

Progress Report 2001

This progress report was written by

Anthony G. Bigio

with substantive contributions from

Carl-Heinz Mumme,

Renan Poveda,

and Laura Tlaiye.

World Bank
Washington, DC

June 2001

Clean Air Initiative in Latin American Cities

Foreword by the Chairperson of the Steering Committee

It is my pleasure to introduce this Progress Report 2001 of the Clean Air Initiative in Latin American Cities. I have been elected to be the chairperson of the Steering Committee of the program for the year 2001 by my colleagues, the representatives of Lima and Callao, Mexico City, Rio de Janeiro, Santiago, and São Paulo.

Prior to me, Diana Ponce, secretary of the Metropolitan Environmental Commission of Mexico City, and Mauricio Lobo, secretary of the Environment of the Municipality of Rio de Janeiro, headed the Steering Committee during 1999 and 2000, respectively. We thank them for their leadership of the program during its first two years, the subject of this report.

Urban air quality is by definition a public good. It is the obligation of our governments, national but especially local ones, to make sure that urbanization, industrialization, and the expansion of urban mobility do not entail a heavy cost to the health and the quality of life of our citizens, especially the young and the old. Urban air pollution affects everybody, but mostly it affects the urban poor who are more exposed to it. Unless remedial action is taken soon, our cities pose the risk of choking their inhabitants.

Changes may seem expensive and difficult to implement at first, but when compared to the value of public health and the quality of the urban environment, they are entirely justified. In addition, programs to improve air quality generate economic opportunities for investment by the public and private sectors, and the resulting benefits are crucial to the collective well-being.

The Clean Air Initiative is founded on the premise that the sharing of experiences among the cities of our region is an important source of innovation and progress to improve urban air quality management. This exchange is happening and yielding tangible results, as documented in the report. The cities' partnership benefits from the views, knowledge, resources, and experience of all the other members of the Clean Air Initiative: private sector companies, foundations, nongovernmental organizations, and environmental and international development agencies that jointly constitute the Steering Committee.

It is my commitment to make sure that during 2001 the Clean Air Initiative in Latin American Cities will continue to be of service to its member cities, extend its outreach across the region, consolidate its partnerships, and become a regional facility to advise and assist cities in improving air quality.

Norberto La Porta
Secretary of Environment and Regional Planning
Municipality of Buenos Aires

Preface by World Bank Vice Presidents

For many years the World Bank has been involved in assisting national and local governments in Latin America and the Caribbean region with investments related to improving urban air quality. Sector projects in the areas of urban transport, industrial pollution management, and urban environment have been implemented in many countries of the region with tangible improvements to air quality. However, as cities grow in size and complexity, much more remains to be done. Moreover, some of the recent gains in air quality may be offset by the rapid increase of urbanization and vehicular use.

The Clean Air Initiative in Latin American Cities does not replace but rather complements these concrete efforts of governments and financial institutions, by creating new avenues for collaboration among Latin America's cities, private sector companies, environmental institutions and international development agencies, foundations, and nongovernmental organizations. This partnership combines experience sharing and public awareness raising with technical assistance and capacity building.

Within the World Bank, the program is a collaborative effort between the Latin America and Caribbean Regional Vice Presidency and the World Bank Institute (WBI). The management of the program — through its Technical Secretariat — is a joint activity. The Latin America and Caribbean Region provides technical assistance to the partner cities for developing or enhancing air quality action plans, and together with other partners is developing a clean technologies Information Pool and a Transport and Air Quality Toolkit. WBI delivers the distance learning course on Urban Air Quality Management, manages the program's website, and organizes the city workshops and other events providing access to knowledge and information.

We are happy to present the first two-year Progress Report of the Clean Air Initiative summarizing the results achieved by all our partners. The contribution of the program as a catalyst for the establishment of effective air quality management programs is evident. It is also evident that the challenge of cleaner air requires a long-term commitment from governments and civil society. As we look back at the progress made and prepare for a new phase of the program, we foresee a gradual transition to greater participation of regional stakeholders in the leadership and management of the program.

Based on the experience of Latin America, the Clean Air Initiative has expanded to Sub-Saharan Africa, Southeast Asia, and Eastern Europe and Central Asia. It is rapidly becoming a global network, through which lessons learned in the implementation of air quality management programs can be shared worldwide by the participating cities, companies, and agencies. The World Bank President's office has recently manifested its support to the global expansion of the Clean Air Initiative. The World Bank's traditional instruments of financial and technical assistance remain available to its clients for the implementation of projects and investments in urban air quality management. We remain committed to the Clean Air Initiative as it strives to become a regional facility at the service of cities and citizens of the Latin America and Caribbean Region.

Vinod Thomas
Vice President
World Bank Institute

David de Ferranti
Vice President
Latin America and Caribbean Region

Contents

OVERVIEW	1
I. PROGRAM PROFILE	2
Mission Statement	2
Goals of the Clean Air Initiative	2
Opportunities for Cleaner Air	2
Impacts to Date	3
II. KEY REGIONAL ISSUES OF URBAN AIR QUALITY	4
Sources and Impacts of Urban Air Pollution in Latin American Cities	4
Policies and Governance of Urban Air Quality Management	5
Interjurisdictional Challenges	6
Policies and Investments for Clean Air in the Cities of Latin America	7
III. GOVERNANCE OF THE PROGRAM	9
Partners	9
Steering Committee	9
Technical Secretariat	11
IV. CITY WORKSHOPS	12
Launching Workshop	12
Lima-Callao	12
Mexico City	13
Rio de Janeiro	14
Buenos Aires	15
Santiago	16
V. CITY ACTION PLANS	18
Lima-Callao	18
Rio de Janeiro	21
Buenos Aires	22
VI. TRAINING AND TECHNICAL TOOLS	23
Communication Activities	23
Distance Learning Courses	23
Regional and International Workshops	25
Clean Technologies Exhibits	27
Technical Tools	28
VII. THE ROAD AHEAD	30
Work Program 2001	30
Program Expansion	31
VIII. URBAN AIR QUALITY: CITY PROFILES	32
Lima-Callao	32
Mexico City	32
Rio de Janeiro	33
Buenos Aires	34
Santiago de Chile	35
São Paulo	36
IX. APPENDIXES	37
Rules of Operation	37
Financial Statement 1999	41
Financial Statement 2000	43

Overview

This progress report summarizes the activities and achievements of the Clean Air Initiative in Latin American Cities during its first two years of operation, 1999 and 2000. The report is intended for the partners of the Initiative and the many local governments, and national and international institutions and companies that are following with interest this innovative regional program.

The Clean Air Initiative focuses on reversing the deterioration of urban air quality in the cities of the region that results from rapid urbanization, increased vehicular transport, and industrial production. Air pollution has been shown to cause thousands of premature deaths and billions of dollars in medical costs and lost productivity each year across the continent.

The program was created at a Launching Workshop held in December 1998 in Washington, DC. A Steering Committee was formed, comprising city governments, private sector companies, international development agencies and foundations, nongovernmental organizations (NGOs), and academic institutions. The Steering Committee meets twice a year to oversee the results and management of the program that is entrusted to a Technical Secretariat staffed by the World Bank.

During its two years of operation, the Initiative has carried out many activities, among them workshops in five of the partner cities and technical studies and institutional assistance for the preparation of air quality action plans in the metropolitan areas of Lima-Callao, Rio de Janeiro, and Buenos Aires. The Initiative is helping catalyze the often difficult but necessary dialogue among environment, transport, and urban planning authorities, and among jurisdictions (municipal, regional, and central governments).

Capacity building and information-sharing activities have included urban air quality management courses delivered via the Internet and satellite. A trilingual website (www.worldbank.org/cleanair) has been designed, launched, and maintained. Communication activities, including via television networks, have projected the image of the program worldwide. Members of the Initiative have taken part in numerous regional and international events on air quality.

Clean technologies are being promoted through exhibits at city workshops in partner cities, the development of a Transport and Air Quality Toolkit, and the preparation of an Information Pool on the characteristics of technological options to reduce air pollution.

As the Initiative enters its third year, activities reflect the need to take stock of its achievements and to prepare for its second phase, which aims at a gradual transfer of its administration to the region. Some key technical and institutional areas also will be explored in more depth.

This report describes in detail the Clean Air Initiative's activities and achievements during its two first years. It also provides an overview of the main air quality issues and problems of the region and specific air quality profiles of the six largest cities of the region. The program's Rules of Operation and key financial statements are found in the appendixes.

I. Program Profile

Mission Statement

The Clean Air Initiative seeks to improve air quality in Latin American cities by bringing together the efforts of leaders from the public and private sectors, NGOs, research and academic institutions, government agencies and international institutions.

Goals of the Clean Air Initiative

- Promote the integrated development or enhancement of city air quality action plans based on the participation of all relevant stakeholders.
- Advance the exchange of knowledge and experience among all partners through capacity building, awareness raising, and information dissemination activities.
- Foster public participation and the active involvement of the private sector in implementing innovations in the use of clean technologies to abate local and global pollution.
- Make the Initiative sustainable by gradually turning over its ownership and management to regional institutions while maintaining the involvement of its founding partners.

Opportunities for Cleaner Air

Technical knowledge and institutional experience are available to substantially improve urban air quality management in a cost-effective manner. To carry out effective and sustainable solutions, it is necessary to:

- Promote the use of cleaner fuels and vehicles
- Improve the planning and operation of public transport
- Integrate transport, air quality, and urban development policies
- Introduce cleaner technologies for energy generation and industrial production
- Alleviate the impact of soil erosion
- Develop green areas within urban centers
- Enhance the scientific knowledge and understanding of urban air quality
- Promote the institutional strengthening of relevant agencies
- Accelerate the use of economic instruments in air quality management.

Impacts to Date

An external evaluation will be carried out during 2001 to ascertain the results of the program so far and to recommend adjustments that may further align its operations with its mandate and goals. However, it is clear that the impacts of the Initiative are manifest at least at three different levels: in the partner cities themselves, at the regional scale, and at the international scale.

In several of the partner cities, the Initiative has enabled the creation of inter-institutional coordination mechanisms for urban air quality management and has increased the capacity of city officials in managing urban air quality management programs. City officials have an improved understanding of the technical and institutional complexities involved and are learning how to establish priorities for action. These priority measures are being reflected in city action plans, prepared with the technical and institutional support of the Initiative, and its bilateral and global partners. The Initiative has also indirectly enhanced the preparation and implementation of World Bank lending operations in environmental management and urban transport in these cities, and has generated a greater public awareness of air quality issues.

At the regional level, the Initiative has provided the communication channel between cities that allows technical and administrative staff to learn from each other those policy and technical options that are available. The six largest cities of the region now lead the Clean Air Initiative, and their membership and ownership of the program have survived the turnover of their initial representatives due to the normal local election cycles. The Clean Air Initiative has also established itself as a primary source of information and technical guidance on air quality management for the secondary and tertiary cities of the region.

Internationally, the Initiative has demonstrated the ability of cities, global companies, NGOs, and international development and environmental agencies to work together in a successful partnership. It has provided an increased understanding of air quality management in developing cities and has enabled the growth of a global network of air quality institutions. The World Bank's interest in expanding these benefits worldwide has motivated the creation of three parallel Clean Air Initiative regional networks among cities and their partners in Africa, Eastern Europe and Central Asia, and South-East Asia.

As the importance of urban air quality grows, these regional networks will have the opportunity to exchange lessons learned from one region to the other. They will eventually integrate into a global framework for the benefit of all their partner cities and ultimately of the millions of urban residents currently suffering from the adverse effects of air pollution.

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II. Key Regional Issues of Urban Air Quality

Sources and Impacts of Urban Air Pollution in Latin American Cities

Latin America is one of the most urbanized regions of the developing world, with approximately 80 percent of its population residing in urban areas and more than 55 metropolitan areas of 1 million inhabitants or more. This process of urbanization has occurred fairly rapidly and has accelerated dramatically during the last 30 years. Starting with the capitals of the colonial period—many of them built on the location of pre-Colombian urban centers—Latin American cities have grown with patterns of urbanization of significant density, including the informal settlements that constitute one-half of the urban housing stock of many major cities.

The development of national economies and the growth of the industrial sector have centered in and around the primary cities and in the case of larger countries, such as Mexico and Brazil, in important secondary ones. Motorization of urban transport has grown exponentially during the 20th century as well, and the deterioration of air quality in all urban centers of the region has been a worrisome reality since the 1980s.

The sources of air pollution vary in each city and are related to (i) industrial production and energy generation; (ii) dispersed and diverse point sources such as airport facilities, bakeries, and the burning of solid waste; (iii) natural sources such as dust in the air from unpaved roads; and (iv) emissions from motor vehicles used for the transport of goods and people and in the construction industry. On average, vehicular emissions account for more than 70 percent of urban air pollution in the cities of the region, and the urban transport sector is commonly regarded as one of the main culprits of the high levels of urban air pollution.

Recent estimates of the Pan American Health Organization (PAHO) show that more than 100 million people in the region are exposed to levels of urban air pollutants that exceed the World Health Organization's recommended ambient air quality standards. The World Health Organization estimates that approximately 200,000 people per year die in the cities of the region due to exposure to high concentrations of particulate matter in the air. Major pollutants include particulate matter, sulphur oxides, lead, carbon oxide, nitrogen oxide, and ozone. Their levels of concentration in the urban air vary with the intensity of emissions and with the geographical and meteorological characteristics of the metropolitan areas themselves (see table 1).

Premature mortality, high levels of morbidity, loss of productivity for individuals and firms alike, high individual and social health care costs, and significant losses in the quality of urban life all account for the loss of billions of dollars each year. The magnitude of air pollution can discourage economic investments in highly polluted cities, causing additional and long-term economic damage to society as a whole.

