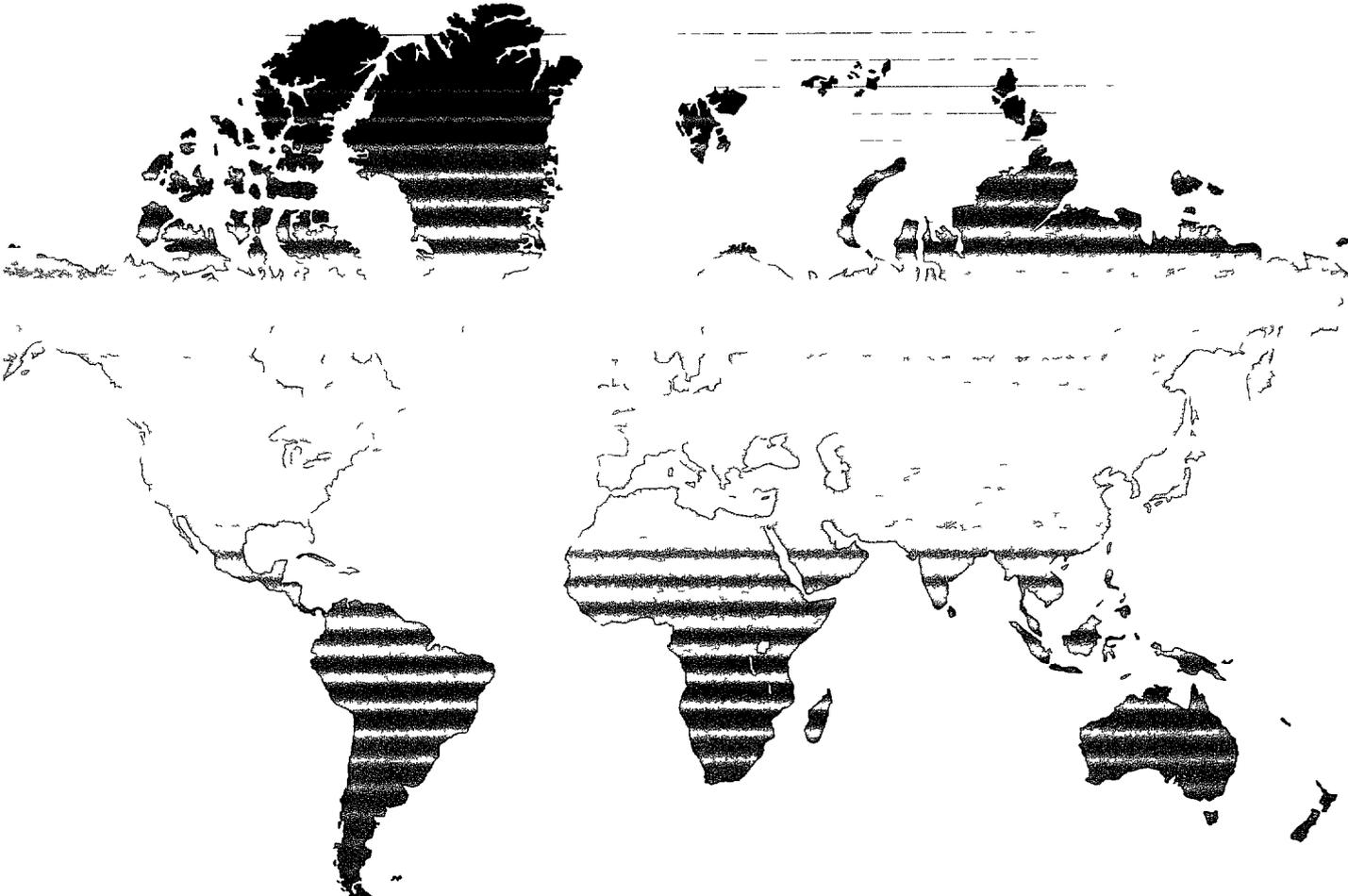


Business Focus Series

Environmental Markets in the Andean Region

(Bolivia, Ecuador and Peru)



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ACRONYMS

ADI	Aguas del Illimani (Bolivia)
BOD	Biochemical Oxygen Demand
CAF	Andean Development Corporation
CEDA	Center for Environmental Law (Ecuador)
CNI	National Chamber of Industry (Bolivia)
CONAM	National Environmental Council (Peru)
CONAM	National Modernization Council (Ecuador)
CONITE	National Commission on Foreign Investment and Technology (Peru)
DIGESA	Environmental Directorate of the Ministry of Health (Peru)
DSM	Demand-Side Management
ECAPAG	Guayaquil Potable Water and Sewerage Company (Ecuador)
ECLAC	Economic Commission for Latin America and the Caribbean
EEC	Environmental Export Council
EEIA	Environmental Impact Assessment Study (Bolivia)
EIA	Environmental Impact Assessment
EMAAP	Quito Potable Water and Sewerage Company (Ecuador)
EMASEO	Quito Waste Management Company (Ecuador)
EMS	Environmental Management System
EVAP	Preliminary Environmental Evaluation (Peru)
FIS	Social Investment Fund (Bolivia)
FNDR	National Regional Development Fund (Bolivia)
FONAM	National Environmental Fund (Peru)
FONAMA	National Environmental Fund (Bolivia)
GDP	Gross Domestic Product
GTZ	German Technical Cooperation Agency
IDB	Inter-American Development Bank
IMF	International Monetary Fund
JICA	Japanese International Cooperation Agency
LA-IET	Latin American Initiative for Environmental Technology (USAID)
MA	Manifiesto Ambiental (Ecuador)
MEM	Ministry of Energy and Mines (Ecuador, Peru)
MERCOSUR	Southern Cone Common Market
MIDUVI	Ministry of Urban Development and Housing (Ecuador)
MIPE	Ministry of Fisheries (Peru)
MITINCI	Ministry of Industry, Tourism, and International Trade (Peru)
MMA	Ministry of Environment (Ecuador)
MPL	Maximum Permissible Limit
MSW	Municipal Solid Waste
NGO	Non-Governmental Organization
OECD	Japanese Overseas Economic Cooperation Fund

OPIC	Overseas Private Investment Corporation
PAA	Environmental Compliance Plan (Bolivia)
PAMA	Environmental Compliance and Management Program (Peru)
PDM I/II	Municipal Development Program I/II (Ecuador)
PROMAR	Governmental Wastewater Management Program (Peru)
PRONAP	National Program of Potable Water and Sewerage Systems (Peru)
SBA	U S Small Business Administration
SEDAPAL	Lima Potable Water and Sewerage Service Company (Peru)
SENREM	Sustainable Environment and Natural Resource Management Project (Peru)
SPDA	Peruvian Society for Environmental Law
SSFA	Sub-directorate for Environmental Management under MITINCI (Peru)
SUMSEL	Municipal sanitation company, Lima (Peru)
SUNASS	National Superintendence of Sanitation Services (Peru)
SUNEIA	Ecuadorian National System of Environmental Impact Assessment
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
US&FCS	U S and Foreign Commercial Service
U S TDA	U S Trade and Development Agency
VICI	Vice Ministry of Industry and Internal Commerce (Bolivia)
VMDSMA	Vice Ministry of Sustainable Development and Planning (Bolivia)
WHO	World Health Organization
WTO	World Trade Organization

THE ANDEAN REGION: Bolivia, Ecuador and Peru



PREFACE

This report has been produced within the framework of the Latin American Initiative for Environmental Technology (LA-IET), a collaborative effort of the United States Agency for International Development (USAID) and the Environmental Export Council (EEC). LA-IET is an umbrella program in several countries and regions in Latin America, including the Andean Region. LA-IET seeks to increase the role of the private sector in environmentally sustainable development by educating the private sector and encouraging investment in environmental technologies and services.

LA-IET is only one of USAID's programs to promote exports of U.S. environmental products and services in the region. Other initiatives include:

- ◆ the Office of Business Development's Global Technology Network that facilitates the transfer of U.S. technology and services to address global development, including environmental problems, and
- ◆ the Environmental Technology Network for the Americas (a joint project of USAID's Global Bureau and the U.S. Department of Commerce) that assists U.S. firms in identifying trade opportunities for environmental products and services in many Latin American countries, including the Andean Region.

These programs have created new opportunities for U.S. environmental companies.

The objective of this report is to identify the most promising environmental markets in the Andean Region for U.S. environmental technologies and services and to educate U.S. environmental exporting companies on how to access those markets. Based on the analysis of different environmental market drivers in the region, including sources of funding and financing, the report presents current estimates of the size of, and best prospects in, six environmental market sectors: water supply and sanitation, industrial wastewater treatment, air pollution control, waste management, pollution prevention and cleaner technologies, and consulting services.

The principal sources of information for this report include interviews with local stakeholders (government agencies, private firms, environmental NGOs, multilateral and bilateral donor agencies, etc.), existing environmental studies and market research, donor project documents, and other relevant literature.

CHAPTER 1

ANDEAN REGION MARKET OVERVIEW

1.1 KEY FACTORS AFFECTING ENVIRONMENTAL MARKETS IN THE REGION

Environmental markets in Bolivia, Ecuador, and Peru are driven by the following five principal factors

Environmental problems Low potable water and sewerage coverage are the most important infrastructure-related environmental problems across the region. Table 1-1 summarizes the coverage rates in Bolivia, Ecuador, and Peru. Even in places where most of the population is connected to the centralized water supply and sewerage networks (primarily big cities), drinking water is often insufficiently treated and/or available only intermittently, and sewage is rarely treated. The political pressure on the governments of the three countries to address the resulting public health threats constitutes a major market driver.

Table 1-1
Water Supply and Sewerage Coverage in the Andean Region (percent)

	Water Supply		Sewerage	
	Urban	Rural	Urban	Rural
Bolivia	75	24	36	15
Ecuador	79	10	61	26
Peru	63	31	59	23

Sources: IDB 1996; World Bank 1997

The urgent need for adequate management of municipal solid waste, particularly in highly populated urban areas, is also a significant factor affecting environmental markets in all three countries. A particular problem is the lack of garbage collection vehicles and properly engineered sanitary landfills.

Other environmental problems, such as industrial water and air pollution, and air pollution from mobile sources, are perceived as less acute and represent only secondary market drivers in the absence of rigorous enforcement of each country's environmental regulations.

Infrastructure privatization Privatization of water supply and sanitation services is becoming increasingly popular in South America as a solution to the inefficiency and financial insolvency of water and wastewater utilities, and the need for infrastructure investments. Among the three studied countries, Bolivia was first to issue a concession to an international consortium for a major utility serving the La Paz metropolitan area. With another concession to be awarded in

1999, this has become a major driver affecting Bolivia's water supply and sanitation market. This is also true, although to a lesser extent, in Ecuador, where the first concession will be granted in 1999. This market driver is not relevant in Peru, however, where the government has given up its earlier plans to privatize Lima's water and wastewater utility.

Market pressure In order to be competitive in international markets, many exporting companies are under growing pressure to demonstrate their commitment to improved environmental performance. In the Andean region, large Peruvian mining and fishmeal companies are directly affected by this global trend. Furthermore, Peru has become the first country in Latin America to attempt to institutionalize the ISO 14001 standard as a means to improve industry's environmental record. In Ecuador, this environmental market driver is weaker, but it nonetheless influences environmental investments in the petroleum and shrimp industries. Bolivia's mostly small and medium-sized industries are not affected by this factor.

Multinational companies, especially in the mining and petroleum sectors, have realized the market advantage of abiding by internationally acceptable environmental rules. Local branches are often required to follow guidelines issued by company headquarters. The competition between multinationals and large local companies can accelerate considerably the process of industry's environmental reorientation in the region.

Regulatory pressure In all the three countries, enforcement of environmental laws is insufficient due to the shortage of technical, human, and financial resources in environmental regulatory agencies. In addition, in Bolivia and Ecuador, the institutional framework for environmental management has not fully crystallized, which leaves industry uncertain about the government's regulatory intentions. Multinational companies are the only ones that feel some regulatory pressure. In Peru, however, the situation is more advanced: in the mining and energy sectors, environmental regulations have been promulgated and are beginning to be enforced, and in the manufacturing and fisheries sectors, companies are expecting stringent regulatory actions in the near future.

Donor funding The IDB is the main sponsor of environmental projects in the region, followed by the World Bank. Japan (particularly in Peru), Germany, and, to a lesser extent, some other European countries and the U.S. provide bilateral environmental assistance. Most donor funding goes to water supply and sanitation infrastructure development and technical assistance. Bolivia and Ecuador depend completely on donor funding for their environmental programs, and Peru relies on foreign loans to finance most public sector environmental projects. U.S. firms are particularly well positioned to bid on U.S.-funded and multilateral donor projects in the region.

1.2 ENVIRONMENTAL MARKET OPPORTUNITIES AND BEST PROSPECTS

The total size of the environmental market in the Andean region (narrowly defined to include Bolivia, Ecuador, and Peru) is estimated at **\$650 million in 1999** (see Table 1-2). Peru has the biggest market of the three countries (\$460 million), mostly due to the large amounts of donor funding in the public sector and private industry's willingness and ability to invest in environmental improvements. The size of Peru's market will likely remain constant over the next two or three years but may decline thereafter, as there are currently no large environmental donor projects scheduled to last beyond 2001.

Ecuador's environmental market is second in size (\$110 million) but is expected to grow very fast (20-25% a year) in the near term as a result of many new donor projects in water supply and sanitation that are expected to start within the next two years.

Bolivia's market is small (\$80 million) and is expected to grow by 3-5% per year over the next five years. The donor assistance strategy expected to be developed in 1999 by major donor agencies operating in the country will determine future environmental market opportunities in Bolivia.

Table 1-2
Estimated Market Size by Country and Market Segment, 1999 (US\$ millions)

Market Segment	Bolivia	Ecuador	Peru	Total
Water Supply and Sanitation	55	75	275	405
Industrial Wastewater Treatment	3	3	20	26
Air Pollution Control	2	3	45	50
Waste Management	5	12	40	57
Pollution Prevention & Cleaner Technol	3	3	65	71
Environmental Consulting Services	12	14	15	41
Total	80	110	460	650

Source: Hagler Bailly, 1999

Water Supply and Sanitation The water supply and sanitation market is by far the largest environmental market segment in the region – an estimated **\$405 million** in 1999. It is driven, on the one hand, by the urgent need to expand potable water and sewerage service in both urban and rural areas in all three countries, and on the other hand, by the large amounts of multilateral and bilateral donor funding in this sector.

This sector is dominated by large, primarily multilateral, donor projects that are attractive for foreign suppliers of equipment and services. However, there is also a growing trend in the region

to issue long-term concessions for major water and wastewater utilities. One concession (in La Paz) has already been issued in Bolivia, and one more (in Cochabamba) is expected to be granted in the near future. Ecuador will also have its first water and sewerage concession (in Guayaquil) in 1999. Concessions offer new opportunities for firms looking to make long-term infrastructure investments in the region.

Peru's water supply and sanitation market is bigger than Bolivia's and Ecuador's combined. Water and wastewater infrastructure improvements are clearly a high priority for the Peruvian government, whose expansive programs in this sectors are supported by hefty amounts of World Bank funding and untied Japanese aid.

The fastest-growing water and sanitation market in the region is in Ecuador. Over \$360 million worth of water and wastewater infrastructure improvement projects will be committed within the next two years by the IDB and the World Bank alone.

The best prospects in the water and sanitation market are the same across the region:

- ♦ building water and sewerage networks, reservoirs, pumping stations, and water and wastewater treatment plants, and
- ♦ supplying water and sewerage pipes, pumps, water meters, and other related equipment.

Industrial Wastewater Treatment This market segment is small – an estimated **\$26 million** in 1999 – and presents significant equipment supply opportunities only in Peru, where large export-oriented mining, petroleum, and fishmeal companies are under increasing regulatory and competitiveness pressures to reduce their wastewater effluents. Most importantly, these companies are able and willing to invest in treatment technologies, such as filtering, flotation, and sludge processing equipment.

In Bolivia and Ecuador, only multinational mining and oil companies are making significant investments in wastewater treatment technologies, mostly to conform with internal corporate requirements. Small domestic plants that dominate the industrial sector lack financial resources to spend on wastewater treatment.

In all three countries, there are opportunities to supply effluent monitoring equipment for all sizes of industrial facilities.

Air Pollution Control The size of this market is estimated at **\$50 million** in 1999, of which 90% is in Peru. The market for air pollution control equipment for stationary sources is driven by the same factors – regulatory and competitiveness pressures – as the industrial wastewater treatment market. Peruvian mining companies are the main investors in equipment to control emissions of particulate matter (baghouses) and sulfur dioxide (scrubbers). Other end-users in the region include petrochemical and cement plants.

A small portion of the region's air pollution control market represents opportunities to supply ambient air monitoring and vehicle emissions inspection equipment under donor projects designed to address widespread air pollution problems caused by mobile sources. In Peru, there are also opportunities to sell clean-fuel buses to the municipality of Lima, which is currently developing a donor-sponsored intersectoral air quality strategy for the metropolitan area.

Waste Management The municipal solid waste management market is relatively significant across the region (estimated at *\$57 million* in 1999), in Peru more than in the other countries. Local governments increasingly recognize the need to improve and expand collection services and replace open-air waste dumps with properly engineered sanitary landfills. A large share of solid waste management services in the region either already has been privatized or will be soon, as in Lima, Peru and Quito, Ecuador. This promises stable growth in this market segment. There are also a few donor projects in this sector. The best prospects in the municipal solid waste market include waste collection trucks and construction of transfer stations and sanitary landfills.

There is no market for hazardous waste management services due to the lack of enforceable regulations in this area. However, there are some opportunities in the remediation of mining tailings piles, particularly in Bolivia (with World Bank support) and prospectively in Peru.

Pollution Prevention and Cleaner Technologies In recent years, many bilateral donors, including USAID, have been promoting pollution prevention and cleaner technologies in the manufacturing industry across the region. Good potential has been identified in food processing, textiles, tanning, and several other industrial sectors. However, in Ecuador and Bolivia, small-scale industries are too poor to afford significant investments in new process technologies and do not have a strong incentive to do so. Therefore, the pollution prevention market in these countries in the short term will be limited to process control equipment that allows industrial plants to monitor and improve their process efficiency.

The hefty size of this market segment on the regional scale (an estimated *\$71 million* this year) is explained by substantial investments in cleaner technologies by large Peruvian mining and fishmeal companies. Private corporations like Southern Peru (copper mining and processing) will invest hundreds of millions of dollars in modernization, driven both by export market pressure and anticipated regulatory actions by the government.

Environmental Consulting Services Consulting services are in equal demand in all three countries, creating an overall market of *\$41 million* in 1999. This market is mostly driven by donor funding, both under projects specifically designed to provide technical assistance to government agencies with environmental responsibilities, and under consulting components of larger infrastructure development projects.

As the legal and institutional frameworks for environmental management are just now being developed in the three countries, there are abundant opportunities in policy development, regulatory support, and institutional strengthening. Some examples of such opportunities in working with government agencies include drafting of laws and regulations, design of

enforcement strategies, development of environmental monitoring and data management systems, staff training, etc

Consulting opportunities under large water supply and sanitation projects include technical assistance to water and wastewater utilities in improving operations management, billing collections, cost accounting, etc

The market for consulting services in industry (paid for mostly by donors, with the exception of Peru) is still limited but is expected to grow as industry’s ability and desire to pay for these services increases. The best opportunities include providing assistance to industries in preparing environmental impact assessments (which are rapidly becoming a key regulatory requirement in the region), conducting pollution prevention and energy efficiency audits (primarily under donor projects), and developing ISO 14001-type environmental management systems. The latter is a fast-growing opportunity driven by the desire of large exporting companies in the region to demonstrate to clients their commitment to continuous environmental improvement.

Another opportunity in this market segment is to work directly for multilateral donors to conduct feasibility studies that are often required for large investment projects.

Table 1-3 summarizes best prospects in each market segment.

