

The project will involve relatively minor works to insert bikeways into existing streets, and thus no settlements will be affected. Nonetheless, the construction will follow the environmental guidelines from CONAMA, to ensure that materials, noise, and traffic flow get well managed. The bikeway designs will be subject to an independent safety audit, and the construction contract will involve an environmental assessment and management plan. As to the rest of the project, there will be environmental benefits. The field test will take place on operating routes. The rest will be studies with indirect benefits in the future.

The project will involve the construction of 19 km of bikeways which will connect existing bikeways. No significant adverse environmental impacts of the project are envisaged, as project activity will be taking place in urban areas with considerable development and human activity and previous intervention. Environmental activities during construction will be limited and may include: (i) interruptions to vehicular and pedestrian traffic; (ii) noise; (iii) impacts on safety of road users; (iv) limitation of access to dwellings or businesses. To mitigate these impacts, the project will follow environmental guidelines for construction prepared by CONAMA RM. No resettlement of persons as a result of the project is envisaged.

10. List of factual technical documents:**11. Contact Point:**

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Note: This is information on an evolving project. Certain components may not be necessarily included in the final project.

Tables, Charts, Graphs:

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