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Table 1. Assessment of Key Pollutants in the Partner Cities^a

Partner City	SO ₂	PM	Pb	CO	NO _x	O ₃
Buenos Aires	○	●	○	●	●	●
Lima	n.a.	●	○	●	n.a.	n.a.
Mexico City	○	●	○	●	○	●
Rio de Janeiro	○	●	○	●	●	●
São Paulo	○	●	○	●	●	●
Santiago	○	●	○	●	●	●

○ low pollution ● moderate to heavy pollution ● serious pollution n.a. Not applicable

^a based on the city profiles, section VIII

In addition to these very significant effects of air pollution on human health and the local environment, the use of fossil fuels in industrial production, energy generation, and transport contributes significantly to the emission of greenhouse gases and thus to the warming of the global atmosphere. The effects of global warming, however, are local and negatively affect cities in the region. Beyond the more long-term rise in the sea level, with its obvious consequences for the coastal cities, violent climatic episodes can be attributed to the change in climatic patterns due to global warming. The recent Hurricane Mitch that destroyed Tegucigalpa in Honduras and the torrential floods in Venezuela that severely damaged Caracas are poignant examples of the local effects of global damage.

Policies and Governance of Urban Air Quality Management

National governments clearly play a major role in urban air quality management by setting standards for ambient air, industrial and vehicular emissions, and fuel quality. Among other things, they are responsible for enforcing environmental regulations, fuel pricing, and the legislation that governs the import of vehicles and their emission standards. Economic policies and public sector investments determine the localization of industrial activities and the intensity of urban mobility, which in turn affect urban air quality.

In Latin American countries, however, the regionwide process of decentralization has entrusted a significant part of local environmental management responsibilities to subnational levels of government. In addition, city governments typically manage land-use and urban transport planning, two policy areas that have a significant impact on urban air quality. City governments are also under pressure from civil society groups that increasingly place urban environmental concerns among the priorities to be addressed at the local level.

The subnational governments are the primary actors for change in the regulatory frameworks and policies that affect the deterioration of air quality. Although national and federal governments have played an important role over the last two decades in establishing and financing air pollution abatement programs in Mexico City, São Paulo, and Santiago, from the beginning local governments have been deeply involved in these programs' design and implementation. Collaboration between national and subnational governments, however, is fraught with difficulties, which are often related to the different political affiliation of local and national governments. Moreover, changes to national policies that may be required to alleviate the level of urban air pollution (for example, in the realm of fuel pricing) may be opposed by economic operators of the rural sector or the national transport systems, or may not be politically sustainable.

For a successful air quality management program, this vertical integration of decisionmaking between national and subnational levels of government must also be accompanied by a horizontal integration between the institutions, ministries, and departments responsible for the multiple sectors involved: urban development, transport, industry, energy, environment, and health. Typically these agencies—at the national or the local government level—have agendas driven by their constituencies' often conflicting interests, making their collaboration somewhat difficult.

The deterioration of urban air quality is the result of the cumulative impact of all of these sectors combined. Private sector companies that operate industrial plants, oil refineries, fuel distribution systems, and urban transport commercial units exercise significant choices within the established policy frameworks, and they need to play an active role in air pollution abatement. This will not happen without a system of consultation and coordination that will include them as well as the various sector agencies. Nor will it happen without the appropriate economic incentives to promote change in investment patterns.

The efforts to establish programs of air quality management in the region have not been similar in all countries. According to recent PAHO data, only 11 countries have national ambient air quality standards. However, there are no established mechanisms for their periodical updates. Thirteen countries have cities that have carried out air quality monitoring activities, out of which only four have established supervision and quality control mechanisms. Fourteen countries have carried out emission inventories, but these are generally incomplete and not updated. Thirteen countries have established measures to reduce air pollution, but the evaluation of their effectiveness is incomplete. The effect of air pollution on public health has become a theme of high visibility; however, the understanding of these effects is still limited.

Interjurisdictional Challenges

Air pollution typically affects entire metropolitan areas and needs to be addressed within the physical boundaries of air sheds. However, individual municipalities generally govern a small portion of the metropolitan territory, and in many cases no metropolitan governance mechanisms exist to integrate the different administrative jurisdictions into a holistic view of the problem and to agree upon a common plan of action.

The need of metropolitan governance clearly exceeds the scope of urban air quality management and can also be seen in the context of land-use planning and functional urban land markets, such as addressing urban mobility and transport needs. Development policies aiming at the strategic positioning of cities in the regional and global markets are also difficult to implement in the absence of instruments to manage urban agglomerations beyond the scale of the individual municipalities.

Numerous problems can occur in the process of creating interjurisdictional collaborative agreements for the purpose of urban air quality management:

- **Different political agendas of the relevant municipalities often make such agreements difficult to formalize**
- **Higher level of motivation and institutional and technical preparedness of the capital city as compared with the surrounding municipalities**
- **Often conflicting agendas of municipalities with those of state governments (in the case of federal systems) or provinces (in the case of unitarian states), with the latter potentially taking over the environmental management responsibilities at the metropolitan scale.**

The last two decades have seen significant investments and some improvements in the ambient air quality of some of the major cities, such as Mexico City, São Paulo, and Santiago.

Policies and Investments for Clean Air in the Cities of Latin America

The last two decades have seen significant investments and some improvements in the ambient air quality of some of the major cities, such as Mexico City, São Paulo, and Santiago. However, these local and specific gains have been largely offset by the aggregate increase of the urban population exposed to air pollution and of the rates of growth of motorization and congestion of urban transport systems throughout the region. While it is clear that urban air quality management must first address the local impact on human health and the local environment, policies and investments should seek the potential co-benefits of the reduction of global emissions from the combustion of fossil fuels through a potential harmonization of measures.

As the awareness of the importance of abating urban air pollution increases, there is growing consensus among national and local governments, development agencies, private sector organizations, and civil society groups as to the policies and investments needed to improve the quality of urban air. These can be briefly summarized as follows:

- **Policies and regulatory frameworks.** National standards are needed for health impacts, ambient air quality, and industrial and vehicular emissions; they need to be aligned with regional and international benchmarking criteria. Fuel pricing and the taxation of vehicles and fuels should reflect their differing degrees of air contamination.
- **Land-use planning and public infrastructure.** Urban planning should favor higher densities around major urban transport corridors and limit sprawl. Investments in road paving and urban parks can improve the local environment while contributing to the abatement of suspended particulate matter and to the absorption of CO₂ emissions.
- **Urban transport management.** Investments in mass transport systems such as segregated bus lanes and light urban railways will result in lower overall emissions. The creation of pedestrian areas and cycle paths will reduce the use of motor vehicles. Traffic demand management in the central urban areas will reduce congestion.
- **Managing the existing fleet of vehicles.** Programs of mandatory vehicular inspection and maintenance and retrofits such as particle traps for diesel engines can substantially reduce emissions. Programs to remove the oldest, most polluting vehicles from the road—while socially difficult—can yield cost-effective results.
- **Cleaner fuels and engines for new vehicles.** The elimination of lead from gasoline, the reduction of sulfur content from diesel, and the introduction of low-polluting fuels, such as compressed natural gas (CNG), liquefied petroleum gas (LPG), and ethanol, can have huge beneficial effects. Cleaner engine technologies, including hybrids and fuel-cell vehicles, should be favored.

- **Industrial pollution abatement.** Environmental management systems and cleaner technologies should be introduced in industrial production units for eco-efficiency and emissions abatement. Energy generation should further reduce its dependency on fossil fuels. Small- and medium-size enterprises need to be supported by special programs.
- **Energy efficiency.** Increase in energy demand related to economic growth needs to be coupled with energy-saving measures at household, public utility, and production unit levels. Building bylaws should favor energy saving and reducing energy usage for residential heating, cooling, and lighting. The resulting global benefits are significant.

The costs of an integrated urban air quality improvement program can be important. For instance, the environmental authorities of the Santiago metropolitan area have recently estimated that approximately US\$1.3 billion has been invested over the last decade in measures mandated by the objectives of reducing air pollution. Approximately 90 percent of the costs of these investments have been borne by the private sector. Such costs are however far inferior to the benefits obtained, such as the reductions in mortality, morbidity, and health costs, and the improvements in overall quality of life, that completely justify the investment in economic terms.

Urban air is by definition a public good. It is therefore the responsibility of the public sector to overcome the reluctance and the pressures of specific interest groups opposed to more stringent policies and regulations. These may be motorists that must pay more to use their vehicles, or industrialists who will have to decrease the pollution of their plants. The justification lies on the side of the health of all citizens, including motorists and industrialists themselves, of the quality of urban life in the cities of Latin America, and of the "global commons," such as climate and atmospheric temperature.

The environmental authorities of the Santiago metropolitan area have recently estimated that approximately US\$1.3 billion has been invested over the last decade in measures mandated by the objectives of reducing air pollution. Approximately 90 percent of the costs of these investments have been borne by the private sector.

III. Governance of the Program

Partners

The Clean Air Initiative in Latin American Cities is a partnership between various organizations from the public sector, private sector, academic institutions, NGOs, and international agencies, because only through partnerships can real progress be made in the battle against urban air pollution.

The partners of the Clean Air Initiative all contribute to the Initiative in some form, either in-kind or with actual financial assistance. The cities invest the time of their staff and provide financial contributions to technical activities and local public events. Development and environmental agencies provide technical expertise and mobilize funding either directly or through the fiduciary trust funds they have established with the World Bank. NGOs and foundations generally mobilize their own resources, such as staff time and the support of their affiliates. Private sector companies commit to a specific level of financial support to the program, with a minimum contribution of US\$50,000 per year.

A large number of organizations have contributed to the Clean Air Initiative through other means, including local sponsors for city workshops and technical agencies from Europe and North America that send experts to take part in the events organized by the Initiative. Bilateral aid agencies finance and implement specific technical work.

Steering Committee

The concept of a Steering Committee for the Clean Air Initiative was agreed upon at the Launching Workshop in Washington, DC, in December 1998. Immediately following the workshop the first meeting of the Steering Committee truly represented the broad coalition of participants in the Launching Workshop. Approximately 50 workshop participants were invited as observers to the first meeting of the Steering Committee.



The Steering Committee is the equivalent of the board of directors of the Clean Air Initiative. It comprises all of the current and active partners as defined above, provides guidance to the Technical Secretariat, decides on the allocation of resources, and plans the direction of its work program. It assesses progress on the various activities from the perspective of each group of stakeholders and determines the future direction of the Initiative with a view toward ensuring its future sustainability.

According to the Rules of Operation, the chair of the Steering Committee is held for one year by one of the partner cities; it then rotates through a process of election by the city representatives. While the Steering Committee generally decides by consensus, city representatives also have veto power to eventually block any decision they perceive as counter to the interests of the cities that are to be at the center of the program.

Steering Committee meetings are held twice a year, usually immediately following a city workshop. Meetings have already taken place in the following locations:

Washington, DC	December 4, 1998
Mexico City	June 19, 1999
Rio de Janeiro	December 4, 1999
Buenos Aires	April 7, 2000
Santiago	October 27, 2000

Minutes of all the meetings are available on the Clean Air Initiative's website: www.worldbank.org/cleanair

The current policy of expanding the membership of the Clean Air Initiative is related to the resources available to the program to carry out its mandate. It is thus not expected that during the year 2001 new cities will join the program. However, plans are being made for the future expansion of the Initiative to other key cities of the region, and activities are being carried out that benefit a wide number of primary and secondary cities of the region, even if they are not officially partners of the program. Table 2 shows the current membership of the Steering Committee of the Clean Air Initiative.

Table 2. Steering Committee Membership as of June 2001

STEERING COMMITTEE PARTNER INSTITUTIONS	REPRESENTATIVE MEMBER	TITLE
City governments		
Buenos Aires, municipality	Norberto La Porta	Secretary of Environment
Lima-Callao, Comité de Gestion Aire Limpio	Raúl Flores García-Rada	Deputy Minister of Transport
Mexico City, Comisión Ambiental Metropolitana	Hilda Gonzales Echeverría	Secretary of Environment
Rio de Janeiro, municipality	Eduardo Paes	Secretary of Environment
Santiago de Chile, CONAMA Región Metropolitana	Gianni López	Director
São Paulo, municipality	Stela Goldenstein	Secretary of Environment
Private companies		
DaimlerChrysler	Monica Saraiva Panik	Marketing Director for LAC
Renault	Alain Felce	Advisor, Urban Mobility
Shell Foundation	Kurt Hoffmann	Deputy Director
Volvo	Lena Gevert	Director, Environmental Affairs
Development banks and environmental agencies		
Carl Duisberg Gesellschaft – CDG	Michael Funke-Bartz	Project Manager
Companhia Estadual de Tecnologia de Saneamento Básico, São Paulo – CETESB	Volf Steinbaum	Manager, Sustainable Transport
Environment Canada	Ginny Hardy	Program Manager
Gesellschaft für Technische Zusammenarbeit – GTZ	Roland Haas	Technical Advisor, Air Quality
Inter-American Development Bank – IADB	Deborah Bleviss	Regional Advisor, LAC
Netherlands Ministry of Foreign Affairs, DGIS	Joep Bijlmer	Senior Policy Advisor
Pan-American Health Organization – PAHO	Marcelo Korc	Regional Advisor Air Quality
U.S. Environmental Protection Agency – USEPA	Cameryl Hill-Macon	Program Manager, LAC
World Bank	John Redwood	Director, ESSD, LAC
NGOs and foundations		
Asociación Regional de Empresas de Petróleo y Gas Natural en Latinoamérica y el Caribe – ARPEL	José Félix García	Executive Secretary
International Council for Local Environmental Initiatives – ICLEI	Tanya Imola	International Coordinator
International Petroleum Industry Environmental Conservation Association – IPIECA	Chris Morris	Secretary General

Technical Secretariat

During the Launching Workshop of the Clean Air Initiative, the founding partners agreed that a Technical Secretariat was needed to supervise the implementation of the program, and that this function should be performed by a team from the World Bank, initially for a period of two years. This was then extended until the end of the first phase, or the end of 2001.