**Table 1-3
Summary of Best Market Opportunities**

Market Segment	Best Prospects
Water Supply and Sanitation	Construction of water supply and sewerage networks, water and wastewater treatment plants, supply and installation of related equipment
Industrial Wastewater Treatment	Effluent treatment technologies for mining, oil refining, fishmeal and shrimp processing industries, effluent monitoring equipment
Air Pollution Control	Baghouses, scrubbers, ambient air monitoring and vehicle emissions inspection equipment
Waste Management	Solid waste collection trucks, construction of transfer stations and sanitary landfills
Pollution Prevention and Cleaner Technologies	Process control equipment, Peru – cleaner technologies in mining, smelting, fishmeal production, and brewing, Bolivia and Peru – renewable energy technologies
Consulting Services	Technical assistance in institutional strengthening, regulatory development, pollution prevention and energy efficiency, EIA, EMS, and project feasibility studies

CHAPTER 2

BOLIVIA

2 1 ECONOMIC AND POLITICAL OVERVIEW

<i>Area</i>	1 1 million sq km
<i>Population</i>	7 8 million
<i>Urban population</i>	60%
<i>GDP</i>	\$8 2 billion
<i>GDP per capita</i>	\$1,033
<i>GDP growth rate</i>	4 3%
<i>Inflation</i>	7%

Source U S Department of State 1998

2 1 1 Major Economic Trends

Economic and Social Indicators Bolivia is considered to be one of the poorest South American countries with a poverty rate of nearly 70% and a per capita GDP of a little over \$1,000. Nevertheless, the government is ambitiously implementing economic reform measures and working to attract foreign investment.

The Bolivian government implemented a series of economic reform measures beginning in 1985 that have cleared the way for moderate but steady economic growth, lower inflation, and higher investment. These reforms targeted areas of the financial sector such as public enterprises, trade and registration procedures, public financial and economic management, and regulatory and legal systems. These initiatives, combined with the government's response to the economic crisis of the early 1980s, have produced an encouraging economic outlook. Bolivia is projected to grow its GDP by over 5% a year between 1998 and 2000. Improved monetary controls helped bring the inflation rate down to 7% in 1997. Public spending restrictions and improved tax collection enabled the government to reduce its fiscal deficit to 4.5% in 1998 (U S Dept of State, 1998).

Bolivia is faced with a \$4.23 billion debt, of which \$1.6 billion is owed to foreign governments, and the remainder owed almost exclusively to multilateral development banks. Payments to foreign governments have typically been delayed due to a series of payment rescheduling schemes, but these creditors have generally been willing to grant such concessions as Bolivia has successfully achieved the fiscal and monetary targets established through IMF programs in 1987.

Structurally, Bolivia's economy is divided between services (58%), industry (27.9%), and agriculture (14.1%), and is likely to grow rapidly in the years to come. The oil and gas sector enjoys particularly strong growth due to the near-term completion of a gas pipeline to Brazil.

The mining sector has dominated Bolivia's economy for nearly two centuries (it now accounts for about 10% of the GDP). Tin has historically been Bolivia's principal export item. The state mining corporation, Comibol, dominated the Bolivian mining industry until prices of tin and other metals collapsed in the mid-1980s. Currently, medium-scale mining accounts for about half the value of production. Since the metal price crisis, gold exports have grown significantly and are now the largest source of Bolivia's export revenue. The importance of zinc and silver has also risen, while that of tin has declined. The mining sector is expected to see considerable investment growth in the coming years, a result of active exploration by multinational mining firms.

Despite its generally encouraging economic prospects, Bolivia's endemic poverty and public indebtedness remain formidable challenges. A large percentage of the population lives outside of the cash economy, while many more have to secure a livelihood through small-scale mining or farming. Almost the entire rural population is living below the poverty line. The Bolivian Government has identified the need to address Bolivia's poverty as one of its primary objectives, and will use donor assistance and concessional financing from international financial institutions to undertake the necessary development activities.

Privatization and Investment Trends The government's efforts to "capitalize" Bolivia's national enterprises have led to important structural reforms in the economy. Capitalization grants investors a 50% share in the enterprise and full management control in exchange for a commitment to invest a certain amount of capital in the expansion and/or modernization of the company. (Under traditional privatization, the investor has to actually buy a controlling share from the state and only then invest additional capital.) In 1995-1997, foreign-based partners in the newly capitalized companies pledged almost \$1.7 billion in new investment in the country's transportation, energy, water, and communications infrastructure (U.S. Dept. of State, 1998).

Capitalization introduced new technology and management skills in these key sectors. The efficiency improvements in the country's infrastructure will have a positive impact across the entire economy by creating a favorable environment for investments in other economic areas.

The capitalization program also significantly reduced the Bolivian Government's presence as an economic player (government expenditures fell from 46% of the GDP in 1995 to 39% in 1998). The government will be increasingly focusing on addressing the severe deficiencies Bolivia faces in such public services as education, health, and road infrastructure maintenance.

Bolivia welcomes foreign direct investment throughout its economy, with very few restrictions. The Investment Law of 1990 guarantees foreign investors national treatment, currency convertibility, and the right of international arbitration in most industries.

Trade Policy Bolivia is actively pursuing a free trade policy. It became a member of the World Trade Organization in 1995 and an associate member of MERCOSUR in 1997. More than 30% of all products traded between Bolivia and the four full MERCOSUR members (Brazil, Argentina, Paraguay, and Uruguay) are tariff-free, and the vast majority of the remainder will enjoy zero tariffs after ten years of membership.

At the same time, Bolivia is a member of the Andean Community (with Colombia, Venezuela, Ecuador, and Peru), which has removed all internal trade barriers. The Bolivian Government's signing of a Bilateral Investment Treaty with the United States in 1998 is expected to further open the Bolivian market to U S investments, products, and services. Bolivia also signed a Free Trade Agreement with Mexico in 1994.

2 1 2 Political Situation

Once known for political instability and military coups, Bolivia is now among South America's leaders in building democratic political institutions and a sustained system of market-oriented economic policies. President Hugo Banzer, elected in 1997 from a field of ten candidates, has expressed a strong commitment to preserving and expanding Bolivia's open economy and fighting illegal narcotics production.

The Bolivian Constitution (revised in 1994) provides for a Cabinet headed by the President, and a two-chamber Congress. General elections are held every five years, the next will occur in 2002. Banzer's "mega-coalition" of centrist and populist parties currently dominates the political scene.

The United States remains Bolivia's largest provider of foreign aid, its principal trading partner, and the largest source of foreign investment. Counternarcotics issues remain the most difficult aspect of U S -Bolivian relationship. The Banzer Administration has committed itself to removing Bolivia from the "coca/cocaine circuit" within five years. The U S is working closely with the Bolivian Government to achieve this goal.

2.2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

2 2 1 Principal Laws and Regulations

Over the last few years, Bolivia has adopted a significant number of environmental laws and regulations addressing various aspects of environmental management. The most important of these, the *Law for the Environment* (Ley de Medio Ambiente, 1992) established a general framework for environmental management in the country and vested principal environmental management responsibilities at the national level in the Ministry (now Vice Ministry) of Sustainable Development and Environment (VMDSMA). The law identifies key instruments for environmental management and planning, such as licensing, monitoring, and the establishment of information systems, calls for the use of economic instruments, and promotes public participation in environmental decision making.

To implement the law, *six implementing regulations* were passed in 1995, two establishing general environmental management guidelines (Reglamento General de Gestion Ambiental) and procedures (Reglamento de Prevencion y Control Ambiental), and four setting specific regulations for air, water, hazardous substances, and solid waste.

The Government has also recently enacted new or revised environmental regulations for several sectors, including forestry, oil and gas, and mining. The Ministry of Industry is developing environmental regulations for the manufacturing sector.

Environmental Impact Assessment and Licensing Process The Reglamento de Prevención y Control Ambiental creates a licensing process which distinguishes between new and existing projects. Based on a preliminary environmental statement, new projects may be required to conduct an Environmental Impact Assessment Study (Estudio de Evaluación de Impacto Ambiental, EEIA), while existing projects may have to develop an Environmental Compliance Plan (Plan de Adecuación Ambiental, PAA).

These documents are first reviewed by the competent authority (e.g., the Vice Ministry of Industry) and then by the environmental agency. Under the decentralization arrangements, the competent authority would be the industrial authority at the prefecture level, or, in certain cases, the municipality, and the environmental agency would be the environmental unit at the prefecture level. However, since no prefecture has yet created such units, the federal Vice Ministry of Industry and VMDSMA are continuing to discharge these responsibilities.

The approval of either the EEIA or the PAA leads to the issuance of an Environmental License (Licencia Ambiental). No subsequent annual approvals are required, although firms must file annual (for air emissions) or bi-annual (for wastewater discharges) monitoring reports (MDSMA, 1995).

The licensing regulations currently require the review of nearly all new projects and existing activities. This exerts a massive pressure on government agencies and, given the tight review schedules, reduces the effectiveness of the licensing scrutiny.

Media-Specific Regulations The media-specific regulations establish a conventional command-and-control approach to environmental protection, including standards, monitoring and reporting (usually semi-annual or annual). The regulations stipulate a five-year grace period (1995-2000) for industry to achieve compliance with the applicable requirements. Many of the requirements are expected to be phased in gradually as the government's environmental management capacity increases.

The regulations for water and air pollution control establish general numeric effluent and emission limits. The air regulation sets concentration-based emission standards for 18 criteria pollutants such as carbon monoxide, sulfur dioxide, ozone, and lead, and more than a hundred hazardous air pollutants. It also establishes specific emission limits for six industries. The water regulation establishes maximum effluent limits for about 100 substances for four classes of receiving waters (MDSMA, 1995).

Not only do the current regulations set standards for too many substances, many of them are excessively stringent given the level of current industrial development in Bolivia and the country's lack of environmental management experience. Some of the limits are the same as U S standards (for example, chrome and certain other toxics), others are based on the very stringent recommendations of the World Health Organization. It is unrealistic to expect that Bolivian industries will be able to meet these limits within the specified five-year timeframe. These standards are likely to be regarded by industry as unachievable and, as a result, may be ignored altogether.

The regulations for hazardous substances and solid waste create some elements of a "cradle-to-grave" hazardous waste management system. However, the generation, storage, treatment, and disposal of specific hazardous wastes must be regulated by relevant sectoral ministries (such regulations have yet to be promulgated). The lack of waste management infrastructure and inspection and enforcement capability makes the prospects of implementing a U S -type hazardous waste management system remote and uncertain.

2 2 2 Institutional Structure

National Level The Vice Ministry of Sustainable Development and Environment (Viceministerio de Desarrollo Sostenible y Medio Ambiente, VMDSMA), subordinated to the Ministry of Sustainable Development and Planning, has the general responsibility for establishing the national environmental policy and coordinating and controlling the environmental management activities of other national sectoral agencies and local governments. VMDSMA also has the responsibility for licensing projects of national importance (primarily in the mining and energy sectors). VMDSMA has three Directorates General for Environmental Policy and Norms, for Biodiversity, and for Special Programs.

Article 10 of the Law for the Environment requires all public entities to modify their structures to be able to execute their legal responsibilities dealing with the environment and allows for the promulgation of sector-specific regulations. The 1997 Law on Administrative Decentralization has delegated most environmental management responsibilities to the Prefectures (regional governments in Bolivia's nine Departments), and the 1994 Law on the Sectoral Regulation System has shifted substantial environmental responsibilities from VMDSMA to the Sectoral Superintendencies (e.g., the Water Sector Superintendencia, SSA), as they are created. However, VMDSMA is charged with carrying out the environmental functions of the national sectoral agencies and Prefectures until their respective environmental units are operational (World Bank, 1997).

The Vice Ministry of Basic Services (Viceministerio de Servicios Básicos) under the Ministry of Housing and Basic Services is responsible for setting priorities for water supply and sanitation plans and projects, promulgating standards and regulations, and coordinating the activities of water supply and sanitation units in the country's nine Departments. Despite this wide-ranging

set of functions, the Vice Ministry currently has insufficient staff and has not yet been able to take up all of its responsibilities

The Ministry of Industry is the competent authority for all industry except mining and energy, however, to date it has not established an environmental unit and, therefore, does not have the institutional capacity to carry out its responsibilities under the law nor to play an active leadership role in promoting sound environmental practices in the industrial sector. The Ministries of Mining and Energy have already developed environmental regulations applicable to the mining and energy sectors

The National Environmental Fund (Fondo Nacional para el Medio Ambiente, FONAMA) was created in 1990 as an autonomous agency subordinated to the Office of the President to obtain and administer domestic and foreign funding for environmental activities. After initial successes in implementing several environmental programs, FONAMA has been experiencing substantial institutional difficulties: it was partly subordinated to VMDSMA, had a high staff turnover, and was managing funds ineffectively. As a result, it has lost credibility with bilateral donors, who recently threatened to withdraw their support if FONAMA was not restructured (World Bank, 1997)

Departmental and Local Levels Bolivian regulations require each Prefecture (departmental government) to create an environmental unit which would have primary responsibility for planning, licensing, monitoring, and enforcement activities pursuant to sectoral regulations of 1995. Such environmental units have been created very recently, most of them having only one to three staff

Bolivia's 311 municipalities are responsible for providing water supply, sanitation, and municipal solid waste management services and often have special units administering these responsibilities. Municipalities also participate in reviewing license applications concerning local projects. The large cities, many of which are departmental capitals, have much more experience with licensing and enforcement, and more environmental management capacity than the Prefectures will be able to develop, at least in the near term

The resources allocated by the national government for municipal services in Bolivia are currently channeled through two institutions: the National Regional Development Fund (Fondo Nacional de Desarrollo Regional, FNDR) and the Social Investment Fund (Fondo de Inversión Social, FIS). FNDR distributes funds primarily to municipalities with over 5,000 inhabitants while FIS focuses on smaller towns

2 2 3 Status of Implementation and Enforcement

Overall, Bolivia's institutions are not prepared to carry out the responsibilities granted to them by the recent environmental laws and regulations, even if the requirements are simplified and phased in gradually. The available human and financial resources are insufficient to fulfill the necessary planning, licensing, monitoring, and enforcement functions.

Until recently, the absence of environmental units at the departmental level meant that VMDSMA had to handle all license applications in the country. VMDSMA's limited technical and financial resources, as well as poor communication infrastructure impeded the transfer of environmental management responsibilities to the Prefectures.

The environmental agencies at all administrative levels lack qualified environmental professionals and heavily depend on the use of long-term local and foreign consultants to meet their staffing needs. Bolivian environmental institutions also suffer from widespread political interference and interagency fighting, which is at least partly due to poorly defined responsibilities, lack of coordination, and duplication of efforts.

Since the implementing regulations of the Law for the Environment were approved in 1995, their enforcement has been fragmental. Over 500 EEIAs were submitted for new projects to VMDSMA in 1994-1996. However, only 32 licenses and 209 exemptions were granted, and the remaining applications were left without a decision. Of 46 preliminary environmental statements requested by VMDSMA from the existing facilities, only 26 were submitted, with no subsequent enforcement action from the agency (World Bank, 1997). Only one fine was assessed by VMDSMA during 1996-1997.

In view of the slow and inconsistent process of issuing licenses to industrial firms, the requirement of the statute that all firms come into compliance within five years from the license issuance date creates uncertainty in industry regarding the exact compliance requirements and deadlines.

2 3 MARKET DRIVERS

Bolivia's environmental market is driven by the need for urgent water, sewage, and solid waste infrastructure improvements and the increasing role of private sector investments (through concessions) in such improvements. The availability of donor funding is also a very important factor that opens up opportunities for foreign suppliers of environmental products and services.

On the other hand, the existing environmental regulations are so poorly enforced that they do not stimulate industry to invest in abatement measures. The exception is multinational companies, particularly in the oil sector, that are under scrutiny by the national and departmental environmental agencies. Importers of Bolivian minerals do not presently put any pressure on the exporting companies to demonstrate good environmental performance.

2 3 1 Major Environmental Problems

Water Supply and Sanitation Bolivia has one of the lowest rates of water supply and sewerage coverage in Latin America. It is estimated that public water supply systems cover 75% of the population in urban areas, leaving almost a million urban inhabitants without access to potable water. Even in those places where piped water supply is available, drinking water is often unsafe, as in La Paz, Santa Cruz, Oruro, and Potosí, where mining and industrial discharges contaminate surface water bodies used for drinking water intake. In rural areas, only 24% of the population is connected to centralized water supply systems (IDB, 1996).

Sewerage services in Bolivia are available to 36% of urban and 15% of rural residents (IDB, 1996). In La Paz, Cochabamba, Oruro, and other Highland cities, between 20% and 50% of the population has no sewage disposal systems whatsoever. With the exception of parts of Santa Cruz and Tarija, municipal wastewater treatment is nonexistent (World Bank, 1997). The result is that large quantities of untreated and partially treated sewage are discharged to surface water bodies throughout the country, causing frequent outbreaks of cholera and other waterborne diseases, as well as damage to agricultural animals and aquatic ecosystems.

Industrial Wastewater Discharges Mining is the main source of industrial effluents in Bolivia. Effluents from mining operations cause widespread contamination of soil and surface and ground waters. About half of mine waters and beneficiation plant effluents are released without any treatment, with concentrations of heavy metals (e.g., lead, cadmium, arsenic, mercury, zinc) 10-100 times higher than the typical standards mining effluents must meet in industrialized countries (Swedish Environmental Systems, 1993). The change in recent years from tin mining to lead, zinc, and silver has led to the increased use of toxic process reagents such as cyanide. Another major problem is acid rock drainage – formation of acid, metal-rich solutions leaching with rainwater from accumulated mine tailings. Mining effluents severely contaminate water supplies, as in the case of La Paz, where part of the city's drinking water supply comes from a contaminated lake (Lake Milluni). They also affect agriculture and recreation, and cause corrosion of water pipes, allowing contaminants to enter the water supply. Of particular concern is the surge of innumerable small-scale and artisan mining operations which have absolutely no environmental controls.

The environmental impacts of the manufacturing industry are relatively small, mostly because of the sector's modest size. The main polluters include tanneries, metal works, meat processing, sugar refining, breweries, cement factories, and textiles. As a rule, they do not have wastewater treatment installations. High organic loads (mostly from food processing) represent the biggest concern, along with nutrients and toxic substances. The manufacturing industries are concentrated in Bolivia's four largest cities: La Paz, El Alto, Santa Cruz, and Cochabamba, creating serious local water pollution problems.

Air Pollution Air pollution from smelters is one of the most important externalities of the mining industry. The emissions of fine particulate matter, sulfur oxides, and arsenic trioxide (from smelters) lead to significant health problems in the vicinity of industrial areas. The oil refineries and thermal electric plants also contribute to localized air pollution problems.

Bolivia has the highest annual growth rate of vehicles in circulation among Latin American countries (World Bank, 1997). As a result, vehicular air pollution, now concentrated in cities with unfavorable meteorological conditions like Cochabamba, is likely to become increasingly serious.

Hazardous and Solid Waste There is no adequate hazardous waste management in Bolivia. Hazardous waste is dumped together with solid waste in poorly engineered landfills. The volume of hazardous waste generated is not very large, however, and it is not regarded as a priority problem by the government.

Municipal solid waste (MSW) collection is at a relatively decent level, particularly in La Paz (85% of households are covered by the service), where it is managed by a private company, CLIMA. In Cochabamba, the coverage rate is about 70%, in Santa Cruz, El Alto, Oruro, Sucre, and Potosí – between 50% and 60%. In smaller municipalities, MSW collection rates are significantly lower (World Bank, 1994).

MSW disposal is considered a bigger problem than collection. The landfills are usually not equipped with liners and leachate collection systems, and are often located near densely populated areas and drinking water sources (e.g., in La Paz, a big landfill is situated right next to the Choqueyapu River).

The mining industry (excluding small-scale operations) produces over 5 million tons a year of solid waste in tailings that are a source of significant air and water pollution problems.