The Technical Secretariat was created as a joint team of two environment units, one belonging to the Latin America and Caribbean (LAC) Vice Presidency, and the other to the World Bank Institute (WBI). The LAC Vice Presidency oversees all activities of the institution in the region, from country assistance strategies and programs to sector policies, and the preparation and implementation of investment operations. WBI has the mandate to foster policy dialogue, promote and carry out capacity building and learning activities, and organize networks of clients and partners of the World Bank around key development challenges.

The Technical Secretariat, as determined by the Initiative's Rules of Operation (see appendix 1), has the following main functions: (i) provide secretarial support to the Steering Committee and its presidency; (ii) in coordination with the presidency, prepare the work program and annual budget; and (iii) prepare the yearly financial report for the approval of the Steering Committee.

Table 3 lists the current members of the Technical Secretariat of the Clean Air Initiative.

Table 3. Members of the Technical Secretariat as of June 2001

NAME	FUNCTION	TITLE
Anthony G. Bigio	Technical secretary, program management	Senior Urban Specialist
Laura Tlaiye	Technical advisor, program management	Lead Environmental Specialist
Adriana Bianchi	City workshops management	Senior Institutional Development Specialist
Carl-Heinz Mumme	Technical supervision	Environmental Specialist
Renan Poveda	Technical supervision	Environmental Specialist
Sergio Margulis	Technical supervision	Senior Environmental Economist
Paul Procee	Distance learning courses	Urban Environmental Specialist
Alexandra Klöpfer	Communications specialist	Research Analyst
Elisabeth Ashbourne	Private sector partnerships	Partnership Coordinator
Christine Copley	Website development	Environmental Specialist
Nelvia Hayme Diaz	Secretariat and administration	Language Team Assistant

The Technical Secretariat has the following functions:

- Ensure that the activities established in the annual program are developed in a technically adequate manner and within the established budget.
- Contribute technically to the development and/or strengthening of air quality action plans, and identify possible sources of financing.
- Contribute in the organization of Clean Air workshops.
- Prepare a detailed annual report of activities conducted in each of the cities and in each of the components, based on the work program and annual budget of the Initiative.
- Promote the participation of cities' representatives and of other decision makers in regional and international conferences.
- Implement the financial strategy agreed to by the Steering Committee and be in charge of generating financing for the program.
- Organize meetings for the Steering Committee in coordination with the presidency, and ensure that the Initiative's goals are fulfilled.
- In conjunction with the presidency, resolve issues not foreseen within the Rules of Operation.

IV. City Workshops

Launching Workshop

The inaugural event of the three-year Clean Air Initiative in Latin American Cities brought together more than 180 participants from 18 countries and was organized by the World Bank in Washington, DC on December 2–4, 1998. The workshop was the first opportunity for the Initiative to unite leaders from the public and private sectors, the NGO community, research and academic institutions, government agencies, and international institutions.

The workshop was opened by a panel of distinguished representatives from the national governments of Argentina, Brazil, Mexico, and Peru, together with senior representatives from the Latin American and Caribbean Vice Presidency and from WBI. An overview presented the air pollution problems in the main cities of Latin America. A description of the mission, justification, goals, strategic approach, and objectives of the proposed Clean Air Initiative in Latin American Cities followed.

City representatives from Lima-Callao, Mexico City, Rio de Janeiro, and Buenos Aires described the specific challenges those cities were facing, the actions necessary, and the resources required for implementation. It became clear that though each city faces a unique situation, the opportunity for making progress through the sharing of local experiences could be significant. The expanding influence of information technology and the possibilities of its practical use were addressed through the presentation of air quality websites and the use of a live videoconference with Mexico during a workshop plenary session.

On the final morning of the workshop, three working groups were assembled to finalize the design of the Initiative:

- City-specific action plans for air pollution abatement: What are the recommendations?
- Hands-on experience with “learning space” and feedback on interactive technologies for the definition of the Initiative’s website and of future distance learning activities.
- Public policies and private investments in Latin America, partnerships for the accelerated introduction of low pollution and low carbon technologies.

Lima-Callao

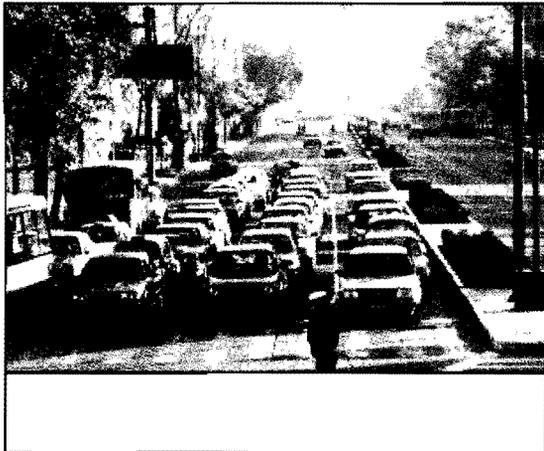
The first city workshop sponsored by the Initiative was held in Lima, Peru, on April 21–23, 1999. It was organized by the Comité de Gestión de la Iniciativa de Aire Limpio Lima-Callao, formed by presidential decree following Peru’s involvement in the Launching Workshop. The Comité includes representatives from the two municipalities, various sector agencies, and the private sector, and is headed by the deputy minister of transport. More than 140 participants attended the workshop, which was given high visibility in the local media.



The goals of the workshop were successfully achieved, with the scope of the Initiative being endorsed and further defined. The Steering Committee was created and agreement was reached on the mission, goals, and work program of the Initiative. Significant financial contributions were secured from bilateral donors and the private sector. The public-private partnership approach also drew resounding support from the workshop participants, who welcomed the involvement of major companies in joining public agencies and local governments in the shared commitment to cleaner air in Latin American cities.

The workshop opened with a presentation of the current status of air quality in the metropolitan area of Lima and Callao. This was based on the relatively scarce scientific information, due to the lack of emissions inventories and of monitoring data as well as little knowledge as to the effect of air pollution on public health. The major problems highlighted entailed the absence of air quality and vehicular emission standards, obsolete legislation regarding the import of second-hand vehicles, delays in phasing out lead from gasoline, and the many interrelated problems related to traffic congestion resulting from a totally deregulated urban transport sector.

Technical delegates from São Paulo, Santiago, and Mexico City presented successful cases of urban air quality management. They highlighted the technical aspects of their programs as well as the institutional complexities they had to face. Santiago shared its experience with participatory action planning. A videoconference with the other partner cities of Buenos Aires and Rio de Janeiro brought the six partner cities together and gave the participants broad exposure to air quality practices in the region.



The workshop gave significant credibility and visibility to the Comité de Gestion that had been just created. It also helped the local stakeholders focus on a series of priority measures for the short-term improvement of air quality in Lima and Callao in the wake of more reliable and comprehensive data. A significant outcome of the workshop was the approval by the government of Switzerland of a financial allocation to conduct some of the studies highlighted at the workshop that were deemed essential for the development of the air quality action plan. These would also be considered as significant inputs to the preparation of an urban transport lending operation by the World Bank that could, if approved, provide financing for some or all of the air quality management measures.

Mexico City

The Clean Air Workshop for the Mexico City Metropolitan Area was held on June 16–18, 1999, as a joint effort of the Clean Air Initiative and of the Secretariat of Environment of the Federal District.

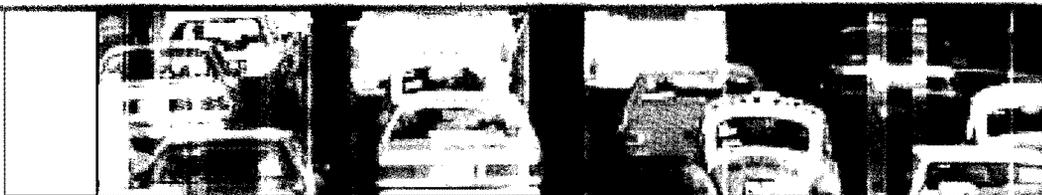
More than 270 participants attended the workshop, representing public and private sectors, NGOs, international development organizations, and financial institutions. The debates and the intense exposure of local policymakers to regional and international experience facilitated the definition of the strategic guidelines for the next decade of work. A summary policy document was produced and published by the Secretariat of Environment and the Clean Air Initiative. It is available on the Initiative's website.

Three working group topics were selected by the conference organizers:

- **Vehicle emissions reduction, focusing on proposals for technical definitions of standards and the regulation of the import of vehicles**
- **Air quality monitoring, focusing on how to establish an air quality monitoring network**
- **Rationalization of the urban transportation system, concentrating on the quality of the transport fleet and on transport routes.**

The main objectives of the workshop were the following:

- **Assess the results of the last decade of urban air quality management**
- **Analyze and exchange experiences at the international level, seeking to bring up-to-date environmental policies to the Mexico City metropolitan area**
- **Define the actions to be taken during the next decade (2000–10) in the Mexico City Metropolitan Area air quality program.**



The next integral air quality program will seek to protect the health of the inhabitants of the Mexico City Metropolitan Area, using an effective intersectoral coordination with authorities related to the environment, transport, urban and social development as well as economic and financial development, within areas of federal and local competence. In addition to these objectives, this program will include the participation of civil society to foster formal and informal environmental education.

The program will seek to assist academic research and economic development and to combat global polluting emissions, contributing to the fulfillment of Mexico's international commitments acquired in the context of the framework for the Convention on Climate Change. The aforementioned are all nodal points in the development of a long-term environmental policy. The policy document outlines the main environmental issues discussed at the Clean Air Workshop, including environmental indicators and the main precedents, challenges, and goals established during the past years, aiming to show a general overview of the achievements of abatement of atmospheric pollution in the Mexico City Metropolitan Area, and drawing attention to the information that will shape the policies intended for implementation during the next decade.

Rio de Janeiro

The Clean Air Initiative workshop was held in Rio de Janeiro on December 2–4, 1999, exactly one year after the Launching Workshop of the program. It was jointly organized with the Secretariat of Environment of the Rio de Janeiro municipality. The Secretariat of Environment was acting on behalf of seven other municipalities of the metropolitan area that share the same air-shed and with which a coordination mechanism was being created.

This workshop had the objectives of (i) raising the level of public and political awareness as to the importance of air pollution in the metropolitan area of Rio; (ii) establishing the Inter-Municipal Consortium to spearhead the efforts of air pollution abatement; and (iii) obtaining support from state and national agencies, as well as from the Initiative's partners, to initiate and carry out the necessary technical studies and action planning. These will in turn lead to the identification and financing of the appropriate air pollution abatement measures at a further stage. The workshop was centered on the following themes:

- Characteristics of air pollution in the metropolitan area of Rio de Janeiro
- Urban air pollution and its effects on human health
- Urban mobility, transport, and air pollution
- Management of air quality: monitoring and control
- Vehicular and industrial technologies and clean fuels
- Institutional and financial aspects of air quality management
- Definition of the clean air action plan for the Rio metropolitan region.

Prior to the workshop these key themes were developed by local working groups coordinated by the Rio Environment Secretariat as the local partner of the Clean Air Initiative. PAHO and Renault, two program partners, played a key role in groups' (i) health and air quality and (ii) urban mobility, transport, and air pollution, respectively. They brought to Rio international experts that collaborated with the local agencies in reviewing the issues at hand, formulating preliminary policy recommendations, and preparing the related workshop papers.



The workshop was attended by 240 participants, the majority of whom were representatives of metropolitan Rio municipalities and agencies, academic and research organizations, and private sector and NGO groups. In addition, there was significant participation from representatives of the State of Rio, from the federal Ministry of Environment, and from the local authorities and sector agencies of São Paulo. International delegates included representatives of other Latin American cities, private sector companies and associations, and bilateral and multilateral agencies that are members of the Clean Air Initiative.

The Rio de Janeiro Clean Air Workshop accomplished its stated goals. Moreover, and as a result of the successful event, the Clean Air Initiative successfully engaged negotiations with the French Development Agency to secure financing for the technical studies need on a number of priority areas. The workshop also created the opportunity for the Rio municipality and State of Rio authorities to approach the federal government to access World Bank loans for environmental management and thus for the implementation of investments.

Buenos Aires

The government of the City of Buenos Aires held the fourth city workshop of the Clean Air Initiative in Latin American Cities on April 4–6, 2000. The workshop was organized jointly between the Secretariat of Environment and the program and was attended by more than 450 participants.

The vast majority of attendees were from the Buenos Aires metropolitan region and from some secondary Argentine cities, Cordoba, Mendoza, and Rosario. There was significant representation from the local, regional, and federal agencies; private companies from the transport, energy, and industrial sectors; academia; NGOs; and foundations active in environmental issues and education. International delegates included representatives of other Latin American cities and private sector companies and associations, together with representatives of multilateral and bilateral agencies.

Parallel technical sessions were organized along with the workshop; they covered specific issues relevant to the Buenos Aires Clean Air program and to the Clean Air Initiative in general:

- Epidemiological monitoring systems, health risk assessment, and social costs
- Air quality monitoring, emissions inventories, and air quality modeling
- Fuel quality and environmental impacts
- Public participation in air quality management
- Clean vehicle/fuel technologies
- Inspection and maintenance programs
- Training for taxi drivers
- Climate change and air quality management.

The general consensus was that the establishment of a metropolitan approach to air quality management is a necessary condition for success. The following actions were

The workshop was organized around the following key objectives:

- **Raising the level of public awareness of the severity of the air pollution problem in the metropolitan area of Buenos Aires**
- **Establishing partnerships with the private sector and the municipalities of the metropolitan area to support the Clean Air program**
- **Obtaining support from provincial and federal agencies, together with the Initiative partners, to strengthen the clean air action plan covering the entire metropolitan region**
- **Establishing an active link between the clean air action plan and two existing World Bank operations in pollution management and urban transport.**

identified as priority areas for action: (i) strengthening the enforcement capacity through training of personnel for the inspection and maintenance systems, (ii) planning and developing a cycle-lane system that would connect to other means of transportation, and (iii) developing an emissions inventory for fixed sources. A Spanish government financial allocation was secured by the Clean Air Initiative to carry out the studies and priority activities.

Santiago

The fifth city workshop of the Clean Air Initiative in Latin American Cities was held in Santiago de Chile on October 24–26, 2000, in partnership between Comisión Nacional del Medio Ambiente (CONAMA) Región Metropolitana and the Clean Air Initiative. It was attended by more than 400 participants.

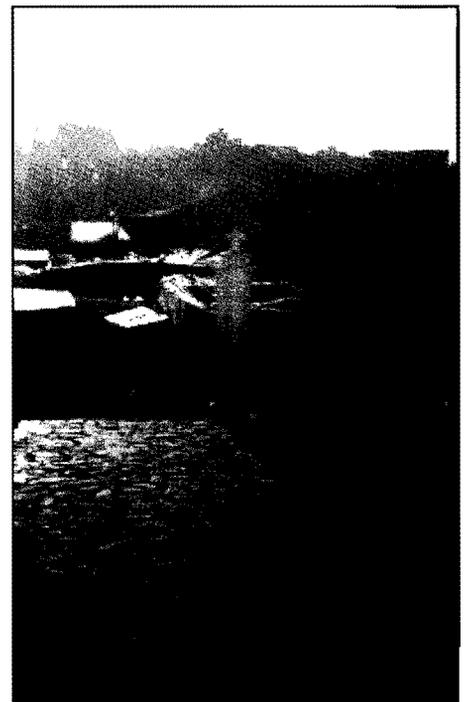
The agenda was organized around three core themes and a series of minicourses. The core themes were (i) air quality action plans and strategies to control atmospheric pollution, with case studies from European and North American cities; (ii) clean technologies and improved fuels and emissions control in the transport and industry sectors; and (iii) the achievements or lessons of the previous action plan and the proposed decontamination plan for the metropolitan area of Santiago. The topics covered by the minicourses were:

- Emissions controls in the industrial sector
- Urban planning, transport, and air quality
- Integrated strategies for local and global control of atmospheric pollutants
- Pollution prevention through education and public participation
- Health impacts from air pollution
- Air quality standards.

In addition, field trips to specific locations relevant to the sessions were carried out on two days of the workshop, with substantial participation. The sites selected for the field visits were the Center of Control and Vehicle Certification of the Ministry of Transport and Telecommunications, the Green Building System,

The objectives were to:

- **Raise the level of public awareness of the concrete actions being undertaken to address air pollution in the Santiago metropolitan area**
- **Establish partnerships between the private sector and CONAMA to support the implementation of the Santiago clean air action plan**
- **Provide a learning opportunity for technical officials from other cities in the region**
- **Enhance support from the Initiative partners to strengthen the Santiago action plan**
- **Benefit from the knowledge and expertise of high-level technical representatives from other countries to provide assessment and advice on the proposed new decontamination plan for Santiago.**



and the National Center for the Environment (CENMA). A natural gas-powered bus, provided by Mercedes Benz, transported participants to these locations.

The Santiago workshop was successful both for the local organizers and for the participating cities. It helped catalyze a dialogue between transport and environmental authorities, now in the process of revising key regulatory aspects of urban bus concessions. It provided CONAMA an opportunity to engage the media in a detailed description of achievements to date and of the new directions of Santiago's Air Quality Management Action Plan (see box 1). For the participating cities, this workshop served as a hands-on training opportunity in a number of technical areas related to air quality management.

Box 1. Profile of the Updated Santiago Air Quality Management Action Plan

An audit of the Santiago action plan reveals that the industrial sector has attained more improvements than the transport sector. This stems from the fact that (i) the industrial sector has an overall cap on its emissions, and every new source has to compensate for its emissions with an equivalent reduction elsewhere; (ii) the applied norms to the existing sources have been consistent over time; (iii) new cleaner fuels at reasonable prices have been made available; and (iv) sources that have not been able to incorporate cleaner fuels have been able to introduce emissions abatement systems.

On the other hand, the transport sector has not been able to make marked improvements because (i) the total of kilometers traveled per year has increased substantially in the past decade; (ii) there is a large group of vehicles without any emissions control; and (iii) some initiatives, such as traffic management, have not demonstrated improvements.

Nevertheless, norms for new vehicles have prevented the growth of emissions from becoming even worse.

Among the goals for the proposed action plan for the decontamination of the Santiago Metropolitan Region are the following:

1. Avoiding that an increase in travel kilometers by vehicles results in increased emission levels by:
 - Prioritizing public over private transport
 - Expanding the compensation system for emissions.

2. Substantially reducing the emissions from the transport sector by:
 - Updating the set of norms for new vehicles
 - Improving diesel fuel quality
 - Allowing the introduction of new technologies and cleaner fuels
 - Reducing the average age of private vehicles
 - Facilitating the introduction of electric or gas buses in the public transport fleet.

3. Maintaining particulate matter (PM) emissions from industry at their current level by:
 - Optimizing the compensation system for emissions
 - Establishing mechanisms to control the emissions of smaller sources
 - Allowing the establishment of partnerships for cleaner production
 - Establishing tools that would favor small- and medium-size enterprises.





V. City Action Plans

Since the launching workshop in December 1998, support to enhance and/or develop city-specific action plans has been identified as one of the essential activities to be carried out under the Clean Air Initiative. While some of the city members (such as Mexico City and Santiago) have been making progress for some time in the implementation of air quality management action plans, other cities, with the Initiative's support, have only recently started working on their development.

The Initiative has sought to contribute to the air quality action plans of city members through technical assistance and by facilitating institutional arrangements and enhancing the necessary mechanisms for interagency collaboration and communication. However, lessons from different metropolitan areas illustrate the critical role of an open dialogue and commitment among key stakeholders (transport, environment, health, energy, federal government, state and city officials, and other interests) to build consensus on the key priorities and actions needed from each stakeholder. Establishing this inter-institutional collaborative process is not an easy task, and often persistence and dedication are required when administrative or political changes occur. Consequently, the institutional challenge has been greater than originally anticipated. As described below, the Initiative will continue to catalyze the institutional framework for the development and enhancement of air quality management action plans in its member cities during the year 2001.

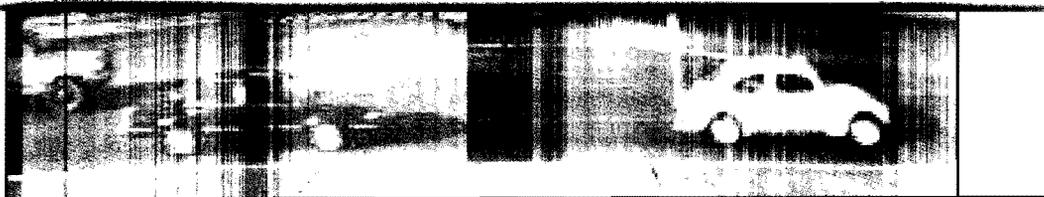
Lima-Callao

Metropolitan Lima-Callao is a territorial unit comprising the city of Lima and the provinces of Lima and Callao. It covers an area of 2,794 square kilometers, with a population of approximately 7.5 million. The air pollution problem in this metropolitan area has been exacerbated over the past 15 years by a series of national economic and social factors that led to measures being taken without regard to their impact on the environment or, specifically, air pollution. Attempts by various central government agencies and by the Lima and Callao municipalities to tackle the pollution problem were both insufficient and ineffective for a series of reasons, including that they were isolated efforts.

Aware of these shortcomings, the government of Peru adopted Supreme Resolution No. 768-98-PCM on December 31, 1998, establishing the Comité de Gestión de la Iniciativa de Aire Limpio for Lima-Callao. The committee is chaired by the vice minister of Housing and Construction and is composed of representatives of the Ministries of Transport and Communications, Housing and Construction, Health, Industry, Energy and Mines, Fisheries, and Defense, and of representatives of the National Environment Council, the Municipalities of the provinces of Lima and Callao, and the National Confederation of Private Business Institutions, Confiep.

The launching workshop of the Clean Air Initiative in Latin American Cities held in Washington, DC, in December 1998 played an important part in the establishment of the Comité de Gestión. Leading the Peruvian delegation to that workshop was the vice minister of Housing and Construction.

The purpose of the Comité de Gestión is "to propose inter-institutional coordination mechanisms and regulations designed to improve air quality in Lima and Callao by promoting actions based on team work in which stakeholders would work in their separate ways for common goals, such as strengthening institutions, information systems, and greater awareness among the general public." It was installed on January 27, 1999, one of its first tasks being to organize an international workshop, entitled The Lima-Callao Clean Air Initiative, which then became the first international workshop of the Clean Air for Latin American Cities Initiative sponsored by the World Bank.



The debates in the workshop helped identify a series of lacunae, such as the nonexistence of emission inventories, the lack of a saturation study mapping the distribution of pollution in Lima-Callao, and the dearth of epidemiological surveys, or particles analyses. Attention also focused on the lack of legal provisions regarding air quality and the absence of air quality standards, ceilings on emission of contaminants, traffic regulations, and so on.

An important point to emerge in the discussion was the lack of a comprehensive Lima-Callao air sanitation plan and the urgent need to prepare one as a vehicle for proposing and implementing a series of key measures to reduce the emission of pollutants and its impact on the environment and health of the population.

Once the working priorities had been established, efforts were made to obtain the necessary technical and economic support. The result was a valuable contribution by the Swiss government, through a World Bank trust fund, to finance work with Swisscontact, a Swiss firm working for the Comité de Gestión, in the following areas:

- Air quality monitoring network
- Regulations and ceilings on additions to the existing number of vehicles
- A vehicle inspection and maintenance program
- A Comprehensive Metropolitan Lima-Callao Air Sanitation Plan.

The results so far are as follows:

- **Air quality monitoring network.** The first step was to conduct the saturation study of pollutants in Lima-Callao, which revealed that the main cause of air pollution in Lima-Callao was particles in suspension with a PM_{10} component. The study also showed which parts of the metropolitan area were most polluted. The data culled from the saturation study made it possible to complete the design of the air quality monitoring network.
- **Regulations and ceilings on the incorporation of vehicles.** The paperwork is undergoing final revision by a working group of the Comité de Gestión. Findings developed in the course of the study have been built into the proposal regarding vehicle ceilings.
- **Vehicle inspection program.** The study was completed and proved to be highly useful during preparation of the vehicle inspection program and its subsequent implementation.

Based on the information obtained during the April 1999 workshop, the Comité de Gestión decided that there were five priorities in addition to drafting the Comprehensive Air Sanitation Plan. These were to:

- **Regulate the importation of (new and used) vehicles**
- **Establish air quality standards and emission ceilings**
- **Establish an air quality monitoring network**
- **Rationalize transportation routes**
- **Establish a vehicle inspection and maintenance program.**



- **The Comprehensive Air Sanitation Plan for Lima-Callao (Plan Integral de Saneamiento Atmosférico).** A more complete version is now available. Technical specifications for 20 measures to reduce the emissions of contaminants have been identified and developed, along with nine management tools. Four major studies have been identified for the next steps in implementing the plan. The International Petroleum Industry Environmental Conservation Association (IPIECA) model is being used in the preparation of the plan, especially for cost-benefit analysis. At the same time, the EMOD-CMAP model is being used to determine the effects of air pollution.

The Comité de Gestión is currently making arrangements for possible technical assistance from the Swedish government in drawing up an inventory of emissions for fixed and mobile sources, the study of the dispersion of air contaminants in Lima-Callao, and epidemiological surveillance of diseases caused by air pollution.

The above focuses on the activities carried out directly by the Comité de Gestión. However, it has at the same time engaged in activities providing technical assistance to other committees concerned with the following:

- Pre-publication of the Regulations Governing National Air Quality Standards, which committee members had helped write. In the course of that activity, agreement was reached on quality levels, and it was decided to entrust the Committee to Manage the Clean Air for Lima-Callao Initiative with responsibility for the Lima-Callao Zone Administration (Gesta Zonal). These regulations are currently awaiting approval. They contain not only quantified air quality standards but also a mechanism for gradually attaining them.
- Preparation of the National Regulations on Vehicles, required by the general law governing land transportation and traffic (Law No. 27181). These regulations have to specify the security and emission features and technical requirements that vehicles must meet, the technical and administrative procedures for authorization of new vehicles, and the system governing technical inspections and spot checks on public roadways. Members of the committee have played an active part in these projects and reviewed studies for projects proposed by Swisscontact.
- Preparation of the Draft Peruvian Technical Fuel Quality Standard, which updates the technical specifications for petroleum and its byproducts, liquid fuels. It was important for committee members to take part in this activity, because it meant that the quality of fuels to be used over the next few years would lower the emission of pollutants. Achievements included the elimination of tetraethyl lead and the exclusion of manganese in gasoline and a lower percentage of sulfur in fuels.
- Publication of Supreme Decree No. 045-2000-MTC, establishing minimum quality standards for imported used vehicles. This decree restricts imports of freight and passenger vehicles manufactured over the previous five years before the decree. It also stipulates that the carbon monoxide emission in such cars may not exceed 4 percent nor hydrocarbons 500 ppm. The General Directorate of Land Transportation of the Ministry of Transport, a member of the management committee, helped prepare this decree.
- As regards citizens' participation and awareness of the air pollution problem in Lima-Callao, the management committee's work was displayed at various forums attended by politicians, academics, and the general public, with the result that these groups are now more sensitive to the air pollution issue.