2.3.2 Infrastructure Privatization

The capitalization process in Bolivia started in the power, transportation, and telecommunications sectors. Currently, the government is working to obtain private participation in the management and operation of water supply and sewerage services. The Technical Group for Water Sector Capitalization in the Vice Ministry of Investment and Privatization (former Ministry of Capitalization) is currently finalizing the regulatory framework to govern the operations in this sector, including

- ♦ regulations for concessions and authorizations,
- ♦ tariff regulations, which establish the criteria, formulas, and procedures for setting and amending service tariffs,

- ♦ regulations on service, which establish the rights and obligations of service providers and users, and
- ♦ regulations on violations and penalties, which establish the fines to which service providers are liable in the event of nonconformance

A water supply and sewerage concession for La Paz and El Alto was granted in July 1997, and similar tenders are being prepared for Cochabamba and Santa Cruz (see Section 2.4.1)

2.3.3 Donor Funding

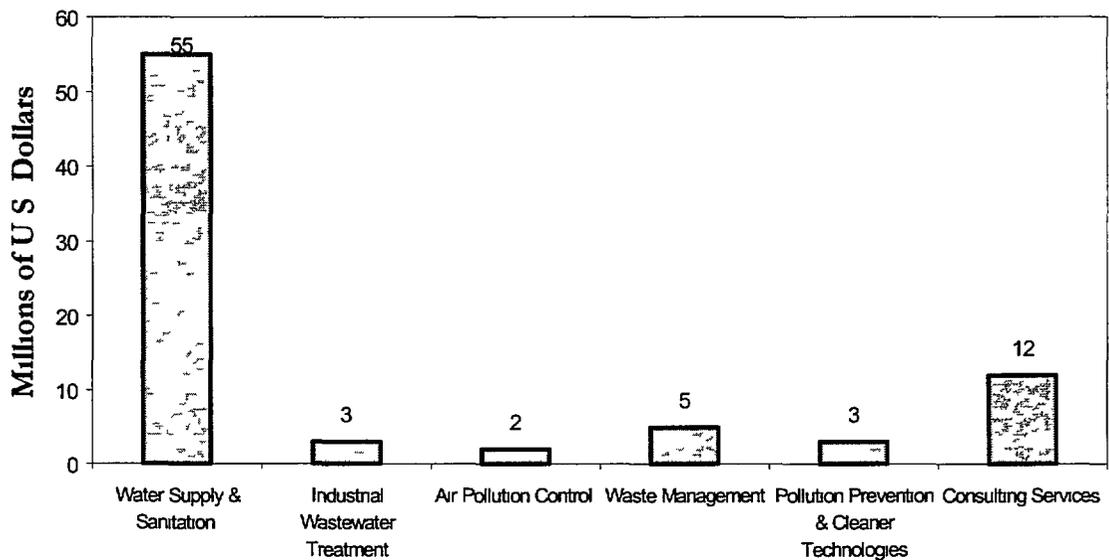
In recent years, public expenditures on environmental projects in Bolivia (including those in mining, energy, manufacturing, and water supply and sanitation) have been largely financed by international donors and lending institutions, primarily the World Bank and the Inter-American Development Bank (IDB). External funding accounted for about 61% of Bolivia's total public environmental expenditures between 1990 and 1995. One strong indication of the excessive dependence of environmental programs on external funding is the fact that the salaries of about 70% of VMDSMA's staff are financed by donors (World Bank, 1997). In view of Bolivia's need for investment in potable water, wastewater treatment, sanitation, and industrial pollution abatement, the bulk of donor funding is expected to shift to these areas in the near future. In April 1999, high-level donor conferences will be held in six Bolivian cities to determine a strategy for environmental donor assistance to the country.

The prevalence of donor funding in Bolivia creates an advantageous climate for U.S. suppliers of environmental products and services.

2.4 MARKET OPPORTUNITIES

Bolivia's environmental market in 1999 is small – just about \$80 million – and is expected to grow by 3-5% per year over the next five years. By far the best environmental equipment supply opportunities are found in the area of municipal water supply and sanitation, which comprises 69% of the market. Environmental consulting services represent the second largest market segment (15%). Both of these markets are heavily dominated by donor funding. Opportunities in the other market sectors are rather limited, mainly due to the Bolivian industry's inability to pay for environmental improvements.

Exhibit 2-1 Environmental Market Summary Bolivia



Total Environmental Market, 1999 \$80 million

2 4 1 Water Supply and Sanitation

Market Size (1999) \$55 million

Best Prospects Construction of water supply and sewerage networks, drinking water and wastewater treatment plants, supply and installation of related equipment

The IDB estimates that among Bolivia's urban residents, approximately 900,000 people do not have access to centrally distributed drinking water, and over 2.3 million lack access to sewerage facilities. The investment needs in the water supply and sanitation sector are significant: over \$550 million of investment are required to achieve 100% piped water supply and sewerage coverage of the country's urban population, of which about 75% would have to be spent on sanitation needs (IDB, 1996). In addition, Bolivia's 1992-2000 National Water and Sanitation Plan estimated that about \$780 million were required over eight years to improve rural water supply and sanitation conditions (World Bank, 1995a). These numbers give an indication of the long-term prospects in this market segment.

Concessions Private sector participation is a major source of financing for these much needed improvements. In July 1997, the Government of Bolivia awarded a 30-year concession for the provision of potable water and sewerage services in the cities of La Paz and El Alto (total

population of over 1.7 million) to Aguas del Illimani (ADI), a consortium led by the French corporation Suez-Lyonnaise des Eaux. ADI has committed to investing over \$360 million over 30 years to achieve 100% piped potable water supply and sewerage coverage in the two cities. The goals for the concession's first five years are to reach 100% and 60% for water supply and sewerage coverage, respectively. In addition, ADI will significantly increase the cities' drinking water and wastewater treatment capacity (see Exhibit 2-2).

A similar concession is being prepared for bidding in Cochabamba, a city of about 480,000 people. SEMAPA, the local utility company, currently has about 43,000 water supply connections (62% coverage) and about 37,000 sewerage connections (52% coverage). In order to achieve full coverage by these services, 27,000 new water supply connections and 33,000 new sewerage connections will need to be installed. All the wastewater collected presently goes through a treatment plant, which will have to be upgraded as part of the future concession. SEMAPA plans to achieve a 90% coverage rate for both water supply and sewerage by 2005 (IDB, 1996).

Potentially, water and wastewater utility concessions may be established in three or four other cities in Bolivia (the most likely candidate is Santa Cruz). However, concessions may not be feasible in small cities, where economic constraints make them unattractive for private investors (Aguas del Illimani, 1998b).

Donor Projects In addition to financing roughly half of the first 5-year expenditure plan of Aguas del Illimani to complement the private investment (see Exhibit 2-2), the World Bank and especially the IDB are contributing large amounts of money to urban and rural water supply and sanitation improvements in Bolivia.

In 1997, the IDB launched a four-year \$88.8 million Urban Basic Sanitation Program (the loan component of which is about \$71 million) to be administered by FNDR. The program's main objective is to finance the expansion and improvement of water supply and sewerage services in Bolivian cities with over 5,000 inhabitants.

Exhibit 2-2 Aguas del Illimani – Water Supply and Sanitation Concession

The shareholders of Aguas del Illimani, S A are the French company Suez-Lyonnaise des Eaux (35%), the Argentine companies Sociedad Comercial del Plata (18%), Meller (12%) and Inversora en Servicios (10%), and the Bolivian companies Bicsa (20%) and Connal (5%)

ADI's investment in water supply and sanitation improvements in La Paz, El Alto, and surrounding communities over the concession's 30-year term is planned as follows

Expansion of the sewerage network	\$130 million
Expansion of the water supply network	\$80 million
Process upgrades and renovation	\$92 million
New water sources and water treatment capacity	\$60 million
Total	\$362 million

ADI's capital expenditure plan for the first five years of the concession (1997-2001) is estimated at \$72 million and will be co-financed by the IDB (\$15 million), the World Bank (\$15 million), and the Andean Development Corporation (CAF – \$10 million) It comprises

- a) increasing water sourcing capacity by constructing two additional reservoirs (with more to follow after the first five years),
- b) providing 100% piped water supply coverage in both cities through the installation of a minimum of 78,250 water connections, of which 71,250 will be located in the El Alto area,
- c) installing a minimum of 38,000 sewerage connections, of which 27,000 will be located in the El Alto area, and
- d) completing the construction of a 1 5 m³/s wastewater treatment plant in El Alto

The first 5-year expenditure plan does not envision wastewater treatment improvements in La Paz However, ADI will prepare a Sanitation Master Plan by the end of 2001, presenting options to address collection and treatment of wastewater currently discharged to the Choqueyapu River

The Concession Agreement mandated drinking water treatment and effluent standards comparable to the WHO Guidelines ADI has conducted an environmental audit that evaluated the environmental impacts of the water supply and wastewater treatment systems, and identified mitigation measures and monitoring programs which will be implemented within a specific timeframe ADI has also established an environmental unit which will address the issues identified in the environmental audit and develop an *environmental management system* covering the whole spectrum of project management and construction activities

Sources The World Bank 1998 Aguas del Illimani 1998a

The “direct costs” component of the program (\$74 million or 83.3%) includes civil works construction and procurement of necessary materials and equipment. Projects in four cities – Santa Cruz (population ca. 850,000), Cochabamba (450,000), Montero (70,000), and Riberalta (55,000) – account for \$51.4 million in direct investment. In all four cities, sewerage coverage will be dramatically increased as a result of the project’s funding, and all the collected wastewater will be treated. In Cochabamba and Montero, investments are also being made to increase potable water coverage. Table 2-1 summarizes the main characteristics of these projects.

Table 2-1
Urban Basic Sanitation Program Principal Investment Components

Parameter	Santa Cruz	Cochabamba	Montero	Riberalta
<u>Water Supply</u>				
Baseline coverage	90%	62%	85%	N/A
New connections	0	13,500	1,720	N/A
Resulting coverage	90%	80%	92%	N/A
<u>Direct cost (US\$ million)</u>	0	10.11	1.64	N/A
<u>Sewerage</u>				
Baseline coverage	31%	52%	21%	0%
New connections	16,900	12,200	6,180	4,120
Resulting coverage	48%	68%	70%	53%
<u>Direct cost (US\$ million)</u>	19.07	9.43	7.30	3.87
<u>Total direct cost (US\$ million)</u>	19.07	19.54	8.94	3.87

Source: IDB, 1996

The World Bank, the Plata Basin Development Fund (Fondo Financiero para el Desarrollo de la Cuenca del Plata, FONPLATA), the CAF, and the Japanese Government also support FNDR's financing activities in urban water supply and sanitation. FNDR has a substantial pipeline of investment projects in this sector either ready for financing or at an advanced preparation stage, for example, a water supply and sewerage project in the city of Portachuelo (\$2.5 million) and a sanitation project in the city of Warnes (\$1.3 million). Both municipalities are located in the department of Santa Cruz (World Bank, 1994).

In 1996, the World Bank started Bolivia's first large-scale Rural Water and Sanitation Project (total value of \$48 million). The project's investment activities in water supply (\$26.1 million) and sanitation (\$9.6 million) are targeted at four departments: La Paz, Cochabamba, Chuquisaca, and Potosí. These departments have a rural population of about 2.4 million and average coverage rates of 20% for water supply and 15% for sewerage (World Bank, 1995a). The project's

investments in water supply and sewerage systems will benefit about 425,000 and 347,000 people, respectively

In 1999, the IDB plans to launch a \$50 million Municipal Sanitation Program, focusing on basic sanitation in Bolivian cities with population of less than 10,000 as well as rural areas. The program will include infrastructure investment, institutional strengthening, and community capacity building components

2.4.2 Industrial Wastewater Treatment

<i>Market Size (1999)</i>	\$3 million
<i>Best Prospects</i>	Effluent treatment technology for mining and oil and gas industry

Since enforcement of environmental regulations is still negligible in Bolivia, the country's mining, energy, and manufacturing companies are only starting to address their pollution problems. However, the expanding capitalization of state-owned enterprises is likely to lead in the near future to increased private investment in industrial wastewater treatment.

According to the World Bank (World Bank, 1997), the highest-priority investments are likely to address tailings leachate and wastewater discharges from ore concentration plants in Potosí, and oil and gas sector effluents. The cost of controlling effluents from the concentration plants in Potosí is relatively modest. Public sector enterprises in the oil and gas industry are hard pressed to mitigate their environmental risks in the context of the ongoing capitalization program in this sector. Under capitalization arrangements, multinational petroleum companies (such as Amoco, Shell, etc.) often split the site remediation costs with the government. Such remediation activities present good opportunities for U.S. environmental firms. The World Bank estimates the total remediation cost of all environmental problems in the oil and gas sector at about \$15 million.

While the problem of wastewater discharges from manufacturing firms, especially food processing plants, is considered one of the biggest environmental problems in Bolivia, substantial investments in pollution control in this sector are unlikely in the near future due to the relatively high cost of wastewater treatment installations and low incentives for regulatory compliance.

Mercury effluents, mostly from numerous artisanal gold mines, cause grave public health and environmental impacts. However, it is very difficult to address this serious problem as these mines are too small and cannot afford any mitigation measures.

2 4 3 Air Pollution Control

Market Size (1999)	\$2 million
Best Prospects	Ambient air monitoring and vehicle inspection equipment

There is practically no market for air pollution control equipment for stationary sources. Air pollution from the manufacturing sector, with the exception of smelters and cement factories, is generally not considered to be a problem. Even the biggest air polluters lack incentives to invest in air pollution control measures. In the mining sector, the dust problems mainly come from exposed and windswept tailings and are very expensive to mitigate. Limited market opportunities are available in supplying ambient air monitoring equipment (e.g., stationary air samplers) to the government which is only starting to develop its air quality management program.

As part of its 1995 Air Pollution Regulations, Bolivia established emission standards for mobile sources. There is currently no enforcement of these standards, partly due to the absence of adequate equipment to measure vehicular emissions. Therefore, there is a small potential market for gas analyzers and other portable equipment for vehicle inspections.

2 4 4 Waste Management

Market Size (1999)	\$5 million
Best Prospects	Collection vehicles, transfer and hauling equipment, sanitary landfill design and construction, mine tailings remediation technologies

Assuming the Bolivian government will begin to enforce the existing *hazardous waste* regulations in the foreseeable future, the requirement to separate hazardous from municipal and non-toxic industrial solid waste will create a market for hazardous waste treatment, storage, and disposal facilities. At this point, there is not enough information to determine the size of this potential market.

The management of *municipal solid waste* is handled more and more by private companies in Bolivia (e.g., CLIMA in La Paz), which generates a positive market outlook in this market segment. The market for additional MSW collection services needed to handle all currently uncollected garbage in La Paz (21,000 tons/yr), El Alto (32,000 tons/yr), and Cochabamba (36,000 tons/yr) is estimated at about \$3 million annually. This market will grow as smaller Bolivian cities become willing to pay more for solid waste management services. Sanitary landfill design and construction also represent a growing opportunity. For example, about \$5

million needs to be invested in the La Paz-El Alto area to construct a landfill for approximately 220,000 tons of waste per year

With respect to industrial solid waste, limited opportunities exist under donor-funded mine tailings remediation projects. For instance, the World Bank's Environment, Industry, and Mining project has allocated \$6 million to co-finance pilot investments in tailings remediation in Oruro. The German government has provided \$2 million for feasibility studies of similar projects in Potosí. More donor money is expected to become available for tailings remediation projects through FNDR, Bolivia's Regional Development Fund.

2 4 5 Pollution Prevention and Cleaner Technologies

<i>Market Size (1999)</i>	\$3 million
<i>Best Prospects</i>	Process control equipment, renewable energy technologies

USAID's Environmental Pollution Prevention Project (EP3) pioneered the promotion of cleaner production practices in nine industrial sectors in Bolivia. EP3 helped establish a new Center for Promotion of Sustainable Technologies that is working with the national (CNI) and local chambers of industry (e.g., in Cochabamba and Santa Cruz) to encourage and facilitate private financing of pollution prevention practices. The Center is supported by the World Bank, USAID, and the Dutch and Danish bilateral aid agencies.

Despite the substantial technical assistance efforts in this area, the market for cleaner technologies in Bolivia's industrial sector is small. Industries that are trying to introduce pollution prevention measures in their technological processes focus primarily on low-cost/no cost management solutions that do not involve process equipment procurement. There is a limited market, however, for process control equipment that allows companies to monitor their process efficiency.

Renewable Energy Technologies The World Bank's Energy Sector Management Assistance Program (ESMAP) has identified some potential for mini-hydro plants (with capacity of less than 500 kW), solar energy installations, geothermal plants, and biomass digesters in Bolivia's rural communities.

2 4 6 Environmental Consulting Services

Market Size (1999) \$12 million

Best Prospects Technical assistance in institutional strengthening, regulatory development, EIA, pollution prevention, and energy efficiency

The demand for environmental consulting services in Bolivia is expected to grow as VMDSMA and other government agencies try to implement the environmental management framework set forth in the Law for the Environment. Since Bolivia's environmental institutions lack the resources needed to finance environmental programs, the money generally comes from multilateral and bilateral donor agencies.

IDB is currently funding a \$23 million project "Institutional Strengthening of VMDSMA" which aims at enhancing the Vice Ministry's technical, regulatory, and administrative capacity and establishing a national multi-media environmental quality monitoring program. The second phase of this project (worth an additional \$12-15 million) is expected to start in the year 2000.

A \$22 million credit co-financed by the World Bank (1996-2000) – the Environment, Industry and Mining Project (EIM) – is designed to assist VMDSMA and the Ministry of Mining in establishing a program for managing industrial and mining pollution. EIM includes the following major technical assistance components (World Bank, 1995b):

- ♦ design of an ambient sampling, monitoring, and data management system (complementary to the IDB project's efforts),
- ♦ development of national programs to mitigate human health and environmental damage from industrial and mining pollution,
- ♦ regulatory support (including design of enforcement strategies) to the agencies responsible for industrial and mining pollution, and
- ♦ technical and management training for the staff of the national, departmental, and local environmental agencies.

A similar technical assistance program is underway in the water supply and sanitation sector. IDB's \$1.3 million project on "Development of a Regulatory Framework for the Water Supply and Sanitation Sector in Bolivia" is working with the Vice Ministry of Investment and Privatization and the newly established Water Superintendence to develop quality standards for water and wastewater services and other components of the regulatory and institutional framework for this sector. Other donor projects in this sector that are primarily targeted at environmental investments also include significant technical assistance components. For

example, IDB's Urban Basic Sanitation Program (see Section 2.4.1) includes technical assistance to water and wastewater utilities in improving operations management, billing collections, customer service, accounting, etc., and the World Bank's Rural Water and Sanitation Project provides for extensive training of community-level operators and administrators.

On the private sector side, environmental consulting services are expected to be in demand mostly for the preparation of environmental impact assessment and licensing documentation, especially when the EIA requirements start to be fully enforced at the prefecture (departmental) level.

Pollution prevention audits represent a potential services market in the long term. While such audits have been conducted in food processing, textile, electroplating, leather tanning, and other industries under USAID's donor assistance, traditional environmental pollution control remains predominant in Bolivia, and the market for pollution prevention services is still small.

Energy Efficiency Services There is also some demand for technical assistance in energy efficiency. The electric utilities in the country's two largest cities, ElectroPaz in La Paz and CREE in Santa Cruz, are planning to implement demand-side management (DSM) programs in the near future to reduce energy consumption in the residential, commercial, and industrial sectors.

2.5 MARKET STRATEGIES FOR U.S. FIRMS

2.5.1 Competition

In the absence of domestic production, all environmental equipment in Bolivia is imported. Although there are no estimates available of third country shares in Bolivia's environmental equipment imports, there is a general preference for U.S. and Japanese environmental technologies, primarily because of their reputation for high quality and price competitiveness. Some European (mostly German) equipment is imported as well, mainly under bilateral tied aid arrangements.

2.5.2 Positioning for Success

Bolivia's current funding situation, where about two-thirds of its expenditures on environmental programs are funded through grants and loans from multilateral and bilateral donor agencies, is likely to continue in the near future. Since USAID's present environmental funding in Bolivia is limited (only about \$5 million in FY 1999), projects funded by either the World Bank or IDB represent the best opportunities for U.S. firms. In some cases, Japanese bilateral funding is also open to U.S. equipment suppliers. See Appendix C for more information about multilateral and bilateral funding operating in Bolivia.