It should be noted that the activities of the Comité de Gestión in Lima-Callao are setting an example for other Peruvian cities. Moreover, the emission reduction measures contemplated in the Comprehensive Metropolitan Air Sanitation Plan will have immediate repercussions throughout Peru by markedly lowering the emission of pollutants and reducing their impact on the health of the population.

Rio de Janeiro

The key stakeholders that participate in the Clean Air Initiative in the Rio de Janeiro Metropolitan Area Region include the municipalities of Rio and Baixada Fluminense (technically known as the Air Basin III). The Air Basin III, considered to be the most degraded in terms of air quality in the metropolitan region, given its large urban and industrial occupation and poor air pollution dispersion capacity, includes the following municipalities: Belford Roxo, Duque de Caxias, Magé, Nilópolis, Nova Iguaçu, Queimados, and São João de Meriti. Other key stakeholders that participate in the Clean Air Initiative in Rio are the State Foundation for Engineering and Environment (FEEMA), the Federal University of Rio de Janeiro (UFRJ), and the Ministry of Environment (MMA). An operating agreement is being discussed among these stakeholders to develop a future action plan to address the air quality problems in the Rio de Janeiro metropolitan area region.

The Clean Air Initiative has aimed at consolidating an air quality action plan that would bring improvements and reduce health-related effects due to the high levels of air pollution in the Rio de Janeiro Metropolitan Area Region. The activities carried out so far under the Clean Air Initiative include training and rapid courses for specialists on air quality analysis and health impacts and air pollution, creation of municipal environmental agencies (such as the Secretary of Environment of the São João de Meriti municipality), and videoconferences in which technical staff learn about the Clean Air Initiative experiences in Lima-Callao and lessons from PAHO.

Furthermore, the Clean Air Initiative workshop that took place in December 1999 served as a platform to openly discuss among key stakeholders the main issues for the development of an air quality action plan for the Air Basin III. The workshop benefited Rio officials in its efforts to develop an action plan through the participation and advice of local and international scientists, technical experts, and policymakers.

Soon after the initial workshop in Rio, the French Agency for Development and Renault agreed to provide technical and financial support to carry out a diagnosis of the air quality in the Rio de Janeiro metropolitan area region, with an emphasis on urban transport and air quality assessment studies. The proposed studies would be regrouped in the following three areas:

- Diagnosis of the current situation
- Application of dispersion models
- Preparation of the initial steps for an air quality action plan.

Another potential contribution to the Rio de Janeiro metropolitan area region action plan is the development of a health impact study that could be carried out in collaboration between the Secretariat for Environment and the Secretariat for Health of the city of Rio de Janeiro.

In summary, the Clean Air Initiative in Rio has contributed to the sharing of technical and methodological experiences through the exposure of Rio's technical staff to international workshops and independent advisory services.



In 2001 the Clean Air Initiative, in collaboration with the Ministry of Environment, will help to establish a working committee comprising the seven municipalities of the Baixada Fluminense and the municipality of Rio de Janeiro that would begin addressing the critical air quality management challenges. This committee should have the financial and technical support of the state environmental authorities, the French Agency for Development, and the Ministry of Environment. The Initiative will also provide the economic analysis to enable the selection of alternative investment options.

Buenos Aires

Following the April 2000 workshop held in Buenos Aires, three key areas of support were identified by the city authorities:

- Strengthening the enforcement capacity through training of personnel for the inspection and maintenance systems
- Planning and developing a cycle-lane system that would connect to other transportation systems
- Developing an emissions inventory for fixed sources.

These targeted activities complement two World Bank lending operations (Pollution Management Project and Urban Transport Project) in the areas of air quality monitoring and emissions inventories for mobile sources. In addition, specialized studies will help develop priority measures for reducing emissions and noise. These efforts are expected to strengthen the Buenos Aires Programa de Aire Limpio and the city's ability to implement its air quality law.

After the city government elections, new environmental authorities, appointed in June 2000, became acquainted with the Clean Air Initiative during the months of August and September. The scope of the activities is confirmed and their implementation is now being planned. These activities are funded through consultant trust funds made available by the governments of Spain and Canada through the World Bank.

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VI. Training and Technical Tools

Communication Activities

The Clean Air Initiative in Latin American Cities relies heavily on extensive communications to promote its mandate and to inform its partners and stakeholders of the results of its activities. A significant amount of the work of the Technical Secretariat is devoted to communication activities.

A public service announcement video on the program was produced before its launch, and during 1999 and 2000 it was widely aired in the region and worldwide, thanks to the financial support of Cable News Network (CNN) through its two channels, CNN International and CNN Español.

Three program brochures have been published in English, Spanish, and Portuguese — the first to launch the program and the second and the third to communicate the scope of the Initiative and its work program for 1999 and 2000. This Progress Report 2001 is one of the key products of the Initiative's communication campaign.

Each of the six workshops promoted by the Initiative and by its partners has generated a specific set of communication products, ranging from CD-ROM to binders, posters, brochures, and local media coverage of the events via television, radio, and daily newspapers.

In addition, the Technical Secretariat keeps the Steering Committee informed of the progress made in the implementation of the program through periodic updates that are sent via e-mail to all partners. A public e-mail account, Clean_Air@worldbank.org, enables the general public to easily access the program. A Technical Secretariat team member handles the account and provides the information or the contacts requested.

Perhaps the most important communication tool that the Initiative has is its trilingual website, in English, Spanish, and Portuguese, www.worldbank.org/cleanair. It was launched in June 1999 and promotes communication, information sharing, and dissemination of best practices in air quality management in the region. In addition, full details on the Steering Committee, partners, launch of the program, city workshops, action plans, and links to all the air quality agencies in the region are accessible on the site. The website has recently been redesigned and updated, and a large amount of new information is available.

Distance Learning Courses

The partner cities have clearly expressed their interest in improving the capacity of their technical and administrative staff in managing urban air quality issues. This training need is shared by many other Latin American cities, whether capital or secondary cities, that are not benefiting from the technical assistance activities of the program. The Initiative's partners have a wealth of technical and institutional knowledge on the subject of urban air quality management, and on this basis two courses have been developed.

Self-Instructional Course on Urban Air Pollution Management

The objectives of this web-based auto-instructional course on air pollution management are to orient and provide a basic understanding of the principles of air pollution. This introductory course is designed to be followed without the help an instructor. It is offered in Spanish and is permanently accessible through the Initiative's website. It is based on materials adapted by PAHO through its Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente (CEPIS) from the manual of the course, "SI: 422 Air Pollution Control Orientation Course," of the U.S. Environmental Protection Agency (EPA). The web version was developed by WBI and PAHO in 1999.

Urban Air Quality Management in Latin American Cities

This is a comprehensive course on urban air quality management that presents an overview of the main technical topics and policy issues regarding air pollution prevention and control from the transport, industrial, and energy sectors. The modules are highly interactive, enhancing participant involvement with the course. The distance learning course has been organized, developed, and implemented through a partnership involving four organizations: the World Bank, PAHO, USEPA — three partners of the Initiative — and the Asociación de Televisión Educativa Iberoamericana (ATEI), based in Madrid, Spain.

Two instructors teach each weekly module by transmitting from the World Bank's television studios in Washington, DC. Latin American practitioners and other international experts bring complementary perspectives to each theme. The signal gets disseminated across the region via the ATEI satellite links. Participants interact with the instructors by sending questions by e-mail, fax, and telephone during the lessons. Training materials reside on an instructional website accessible via the Initiative's website to the participants that have password access. Materials include copies of the instructors' presentations, readings, exercises, evaluation forms, a discussion space, useful web links, and information about the course and its instructors. The first edition of the course ran very successfully between October 27 and December 15, 2000, with more than 200 participants registered in 16 cities in the region (see table 4).

The eight modules of the distance learning course, delivered once a week over a two-month period, cover the following topics:

- Introduction to the course and to urban air quality management
- Sources and emissions of air pollution
- Air quality monitoring and modeling
- Health impacts of air pollution and economic valuation
- Policies and strategies for air quality management
- Transport management and vehicular emissions abatement
- Energy, industrial, and green-house gases emissions
- Integrated city action plans for air quality management.

Table 4. Participation in the Distance Learning Course on Urban Air Quality Management

COUNTRY	CITY	PARTICIPANTS	COUNTRY	CITY	PARTICIPANTS
Argentina	Buenos Aires	18	Colombia	Bogotá	10
	Córdoba	11		Medellín	6
	Santa Fé	15		Barranquilla	7
	Avellaneda	23	Ecuador	Quito	14
Bolivia	La Paz	4	Mexico	Mexico City	3
Chile	Santiago	1	Panamá	Panamá City	24
	Valparaiso	14	Peru	Lima	40
Colombia	Cali	5	Uruguay	Montevideo	7

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Regional and International Workshops

In addition to the workshops organized by the Clean Air Initiative and the city partners, the Initiative has been substantively involved in a number of other conferences and workshops. Representatives from the partner cities, both institutional and technical, have attended these events and shared with the different audiences the progress being made in urban air quality management. Staff from the Technical Secretariat has generally attended and contributed to the debates with presentations on the program, its strategic thrust, and its achievements.

Air and Waste Management Association Annual Meetings, June 1999

The 92nd Annual Conference and Exhibition of the Air and Waste Management Association was held in St. Louis, Missouri, on June 21–23, 1999. The Clean Air Initiative in Latin American Cities was one of the participating organizations, specifically for the International Urban Environment Forum. The general theme of the event was Mobile Sources and Transportation Planning Issues. On June 22, the Clean Air Initiative in Latin American Cities was presented and discussed at the roundtable on regional initiatives by the Technical Secretariat. Steering Committee representatives from Brazil, Mexico, and Peru attended the conference and played an active role in its technical sessions.

DaimlerChrysler/World Bank Environment Forum, July 1999

The DaimlerChrysler/World Bank Environment Forum was held in Magdeburg, Germany, on July 12–14, 1999, and brought together more than 200 participants from 27 countries. The forum concentrated on five areas of interest and developed an initial set of partnerships and business ideas for each of these areas. One of the technical sessions was on the Clean Air Initiative in Latin American Cities, chaired by Ferdinand Panik of DaimlerChrysler and John Redwood of the World Bank. One of the key outcomes of the meeting was the identification of the need to develop a reliable and comprehensive database on the emerging technologies that can contribute to cleaner air in the

cities of developing countries. This idea was eventually developed by DaimlerChrysler into a proposal for an information pool, which is currently being implemented as part of the current work program of the Clean Air Initiative.

World Bank/International Association of Natural Gas Vehicles Workshop on Compressed Natural Gas Vehicles, March 2000

A workshop on compressed natural gas vehicles was held on March 2–3, 2000, at the World Bank, and it brought together participants from the Clean Air Initiative, the World Bank, the Global Environment Facility, and the International Association of Natural Gas Vehicles. The workshop examined recent technical, economic, and environmental evaluations and relevant country case experiences and reviewed best practices and policy preconditions under which compressed natural gas becomes a sustainable solution for urban transport projects. The materials presented at the workshop are available on the Clean Air Initiative website. Further technical studies in the Initiative's partner cities will be conducted on the applications of compressed natural gas technology.

Cooperation for the Continuing Development of Urban and Suburban Transportation (CODATU) Urban Transport and Environment Forum, April 2000

The ninth global meeting of CODATU, an international nonprofit association of urban transport specialists, took place on April 11–14, 2000, in Mexico City, with the theme of Urban Transport and Environment. The management of CODATU was in touch with the Clean Air

Initiative for several months prior to the event to ensure its participation in the program. A half-day session involving a panel discussion on the goals, principles, governance, and activities of the Clean Air Initiative was included. The representatives from Mexico, Peru, and Brazil, together with the Technical Secretariat, facilitated the panel discussion.

Air and Waste Management Association Annual Meeting, June 2000

The 93rd Annual Conference and Exhibition of the Air and Waste Management Association was held in Salt Lake City, Utah, from June 18–22, 2000. The Clean Air Initiative in Latin American Cities was one of the participating organizations, specifically as part of the International Urban Environment Forum entitled Mobile Sources and Transportation Planning Issues. Representatives from Initiative partner cities from Chile, Brazil, and Mexico participated. A paper, "Inter-institutional and inter-jurisdictional issues for successful urban air quality management: An overview of six cities in Latin America," was presented by Anthony G. Bigio, Technical Secretariat of the Clean Air Initiative.

IPIECA Training Course on the Urban Air Quality Management Toolkit in Lima, June 2000

The Comité de Gestión de la Iniciativa de Aire Limpio organized a training course on use of the IPIECA urban air quality management toolkit. The training took place June 5–13, 2000, and was financially supported by ExxonMobil, Texaco, Shell, Repsol-YPF, and Petroperu, all members of IPIECA and the Asociación Regional de Empresas de Petróleo y Gas Natural en Latinoamérica y el Caribe (ARPEL). Some 30 participants from different ministries, the cities of Lima and Callao, Petroperu, and the private sector attended the IPIECA toolkit workshop for five days. Four technical papers were distributed to the participants explaining the design and application of the

toolkit. It is envisaged that Swisscontact will now apply the IPIECA toolkit as a structured approach for the economic analysis of the comprehensive air quality action plan for Lima and Callao.

PAHO Meeting of the Regional Air Quality Assurance and Compliance Program, September 2000

In 1999, the Pan American Center for Sanitary Engineering and Environmental Sciences of PAHO conducted a survey of urban air quality management programs in Latin America and the Caribbean. The results of the survey indicated that 13 countries have cities with air quality monitoring networks, but, in general, they have not implemented quality assurance and quality control programs. An experts' meeting was organized by PAHO in Lima, Peru, from September 5–7, 2000, and contributed to the drafting of a regional program proposal on quality assurance and quality control.

PAHO Regional Meeting on Health and Air Quality, October 2000

PAHO and the Mexican National Institute of Ecology, with a number of other agencies from the health sector, organized a meeting of experts on the theme of health and air quality, which was supported by the Clean Air Initiative. The meeting took place in Mexico City from October 16–20, 2000, and representatives from the Clean Air Initiative's partner cities were present. Its main objectives were to present and discuss (i) the progress made in health and air quality programs in the countries of the region and in the overall implementation of PAHO's regional plan for urban air quality and health for the decade 2000–10, (ii) the functioning of Mexico City's air quality and health program, and (iii) to determine what of Mexico City's program could be applied with interest to other cities of the region.

IPIECA Training Course on its Urban Air Quality Management (UAQM) Model in Rio de Janeiro, November 2000

Petróleo Brasileiro S.A. (PETROBRAS), an ARPEL member, sponsored a second training course on the use of the IPIECA urban air quality management toolkit for members of the Clean Air Initiative team in the partner city of Rio de Janeiro from November 16–22, 2000. Using the air quality data provided, plus the experience of Enstrat (IPIECA consultants and designers of the toolkit), customized versions of the toolkit were prepared to form the basic foundation for the workshop.

ARPEL-IFQC Regional Seminar on Current and Future Fuel- and Vehicle-Related Issues in Latin America and the Caribbean, December 2000

ARPEL and the International Fuel Quality Center (IFQC) organized this regional seminar, sponsored by the World Bank and the Latin American Energy Organization (OLADE), that took place in San José de Costa Rica from November 30 to December 1, 2000. Among the objectives were the presentation of the accomplishments of the Clean Air Initiative and the regional discussion of urban air quality management issues in relation to vehicular emissions. The chairman of the Steering Committee, Maurício Lobo, made a presentation on the Clean Air Initiative to an audience of 130 participants from 14 countries, which included professionals from government, industry, and academia.

Clean Technologies Exhibits

In Rio and Santiago in December 1999 and October 2000, respectively, technology exhibits were organized along with the Clean Air Initiative workshops. The purpose of these side events was to enable partner companies and local private sector operators to showcase the results of their investments in the area of new, cleaner technologies that, if applied, can contribute to significant improvements in air quality. These results range from innovations in vehicle technologies and alternative fuels to environmental equipment and software

The clean technologies exhibit in Rio de Janeiro had four stands displaying information and products from the following companies: DaimlerChrysler, Renault, Scania, and Grupo MC-100, a Brazilian company that commercializes environmental equipment.

related to air quality measuring, monitoring, and modeling. In view of the large number of representatives from local and central governments at the Initiative's city events, companies appreciated the opportunities to expose them to their products and to provide them with technical and commercial information.

The clean technologies exhibit in Rio de Janeiro had four stands displaying information and products from the following companies: DaimlerChrysler, Renault, Scania, and Grupo MC-100, a Brazilian company that commercializes environmental equipment.

The clean technologies exhibit in Santiago comprised 13 stands, where local and foreign private sector firms and agencies displayed equipment, vehicles, and printed materials relevant to the technological advances that have been made in reducing air pollution. The exhibit not only served to present the technologies firsthand but also complemented several of the workshop sessions. The stands displayed information and products of the following groups: Codelco, Chevrolet, Gasco, Metrogas, Embassy of Canada, Centro Nacional del Medio Ambiente, Departamento de Fiscalización del Ministerio de Transportes y Telecomunicaciones, and Commercial Kaufman, representing Mercedes-Benz vehicles.

Technical Tools

Air quality and transport toolkit

The USEPA and the World Bank agreed to share resources and expertise to jointly work in the development of a transportation and air quality toolkit to be piloted in Latin America under the Clean Air Initiative. The toolkit consists of individual modules to be developed in two phases and will serve as a multimedia source of information for developing the transportation component of an air quality program. The toolkit will include software, data sources, references, key contacts, and other user-friendly information needed to deal with the challenges of air pollution from the transport sector. A key part of the toolkit will be based on best practices, mitigation strategies, and innovative solutions that simultaneously reduce local air pollution and greenhouse gas emissions. The first phase of the toolkit will be completed during the course of 2001 in both electronic and printed versions. It will cover, among others things, the following topics:

- Introduction and getting started
- Setting and implementing fuel-related standards
- Setting and implementing standards for new vehicles
- In-use vehicle emissions
- Alternative fuels and clean technologies
- Urban transportation planning
- Economic analysis
- Public outreach.

The World Bank and USEPA will strive to make the toolkit as widely available and user-friendly as possible, using the Clean Air Initiative's and the agency's websites as vehicles for dissemination. The World Bank's contribution to the toolkit will focus on (i) reviewing and providing technical input throughout the toolkit development, (ii) contributing to the in-use vehicle emissions module through the experience of the inspection and maintenance program in Mexico City, and (iii) developing the economic analysis module.

Information Pool

The workshop organized by DaimlerChrysler and the World Bank in Magdeburg, Germany, in July 1999 featured ways to accelerate the introduction in Latin America of clean vehicle and fuels technologies that are low on local and global pollutant emissions. This workshop resulted in the recommendation to create a clean technologies Information Pool that would provide comprehensive information on cleaner vehicle and fuel technologies. This proposal was formally presented to and fully endorsed by the members of the Steering Committee in April 2000 at the Initiative's Buenos Aires meeting.

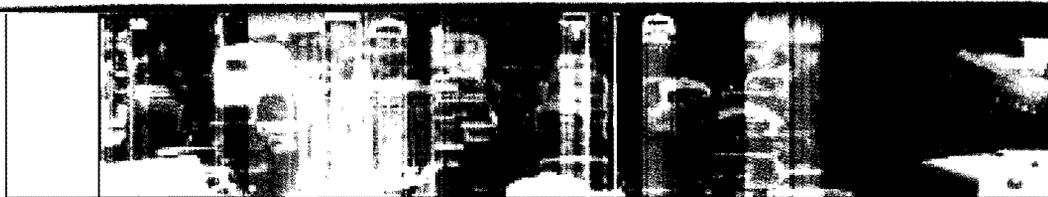
It is envisaged that the participating companies of the Clean Air Initiative will contribute knowledge and experience to the Information Pool, which will help to ensure access to the most up-to-date information from the industry. The Information Pool will be directly managed by an administrator, independent from the technology suppliers who will be responsible for collecting, reviewing, analyzing, and entering the information in a neutral and noncommercial manner, and maintaining the data pool. The World Bank and other members of the Steering Committee of the Clean Air Initiative will provide guidance and advice and ensure that the Information Pool is neutral and objective and that it serves the needs of cities in Latin America.



It is foreseen that the Information Pool will address the following issues:

- Dissemination of clear, technically accurate and noncommercial information on clean vehicle and fuel technologies
- Provision of a synopsis of best practices and lessons learned (positive and negative results) of programs, projects, pilot and demonstration projects, and public-private partnerships for the introduction of clean vehicle and fuel technologies
- In-depth analysis of specific conditions (energy sources, fuel pricing, economic incentives, environmental policies, and so forth) in representative Latin American cities that are relevant to accelerating the introduction of clean vehicles and fuel technologies;
- Evaluation of clean technologies (propulsion systems and fuels) for vehicles used in urban transport in Latin American cities that are able to contribute cost effectively to local and global environmental objectives within the next 20 years
- Assessment of the incremental costs of the introduction of urban transport technologies low in local and global pollutant emissions (as compared with clean vehicle and fuel technologies low only in local pollutant emissions) in Latin American cities
- Assessment of the most promising policy options and appropriate institutional setups that could help to remove market barriers and to increase market penetration of clean vehicle and fuel technologies.

The Information Pool is expected to be operational during the course of 2001, with an emphasis on urban buses and trucks.

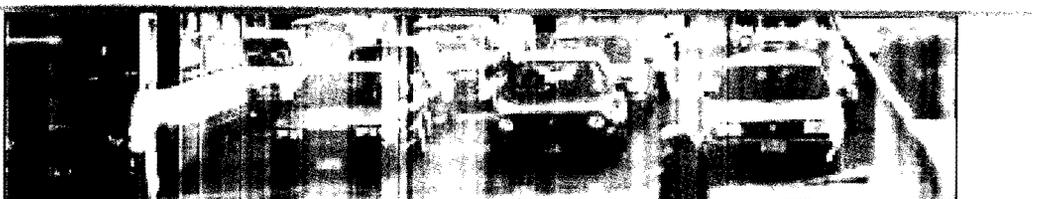


VII. *The Road Ahead*

Work Program 2001

The year 2001 is the final year of the first three-year phase of the Clean Air Initiative in Latin American Cities that was launched in December 1998. While the work program for 2001 will continue to include the Initiative's normal activities as defined under its goals, some special tasks will be related to the transition of the Initiative from a time-limited program to a permanent regional facility at the service of the cities of the region. During 2001 the Clean Air Initiative will continue to carry out the following:

- **Air quality action plans.** The ongoing work in Lima-Callao, Buenos Aires, and Rio de Janeiro will continue, with the aim of (i) completing the technical studies undertaken, (ii) consolidating the coordination mechanisms between the various local governments involved and improving their operational linkages with national and federal governments, and (iii) identifying the technical and financial scenarios for implementation of the proposed air quality improvement measures.
- **City workshop in the partner cities.** These workshops aim to support the ongoing work on urban air quality management and to exchange the local experience with the lessons learned by other partner cities and with the perspective of other program partners. The two-city workshops of 2001 will take place in Lima in July and in São Paulo in December. The participation of representatives from partner cities in other significant regional and international events related to air quality will also continue.
- **Training and information dissemination.** A second delivery of the distance learning course on urban air quality management, which was developed in partnership between the USEPA, PAHO, and the World Bank, will take place during May and June 2001 in collaboration with ATEI. The Clean Air Initiative's website will be further expanded and enriched with the recent materials resulting from the city action plans. The urban transport and air quality toolkit will be completed and made available to the regional partners.
- **Promotion of low-emission, low-carbon technologies.** The information pool, a database on technologies relevant to the issues of urban air quality management, will be completed and made accessible on-line on the Clean Air Initiative's website. Studies on the opportunities to introduce alternative transportation fuels, and on seeking the harmonization of local and global emissions reduction strategies, will also be conducted.
- **Technical studies.** It is envisaged that three studies will take place, building on some of the emerging themes and on the requests of the partner cities: (i) a study on the experience of São Paulo with urban air quality management, related to the recent introduction of low-polluting urban transport vehicles and other technical issues; (ii) a study on the potential for the harmonization of policies aimed at local and at global pollution abatement in Santiago; and (iii) a study on the institutional aspects of urban air quality management in the six partner cities, which will explore issues of intergovernmental collaboration.



In view of the need to define the future direction of the Initiative and assess its sustainability, the following activities will also be a part of the 2001 work program:

- **Strategic study on the short-term future of the program.** This study will address the opportunities of improving program delivery and obtaining a greater involvement by all its partners in program implementation during 2001.
- **Evaluation of the Clean Air Initiative.** Carried out by independent consultants made possible by a special grant of the Dutch government, the evaluation will assess the quantitative and qualitative outputs for 1999 and 2000. In particular, the evaluation will try to establish whether the Initiative has effectively improved the abilities of the cities of the region to manage air quality and accelerated the process of going from plan to action.
- **Identification of a sustainable institutional setup.** On the basis of the results of the evaluation and of its recommendations for the future sustainability of the program, the Steering Committee and the Technical Secretariat will identify the best scenario for the active involvement of regional institutions in the implementation of the program. Technical and administrative arrangements will be explored and defined.

Program Expansion

The program in Latin America has provided an interesting model for cities and development agencies in Africa, Asia, and Eastern Europe. Program activities started in Africa in 1999 and are currently ongoing. The Clean Air Initiative in Asian Cities was officially launched in Bangkok, Thailand, in February 2001. A similar event in Bratislava, Slovak Republic, launched the Initiative in Eastern Europe and Central Asia in April 2001. The World Bank has been supporting this expansion of the program through its Environment, Transport, Urban Development, and Energy departments, both at the central level and through its sector units in the regional vice presidencies. As in the case of Latin America, the success of the new regional networks will depend entirely on the active participation of the cities and on the development agencies and private sector companies involved with urban air quality management projects in each region.

By the end of 2001 there will be four parallel networks fighting for better urban air quality management under the banner of the Clean Air Initiative. Each of these networks will be clearly driven by the priorities of its partner cities and by the decisions of its governing body. A mechanism of global coordination will be created during 2001 and will provide the avenue for synergies among them. The World Bank remains committed to the expansion of the program and will strive to provide the necessary connectivity among the four regional initiatives.

VIII. Urban Air Quality: City Profiles

Lima-Callao

The problem

Two saturation studies carried out by Swisscontact confirmed that PM₁₀ is the critical air pollutant in Lima-Callao.