As in all countries, establishing a presence in Bolivia requires time and investment of human and financial resources. There are basically three ways U.S. companies can take advantage of Bolivia's environmental market: infrastructure development, equipment sales, and environmental services.

Infrastructure Development The Bolivian government's capitalization program is opening the water and wastewater services market to foreign participation. It is likely that Aguas del Illimani will serve as a model for privatizing water supply and sanitation services in major Bolivian cities. U.S. firms should investigate partnerships with companies, particularly European firms, that have experience in the operation of water concessions. Having a strong local presence – through a local office or a strong local partner with good contacts with the municipal governments – is critical for success in this market.

Equipment Sales Demand for environmental equipment in Bolivia is satisfied through one of the following three mechanisms:

- ♦ International public tenders under donor-funded projects which require the foreign exporter to have a local partner in order to be eligible for bidding. The partnership often ends after the sale is completed, except when the donor agency demands technical support over a certain period of time and/or other services such as local training, maintenance, and repair.
- ♦ Local public tenders by Bolivian government agencies that require suppliers to be permanently established in Bolivia. Suppliers typically use local sales representatives to serve as intermediaries to satisfy this requirement.
- ♦ Direct imports mainly through national and international dealers, very often assisted by consulting firms.

Under all of these scenarios, finding a well-established local partner or representative is extremely important. There are a number of U.S. government programs that assist exporters of environmental technologies in finding local agents and distributors and developing market entry strategies, as well as provide exporters with financing and risk insurance. See Appendix D for the details of these programs and contact information.

Consulting Services To successfully pursue donor-funded technical assistance projects as well as provide consulting services to local private clients, a local presence is highly recommended. It is fairly easy to establish an office in Bolivia – there are no limitations on foreign ownership. U.S. companies should also explore the possibility of establishing partnerships with local companies or NGOs. Expertise in environmental impact assessments and EMSs is very important since these are likely to be the two main areas of demand from private clients (see Section 2.4.6). Knowledge of specific industrial processes is also essential in working with local industries.

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CHAPTER 3

ECUADOR

3.1 ECONOMIC AND POLITICAL OVERVIEW

<i>Area</i>	283,560 sq km
<i>Population</i>	11.9 million
<i>Urban population</i>	60%
<i>GDP</i>	\$19.6 billion
<i>GDP per capita</i>	\$1,699
<i>GDP growth rate</i>	2%
<i>Inflation</i>	45%

Source: U.S. Department of State, 1997; ECLAC, 1998

3.1.1 Major Economic Trends

Economic and Social Indicators The petroleum sector is the basis of Ecuador's economy. It accounts for over one-third of both public sector revenue and export earnings, ensuring a favorable balance of trade. The manufacturing industry is largely oriented to producing for the domestic market, although regional economic integration is creating more export opportunities in this sector. Ecuador is the world's largest exporter of bananas and a major producer of shrimp. Together, these two commodities account for another third of the country's exports.

Because of the collapse of oil prices in the 1980s, Ecuador went into a decade of stagnation under the burdens of debt and inflation. During Sixto Durán-Ballén's presidency (1992-1996), there were partial efforts to modernize the state and lay a basis for sustainable economic expansion. Durán-Ballén's administration pursued legislative reforms in the financial, agricultural, telecommunications, and energy sectors, while also promoting trade liberalization. However, the incomplete implementation of reforms failed to create sustainable growth.

The reforms have also done little to improve the social conditions in the country. In 1996, 35% of the population lived below the poverty line, and the unemployment rate was 8.3%, while the underemployment rate is estimated to be much higher (U.S. Department of State, 1997).

In 1997, Ecuador's medium and long-term debt, including arrears, amounted to \$15 billion. It is one of the largest per capita external debt levels in Latin America. Interest payments on all Ecuador's long-term debt claim about 4% of the GDP, or 16% of exports.

El Niño brought severe losses to the Ecuadorian economy – about \$3 billion in 1997 and 1998 – and reduced the GDP growth rate to approximately 2% (ECLAC, 1998). Agriculture and tourism were the main affected sectors, while the damage to the transportation infrastructure affected

indirectly the manufacturing industry and general commerce. Other negative economic factors were persistently low petroleum prices, political instability (see Section 3.1.2), and external financing problems caused by the international monetary crisis. The reductions in external financing caused high volatility in the exchange rate and a strong depreciation of the national currency, the sucre.

At the same time, inflation sky-rocketed due to El Niño's impact on the agriculture and transportation system, and the elimination of government subsidies for fuel and electricity. Annual inflation reached 45% in 1998, the highest rate in Latin America and the Caribbean (ECLAC, 1998). The financial crisis became particularly severe in March 1999, leading to a general strike and massive social unrest. In response, the government proposed a set of austerity measures to avert economic collapse but had to back down somewhat from the original plan in order to reduce the impact on the already impoverished population.

Privatization and Investment Trends Investment liberalization measures of the early 1990s provided foreign investors with full national treatment and eliminated prior authorization requirements for investment in most industries. The rules for foreign investment (including profit repatriation) have been greatly simplified, and foreign investors now enjoy equal tax treatment with domestic investors.

The Ecuadorian economy is largely owned and managed by the private sector, but the state has long played a significant economic role characterized by bureaucratic regulations, unproductive subsidies, and state ownership of "strategic" economic sectors (petroleum, mining, electricity, telecommunications, and fishing industry). In recent years, there have been tentative moves toward reducing the state's control over the economy.

The 1993 Law for Modernization of the State allows private sector participation in the "strategic" sectors but only through concessions (full privatization is seen as a last-choice option). The National Modernization Council (CONAM) is in charge of implementing Ecuador's "modernization" policy. CONAM plans to promote private participation in the power, transportation, telecommunications, water and wastewater infrastructure, and waste management sectors through either concessions or direct sale (U.S. Department of State, 1997).

Trade Policy Ecuadorian trade policy was substantially liberalized during the early 1990s, resulting in a reduction of tariffs and tariff dispersion (Ecuador's import tariffs now range from 5% to 20%, with an average of 11%), and elimination of most non-tariff surcharges.

Ecuador is a member of the Andean Community (with Colombia, Venezuela, Bolivia, and Peru), which has removed all internal trade barriers. Ecuador also has bilateral free trade agreements with Chile, Colombia, and Venezuela. The Ecuadorian government has expressed interest in joining the Mexico-Colombia-Venezuela ("G-3") trade accord. It is also engaged in trade talks with MERCOSUR and participates in the Free Trade Area of the Americas negotiations. Ecuador was admitted to the World Trade Organization in 1996.

The United States is Ecuador's largest trading partner, providing a major market for its top exports and serving as the main foreign supplier of both consumer and capital goods. Ecuador's steps to open its economy to external competition have helped further expand bilateral trade and investment ties.

3 1 2 Political Situation

The Ecuadorian Constitution grants broad powers to the president (also serving as the head of government) who is elected for a four-year term with no right for immediate reelection. The unicameral Congress has little control over the public sector budget but can block the government's legislative initiatives and has the power to remove cabinet ministers from office.

In July 1996, Abdala Bucaram was elected president on a populist platform of increased social spending. However, Bucaram's presidency was soon cut short when massive corruption of his administration alienated almost all the layers of the society. Widespread demonstrations in February 1997 led Congress to oust Bucaram and name Fabian Alarcon as interim president.

The legitimacy of the Alarcon administration was confirmed through a popular referendum in May 1997. New elections in August 1998 elected Jamil Mahuad Witt as the new President of Ecuador. Ecuador's political instability since 1996 has slowed down the economic and social reform in the country. The social upheaval of March 1999 to protest the virtual economic collapse has further deepened the country's political crisis.

3 2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

3 2 1 Principal Laws and Regulations

Decree 1802 of 1994 "Ecuador's Basic Policies for the Environment" establishes 17 principles of environmental management, including environmental impact assessment (EIA) and incentives for the use of cleaner technologies. A new draft framework law (Ley de Prevencion y Control de la Contaminacion Ambiental) is expected to be adopted by the Ecuadorian Congress in 1999. The new law will introduce a National System of Environmental Impact Assessment (SUNEIA), including provisions for public participation, stipulate wider use of economic incentives, and tighten the sanctions for environmental violations (MMA, 1998). It will also explicitly determine the responsibilities of the Ministry of Environment and its relations with other government agencies. Until the new Pollution Prevention and Control Law goes into effect, the Pollution Prevention and Control Law of 1976 (fairly general and declarative) remains the official basis of environmental legislation in Ecuador.

There are a number of medium-specific laws and regulations (US&FCS, 1997a)

- ♦ The Water Law of 1972 regulates the use of marine, surface, and ground waters and is executed by the National Council for Water Resources (Consejo Nacional de Recursos Hídricos) The Water Pollution Prevention and Control Regulation (1989) requires industrial wastewater treatment and sets use-based ambient water quality standards and wastewater discharge standards Municipalities are responsible for setting effluent limits for individual industrial sources The new Water Law (currently under preparation) will be based on a watershed management approach and will seek to integrate water management with environmental management in general
- ♦ The Regulation on Air Quality Norms (1991) establishes air quality standards and stipulates measurement methods for air quality monitoring This regulation is supplemented by the General Rules for Emissions from Stationary Sources and General Methods of Measurement (1993) establishing emission standards and measurement and sampling techniques The Ministry of Health is the implementing agency for these two regulations Some municipal governments (e.g., Quito) have already established municipal emission standards, although many municipalities have not been able to enforce them due to a lack of resources
- ♦ The Solid Waste Management Regulation (1992) governs collection, storage, transportation, and disposal of municipal garbage and industrial hazardous waste, and establishes requirements for landfills The regulation is executed by the Ministry of Health In 1996, the Ministry of Health promulgated a Regulation on Solid Waste Management in Health Establishments that mandates proper disposal of medical waste

Some sectoral ministries have their own environmental regulations For example, the Ministry of Energy and Mines regulates environmental issues in these industries The Mining Law (1991) mandates EIAs in order to prevent and mitigate environmental and social impacts of mining activities EIA for mining projects is further regulated by the General Regulation for the Mining Law (last amended in 1995) The Mining Law also regulates wastewater treatment, waste management, reforestation, and ecosystem protection as it relates to mining Environmental aspects of mining exploration, extraction, and processing are also regulated by another ministerial decree – Environmental Regulations for Mining (1997) The Ministry of Industry and Fisheries is expected to develop and promulgate environmental regulations for the manufacturing industry in the near future

Municipalities in Ecuador also have a right to promulgate their own environmental regulations (ordinances) as long as they are no less stringent than the national norms Quito has the best environmental management program among Ecuadorian municipalities Quito's Municipal Ordinance No. 2910 ("Prevention and Control of Water and Air Pollution," 1992) establishes industrial wastewater pretreatment standards and air emission standards for criteria pollutants for stationary and mobile sources It also requires industrial establishments to submit an

environmental management plan in order to get an environmental quality control certificate and an operating permit. Sanctions for noncompliance with emission and effluent standards are stringent and include permit revocation.

3 2 2 Institutional Structure

The institutional responsibilities for environmental management at the national level are divided between the new Ministry of Environment (Ministerio del Medio Ambiente, MMA) created in 1996, Ministry of Public Health, the Ministry of Urban Development and Housing (Ministerio de Desarrollo Urbano y Vivienda, MIDUVI), and several sectoral ministries (Ministry of Energy and Mines, Ministry of Agriculture, and Ministry of Industry and Fisheries).

The Ministry of Environment still does not have a clear status and is actively participating in the development of the new framework environmental law which will give it the authority to promulgate cross-sectoral environmental policies and regulations, thereby concentrating many of the powers currently vested in the sectoral ministries. The Ministry's work will be overseen by a coordinating committee formed by representatives of relevant government agencies and the private sector. Presently, MMA is working on developing nationwide EIA procedures and national programs for environmental monitoring and inspections, economic incentives, enforcement, and cleaner production. The current Minister of Environment is widely regarded as a very capable person with significant experience in environmental issues (MMA, 1998).

The Subsecretariat of Environmental Sanitation under MIDUVI is responsible for regulating drinking water supply and sanitation at the national level. However, the municipal governments are supposed to enforce these regulations and manage the construction and operation of water supply and sewerage systems. The sectoral ministries have their own environmental units but their future is uncertain, pending the promulgation of the new law.

Each major municipality in Ecuador has its own environmental department with significant authority to promulgate and enforce standards and procedures implementing national regulations, as well as manage the municipal environmental services. The Municipality of Quito has had an environmental department for the last nine years with an existing staff of 35 full-time employees. In order to improve its enforcement record and cope with its shortage of human resources, the municipality has proposed a reform that would allow the inspection of facilities to be conducted by private companies.

3 2 3 Status of Implementation and Enforcement

Ecuador's enforcement of environmental laws and regulations is very weak, although in some municipalities the situation is slightly better than in others. Even in Quito, where the municipal

government is active in designing and implementing environmental management programs, many industrial establishments have not acquired the necessary environmental permits

The lack of human, technical, and financial resources is the main impediment to effective implementation of environmental policies and regulations in Ecuador. In addition, the regulatory authority for environmental management is scattered between many national government agencies that seldom interact with each other to achieve common goals. Hopefully, Ecuador's forthcoming framework environmental law will streamline the environmental policy-making, regulatory, and enforcement process in the country.

Ecuadorian industrial firms consider the current regulations too stringent and often simply ignore them. In the absence of rigorous enforcement, industries are generally not interested in making investments in environmental improvements and use their political levers to avert penalties for environmental violations. On the other hand, there is very limited technical support for those industries that want to improve their environmental performance.

3.3 MARKET DRIVERS

As in many other Latin American countries, Ecuador's environmental market is driven first and foremost by the need to provide basic environmental services (potable water supply, sewerage, and sanitary waste disposal) to the population. The hefty amounts of donor funding in Ecuador are allocated to addressing these problems. In addition, there are near-term plans to offer concessions for water and wastewater services (in Guayaquil) and municipal solid waste collection (e.g., in Quito, on the Galapagos Islands), whose success may lead to a large-scale privatization of municipal environmental services.

The imminent adoption of a new framework environmental law will not immediately change the present situation of the lack of interagency coordination and enforcement of environmental regulations. The only strong incentive for some (in fact, quite few) Ecuadorian exporting industries to improve their environmental performance is the pressure from importers in the developed countries, primarily Japan.

3.3.1 Major Environmental Problems

Water Supply and Sanitation Potable water supply coverage in Ecuador is 79% in urban areas and 10% in rural areas (World Bank, 1997). In Quito, the Potable Water and Sewerage Company (Empresa Municipal de Alcantarillado y Agua Potable, EMAAP) provides water to 90% of the city's residents and 55% of the population of 34 neighboring communities (EMAAP, 1998). However, the system is largely inefficient. 45% of the city's water supply is unaccounted for, either because of physical losses (25%) or because of poor metering and billing (USAID, 1995).

Sewer systems cover 61% of Ecuador's urban population and only 26% of the rural population (World Bank, 1997). Quito's sewerage network (also operated by EMAAP) is considered the most efficient in the country, serving about 70% of the city's residents, while Guayaquil's is considered one of the worst, with less than half of the households connected to the sewer lines and large volumes of wastewater routinely accumulated in stagnant pools around the city.

Ecuador only treats 4% of its municipal wastewater (through oxidation lagoons). Raw sewage is the main source of contamination of Ecuador's rivers. The main river in Quito, the Machangara, is considered biologically dead. The Guayas River, the main waterway in Guayaquil, receives the largest volume of wastewater discharges in the country.

Industrial Wastewater Discharges Industrial wastewater discharges affect primarily the cities of Quito and Guayaquil. The main polluters in these two cities are the plastics, electroplating, metallurgical, chemical, textile, and food processing plants. In the rural areas of the Amazon, coastal and mountain regions, the major contaminating industries are petroleum and mining. Some petrochemical industries have installed effluent treatment devices but most other industrial facilities have not.

The effluents originating from shrimp ponds also contribute to water pollution. They contain high concentrations of nutrients, organic material, and suspended solids.

Air Pollution Air pollution is a major concern in Ecuador, particularly in Quito and Guayaquil, where over 80% of Ecuadorian industries are located. Quito's air quality problems are particularly serious, since the capital is located in a narrow mountain valley where the meteorological conditions create heavy smog over the city.

The chemical, petroleum, metal manufacturing, and cement plants in Quito and Guayaquil, as well as a large oil refinery in the province of Esmeraldas, generate significant emissions of sulfur dioxide, nitrogen oxides, and particulate matter. It is estimated that the Esmeraldas oil refinery generates over 200 metric tons per day of sulfur dioxide (US&FCS, 1997b).

The ceramics manufacturing industry in Cuenca releases into the air considerable amounts of mercury and other heavy metals. Studies conducted by environmental organizations have found that cancer rates in areas around ceramics plants are much higher than the national average (US&FCS, 1997b). Other important stationary sources of air pollution in Ecuador are oil and gas-fired power plants and solid waste incinerators.

Mobile sources contribute over 80% of air pollution in urban areas in Ecuador. The number of automobiles in Ecuador is increasing rapidly. In 1990, there was one automobile per 11 people, but by 2020 this number is estimated to reach one automobile per 3 people (US&FCS, 1997b). This increase in vehicle use has augmented the fuel consumption and the resulting emissions of carbon monoxide, nitrogen oxides, and particulates. Quito phased out leaded gasoline in 1996,

and the rest of the country followed suit in 1997. However, lead was replaced by benzene and similar carcinogenic compounds, creating a new public health threat. The life cycle of automobiles is very long in Ecuador, 10-15 years, further increasing air pollution. The large number of old diesel vehicles is the most significant source of air emissions in Quito.

Monitoring of air quality in Quito and Guayaquil is poor, and practically non-existent in other cities and rural areas. Quito's geographic location, nestled in a valley with insufficient wind, makes the city susceptible to air pollution.

Hazardous and Solid Waste Poor municipal solid waste management is a significant problem in Ecuador. Solid waste collection is generally a lesser concern than disposal. In Guayaquil, MSW collection and disposal services are managed by a Canadian company (under a concession) and are considered the best in the country. In Quito, the Metropolitan Waste Company (Empresa Metropolitana de Aseo, EMASEO) provides 95% coverage for the city proper and 80-85% coverage for the surrounding communities, collecting about 1,200 tons of solid waste per day. Most of the remaining waste is collected by micro-enterprises with primitive collection vehicles (EMASEO, 1998).

No more than 10% of the municipalities have landfills (and even those are not properly designed). In most Ecuadorian cities, solid waste is hauled to open-air dumps that have no liners, covers, or barriers. It is rather common for the poor to build shacks right beside or even on top of the dumps if they had no other place to live. In Quito, there are no sanitary landfills for solid waste disposal. Until recently, the city's solid waste had been dumped to the Zambisa canyon, in the northeastern part of the city, which represents a major public health threat to the surrounding communities. In Guayaquil, the first landfill in the country equipped with liners was constructed only recently.

Hazardous waste management is nonexistent in Ecuador. Hazardous and medical waste is disposed of in common garbage dumps. In Quito, a municipal order exists requiring industrial hazardous waste generators to treat the waste, but it is not enforced. Almost all Quito's hospitals have incinerators but do not operate them for cost-saving reasons, ignoring the recent regulation that requires special treatment of medical waste.

3 3 2 Infrastructure Privatization

Although the Ecuadorian government has been slow and hesitant in implementing its "modernization" program, the upcoming concession in Guayaquil (see Section 3 4 1) is a positive sign indicating that it may be willing to issue concessions for drinking water and sanitation services in some cities where water and wastewater problems are most acute. It is even more likely that the municipal governments will offer concessions for municipal solid waste management, based on the successful example of Guayaquil. Quito is already following suit, privatizing its waste collection services, and the Galapagos Islands, with their unique nature

conservation needs and developing tourism infrastructure, are a possible candidate (see Section 3.4.4)

The National Modernization Council (CONAM) is currently developing concession regulations for different infrastructure industries, including

- ♦ tariff regulations, which establish the criteria, formulas, and procedures for setting and amending service tariffs,
- ♦ regulations on service, which define the rights and obligations of service providers and users, and
- ♦ regulations on violations and penalties, which stipulate the fines to which service providers are liable in the event of nonconformance

3.3.3 Competitiveness Pressure on Exporting Industry

Ecuador's main export commodities are petroleum, bananas, and shrimp products, which together account for approximately 60% of the country's exports. The vast majority of these goods are exported to developed countries, which are increasingly concerned about the environmental aspects of their imports. Japan, which is a major importer of Ecuadorian shrimp, requires ISO 14001 certification as proof of the suppliers' commitment to a continuous improvement of environmental performance. There are also a number of quality certification programs for banana producers that incorporate environmental considerations (e.g., Eco-OK). In Ecuador's oil industry, the growing presence of multinational companies that have corporate environmental performance standards also stimulates investments in pollution prevention and control measures.

3.3.4 Donor Funding

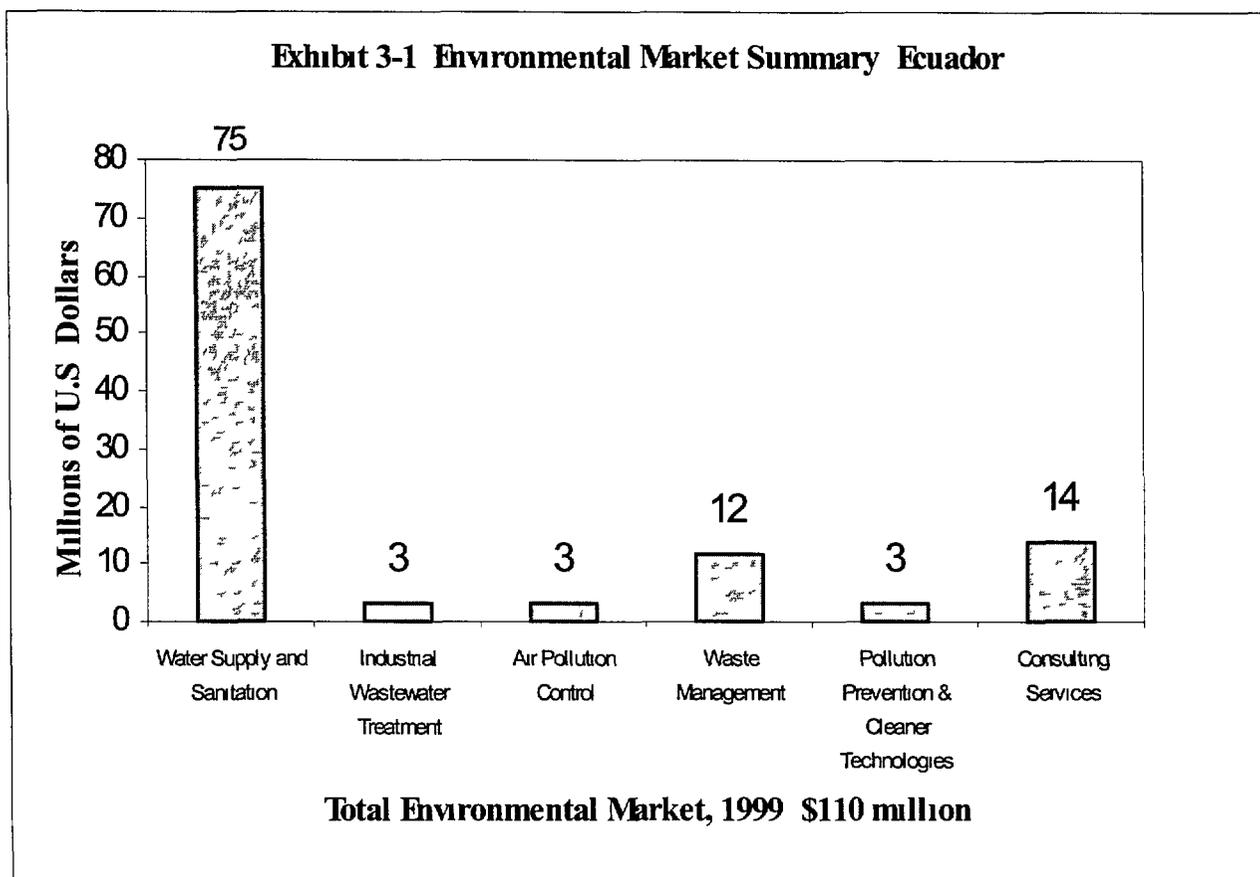
All significant environmental projects in Ecuador are supported by multilateral and bilateral donors, with the share of donor funding in individual projects ranging from 65% to 100%. The IDB is the largest environmental donor in Ecuador (with about \$350 million committed in the ongoing projects and at least another \$150 million in the pipeline), followed by the World Bank. The multilateral donors in Ecuador primarily sponsor water supply and sanitation programs, but also waste management projects and technical assistance to government agencies with environmental responsibilities.

The field of bilateral donors is led by the Japanese and German international development agencies. USAID is phasing out its operations in Ecuador and will close down its Mission in Quito in 2003.

3 4 MARKET OPPORTUNITIES

Ecuador's environmental market in 1999 is relatively small (\$110 million) but is expected to grow very fast (by 20-25% a year) over the next three years. Most of the growth will occur in water supply and sanitation, the market segment that already represents two-thirds of all environmental market opportunities in Ecuador. The water and wastewater market is likely to double in three years due to several large multilateral donor projects in this sector expected to be launched in 2000 and 2001.

The other two significant market segments are municipal solid waste management (11% of the total market) and consulting services (13%). Market opportunities in other areas are limited because of the lack of incentives for Ecuadorian industry to invest in environmental technologies.



Source: Hagler Bailly, 1999

3 4 1 Water Supply and Sanitation

Market Size (1999) \$75 million

Best Prospects Water and sewerage pipes, pumps, water meters, construction of new transmission lines, storage tanks, pumping stations, and water and wastewater treatment plant equipment

Guayaquil Concession As mentioned in Section 3 3 1, Guayaquil has one of the most poorly maintained sanitation systems in Ecuador. Driven primarily by the need to expand the existing water and sewerage networks and drastically improve their efficiency, the Guayaquil Water and Sewerage Company (Empresa Cantonal de Agua Potable y Alcantarillado de Guayaquil, ECAPAG) will become the first water and wastewater utility in the country to transfer the provision of both services to a private operator through a 30-year concession. ECAPAG will be converted into an oversight authority for the concession. The concession is expected to be granted in 1999 (see Exhibit 3-2).

Exhibit 3-2 Guayaquil Water and Wastewater Concession

The 30-year concession contract to be awarded in 1999 includes the following provisions:

- ◆ Development (in the first year of the concession) of a Master Plan for the expansion of the potable water, sewerage, and stormwater systems
- ◆ Implementation of a five-year, \$72.5 million rehabilitation program for potable water and sanitary and stormwater sewage. The main components of the rehabilitation program are:
 - water supply works, including installing new pipes, replacing equipment and parts at the water treatment plant, taking outdated systems and storage tanks out of service, and sealing leaks, and
 - sewerage works, including cleaning and repairing 37 km of sewer mains, rehabilitating equipment, 12 pumping stations, and three sewage treatment plants, and repairing or replacing corroded or damaged sewer pipes on 320 hectares in 25 sectors of Guayaquil
- ◆ Expansion of the water supply, sewerage, and stormwater management systems estimated at \$520 million. The expansion program will start in the second five-year period and run through the end of the concession.

Source: U.S. Department of Commerce, 1998

The IDB will provide a \$40 million loan to finance (1) technical assistance for the start-up of the concession and (2) urgent rehabilitation works (with a total cost of \$72.5 million) needed to prevent the collapse of the infrastructure, keep the systems in operation, and decrease their vulnerability. The World Bank will further support the concession's investment program with a \$70 million project which is currently under preparation and is expected to start in the year 2000.

Donor Projects To date, the Guayaquil water and wastewater utility has been the only concession announced in the sector (others may follow if the Guayaquil concession is successful). There are currently no plans to privatize Quito's water and wastewater utility, EMAAP, since it has a rather strong in-house technical capacity and financial stability.

Nonetheless, the water supply and sanitation market in Ecuador is likely to expand significantly as a result of large and growing injections of donor funding, mostly from the IDB. In Quito, for instance, EMAAP is currently engaged in a number of IDB-sponsored large-scale water and wastewater infrastructure rehabilitation and expansion projects.

The \$170 million Quito Water Supply and Sewerage Program (launched by the IDB in 1994 and expected to be completed by 2002) aims at

- a) Expanding the production capacity and increasing the coverage (to 100%) of the city's water supply system. The specific projects include the construction of a 15-meter-high dam and a reservoir of over 23 million m³, installation of 48 kilometers of conveyance lines, construction of a first module of water purification plant, installation of a distribution system (over 500 km worth of pipes, 20,000 household connections, and 11 storage tanks) in the southern areas of Quito, and replacement of 20,000 water meters. (In addition to this program, EMAAP is working on two water projects in the north and northeast of Quito to add another 20,000 households to the system.)
- b) Expanding the sewerage system by installing approximately 300 km of sewer pipes across Quito (IDB, 1998).

The IDB has recently unveiled plans to finance the design and construction of three wastewater plants in Quito. One plant will serve the center of the city and treat 70% of the city's municipal wastewater volume, another will cover the southern areas (20% of the total), and the third will serve the northern district (10%). The construction is planned to be completed by 2015. The IDB is in the process of preparing the Terms of Reference for this upcoming project (EMAAP, 1998). The IDB also plans to invest \$400,000 in the modernization of one of Quito's water treatment plants, originally built in 1955. In order to enhance its so far very limited monitoring capabilities, EMAAP intends to establish a laboratory to analyze drinking water and municipal wastewater samples from its treatment plants (EMAAP, 1998).

The IDB is also supporting water and wastewater infrastructure improvements in the city of Cuenca. The first stage of the Cuenca Sanitation Program (\$56.6 million, 1995-1999) was designed to increase the city's potable water coverage from 85% to 95% and sewerage coverage

from 75% to 85%, reduce the amounts of unaccounted-for water, upgrade the existing drinking water treatment plant, and build a new sewage treatment plant. The program's second phase, Cuenca Sanitation II (with a total cost of \$75 million) is currently under preparation. It is also expected to include a large infrastructure works component.

Since 1993, the IDB has been financing the Municipal Development Program (PDM I) which allocated \$132 million (52.4% of the total program cost) for sanitation projects in Quito, Guayaquil, and several other cities. This project is nearing completion, and the second stage (PDM II) is expected to start in 2000. The total funding for PDM II will be \$300 million, including \$100 million from the IDB and the same amount from the World Bank. At the time of the writing, it is still unclear how much of this money will be directed to the water supply and sanitation sector.

As part of its upcoming \$50 million Galapagos Environmental Management Program (expected to be launched in 1999), the IDB will provide \$6 million for the renovation of a water purification plant and the water distribution infrastructure (including pipes and storage tanks) in Puerto Ayora and upgrading the water purification plant in Puerto Baquerizo. Investments in building a new sewage collection and wastewater treatment system in Puerto Ayora are expected to follow under the next installment of financing (IDB, 1997).

The Andean Development Corporation (Corporacion Andina de Fomento, CAF) is financing a \$41.2 million program (1998-2008) to construct a regional water supply system and local sewerage systems for 750,000 inhabitants of the Santa Elena Peninsula. Another CAF loan (currently under preparation) would provide \$45 million to build water supply, sewerage, and stormwater management infrastructure for municipalities located in low-income areas of the country.

The World Bank's \$35 million Rural and Small City Water Project (to be launched in 2000) will finance water and sanitation projects in about 55 small towns and 500 rural communities.

3.4.2 Industrial Wastewater Treatment

Market Size (1999)	\$3 million
Best Prospects	Effluent treatment technologies for oil refining and food processing, effluent monitoring equipment

The market for industrial wastewater treatment equipment is very limited in Ecuador. The industries most likely to spend money on wastewater treatment technologies are foreign-owned oil refineries and shrimp-processing plants (the latter are under pressure from Japanese shrimp importers to improve environmental performance).

Most Ecuadorian manufacturing industries are small and, therefore, reluctant to invest in effluent treatment in the absence of enforcement actions on the part of the regulators. There are, however, a few cases where the municipality forced the most polluting industries to reduce their discharges. For example, Quito's biggest slaughterhouse is planning to construct a biological treatment plant. In general, Ecuadorian industries need small, low-cost treatment installations with basic technology that are easy to operate and maintain. The greatest demand in this market segment is for distillation, filtering, and sludge processing equipment, as well as effluent characterization devices.

3 4 3 Air Pollution Control

Market Size (1999)	\$3 million
Best Prospects	Baghouses, scrubbers, and other emission control equipment for cement and petrochemical industries, ambient air monitoring and vehicle emissions inspection equipment

The market for air pollution equipment is limited, and its growth will depend on the municipalities' ability to enforce the new environmental laws and regulations. Ecuadorian industries are unwilling to spend any money on air pollution control equipment and instead prefer to build high emission stacks. Only the multinational industries (mostly in the oil sector) invest in emission controls as required by their parent companies.

The Environmental Control Department of the Municipality of Quito has launched a project to establish a Metropolitan Network of Measurement and Monitoring of Air Quality. The project is supported by an IDB loan of over \$1.6 million and includes equipment procurement for eight monitoring stations around the city. Since transportation is the most significant source of air pollution in Ecuadorian cities, vehicle emissions monitoring equipment is also expected to be in demand. For example, Quito is using the Swiss government's funding to develop a vehicle emissions monitoring and control program.

3 4 4 Waste Management

Market Size (1999)	\$12 million
Best Prospects	Solid waste collection trucks, construction of transfer stations and sanitary landfills

Ecuador's market for waste management services is still rather small and is only starting to grow, mostly due to the increasing environmental awareness of municipal governments in the big cities, particularly in Quito. Quito's solid waste management enterprise, EMASEO, is currently preparing a bidding process to transfer over 50% of the city's MSW collection services to private operators. In addition, EMASEO plans to build one properly engineered landfill for non-hazardous municipal and industrial waste, and a special "security" disposal cell for industrial hazardous waste, the design of the landfill and security cell will be according to international standards. The company will soon open a bidding process for the design, construction, and operation of both landfills.

Other MSW management plans in Quito include the construction of a waste transfer station and providing equipment support to waste collection micro-enterprises (there are currently five) operating in the outskirts of the city. The latter initiative is supported by the IDB. Several medical waste management pilot projects worth a total of about \$1 million are expected to be launched shortly, following the recent promulgation of a national regulation requiring special treatment for infectious waste in hospitals (EMASEO, 1998).

The Galapagos Environmental Management Program financed by the IDB will have a substantial (\$10.5 million) solid waste management component. The program (scheduled to begin in 1999) will develop a solid waste management system for the Galapagos Islands, which are an environmentally fragile area and a great tourist attraction. The system will cover collection and sanitary disposal of all residential, commercial, and hospital waste on the islands. The project will support the procurement of the necessary waste collection and transfer equipment, construction of a landfill, closure of all open dumps, and a recycling pilot initiative (IDB, 1997). The local government is planning to issue concessions for waste management services on the Galapagos in order to enable full cost recovery (the service cost estimates are double those incurred in mainland Ecuador).

The second stage of the IDB-funded Municipal Development Program (PDM II) slated to begin in 2000 is also expected to generate opportunities in municipal solid waste management.

Due to the lack of enforceable hazardous waste regulations in Ecuador, there will be no market for hazardous waste management services in the near future.

3 4 5 Pollution Prevention and Cleaner Technologies

Market Size (1999)	\$3 million
Best Prospects	Process control equipment

USAID's Environmental Pollution Prevention Project (EP3) started the development of a market for pollution prevention and cleaner technologies in Ecuador. EP3 conducted 16 pollution prevention audits in eight industrial sectors, including textiles, tanning, pulp and paper, ceramics, etc. USAID, along with a few other donors, will continue (through the year 2000) to provide funding to the Ecuadorian NGO Oikos Corporation to promote pollution prevention and industrial cleaner production.

In 1996, the IDB launched a \$24 million Science and Technology Project to promote technological innovation in Ecuador. Under this project, there are 30 pilot initiatives (with a total cost of approximately \$6 million) aimed at the technological modernization of the industrial sector.

Despite the substantial donor-sponsored technical assistance promoting the concept of cleaner production to Ecuadorian industry, the high interest rates (60-80% in local currency) generally prevent industries from obtaining loans to finance procurement of cleaner technologies. Therefore, this market segment will be limited in the short term to low-cost technical solutions, including installation of process control equipment that helps improve operating efficiency.

3 4 6 Environmental Consulting Services

Market Size (1999)	\$14 million
Best Prospects	Technical assistance in institutional strengthening, regulatory development, pollution prevention and energy efficiency, EMS, project feasibility studies

The demand for public sector environmental consulting services in Ecuador is expected to grow as the Ministry of Environment and the municipal environmental agencies work to implement the new environmental management framework envisioned in the forthcoming environmental law. Institutional strengthening and regulatory support will dominate the environmental consulting market in the near future.

The World Bank is currently funding a \$20 million Environmental Management Project (1997-2000) which consists of four components (World Bank, 1996)

- 1) Policy Formulation and Institutional Strengthening (\$6.5 million), including environmental management assistance to the Ministries of Environment, Urban Development and Housing, Industry and Fisheries, and Energy and Mining
- 2) Environmental Planning and Management in the Ecuadorian Amazon (\$3.1 million), including assistance in land use policy development and planning, environmental impact assessment, and designing institutional mechanisms for community participation
- 3) Municipal/Provincial Environmental Management (\$3.9 million), including institutional and programmatic support to the municipalities of Quito, Guayaquil, Cuenca, and several small and medium-sized Ecuadorian cities
- 4) Environmental Information and Management in the Gulf of Guayaquil (\$6.5 million), including policy development for fisheries and shrimp aquaculture, pesticide control, and mangrove forest protection

The Environmental Management Project presents an ongoing consulting opportunity as about half of the funds have not been disbursed as of the beginning of 1999. This project will soon be complemented by the IDB's \$1 million "Institutional Strengthening for the Ministry of the Environment" project, which is currently in the preparation stage. This project will support the Ministry's policy development and other environmental management initiatives.

As is often the case, many large donor-funded environmental infrastructure development projects in Ecuador include substantial technical assistance components. For example, it is expected that no less than 20% of the costs of the upcoming \$300 million second phase of the Municipal Development Program (PDM II) will be spent on consulting services. Feasibility studies for the Cuenca II water supply and sewerage program will be financed through a separate IDB credit of \$750,000 (to be approved in 1999).

To date, the market for industrial pollution prevention audits and EMS development has been mostly driven by donor funding. In addition to the above-mentioned USAID technical assistance in pollution prevention, UNIDO has been implementing a German-funded \$80,000 EMS project in seven shrimp companies. In the future, the shrimp industry is expected to become a major private client for EMS services, as large Ecuadorian shrimp-producing and processing companies are under pressure from major importers of shrimp products (particularly Japanese companies) to get certified to the ISO 14001 standard. Other indicators of the growing demand for EMS consulting services in Ecuador are the ISO 14001 certification of the Ecuadorian branch of Occidental Exploration and Production, a U.S. oil company, and the pending certification of Dole, a major Ecuadorian banana-exporting company (CEDA, 1999).