The sources of air pollution

In the Lima-Callao metropolitan area, major sources of air pollution are vehicular transport, industry, and solid waste incineration in open spaces. The former two are estimated to contribute about 80 percent of the PM₁₀ problem.

The transport problem is linked to:

- The high number of vehicles: Lima-Callao accounts for 70 percent of the country's one million registered vehicles, an increase of more than 55 percent over the period 1990–96, partly attributable to the recent liberalization of imports
- The average age of the vehicle fleet (approximately 18 years)
- Lack of maintenance and technical inspection
- The high price of unleaded gasoline compared to leaded gasoline.

Moreover, the public transport system is unregulated and inefficient. The problem is further exacerbated by the presence of a large number of intermunicipal terminals located in the center of the city.

A second major source of air pollution in Lima-Callao is the aging industrial base, characterized by little or no emission controls. Many plants established before any form of pollution controls were imposed still operate, and few have invested in the necessary mitigation measures to achieve pollution reduction. In 1995, 66 percent of Lima's and Callao's industries had no control devices on atmospheric emissions. The port of Callao in the west and industries in the north, such as a thermal power plant, cement factory, and fish processing plants, are the main sources of industrial pollution. Small-scale and informal industries also operate without any control on air pollution.

Mexico City

The problem

Tremendous progress has been made to reduce air pollution in the Mexico City metropolitan area over the last 10 years. Ambient lead concentrations have been reduced by 98 percent, sulfur dioxide concentrations have been reduced sufficiently to reach acceptable levels, and few violations of the CO air quality standard remain. However, serious problems persist with high concentrations of ozone and particulates. Air quality concentrations of ozone remain high on most days, often exceeding acceptable levels by a factor of two or more. PM₁₀ levels are also high, especially in heavily industrialized areas and where traffic and soil erosion are highest. Despite continuing growth in population and the number of vehicles, however, there is evidence of a downward trend in the highest concentrations of PM₁₀ and ozone.

The sources of air pollution

The transport sector is a major source of air pollution in the Mexico City metropolitan area, accounting for nearly all CO, more than 75 percent of NO_x, 35 percent of VOC, 24

percent of SO₂, and 41 percent of PM₁₀. Under conditions of rapid urban growth, it is likely that travel demand will increase significantly. Under current trends, by 2020 the Mexico City's metropolitan population will reach 26 million.

The problem of air pollution has been well recognized by both the Mexican government and citizens since the 1970s, and air pollution has been measured routinely since the mid-1980s, when it became a social concern. Important aspects of the problem have been addressed successfully through the policies and actions enacted in the 1990s.

In order to achieve these results a number of measures have been implemented, the most important being: (i) tax policies to reduce the price differential between unleaded and leaded gasoline; (ii) exemptions from the "one day ban" on the use of vehicles were used as an incentive to modernize the vehicle fleet; (iii) a surcharge on gasoline was used by the Environmental Trust Fund to finance the installation of gasoline vapor recovery equipment in service stations; (iv) improvements in the refining process have allowed the production of unleaded and reformulated gasoline and diesel with a lower sulfur content; (v) the inspection and maintenance system has been significantly upgraded by the move to a completely centralized system; (vi) upgraded emission standards for new vehicles have been established; and (vii) restrictive policies for high-use vehicles (taxis, minibuses, and trucks) and financing programs to implement them have accelerated the replacement of such vehicles.

The government institutions that form the Metropolitan Environmental Commission have been strengthened. They have enhanced their diagnostic, planning, and implementation capabilities and have tripled their professional staff. Comprehensive local environmental laws and regulations have been passed. An important step toward the sustainability of the program was the creation of an Environmental Trust Fund that levies a surcharge on gasoline in the Mexico City metropolitan area.

Rio de Janeiro

The problem
<p><i>The northern region and the eight municipalities that compose the Baixada Fluminense are subject to severe air pollution problems. The Baixada region, or the Air Basin III, of the Rio de Janeiro metropolitan area is where most of Rio's 10 million inhabitants (and among the poorest) reside. It is also in the northern region where most of the industries (approximately 178) are concentrated and where most of the vehicular traffic flows. The Baixada region covers an area of approximately 1,000 kilometers and has an urbanization rate of 98.6 (the highest in the country).</i></p>
<p><i>While an air quality monitoring network is foreseen for the near future for the metropolitan region (there are 18 planned fixed stations), most of the data for the Baixada region is estimated and not often reliable. Nevertheless, it has been acknowledged that PM₁₀ and ozone levels in the northern zone are high primarily because of high industrial activity and mobile sources.</i></p>

The sources of air pollution

Despite the total emissions from mobile sources being more significant, the Baixada vehicle fleet produces more emissions per kilometer. This difference is due to Baixada's older fleet and to the existence of a higher overall number of diesel buses and trucks with slower traffic speeds than in the southern part of the city.

A breakdown of the transport sector emissions reveals that, together, the private vehicle groups using alcohol and gasool account for most of the emissions of carbon monoxide, hydrocarbons, and particulate matter. The diesel buses account for more than 50 percent of all emissions of oxides of nitrogen, and nearly 50 percent of all sulfur dioxide comes from the transport sector.

Data from emissions resulting from the unregulated burning of refuse are unavailable. But a significant portion of particulate matter and other pollutants comes from the open combustion of garbage and other materials, such as vehicle tires.

Buenos Aires

The problem

The Gran Buenos Aires metropolitan area tends to suffer less from air pollution than other cities of similar size in the developing world due to the strong breezes that give the city its name. However, the limited data available show that levels of a number of pollutants exceed, or are likely to exceed, Argentine air quality standards and international norms. The pollutants of greatest concern in the Gran Buenos Aires region are PM_{2.5}, NO₂, CO, and ozone. Short-term SO₂ concentrations may also be a problem in the vicinity of major SO₂ sources such as the Dock Sud refinery and industrial area.

The sources of air pollution

The transport sector is estimated to be the main source of all pollutants, accounting for 72 percent of the estimated emissions of SO₂, 70 percent of combustion-generated PM_{2.5}, and 88 percent of NO_x emissions. Among transport sources, road vehicles are overwhelmingly dominant as the main source of pollution. Other important sources of combustion-generated particulate matter include open burning of waste and vegetation. Electric generation and, to a lesser extent, industrial emissions are the other main sources of NO_x and SO_x emissions.

Data on ambient air quality in Gran Buenos Aires are limited both in their geographic scope and their temporal coverage, primarily due to the absence of a continuous air quality-monitoring network, which is expected to be procured during 2001. Historical air quality data are available from the single, manual monitoring station maintained by the government of the City of Buenos Aires. This station is located in the Palermo district, in the northeast portion of the city, about 2 kilometers inland from the Aeroparque airport. Pollutants monitored at this station include NO, NO₂, SO₂, and total suspended particulate matter. In the past, lead was also monitored.

Unfortunately, the Palermo site is probably not representative of average air quality conditions in the city. Under northeasterly wind conditions, the Palermo site is upwind of nearly all significant sources. Under southeasterly conditions, it would be affected by emissions from the major thermoelectric complexes along the waterfront, the port, and Dock Sud.

Carbon monoxide concentrations are not monitored at the Palermo station. However, a private foundation, Siglo 21, monitors CO concentrations at a heavily trafficked intersection in the center of the city. These measurements routinely show CO levels in excess of Argentine and international standards. An additional monthly monitoring campaign that took place during the fall and winter of 1997 also confirms that particulate matter—PM₁₀ and PM_{2.5}—ozone (worse in the summer months), NO₂, and localized SO₂, are pollutants of concern.

Santiago de Chile

The problem

The geographic and weather conditions are particularly unfavorable for air dispersion and tend to aggravate the pollution concentrations in the Santiago de Chile region, particularly during the winter months when the wind currents tend to decrease and thermal inversion takes place, concentrating the atmospheric pollutants in the basin. With prevailing anticyclonic conditions throughout the year, an inversion layer typically exists at between 600 and 900 meters above the city. This layer intensifies in the autumn and winter, preventing natural dispersion of pollutants and trapping most particles within 400 meters above the city. Thus, between the months of July and August, during the Chilean winter, particulate concentrations in Santiago are among the highest observed in any urban area in the world (300 to 400 $\mu\text{g}/\text{m}^3$). These particles include a large proportion less than 2.5 microns in diameter, including sulfates.

The emissions inventory carried out on October 2000 reveals that mobile and fixed sources are the main causes of air pollution in the region. The main pollutants that exceed the air quality norms are PM_{10} , CO, and O_3 . Among the different pollutants, particulate matter is considered to have the greatest health impact in Santiago, with buses and trucks being the main sources of emissions. In 2000 there were 25 contingency days—10 of pre-emergency and none of emergency for PM_{10} . Statistics show, however, that in the last four years there has been a reduction in the number of contingent episodes, mainly due to improvements in technology and fuels.

The sources of air pollution

The transport sector is the most polluting in the urban area, contributing 48 percent of total particulate matter (PM_{10}), 84 percent of nitrogen oxide (NO_x), and 91 percent of carbon monoxide (CO). In addition, other significant emissions derived from the transport sector are 30 percent of all volatile organic compounds (VOCs), and 34 percent of sulfur dioxide (SO_x). These sources originate from buses, trucks, motorbikes, and private and commercial vehicles, which undertake approximately 8.4 million day trips.

Industrial activities have increased notoriously during the past two decades, leading to an increase in fuel consumption. Among the main activities that generate air pollution emissions are (i) combustion (from electric generation, waste incineration, heating), (ii) metallurgic processes, (iii) mineral extraction/production, (iv) chemical industry, (v) wood and paper, and (vi) agricultural and livestock. The most significant emissions from fixed sources are PM_{10} (accounting for 21 percent), and SO_x (accounting for 64 percent). While it is assumed that fixed sources significantly contribute VOCs, this has yet to be determined through studies for the metropolitan region.

Moreover, the emissions from fixed and mobile sources contribute to a characteristic of the Santiago metropolitan region—the large amount of dust from unpaved roads, soil erosion, construction and demolition, and from the production of mining aggregates.

São Paulo

The problem

The São Paulo metropolitan region is characterized by a significant number of hills in the surrounding area, which play a trapping role during the winter months, leading to thermal inversions. The São Paulo metropolitan region counts with an air quality-monitoring network composed of 22 stations, which periodically measure the pollution levels at regional and local levels.

Particulate matter is one of the main pollutants in the São Paulo metropolitan region, and one that has a great impact on the health of its inhabitants. An estimated 12.4 thousand tons of black smoke (PM_{10}) are emitted into the atmosphere every year from the more than 400,000 diesel buses, trucks, and cars. The total of suspended particles exceeds the air quality standards most of the year. Nitrogen dioxide (NO_2) emissions have also been in violation of limits for several years.

High ozone (O_3) concentrations are also a major problem in São Paulo. For instance, during 1997 there were more than 100 violations of the one-hour ozone standard ($160 \mu\text{g}/\text{m}^3$). Carbon monoxide (CO) emissions often exceed the daily air quality standards, particularly during the winter months.

The sources of air pollution

According to the São Paulo State Environmental Agency (CETESB), approximately 90 percent of the pollution in the metropolitan area originates from the vehicle fleet. Industrial activities are estimated to contribute the following overall emissions: 2 percent of CO, 3 percent of HC, 4 percent of NO_x , 31 percent of SO_x , and 10 percent of particulate matter.

The main contributors to sulfur dioxide (SO_2) emissions are the burning of fuel, oil refineries, diesel vehicles, and processes for pulp and paper production. The main sources of NO_2 emissions are the fuel combustion process in cars, some industrial activities, and fuel-based thermoelectric units. The primary sources of O_3 in the metropolitan area are mobile sources (cars, taxis, diesel vehicles, and other motor vehicles), which account for 95 percent of the total NO_x and 97 percent of the total nonmethane hydrocarbons.

The alcohol- and gasool-fueled vehicles used in the metropolitan area cause a significant contribution to CO and hydrocarbon emissions.

IX. APPENDIXES

Rules of Operation

ARTICLE 1. INITIATIVE'S MISSION

The Clean Air Initiative seeks to improve air quality in Latin American cities to protect the health of its habitants and to mitigate global pollution by bringing together the efforts of the appropriate authorities of each city represented, from the private and social sectors, nongovernmental organizations (NGOs), international organizations, and governmental international aid agencies.

ARTICLE 2. OBJECTIVES

The Initiative has the following objectives:

- To protect the health of habitants exposed to atmospheric contamination generated in the cities
- To promote the development and strengthening of clean air action plans in the cities, based on the participation of all the relevant actors
- To facilitate the exchange of knowledge and experience among participating members
- To facilitate public participation and the active involvement of the private sector to stimulate innovation in the use of low-emission, low-carbon technologies
- To achieve institutional and financial sustainability of the Initiative.

ARTICLE 3. ORGANIZATIONAL STRUCTURE

The Initiative will be organized as follows:

- Steering Committee
- Presidency
- Technical Secretariat

ARTICLE 4. STEERING COMMITTEE

4.1. Duties

The Steering Committee has the following duties:

- Approve, evaluate, and, if needed, modify the annual work program and budget proposed by the presidency.
- Approve, evaluate, and, if needed, modify the financing plan prepared by the Technical Secretariat in coordination with the presidency.
- Approve, evaluate, and, if needed, modify the criteria for membership, the rights and obligations of the members, as proposed by the presidency in coordination with the Technical Secretariat.
- Approve, evaluate, and, if needed, modify the proposal to transfer to regional institutions the functions of the Technical Secretariat as proposed by the presidency.