Energy Efficiency Services There are also opportunities for consulting in energy efficiency under Ecuador's Program for Demand Management and Rational Use of Electrical Energy (AD&UREE) executed by the Ecuadorian Electrification Institute under the auspices of the

Ministry of Energy and Mines Under this program (1994-2010), Ecuadorian electricity companies are supposed to spend \$55 million to introduce various energy saving measures in the residential, commercial, and industrial sectors

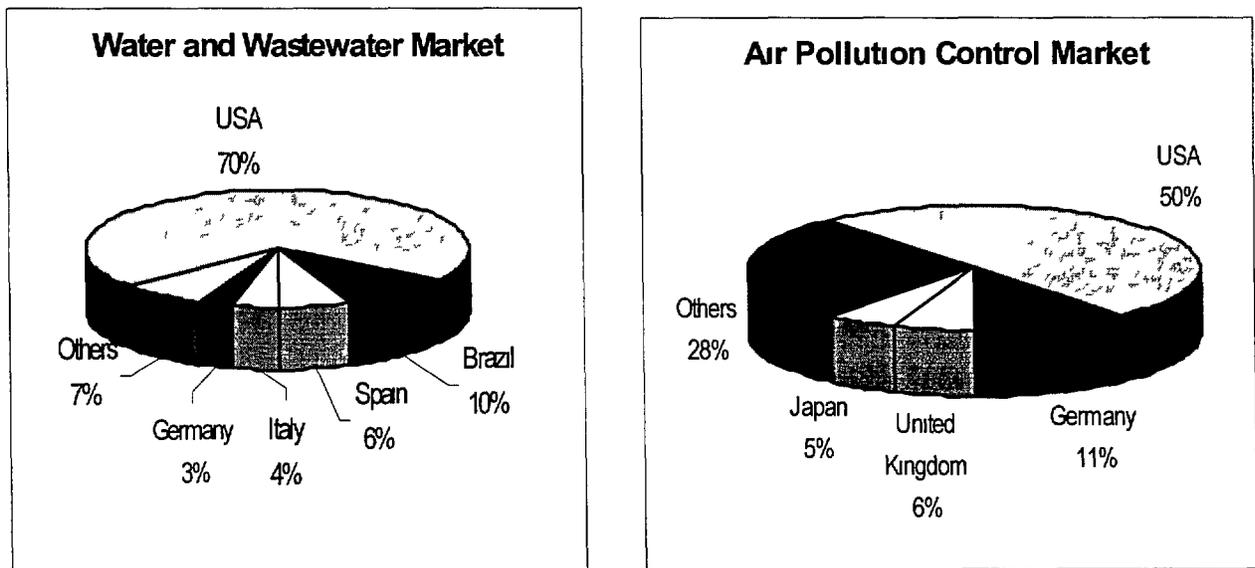
3.5 MARKET STRATEGIES FOR U.S. FIRMS

3.5.1 Competition

The United States has traditionally maintained superiority in the Ecuadorian environmental market because of the historic preference for the high quality of American products and services. This is especially true in the water and wastewater market, where imports from the U.S. have a 70% market share (see Exhibit 3-3). The competition in this market segment comes from Brazilian firms, which can supply cheaper alternatives to U.S. technologies in tough economic times, and European firms. The domestic production is virtually nonexistent, with the exception of simple metal parts (US&FCS, 1997c).

Domestic production of air pollution control equipment, on the contrary, is very significant (up to 60% of the market) and includes dry and wet control systems such as grids, nozzles, and filters. U.S. companies control 50% of the import market and supply industrial burners and furnaces with emission controls already installed, as well as electronic control instruments and monitoring devices (US&FCS, 1997b). Other major third-country suppliers include Germany, Great Britain, Japan, Spain, Finland, Italy, and the Netherlands (see also Exhibit 3-3).

Exhibit 3-3 Environmental Equipment Import Market Shares in Ecuador



Source: US Foreign and Commercial Service 1997

3 5 2 Positioning for Success

With USAID funding on the decline in Ecuador, World Bank and particularly IDB projects present the biggest opportunities for U S suppliers of environmental technologies and services Appendix C provides descriptions and contact information on multilateral and bilateral donor agencies

Infrastructure Development Infrastructure development opportunities are still limited in Ecuador but they are expected to grow as more concessions are offered for water supply, sanitation, and municipal waste management services Partnering with an Ecuadorian engineering firm is essential in winning this work Local firms have critical familiarity with the in-country regulatory environment and extensive technical knowledge important in adapting U S technologies and engineering to local conditions

Equipment Sales Ecuador's environmental equipment market is very open to U S products which are highly regarded for their quality and guaranteed technical assistance and support Since the environmental market involves some degree of technology transfer, training for Ecuadorian plant engineers should be included as a part of the service package offered by U S firms

U S companies interested in the Ecuadorian market must be aware that this market is highly sensitive to price, especially now when the devaluation of the local currency makes imported goods more expensive U S firms may want to offer low-cost solutions that involve producing some equipment in the country, taking advantage of the wide availability and low cost of labor

A local representative or agent is necessary in order to sell any product in Ecuador Legally, a representative is required for equipment sales to the government The market is very receptive to joint ventures between Ecuadorian and American companies A joint venture can provide comprehensive service from the customized design and installation of a pollution control system to technical support and after-sale maintenance

It is advisable to contract the services of local engineers that have been trained in the latest technologies available Ecuadorian universities, such as the Escuela Superior Politecnica del Ejercito in Quito, are known for the quality of their engineering departments

Ecuador's standard import procedure requires the importer to register with the Ecuadorian Central Bank and obtain an import license for every transaction before a letter of credit can be opened in favor of a foreign supplier and incoming goods are shipped from the point of origin Import licenses are not difficult to obtain and can be requested by anyone wishing to import a product

Ecuadorian government agencies usually publish procurement announcements in national newspapers and trade journals Bid documents containing detailed information must be purchased by the interested party Although Ecuador's government procurement practices do not

discriminate against U S or other foreign suppliers, bidding for government contracts may be cumbersome due to the widespread bureaucracy and corruption

Appendix D contains information on U S Government programs to assist American companies with loan guarantees, limited financing and insurance, and business development

Consulting Services U S companies that have experience in the region and have Spanish-speaking staff will have an advantage in the consulting market Again, the key success factors are continuous monitoring and pursuit of donor-funded technical assistance projects and partnerships with local organizations (often non-governmental groups) Regulatory and institutional expertise, as well as knowledge of environmental management systems are in high demand in Ecuador

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CHAPTER 4

PERU

4 1 ECONOMIC AND POLITICAL OVERVIEW

<i>Area</i>	1 3 million sq km
<i>Population</i>	24 8 million
<i>Urban population</i>	72%
<i>GDP</i>	\$51 billion
<i>GDP per capita</i>	\$2,041
<i>GDP growth rate</i>	2 5% (1998), 7 2% (1997)
<i>Inflation</i>	8%

Source U S Department of State 1998

4 1 1 Major Economic Trends

Economic and Social Indicators Since 1990, the Peruvian government has been pursuing a bold reform agenda that ended 30 years of economic mismanagement that brought the country to virtual economic collapse in the late 1980s. As part of its reform program, the government liberalized interest rates, the exchange rate, and international capital flows. It increased competition by opening the economy to trade with the rest of the world, introducing anti-monopoly measures, and eliminating price controls. It facilitated private ownership of land and carried out an expansive privatization program. The rate of inflation has fallen steadily since 1990 as a result of stringent monetary and fiscal measures. It dropped from 7,649% in 1990 to 6 5% in 1997, the best performance in a quarter-century (U S Dept of State, 1998). Peru has just completed the second term of IMF's Extended Fund Facility which the government has used as a way of signaling to the international financial community its intention of keeping fiscal discipline. However, the country's external debt remains very high (\$27 5 billion in 1996) and growing, making foreign creditors less likely to offer the Government of Peru the same favorable terms as in the mid-1990s.

Industry is responsible for 36% of Peru's GDP (services for 57% and agriculture for the balance). The industrial sectors developing the country's abundant mineral, fishing, and hydrocarbon resources contribute to much of its economic growth. Over the last year, however, Peru's economic performance was affected by both the Asian economic crisis and the El Nino weather phenomenon. The crisis in Asia sharply reduced the demand for and prices of Peruvian metals exports (copper is Peru's single largest export item). El Nino led to a drastic decline in fish stocks, causing severe damage to the fishing industry. The El Nino-related weather conditions also took their toll on the country's agriculture.

In the long term, the mining and petroleum sectors offer the best growth prospects as Peru is believed to have large undiscovered reserves of metals and oil. Several major new investments in the exploration of these resources are expected in the near future and into the next century. The infrastructure needed for such projects will generate growth in the construction and engineering services industries. Tourism is also a potentially very important source of both foreign exchange revenues and employment. In the first half of 1998, tourist arrivals were up over 10% from the previous year (U S Dept of State, 1998).

Among Peru's main social concerns are the underemployment of about half of its labor force and the shortage of new job opportunities. Investment is directed primarily at sectors that employ few people, such as mining, which accounts for just 1% of the workforce. In sectors like agriculture, which employs about a quarter of the working population, there has been very little improvement in salaries or working conditions.

Privatization and Investment Trends The Peruvian government actively seeks to attract private investment, both foreign and domestic, into the economy. Since 1990, it has been pursuing economic stabilization and liberalization policies which have lowered trade barriers, lifted restrictions on capital flows, and opened the economy to foreign investors. Peru's 1993 Constitution establishes equal conditions for domestic and foreign investment. The two major laws affecting foreign investment in Peru are the Foreign Investment Promotion Law (Decree 662 of 1991) and the Framework Law for Private Investment Growth (Decree 757 of 1991). Although there is no screening of foreign direct investment, foreign investors must register with the National Commission on Foreign Investment and Technology (CONITE) to guarantee that they will be able to repatriate capital, profits, and royalties (U S Dept of State, 1998).

In 1991, the Peruvian government launched an extensive privatization program, encouraging foreign investors to participate. From 1991 through mid-1998, privatization sales reached a total of \$7 billion, of which foreign investors have acquired the vast majority. However, the privatization program has slowed down somewhat in the last year. For example, Mantaro, the country's largest hydroelectric generator, at one time scheduled to be privatized, is now to be operated as a concession. SEDAPAL, Lima's water and wastewater utility, will remain indefinitely under state control, contrary to the earlier plans for its privatization. Centromin Peru, a huge state-owned mining company which the government began privatizing in 1994, is still not completely sold (LatinFinance, 1998).

Trade Policy Peru is actively involved in the hemispheric free trade process. Peru has been a member of the Andean Community (with Venezuela, Ecuador, Colombia, and Bolivia) since 1969. In 1997, it agreed to rejoin the Community's Free Trade Area (FTA), which it left in 1992. Peru will be fully integrated into the FTA by 2005, although a majority of its trade with the Andean Community is already tariff-free. Peru's average tariff for non-FTA countries is about 13%, down from 66% in 1990.

As part of the Andean Community, Peru has participated in long negotiations to establish a free trade area with MERCOSUR resulting in April 1998 in a framework agreement between the two

trade blocks, which is regarded as the first step in building a South American free trade zone. Peru is also taking an active part in creating a Free Trade Area of the Americas by 2005.

Since 1991, Peru has signed bilateral investment agreements with over 25 countries, including many European Union countries and its South American neighbors. Although Peru has not yet concluded a Bilateral Investment Treaty with the United States, the U.S. Government has expressed its intention to negotiate such an agreement on terms that would safeguard the interests of American direct and portfolio investment in Peru.

4.1.2 Political Situation

Peru is a republic with a dominant executive branch headed by President Alberto Fujimori, who was first elected in 1990 and reelected by a landslide in 1995. The President appoints the government ministers. The legislative branch is represented by a unicameral Congress, also elected for a five-year term. The next presidential and parliamentary elections will take place in 2000.

The Fujimori administration has been successful in significantly reducing terrorist activities in the country. Peru's human rights record has also improved substantially as the level of political violence declined. However, there are still cases of intimidation of opposition politicians and journalists by the government, as well as political pressure on the judiciary.

The U.S.-sponsored development and humanitarian assistance program for Peru is the largest in South America. It targets the strengthening of democracy and human rights protection, elimination of illegal narcotics production and trafficking, and promotes sustainable development.

4.2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

4.2.1 Principal Laws and Regulations

The general environmental management framework in Peru is governed by the Environmental Code (Codigo del Medio Ambiente y los Recursos Naturales, 1990) which gives sectoral ministries, including the Ministries of Industry, Energy and Mines, and Fisheries, the authority to regulate polluters within their jurisdiction. The national environmental agency, Consejo Nacional del Ambiente (CONAM), plays a coordinating role with respect to environmental policies of the sectoral ministries.

Cross-Sectoral Environmental Regulations The General Water Law (Ley General de Agua, last modified in 1983) established strict health-based ambient standards for all receiving waters, depending on their nature and use. Discharges are prohibited if they cause the receiving waters to exceed these standards. However, this ban is poorly enforced. The General Water Law is

expected to be replaced shortly by guidelines for water resources to be promulgated under the Organic Law for the Sustainable Use of Natural Resources (1997)

The Ministry of Health sets drinking water quality standards for numerous parameters, including biological oxygen demand and heavy metals. Although the law gives the Ministry of Health the power to stop any wastewater discharge that causes a drinking water source to exceed these standards, this authority has never been exercised.

Existing law in Peru imposes different standards on industrial firms, depending on whether they discharge wastewater to a municipal sewage system or directly to surface waters. Limits for discharges to a sewer system are imposed by municipal utilities acting under the overall authority of the National Superintendence of Sanitary Services (Superintendencia Nacional de Servicios de Saneamiento, SUNASS). However, the effect of such limits is minimal since most utilities do not treat industrial effluents before discharging them to the receiving waters.

There are currently no air quality standards at the national level. However, CONAM is planning to establish criteria and procedures for setting ambient standards and emission standards by sectoral ministries. There is also no comprehensive waste management law in Peru. The Regulation for Urban Cleaning (Reglamento de Aseo Urbano, 1983) delegates the responsibility for collection and disposal of municipal garbage and medical waste to municipal authorities. Industrial hazardous waste is practically unregulated.

Environmental Regulations for the Mining Industry Peru's Ministry of Energy and Mines (MEM) has so far established the most sophisticated environmental regulatory system among sectoral agencies. Its Decree 016-93-EM of 1993, the Regulation for Environmental Protection in Mining-Metallurgical Activities, established a system for setting maximum permissible limits (MPLs) for the mining industry. MPLs for wastewater effluents were issued in early 1996 and for air emissions in 1997. The regulation requires existing plants to monitor their emissions for 12 months (based on a monitoring guide published by the Ministry's Directorate for Environmental Affairs) and gives them another year to prepare a Preliminary Environmental Assessment (Evaluation Ambiental Preliminar, EVAP). Upon approval of the EVAP, all existing pollution sources have to prepare an Environmental Compliance and Management Program (Programa de Adecuación y Manejo Ambiental, PAMA). To date, almost all the mining companies have submitted PAMAs. New plants or those planning an expansion of more than 50% are required to prepare an Environmental Impact Assessment (EIA). If a submitted EIA is not rejected in 45 days, it is considered approved, after which PAMA requirements come into force.

A PAMA must identify actions to be taken to reduce pollution to maximum permissible levels, their timeframes, and amounts to be invested in respective abatement measures. Once a PAMA is approved, mining companies are obligated to invest at least 1% of their sales value in pollution control and prevention, regularly monitor their air emissions and wastewater discharges, and provide an annual environmental report to MEM.

Failure to comply with PAMA conditions may result in an operation being closed for 30 days and fined up to \$8,500. Multiple violations may carry a penalty of closure for 90 days and fines of \$25,500 or, in serious cases, permanent closure of the operation. Compliance with PAMAs must be achieved in 5 years for mining operations and in 10 years for smelters (US&FCS, 1997a)

Environmental Regulations for the Oil and Gas Industry MEM is also responsible for the country's oil and gas industry. The environmental regulation for oil and gas production activities establishes requirements similar to those for mining operations plus a requirement for Contingency Plans for Oil Spills and Emergencies to be updated once a year. All existing hydrocarbon companies had to submit PAMAs by July 1997 and comply with them within 7 years from the date of their approval.

Environmental Regulations for the Manufacturing Industry The Ministry of Industry, Tourism, and International Trade (Ministerio de Industria, Turismo, Integración y Negociaciones Comerciales Internacionales, MITINCI) promulgated in 1997 a "Reglamento de Protección Ambiental para el Desarrollo de Actividades de la Industria Manufacturera" – a framework environmental regulation for the manufacturing industry. The regulation lays out an EIA process for new and modified industrial activities. A project proponent must submit to MITINCI a Environmental Impact Declaration (Declaración de Impacto Ambiental, DIA) or an EIA, depending on the firm's self-assessment of the potential environmental risk. An EIA is more detailed, and includes a management plan emphasizing pollution prevention.

Existing manufacturing firms must submit a PAMA to MITINCI. PAMAs must be based on emission and effluent standards which have been proposed but not yet promulgated by the ministry. The regulation establishes a preference for pollution prevention measures as part of PAMA over potential recycling and treatment options. Industries have to comply with PAMAs within five years from the date of their approval. The framework regulation also requires industrial establishments to regularly submit monitoring reports (US&FCS, 1997a).

In addition to specific standards for air emissions and wastewater discharges, MITINCI has yet to promulgate hazardous and solid waste management regulations.

Environmental Regulations for the Fisheries Industry The General Regulation for Environmental Protection in Fisheries Activities was promulgated by the Ministry of Fisheries (Ministerio de Pesquería, MIPE) in 1994 required the submission of PAMAs by 1995. The majority of fishmeal and fish oil companies have complied this requirement. However, the regulation has never been fully implemented because of its internal discrepancies and weaknesses. It is now being revised with increased emphasis on promoting pollution prevention rather than end-of-pipe control requirements (US&FCS, 1997a)

4 2 2 Institutional Structure

The National Environmental Council (Consejo Nacional del Ambiente, CONAM) was established in December 1994 and became operational in 1996. It is not an Environmental Ministry but rather a consultative body whose Directive Council is comprised of representatives of different levels of government (national, regional, and local) and the private sector. CONAM is in charge of coordinating environmental policies across sectors and clarifying responsibility for overlapping environmental issues where more than one sector is involved. It may issue decrees to that effect. Among CONAM's responsibilities are also the development and implementation of a National Environmental Management System, National Environmental Action Plan, and National Environmental Information System. In addition, CONAM is planning to create a National Environmental Fund (FONAM) that would disburse the national government's funds for environmental projects (CONAM, 1998).

Each of the sectoral ministries (Ministries of Energy and Mines, Agriculture, Industry, and Fisheries) has its own environmental unit authorized to enforce sectoral environmental regulations. The Sub-directorate for Environmental Management (Subdirección de Supervisión y Fiscalización Ambiental, SSFA), the environmental authority within MITINCI, has both fewer staff and a relatively low position in the Ministry than the equivalent authorities in other ministries. The Directorate General of Environmental Affairs (Dirección General de Asuntos Ambientales) of the Ministry of Energy and Mines and the MYPE's Directorate for the Environment have a significantly higher administrative status. In addition, SSFA has only three professionals to manage over 5,000 large industrial firms, whereas the Ministry of Energy and Mines has 14 environmental staff to handle approximately 200 large mining firms.

The Ministry of Health has its own Environmental Directorate (Dirección General de Salud Ambiental, DIGESA) which focuses on monitoring and controlling ambient air and water quality, drinking water quality and basic sanitation (including wastewater treatment and solid waste collection and disposal), food safety, and occupational health. DIGESA has the power to shut down industrial plants for public health reasons.

SUNASS regulates and supervises local water supply and sewerage utilities, and establishes standards and tariffs for these services. Each utility, however, is responsible for its industrial pretreatment program. Solid waste management is entirely under the jurisdiction of local governments.

4 2 3 Status of Implementation and Enforcement

While environmental regulations have been promulgated by each sectoral ministry, there is little coordination between the ministries to address common problems that involve two or more sectors. For example, the Ministries of Health, Agriculture, Industry, Energy and Mines, and Fisheries all have responsibilities for water pollution control, and yet discharge standards have not been adopted by some ministries and are not enforced by others. There is a lot of competition

and animosity between the sectoral ministries, and all of them blame CONAM for being unfairly harsh to their industry

Although the Ministry of Energy and Mines has been more successful than others in enforcing its environmental regulations, there is a general lack of personnel and technical expertise to maintain viable enforcement programs. For instance, the regulations are lax with respect to EIA and PAMA preparation. Until recently, many firms were contracting their own subsidiaries to conduct environmental impact studies, with the government agencies only approving or rejecting the results. The situation is expected to improve following the adoption of private auditor certification requirements.

4.3 MARKET DRIVERS

Serious problems with delivering water supply, sewerage, and waste management services in Peru, particularly in and around Metropolitan Lima, are the main driver for the Peruvian government and international donors to invest in environmental improvements in the country. There is also significant pressure on Peru's two major exporting industries, mining and fishmeal, to comply with the new sectoral environmental regulations and respond to importers' requirements for sound environmental performance.

Peru's infrastructure privatization prospects have been set back significantly by the recent decision not to privatize SEDAPAL, Lima's water and wastewater utility. Concessions for small local utilities appear unlikely. The emerging plans to issue concessions for solid waste collection services in some cities cannot be characterized as an important market driver.

4.3.1 Major Environmental Problems

Water Supply and Sanitation Only about half of Peru's population has access to piped drinking water: 63% in urban areas and 31% in rural areas (World Bank, 1997c). Only 40% of the piped water in the country meets bacteriological standards (US&FCS, 1997b). The coverage rate in urban areas is around 75%. In many areas of Peru, water supply is irregular, and water shortages are quite common. In the early 1990s, 48% of the population received water for less than 12 hours each day, and 28% had it for less than six hours a day. In Lima, potable water coverage is about 80%. However, the water supply infrastructure is inefficient and worn out: the rate of physical water losses due to leaking pipes exceeds 30%, based on a district-by-district study (World Bank, 1994).

There is a severe shortage of sewage collection and treatment systems in Peru, which is one of the leading causes of surface and ground water contamination and high rates of child mortality. It is estimated that 59% of the urban population and 23% of rural residents have access to basic sanitation facilities (World Bank, 1997c). Only 35% of Peru's households are connected to

centralized sewerage systems (US&FCS, 1997b) Only 15% of the wastewater in the country is treated, and just 8% in Lima each day, Lima discharges 1.5 million m³ of raw sewage into the ocean

Industrial Wastewater Discharges Peru's rivers and coastal waters are polluted with heavy metals, including lead, from mining operations Heavy metals are found in the drinking water of the mountain communities located near the mining sites as well as in most downstream locations, in almost every sediment sample analyzed along the coast, and in marine organisms (US&FCS, 1997a) The heavy metals discharges come mostly from ore concentration processes Some artisan miners also use mercury for gold separation, as a result of which mercury is released into surface waters

The fishmeal industry is the largest polluter of Peru's coastal waters Fish are fed directly from boats into fishmeal plants, with transport water containing fish parts, oil, and blood discharged into the sea The other stream of BOD-rich effluents comes from fish processing itself These discharges harm marine ecosystems, thereby indirectly affecting the fishing industry itself, and inhibit tourism in the country's coastal cities

Petrochemical, textile, beer, and tannery plants are the main sources of wastewater discharges in the manufacturing industry Petroleum refineries on average treat only about a third of their effluents, whereas steel and chemical facilities and most small plants in other industries do not have any effluent treatment installations

Air Pollution Emissions from mobile sources are mainly responsible for air pollution problems in Peruvian cities Since the opening of the Peruvian market to imported used vehicles in 1991, the number of private vehicles in the country has increased dramatically and will exceed one million by the year 2000 (of which about half will be in Lima) Of this number, over half are vehicles with an age of six years or more (US&FCS, 1997a) In Lima, the number of public transport buses has tripled over the last six years to over 50,000 units With an average age exceeding 10 years, most of the bus fleet is dilapidated and highly polluting (World Bank, 1997a) High emission levels of lead (lead in gasoline in Peru is expected to be phased out completely only in 2005), nitrogen dioxide, carbon monoxide, and particulates result in high risk of respiratory diseases in large cities The situation is exacerbated by the fact that vehicle emissions are not regulated in Peru

The cement, limestone, and plaster industry is the largest generator of particulate emissions among stationary sources Sulfur dioxide emissions are caused mainly by smelters Very few industries have air pollution control devices

Hazardous and Solid Waste There are no reliable data on hazardous waste generation in Peru, since a regulatory framework for hazardous waste management is only being contemplated by CONAM and the sectoral ministries Presently, industrial hazardous waste is disposed together with non-toxic industrial waste and municipal trash

The municipal solid waste collection and disposal problem is most serious in Peru's poor urban areas, especially in Lima, a city that houses about a third of the country's population. Of almost 4,400 tons of garbage generated in Lima daily, only 3,150 (72%) is collected by SUMSEL, Lima's municipal sanitation company. Another 6% is picked up by so-called "segregators" who collect paper, glass, and plastic and then sell it (SPDA, 1998). The rest is burned (despite a legal prohibition) or left to self-ignite. Of the trash that is collected, only 35% is disposed in four existing landfills (lacking proper sanitary design), and 65% is piled in illegal dumps or thrown into the Rimac River (US&FCS, 1997a).

4 3 2 Competitiveness Pressure on Exporting Industry

Peru's metals mining sector and its related industry are responsible for about 45% of the country's total export revenue. Total direct investment in the sector has been around \$1 billion a year over the last three years and is expected to stay at the same level in the short term (World Bank, 1996). By establishing a level playing field between public and private and between foreign and national mining companies, the Peruvian General Mining Law of 1992 provided a sound basis for competition in the sector and created incentives for its modernization and environmental upgrading.

The fisheries industry is the second largest exporter in Peru with 16% of the total exports value. A lot of market pressure for environmental improvements in this industry is coming from Japan, the main importer of Peruvian fishmeal products. Recently, Japan required that all Peruvian fishmeal exporting firms obtain ISO 14001 certification.

Peruvian industrialists are rapidly becoming aware that environmental abatement measures should not be regarded as an expense, but as an investment in the increased competitiveness in international markets. An association of Peru's fourteen top business concerns backed CONAM's initiative to promote environmental responsibility in industry and formed the "Club ISO 14000" that seeks to educate companies about the benefits of adopting this international standard and investing in environmental improvements in general (Inter Press, 1998).

CONAM is seeking to institutionalize the ISO 14001 standard in Peru by creating a more favorable enforcement regime for companies that demonstrate a commitment to continuous environmental improvement. This is the first such initiative in Latin America.

4 3 3 Regulatory Pressure

Peruvian sectoral ministries are actively developing new environmental standards to support the recently established regulatory framework for environmental impact assessment and mitigation. Emission and effluent standards are expected to be promulgated soon by the Ministries of Industry and Fisheries (hazardous waste regulations are a more remote prospect). Their adoption

will complement the existing monitoring requirements and make existing regulations more enforceable

The new Peruvian environmental regulations promote cleaner production as a preferred compliance mode. This should increase the potential pollution prevention and cleaner technologies market

4.3.4 Donor Funding

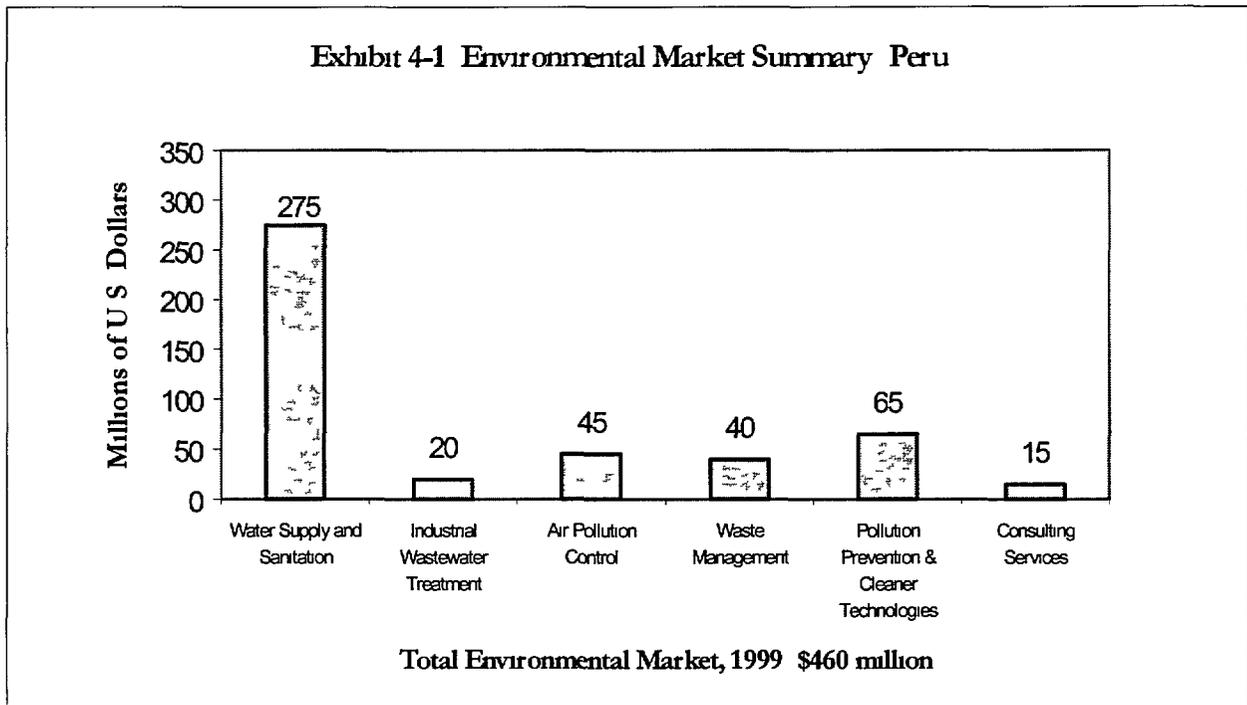
Donor funding does not have as tremendous an influence on the environmental market in Peru as it does in Bolivia and Ecuador. The share of both public and private sector environmental spending is significant and will grow over time. However, donor funding is dominant in Peru's water supply and sanitation sector, with the World Bank and the Japanese Overseas Economic Cooperation Fund (OECF) currently contributing most of the money. Japanese bilateral aid plays a particularly important role in Peru due to President Fujimori's close ties with Japan.

USAID is active in providing technical assistance to Peruvian environmental institutions, creating an advantageous climate for U.S. consulting firms.

4.4 MARKET OPPORTUNITIES

Peru has by far the largest environmental market of the three countries considered in this report – \$460 million in 1999. The size of the market will likely remain roughly the same over the next two or three years but may decline thereafter, as there are few large environmental donor projects in the pipeline.

While the water supply and sanitation sector clearly dominates the market (with 60% of the total market size), other market segments are also significant. Peruvian industry's ability and willingness to invest in pollution control and prevention create opportunities in the industrial wastewater treatment, air pollution control, and cleaner technologies markets. The private sector component of Peru's environmental market is expected to grow in the near future.



Source Hagler Bailly 1999

4 4 1 Water Supply and Sanitation

Market Size (1999) \$275 million

Best Prospects Water and sewerage pipes, pumps, water meters, construction of new transmission lines, pumping stations, reservoirs, and water and wastewater treatment plants

In 1998, after many years of uncertainty, the Peruvian government cancelled plans to privatize Lima's water and wastewater utility, SEDAPAL. However, the government (with support from international donors) is planning to spend large amounts of money in the next few years on water and sewerage infrastructure improvement projects in the capital's metropolitan area. SEDAPAL's total combined domestic and donor-funded investment in 1997-2002 will amount to \$1.1 billion (see Table 4-1).

Table 4-1
Summary of SEDAPAL Investment Plans, 1997-2002

Investment Item	Investment Amt (million \$)
Expansion of water treatment and distribution systems and sewage collection and treatment systems	693
Rehabilitation of water supply and sewerage networks	340
Water conservation projects	39
Development of new water sources	11
Total	1,083

Source US & Foreign Commercial Service 1997

The service expansion investments constitute the main part of SEDAPAL's investment program. In 1999-2002, SEDAPAL will carry out several large water infrastructure projects supported by the Japanese OECF and the World Bank, including

- ♦ Huachupa Project (\$145 million) to construct a wastewater treatment plant and 50 kilometers of water pipelines,
- ♦ Rimac Project (\$26 million) to build 29 kilometers of water supply lines, and
- ♦ Atarjea-Villa El Salvador project (\$25 million) to install 21 kilometers of water pipelines

Part of SEDAPAL's sewerage service expansion plans will be funded through the Peruvian government's wastewater management program (PROMAR) partially supported by the World Bank. The latest World Bank project within the framework of PROMAR, Lima Wastewater Management and Coastal Pollution Control Project, allocates \$230 million for wastewater management infrastructure development, including the construction of about 20 km of large interceptors to transport sewage to treatment facilities, two primary treatment plants, and several small secondary treatment plants (World Bank, 1997b).

PROMAR is also funding the \$160 million Southern Lima Metropolitan Sewerage Improvement Project that will build 33 kilometers of sewerage pipelines and three secondary wastewater treatment plants for the areas south of Lima: San Juan de Miraflores, Villa El Salvador, La Chira, and San Bartolo. The project is financed by the Japanese Overseas Economic Cooperation Fund (OECF) and is expected to be completed in the year 2000. The \$135 million North Outfall Project that will provide wastewater treatment to the basins of the Rimac and Chillón Rivers, north of Lima, is in the feasibility study stage. The project will include the construction of three wastewater treatment plants and two sewage outfalls (US&FCS, 1997b). Equipment most in demand for these and other PROMAR projects includes grit pumps, clarifiers, digesters, tanks, automated control equipment, diffusers, aerators, chlorinator tanks, and disinfection tanks.

The rehabilitation of water supply networks involves replacing primary and secondary pipes, reconstruction of house connections, rehabilitating unused reservoirs and wells and repairing defective ones, and supplying basic maintenance equipment. The sewerage network rehabilitation also includes replacing pipes as well as repairing house connections and manholes.

SEDAPAL's water conservation projects are aimed at reducing the volume of unaccounted-for water through the preparation of a customer cadastre, reconstructing substandard water boxes, and installing water meters for the majority of the utility's customers. The investments in new water sources will cover the construction of new wells that will supply water to areas where surface waters cannot continue to be used as a source of drinking water due to contamination.

Another government program, the National Program of Potable Water and Sewage Systems (PRONAP), was completed in 1998. PRONAP, financed by the IDB, conducted a number of feasibility studies for water supply and sewerage projects in cities and neighboring communities outside Metropolitan Lima. PRONAP has identified over \$600 million worth of investment to improve water and sewerage systems in 36 areas throughout the country, setting the stage for the Peruvian government to start negotiations with multilateral and bilateral donors to finance these investments. The projects for the following seven Peruvian cities are likely to be launched in 1999-2000 (Table 4-2).

Table 4-2
Prospective Water Supply and Sanitation Projects Outside Lima

City	Total Investment (million \$)	Investment in Equipment (million \$)
Puno	17.9	6.5
Juliaca	28.2	9.5
Tacna	32.9	12.6
Cuzco	56.4	5.2
Chimbote	57.4	9.0
Pura-Castilla	41.9	8.2
Iquitos	73.5	8.6
Total	308.2	59.6

Source: US & Foreign Commercial Service, 1997.

The IDB has expressed its intention to finance about \$200 million in initial investments in water supply and sanitation, based on the feasibility study results. The project is likely to start in 1999 and run for six years (US&FCS, 1997a).

The German government has provided a \$100 million loan to the Peruvian government that will be used to pay for water supply and sewerage projects in seven provincial cities in 1998-2000.

The funds are managed directly by local water and wastewater utilities. Priority is given to cities whose infrastructure was damaged by El Niño. Projects have been initiated in Trujillo and are expected to be launched in Puno, Tumba, Piura, Ica, and Arequipa. Additional funding will come from the World Bank's El Niño Rehabilitation Program which designates \$45 million for water supply and sanitation rehabilitation projects in Peru.

4.4.2 Industrial Wastewater Treatment

Market Size (1999)	\$20 million
Best Prospects	Effluent treatment technologies for metals processing, oil refining, and fishmeal plants

Peruvian private companies in export-oriented sectors (mining, energy, and fisheries) are increasingly purchasing cleaner technologies for their new projects, thereby reducing the relative need for end-of-pipe wastewater treatment technologies. However, the market segment for wastewater treatment equipment is expected to grow in absolute terms in the coming years. The large mining companies have committed to invest about \$100 million in industrial wastewater treatment plants between 1997 and 2006 (according to PAMAs submitted to the Ministry of Energy and Mines). Peruvian oil producers such as Petrotech and Occidental Petroleum also need water pollution control equipment, including emergency oil spill control equipment such as booms, skimmers, pumps for skimmers, and vacuum trucks. The oil refineries owned by PetroPeru and Relapasa are hard pressed by new regulations to install treatment facilities for removing oil and solids from the rest of the wastewater.

In the fishing industry, there is a growing demand for filtration equipment such as trommel regenerators, flotation equipment such as flotation cells which separate oil from water, and clarifiers and flocculation equipment. The market for such equipment is estimated at approximately \$35 million over the next five years (US&FCS, 1997b).

Due to the weakness of environmental regulation for Peru's manufacturing industry and the lack of export-related incentives, the market for wastewater treatment equipment in this sector is very small.

4 4 3 Air Pollution Control

Market Size (1999)	\$45 million
Best Prospects	Scrubbers, baghouses, ambient air monitoring and vehicle emissions inspection equipment

Among the stationary sources of air pollution in Peru, the mining companies are the most active in investing in emission control devices. For example, Centromin, the largest state mining company, plans to invest some \$90 million in scrubbers for its smelters in 1997-2002. In the same timeframe, privately-owned Southern Peru Copper Corporation will invest up to \$150 million in similar equipment (US&FCS, 1997a). Baggouses and other dust control installations are needed in the cement industry but it is unclear how much, if anything, the cement plants are ready to spend on air pollution control equipment in the absence of an air emissions regulation for the manufacturing industry.

In view of the expected promulgation by the Ministry of Health of national air quality standards, the Municipality of Lima is developing an intersectoral air quality strategy for the city. Much of it focuses on creating an ambient air monitoring system (one pilot project has been planned so far) and controlling mobile sources. The Municipality intends to promulgate a city ordinance in 1999 that would establish a vehicle inspection regime (SPDA, 1998). These plans are part of a comprehensive program to improve Lima's transport infrastructure and traffic management which is going to be supported by a \$94 million World Bank loan (Lima Urban Transport Project) scheduled to commence in 1999. The Program to Reduce Traffic-Generated Air Pollution, which is part of the overall project, will (a) develop vehicle emission standards for Lima, (b) help the city establish an air monitoring program and procure appropriate equipment, and (c) promote the renewal and retrofitting of the existing bus fleet to run on cleaner fuels. Thus, air monitoring and vehicle emissions inspection equipment, as well as clean-fuel buses constitute significant opportunities for foreign equipment suppliers. These opportunities are expected to grow in the near future due to Lima's participation in the World Bank-sponsored Clean Air Initiative for Latin America.