- Establish, and, if needed, modify the mission, objectives, and structure of the Initiative.
- Verify the operational effectiveness of the Initiative by assigning its management to regional institutions.
- Revise the implementation of the Initiative based on the annual report prepared by the Technical Secretariat, and evaluate annually the fulfillment of its objectives.
- Agree upon its own Rules of Operation.
- Evaluate and agree on new membership requests.

4.2 Members

The Steering Committee will be formed by representatives of the following:

- Local governments
- NGOs
- Private sector
- Governmental international aid and environmental agencies
- International organizations.

In the case of local governments, those cities that show interest will be able to become members of the Initiative by providing a written request stating the following: (i) their commitment to develop or improve a clean air participative action plan and to implement it, (ii) their interest in counting with technical and/or financial assistance for the development or strengthening of the plan, and (iii) their interest in joining the Initiative.

Each local government will appoint its representative. By local governments it is intended, in line with the principles of Agenda 21, the governmental level distinct from the national one that has direct responsibilities for urban environmental management. Representation will fall in priority to municipalities, while it will be accepted that cities be represented by regional or national metropolitan authorities. New cities will be accepted as long as there will be sufficient resources for them to implement work in line with the Initiative's mission.

NGOs, international aid governmental agencies, and international organizations will make a tangible contribution, previously agreed upon with the Steering Committee, which will be evaluated annually. The participation of these members will not cause expenditure of any of the financial resources with which the Initiative counts.

Private sector members have to make a minimum annual contribution of US\$50,000 (fifty thousand dollars).

4.3 Meetings of the Steering Committee

- At least two ordinary meetings will be held annually.
- Extraordinary meetings must be convened by the presidency of the Steering Committee in coordination with the Technical Secretariat.

4.4 Decisionmaking Criteria

Whenever possible, there must be a consensus of the cities for the Steering Committee to make decisions. When this consensus is not achieved, there must exist an absolute majority of cities votes in the Steering Committee.

It is required that there be an absolute majority of votes from the members of the Steering Committee for the approval of decisions.

There should exist a minimal quorum of two-thirds of the members to submit issues for consideration for the approval of the Steering Committee.

ARTICLE 5. PRESIDENCY

5.1 Election

- The presidency of the Steering Committee will be elected between representatives of the participating cities.
- The presidency will rotate each year.

5.2 Functions

The presidency will have the following functions:

- Propose to the Steering Committee the work program and annual budget for the Initiative, to be prepared in coordination with the Technical Secretariat.
- Prepare with the Technical Secretariat and propose to the Steering Committee the financial plan.
- Prepare with the Technical Secretariat and propose the criteria for membership and the rights and obligations of the members.
- Develop with the Technical Secretariat and propose to the Steering Committee the proposal to transfer to regional institutions the functions of the Technical Secretariat.
- Elaborate and propose the Rules of Operation of the Steering Committee.
- Convene meetings of the Steering Committee in coordination with the Technical Secretariat.
- Promote the Initiative across its own networks.
- Propose, in coordination with the participating cities and the Technical Secretariat, the contents for the website and distance learning courses.
- Support the cities in preparing their action plans.
- Maintain a permanent and current list of contacts within the cities.
- Resolve, in coordination with the Technical Secretariat, issues not foreseen within these Rules of Operation.

ARTICLE 6. TECHNICAL SECRETARIAT

6.1 Representation

The World Bank will function as Technical Secretariat during the first three years, starting from December 1998, and at the end of this period the Steering Committee will reconsider transferring the Technical Secretariat.

6.2 Duties of the Technical Secretariat

- Provide secretarial support to the Steering Committee and the presidency.
- Prepare, in coordination with the presidency, the work program and annual budget for the Initiative.
- Prepare the financial plan in coordination with the presidency.
- Prepare, in coordination with the presidency, the criteria for membership and the rights and obligations of the members.
- Prepare, in coordination with the Presidency, the proposal to transfer to regional institutions the functions of the Technical Secretariat.
- Implement the financial strategy agreed upon by the Steering Committee.
- Ensure that the activities established in the annual program are developed in a technically adequate manner and within the established budget.
- Ensure that the Initiative's goals are fulfilled.
- Prepare a detailed annual report of activities conducted in each of the cities and in each of the components, based on the work program and annual budget of the Initiative.
- Promote the participation of cities' representatives and of other decisionmakers in regional and international conferences.
- Be in charge of generating financing.
- Organize, in coordination with the presidency, meetings for the Steering Committee.
- Contribute technically in the development and/or strengthening of clean air action plans, and identify possible sources of financing.
- Contribute in the organization of clean air workshops, which will be carried out as support to and in the context of the development or strengthening of the cities' action plans.
- Resolve, in coordination with the presidency, issues not foreseen within these Rules of Operation.

ARTICLE 7. MEMBERSHIP REQUIREMENTS

There will be an annual evaluation of the performance of each member of the Steering Committee to assess and comment on members' performance and, where necessary, to provide the approval of members' continued membership in the Initiative.

ARTICLE 8. FINANCING AND BUDGET

- The budget will have an annual allocation.
- The financial and in-kind contributions of all members will be recorded in the budget, and the type of contribution will be recorded for all nonprivate sector members.

Financial Statement 1999

Resources (in US\$)

SOURCES OF FINANCING	PROJECTED	RECEIVED	DISBURSED	CARRIED OVER
RESOURCES ADMINISTERED BY THE TECHNICAL SECRETARIAT				
WORLD BANK				
Latin America and Caribbean Region	127,528	127,528	127,528	
World Bank Institute	92,000	155,500	155,500	
Subtotal	219,528	283,028	283,028	
BILATERAL CONTRIBUTIONS				
Netherlands Government	75,779	149,313	149,313	
Flemish Trust Fund		43,812	43,812	
Spanish Trust Fund		40,000	15,000	25,000
Swiss Trust Fund for Lima-Callao		262,000	7,883	254,117
Spanish Trust Fund for Buenos Aires		262,000		262,000
Subtotal	75,779	757,125	216,008	541,117
PRIVATE SECTOR				
DaimlerChrysler yearly contribution	100,000	100,000	93,176	6,824
Volvo yearly contribution	50,000	50,000	50,000	
Renault yearly contribution	50,000	50,000	50,000	
DaimlerChrysler LW luncheon and reception*	15,000			15,000
ICF-Kaiser LW reception*	3,750			3,750
IPECA LW luncheon	2,500			2,500
Subtotal	221,250	200,000	193,176	28,074
TOTAL	516,557	1,240,153	692,212	569,191
*yet to be received				
RESOURCES CONTRIBUTED IN CASH OR KIND BY PARTNERS				
CNN transmission of PSA	100,000		100,000	
Lima Comité de Gestion			42,532	
Mexico City Government			17,650	
Rio de Janeiro Municipality			46,278	
Renault			61,000	
PAHO			48,600	
CDG, GTZ, TUEV, WHO, USAID, Lima Workshop			10,833	
Subtotal	100,000		326,893	
TOTAL DISBURSED			1,019,105	

Expenditures

Sources of Funding

ACTIVITIES	WORLD BANK	BILATERAL	PRIVATE SECTOR	DIRECT SUPPORT CASH OR KIND	TOTAL
LIMA WORKSHOP AND ACTION PLAN					
Travel, subsistence, organization, training materials		29,858		53,365	
Technical consultancies		49,926	5,759	14,000	
World Bank staff time and travel	59,998	30,743			243,649
MEXICO CITY WORKSHOP					
Travel, subsistence, organization, training materials			45,818	17,650	
World Bank staff time and travel	34,942	32,758			
Consultants			19,804	10,000	160,972
RIO DE JANEIRO WORKSHOP					
Travel, subsistence, organization, training materials, consultancies			21,410	46,278	
World Bank staff time and travel	49,050	7,130			
Technical consultancies			25,872	79,100	228,840
BUENOS AIRES WORKSHOP					
World Bank staff time and travel	14,500				14,500
TOOL-KIT DESIGN					
World Bank staff time and travel	5,221	2,310			7,531
PUBLIC SERVICE ANNOUNCEMENT					
Transmission worldwide by CNN International				100,000	100,000
PROGRAM BROCHURE					
Logo and brochure design and printing		7,486	7,480		
World Bank Institute staff time	6,400				21,366
PROGRAM WEBSITE					
Website design, construction, translation		8,580	15,880		
World Bank staff time	19,471	3,696	10,000		57,627
DISTANCE LEARNING COURSE					
World Bank staff time and travel	17,071	27,428			
Technical consultancies, adviser		3,340	21,000	6,500	75,339
AWMA MEETING ST. LOUIS					
World Bank staff time and travel	13,841				13,841
DAIMLERCHRYSLER MTG. MAGDEBURG					
World Bank staff time and travel	9,641				9,641
PROGRAM MANAGEMENT					
World Bank staff time	52,893	12,753			
Steering Committee meetings			15,153		
Costs charged by TF Administration			5,000		85,799
GRAND TOTAL	283,028	216,008	193,176	326,893	1,019,105

Financial Statement 2000

Resources (in US\$)

SOURCES OF FINANCING	CARRIED OVER	PROJECTED	RECEIVED	DISBURSED & COMMITTED	CARRIED OVER
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RESOURCES ADMINISTERED BY THE TECHNICAL SECRETARIAT

WORLD BANK

Latin America and Caribbean Region		60,000	131,676	131,676	
World Bank Institute		150,000	285,854	285,854	
Subtotal		210,000	417,530	417,530	

BILATERAL CONTRIBUTIONS

Netherlands Government		100,000	21,000	21,000	
Spanish Trust Fund	25,000	25,000	32,864	32,864	
Dutch Trust Fund			5,362	5,362	
German Trust Fund			50,000		50,000
Swiss Trust Fund for Lima-Callao	254,117	254,117	254,117	254,117	
Spanish Trust Fund for Buenos Aires (1)	262,000	262,000			262,000
Subtotal	541,117	641,117	363,343	313,343	312,000

PRIVATE SECTOR

Mexico City Government Refund (2)	6,824		11,741	7,035	
DaimlerChrysler yearly contribution (3)		100,000	100,000	100,000	4,706
Volvo yearly contribution		50,000	50,000	50,000	
Shell contribution for 1999 and 2000		100,000	100,000	100,000	
Renault yearly contribution		50,000	50,000	50,000	
DaimlerChrysler LW luncheon and reception(3)	15,000				
ICF-Kaiser LW reception(3)	3,750				
IPECA LW luncheon(3)	2,500				
Interest on TF resources			3,164	3,164	
Subtotal	28,074	300,000	314,905	310,199	4,706

RESOURCES CONTRIBUTED IN CASH OR KIND BY PARTNERS

ARPEL				106,829	
Environment Canada				275,970	
GTZ				40,000	
PAHO				19,000	
Renault				72,600	
Subtotal				514,399	
TOTAL DISBURSED AND COMMITTED				1,555,471	

- (1) Spanish CTF currently suspended Bank-wide
 (2) Mexico City Govt. refund amounted to 11,741 instead of 6,824
 (3) Refunded to WBI and included in the 285,854

Expenditures

Sources of Funding

ACTIVITIES	WORLD BANK	BILATERAL	PRIVATE SECTOR	DIRECT SUPPORT CASH OR KIND	TOTAL
BUENOS AIRES WORKSHOP AND ACTION PLAN					
Travel, logistics, training materials, technical contributions			33,932	91,870	
World Bank staff and consultant time and travel	122,797	18,295	1,646		
Consultancies		5,362			273,902
SANTIAGO WORKSHOP					
Travel, logistics, training materials, technical contributions			24,470	183,700	
World Bank staff and consultant time and travel	53,642		46,196		308,008
LIMA ACTION PLAN					
Technical consultancies and travel		249,000			
Unallocated funds returned to Swiss Trust Fund		5,117			
WB staff and consultant time and travel	23,239	270	15,276		292,902
RIO DE JANEIRO ACTION PLAN					
World Bank staff and consultant time	23,310	2,671	4,417		
Technical consultancies for action plan preparation	3,393		3,369		37,160
DISTANCE LEARNING COURSE					
Course production, translation, printed materials			7,401		
World Bank staff time	78,620				
Other instructors and consultants		21,000	14,200	19,000	140,221
TOOL-KIT DESIGN					
Toolkit design and implementation				105,000	
World Bank staff and consultant time	5,310	1,996	17,047		129,353
CLEAN TECHNOLOGIES					
World Bank staff and consultant time	5,390	931	13,584		19,905
WEB-SITE					
Website Editor			10,000		
World Bank staff time	18,150				28,150
COMMUNICATION STRATEGY					
CAI Progress Report 2001 design, production, editing			34,417		
Brochure 2000	5,084		2,000		
Technical documents				1,700	
World Bank staff time	20,798				63,999
INTERNATIONAL CONFERENCES					
PAHO, Mexico			6,711		
CODATU, Mexico			4,006		
AWIMA, Salt Lake City			2,482		
CNG, Washington, DC			10,337		
Other conferences				1,829	
World Bank staff time and travel	23,444				48,809
PROGRAM MANAGEMENT					
World Bank staff and consultant time	34,353	8,701	12,465		
Buenos Aires Steering Committee			7,020	11,340	
Santiago Steering Committee meeting			4,223	5,640	
Coordination and research activities				94,320	
Costs charged by TF Administration			35,000		213,062
GRAND TOTAL	417,530	313,343	310,199	514,399	1,555,471

Acknowledgments

EDITING

Christine Copley and Alexandra Klöpfer, World Bank Institute
Tora Estep, International Communications, Inc.

DESIGN

BIG fish Design

World Bank Photos





*Clean Air Initiative in
Latin American Cities*

1818 H Street, NW
Washington, DC 20433

Phone: (202) 458-0859

Fax: (202) 676-0978

Email: Clean_Air@worldbank.org
www.worldbank.org/cleanair