4 4 4 Waste Management

Market Size (1999)	\$40 million
Best Prospects	Solid waste collection trucks, construction of transfer stations and sanitary landfills

There is no significant market for hazardous waste management equipment and services at this time due to the lack of a regulatory system in Peru that would require special management of

industrial hazardous waste With respect to non-toxic industrial waste, there is a need for technical solutions for the mining tailings problem (e g , building contention barriers and using liners to curb leaching of dangerous pollutants), but it is difficult to estimate how much of these services have already been contracted

On the other hand, the market for municipal solid waste collection and disposal services is substantial, especially in Metropolitan Lima Lima's Municipal Environmental Agenda for 1999-2002 lists as its first task improved MSW management Municipal Ordinance No 124-98 establishes norms for the transport and disposal of solid waste In order to achieve the goal of 90% MSW collection and 100% sanitary disposal of all the collected waste by the year 2003, the municipality plans to offer concessions for Metropolitan Lima's MSW management services which are now handled by a municipal company, SUMSEL The Municipality intends to divide the services between a foreign company, domestic public services companies, and microenterprises The details of the concessions have yet to be determined The concessions will be overseen by a Metropolitan Superintendence for Public Cleanliness that is going to be created as an independent agency in charge of establishing MSW service regulations and tariffs within the metropolitan area (SPDA, 1998)

The highest demand in the MSW management market segment is for waste collection and compacting trucks The demand for landfill equipment is also expected to grow rapidly For example, DIGESA estimates that Lima needs to build three additional landfills and five transfer stations for solid waste (DIGESA, 1998)

4 4 5 Pollution Prevention and Cleaner Technologies

Market Size (1999) \$65 million

Best Prospects Cleaner technologies in ore processing, smelting, fishmeal production, and brewing, solar and wind energy technologies

The biggest investments in cleaner technologies in Peru will be made by large, mostly multinational mining companies (which comprise over two-thirds of the industry's volume) seeking to modernize their ore processing and smelting operations to increase process efficiency and reduce environmental impacts The giant Southern Peru Copper Corporation alone plans to invest around \$500 million in new technologies in 1997-2006 (US&FCS, 1997a)

The assessments conducted in the fishmeal industry by USAID's Environmental Pollution Prevention Project (EP3) revealed staggering opportunities for cleaner technologies that reduce the industry's organic waste discharges and generate substantial economic benefits by recovering valuable raw material All the seven pilot project plants have installed EP3-recommended cleaner technologies and are saving between \$2 million and \$3 million annually The Ministry of

Fisheries estimates that Peruvian fishmeal plants will invest about \$33 million in cleaner technologies in the next two to three years (Inter Press, 1998)

The brewing industry is another sector offering good prospects for cleaner technologies imports. Breweries represent one of the most profitable industries in the manufacturing sector. The industry is very image-conscious, partly because it is trying to reach external markets, and, therefore, is striving for better product quality and environmental performance. In addition, it is one of the priority groups targeted by MITINCI's environmental regulations. There are a number of cleaner technologies (e.g., for water recycling) that can significantly reduce the volume of BOD-rich wastewater discharges. Although these are mostly low-cost technologies, they represent a notable share of the market.

Renewable Energy Technologies There are also prospective opportunities in the renewable energy sector. The World Bank is planning to sponsor a five-year project worth \$10.8 million to assist the Peruvian Ministry of Energy and Mines in designing and implementing a program to promote the use of photovoltaic systems in remote rural areas of the country. In addition, the European Union is likely to fund feasibility studies for several wind energy projects in Peru.

4.4.6 Environmental Consulting Services

Market Size (1999)	\$15 million
Best Prospects	Technical assistance in institutional strengthening, regulatory development, EIA, and EMS

USAID is very active in funding technical assistance projects to strengthen Peru's institutional capacity in environmental management and promote pollution prevention and cleaner production in Peruvian industry. Between 1997 and 2002, USAID will provide over \$21 million in grants for technical assistance in environmental management. Most of this money will come through the Sustainable Environment and Natural Resource Management Project (SENREM) – a \$12.5 million, five-year (1995-2000) effort to increase the capacity of Peru's public and private sector to identify and manage environmental and natural resource problems. There is about \$8.5 million remaining in the project as of the end of 1998.

SENREM includes three principal components (CONAM, 1998)

- a) *Legal, Regulatory, and Policy Reform* This component is designed to assist in developing and improving Peru's environmental laws and policies, and to strengthen the institutional capacity of CONAM and other agencies with environmental responsibilities.
- b) *Private Sector Advocacy* This element of the project promotes an environmental policy dialogue between government and industry, introduction of cleaner production practices in

various industry sectors, and establishment of ISO 14001 corporate environmental management systems

- c) *Demonstration Projects* Many of the projects under this last segment of SENREM are designed to demonstrate the benefits of pollution prevention and waste minimization in Peruvian industry. Such projects are likely to lead to further demand for pollution prevention audits on the part of the industry.

The USAID Mission is also preparing a project to establish a Center for Cleaner Production in Peru.

The other two projects providing technical assistance to CONAM are the IDB's "Strengthening of Environmental Institutions" project (\$2.2 million, 1996-1999) and UNDP's "Capacity XXI" project (\$1 million, 1997-2000). Both projects work on establishing a national environmental management framework for Peru.

Many other donor-funded environmental projects in Peru also include technical assistance components. For example, the World Bank's Lima Wastewater Management and Coastal Pollution Control Project allocates \$20 million to the development of a regulatory and institutional framework for water pollution control and a water quality monitoring system in the Lima Metropolitan Area.

There is also a substantial market for environmental consulting in the private sector. Promising market opportunities exist in the preparation of environmental assessments for new and existing industrial projects – EIAs and PAMAs, respectively. While it is difficult to estimate the number of assessments that will be needed even in the short term, the greatest demand is expected in the mining, petroleum, and fisheries industry, the sectors with the most stringent environmental regulations and the largest share of multinational capital.

In addition, many exporting companies in Peru are seeking to develop ISO 14001 environmental management systems. In some cases, Japanese and European importers of Peruvian products (e.g., fishmeal) require that their suppliers get certified to ISO 14001. Apart from the leading exporting sectors (mining and fisheries), EMS development has good potential in the brewing industry. Most of Peruvian beer plants use automatic quality control systems and are certified to ISO 9000, the international quality management standard. Cervesur, Peru's largest beer company with a 20% share of the local market, has already obtained ISO 14001 certification.

Energy Efficiency Services In addition, there is a need for consulting services in energy efficiency. Peru's Ministry of Energy and Mines has been allocating \$1 million a year since 1994 under its Energy Savings Project that seeks to reduce electricity demand in the industrial, commercial, and residential sectors, and promote the use of renewable energy. In addition, the World Bank is currently preparing a \$740,000, 18-month project to develop guidelines for the design of energy efficient buildings and the use of solar energy in the residential and commercial sectors. Starting in 1999, the IDB will sponsor a \$5 million, three-year Market-Based Energy

Services Program that will provide technical assistance in designing and implementing pilot projects on energy efficiency and clean energy sources

4.5 MARKET STRATEGIES FOR U.S. FIRMS

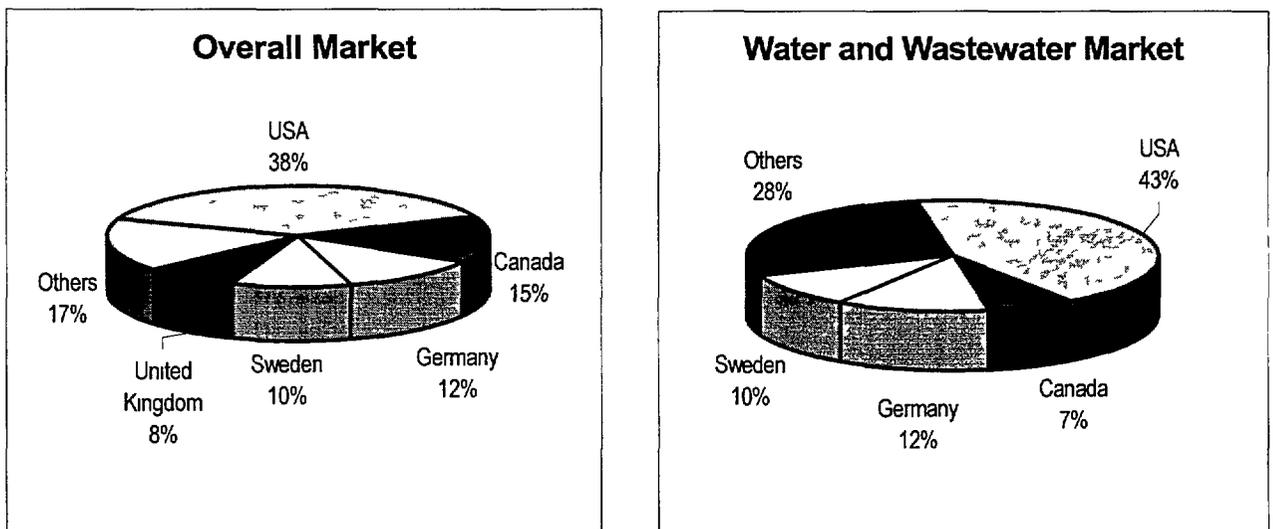
4.5.1 Competition

Local production of environmental equipment in Peru is very limited. Most of the equipment currently being used in environmental projects is imported from other countries. The most important competitive factors in Peru are price, quality, transportation costs, and after-sale service. After-sale maintenance support and service are particularly important for high-tech equipment.

The United States had a 38% share of Peru's pollution control equipment market in 1996. In the water and wastewater market, the U.S. share was even higher – 43% (US&FCS, 1997a). Good reputation, superior technology, relatively low transportation costs (compared with European and Japanese imports), and reliable service make U.S. products popular in Peru's environmental market. U.S. environmental equipment exports to Peru are expected to grow by 20% a year in the short term.

The main competition for U.S. suppliers comes from Canadian and European firms (see Exhibit 4-2). South American firms, mainly from Argentina and Chile, are increasing their market share due to their proximity to Peru and the ability to provide services in Spanish.

Exhibit 4-2 Environmental Equipment Import Market Shares in Peru



Source: U.S. & Foreign Commercial Service, 1997

4 5 2 Positioning for Success

Funding in Peru's environmental market comes mostly from multilateral donors (the IDB and the World Bank) and bilateral U S , Japanese (untied aid), and German assistance programs (under which U S firms are generally not eligible to bid) U S companies wishing to enter this market should monitor the project pipelines of the key donor agencies Appendix C provides contact information for these funding sources

Due to the centralization of the population and economic activity in Lima, most of the demand for environmental products and services is concentrated in the capital However, more market opportunities will emerge in the provinces as the government solves the most urgent pollution problems in the Lima Metropolitan Area Also, the Peruvian government is the largest client in the market, so U S exporters need to know the rules and customs of the government's procurement process

Infrastructure Development Since practically all environmental infrastructure in Peru is publicly owned, opportunities in the infrastructure development market are primarily donor-driven Although bidding for large IDB and World Bank water and wastewater projects can be done from a U S corporate office, having a strong in-country presence through a local office or a well-established local partner is essential for success

In many cases, large tenders call for the supply of a wide variety of commodities and services Since a single U S firm might not be able to provide everything required for the bid, a consortium of companies (possibly with European participation) can offer a comprehensive bid package However, Peruvian clients generally prefer a single bid for an entire tender rather than separate bids for each component

Equipment Sales In general, a good way to enter the Peruvian market is by using a local partner that knows the demand and has distribution channels already in place Most equipment distributors are located in Lima with branch offices in the other main cities such as Arequipa, Trujillo, and Tacna U S suppliers may wish to take advantage of relevant U S Department of Commerce services such as Gold Key Service, which identifies potential distributors and puts them in touch with American suppliers Appendix D offers more information on existing U S Government programs to assist U S exporters

An alternative approach is to establish a local office to have a better insight into the market and a faster response to sales opportunities It is important to note, however, that Lima is one of the most expensive cities in Latin America in terms of commercial space

To sell to the Peruvian government, the U S company or its local partner must register as a supplier with the appropriate ministry Government agencies usually publish tender notices in major newspapers, making it easier for the suppliers to monitor and identify current opportunities

Consulting Services U S firms have a strong competitive advantage in this market due to the significant amounts of USAID funding in Peru. USAID environmental funding is available mainly in the areas of policy development, institutional strengthening, pollution prevention assessments, and monitoring and information systems. USAID projects allow U S firms to demonstrate their expertise and market their services to potential Peruvian private clients.

The private sector market offers opportunities for U S consulting firms specializing in ISO 14001, environmental impact assessments, and pollution prevention audits. Companies providing services to Peruvian industry clients should be knowledgeable in local industrial processes. Firms with demonstrated experience in doing business in Peru and other South American countries will have the best chances for success.

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APPENDIX A
SUMMARY OF PRINCIPAL DONOR-FUNDED ENVIRONMENTAL
PROJECTS BY COUNTRY

Project Name	Project Areas	Donor	Total Cost	Duration/Status
BOLIVIA				
Urban Basic Sanitation Program	Water supply and sanitation	IDB	\$88.8 million	1997-2000
Aguas del Illimani (support for the concession)	Water supply and sanitation	IDB, World Bank, CAF	\$40 million	1997-2001
Rural Water and Sanitation Project	Water supply and sanitation, technical assistance	World Bank	\$48 million	1995-2000
Municipal Sanitation Program	Sanitation	IDB	\$50 million	under preparation
Environment, Industry and Mining Project	Industrial pollution control technical assistance	World Bank	\$22 million	1996-2000
Institutional Strengthening of the Vice-Ministry of Environment (VMSDMA)	Technical assistance	IDB	\$23 million	1995-2000
Development of a Regulatory Framework for the Water Supply and Sanitation Sector	Technical assistance	IDB	\$1.3 million	1997-2000
ECUADOR				
Guayaquil Concession for Water Supply and Sewerage Services (investment support)	Water supply and sanitation	IDB	\$50 million	1999-2003
Guayaquil Water Privatization	Water supply and sanitation	World Bank	\$70 million	under preparation
Quito Water Supply and Sewerage Program	Water supply and sanitation	IDB	\$170 million	1994-2002
Municipal Development Program I (PDM I)	Water supply and sanitation, waste management	IDB	\$251 million	1993-1999
Municipal Development Program II (PDM II)	Water supply and sanitation, waste management	IDB World Bank	\$300 million	under preparation
Cuenca Sanitation I	Water supply and sanitation	IDB	\$56.6 million	1995-1999
Cuenca Sanitation II	Water supply and sanitation	IDB	\$75 million	under preparation

SUMMARY OF ENVIRONMENTAL PROJECT OPPORTUNITIES BY COUNTRY ♦ A-2

Project Name	Project Areas	Donor	Total Cost	Duration/Status
Water Supply and Sewerage of Cuenca II	Technical assistance	IDB	\$0 75 million	under preparation
Rural/Small City Water	Water supply and sanitation	World Bank	\$35 million	under preparation
Infrastructure and Urban Services in Low-Income Areas (PROINSUR)	Water supply and sanitation	CAF	\$45 million	under preparation
Water Supply/Sewerage for the Peninsula of Santa Elena	Water supply and sanitation	CAF	\$41 2 million	1998-2008
Galapagos Environmental Management Program	Water supply and sanitation, waste management	IDB	\$40 million	under preparation
Science and Technology Project	Cleaner technologies	IDB	\$24 million	1996-2000
Environmental Management Project	Technical assistance	World Bank	\$20 million	1997-2000
Institutional Strengthening of the Ministry of Environment	Technical assistance	IDB	\$1 million	under preparation
PERU				
Lima Wastewater Management and Coastal Pollution Control Project	Sanitation	World Bank OECF	\$306 million	1995-2001
Lima Urban Transport	Air pollution control	World Bank	\$94 million	under preparation
Sustainable Environment and Natural Resource Management (SENREM)	Technical assistance	USAID	\$12 5 million	1995-2000
Southern Lima Metropolitan Sewerage Improvement Project	Sanitation	OECF	\$160 million	1996-2000
Strengthening of Environmental Institutions	Technical assistance	IDB	\$2 2 million	1996-1999
Capacity XXI	Technical assistance	UNDP	\$1 million	1997-2000
Market-Based Energy Services Program	Technical assistance (energy efficiency)	IDB	\$5 million	1999-2001
Guidelines for Energy Efficient Buildings	Technical assistance (energy efficiency)	World Bank	\$0 74 million	under preparation
Rural Electrification Using Solar Energy Systems	Renewable energy technologies	World Bank	\$10 8 million	under preparation

APPENDIX B

KEY LOCAL CONTACTS

BOLIVIA

U S Government Contacts

The Commercial Service

U S Embassy, La Paz

Avenida Arce No 2780

Casilla 425, La Paz, Bolivia

Tel (591-2) 430-251

Fax (591-2) 433-710

U S Agency for International Development

Calle 8 No 104, Obrajes

Casilla 4530, La Paz, Bolivia

Tel (591-2) 430-417

Fax (591-2) 785-712

American Chamber of Commerce in Bolivia

Edif Hilda, Ofic 203

Av 6 de Agosto

La Paz, Bolivia

Tel (591-2) 432-573

Fax (591-2) 432-472

Bolivian Government Contacts

Vice Ministry of Sustainable Development and Environment

Viceministerio de Desarrollo Sostenible y Medio Ambiente (VMDSMA)

Calle Mendez Arcos 710

Esq Plaza España

La Paz, Bolivia

Tel (591-2) 413-383

Fax (591-2) 410-936

Vice Ministry of Industry and Internal Commerce

Viceministerio de Industria y Comercio Interno (VICI)

Av Camacho 1488, Piso 4

Casilla 4430, La Paz, Bolivia

Tel (591-2) 372-051
Fax (591-2) 370-936

Vice Ministry of Energy and Hydrocarbons

Viceministerio de Energia e Hidrocarburos
Av Mariscal Santa Cruz
Centro de Comunicaciones, Piso 12
La Paz, Bolivia
Tel (591-2) 374-050
Fax (591-2) 392-758

Vice Ministry of Mining and Metallurgy

Viceministerio de Minería y Metalurgia
Edif Centro de Comunicaciones, Piso 14
La Paz, Bolivia
Tel (591-2) 371-184
Fax (591-2) 391-241

Vice Ministry of Investment and Privatization

Viceministerio de Inversion y Privatizacion
Av Mariscal Santa Cruz
Edif Centro de Comunicaciones
La Paz, Bolivia
Tel (591-2) 355-388
Fax (591-2) 350-786

Vice Ministry of Basic Services

Viceministerio de Servicios Basicos
Av 20 de Octubre 2230
La Paz, Bolivia
Tel (591-2) 372-249
Fax (591-2) 373-465

National Environmental Fund

Fondo Nacional para el Medio Ambiente (FONAMA)
Calle Mercado 1328
Edif Mariscal Ballivian, Mezzanine
La Paz, Bolivia
Tel (591-2) 392-367, 392-370

National Regional Development Fund

Fondo Nacional de Desarrollo Regional (FNDR)
Edif FONCOMIN, Piso 8

Av 20 de Octubre 2038
Casilla 12613, La Paz, Bolivia
Tel (591-2) 378-942
Fax (591-2) 392-123

Social Investment Fund
Fondo de Inversion Social (FIS)
Calle Belisario Salinas 354
La Paz, Bolivia
Tel (591-2) 413-124

Bolivian Industry and Trade Associations

National Chamber of Industries
Camara Nacional de Industrias
Av Mcal Santa Cruz No 1392
Edif Camara Nacional de Comercio, Piso 14
Casilla 2603, La Paz, Bolivia
Tel (591-2) 374-477
Fax (591-2) 362-766

National Chamber of Commerce
Camara Nacional de Comercio
Av Mcal Santa Cruz No 1392
Edif Camara Nacional de Comercio, Piso 7
Casilla 2603, La Paz, Bolivia
Tel (591-2) 378-606
Fax (591-2) 391-004

Confederation of Bolivian Private Enterprises
Confederacion de Empresarios Privados de Bolivia
Av Mcal Santa Cruz No 1392
Edif Camara Nacional de Comercio, Piso 7
Casilla 2603, La Paz, Bolivia
Tel (591-2) 359-970
Fax (591-2) 379-970

Other Relevant Bolivian Organizations

Liga de Defensa del Medio Ambiente

Av Ecuador 2131
Casilla 11237, La Paz, Bolivia
Tel (591-2) 324-909
Fax (591-2) 392-321

Aguas del Illimani

Villa Fatima
Av De las Americas 705
Casilla 9359, La Paz, Bolivia
Tel (591-2) 211-225
Fax (591-2) 212-454

Multilateral and Bilateral Donor Agencies in Bolivia

The World Bank

Banco Mundial
Av 16 de Julio 1628
Edificio BISA, Piso 9
Casilla 8692, La Paz, Bolivia
Tel (591-2) 356-844
Fax (591-2) 391-038

Inter-American Development Bank (IDB)

Banco Interamericano de Desarrollo
Av 16 de Julio 1628
Edificio BISA, Piso 5
Casilla 5872, La Paz, Bolivia
Tel (591-2) 351-221
Fax (591-2) 391-089

Andean Development Corporation

Corporacion Andina de Fomento (CAF)
Edif Multicentro, Torre B, Piso 9
Calle Rosendo Gutierrez, Esq Av Arce
La Paz, Bolivia
Tel (591-2) 431-333
Fax (591-2) 432-049

Japanese International Cooperation Agency (JICA)

Calle Batallon Colorados 42
Casilla 11447, La Paz, Bolivia
Tel (591-2) 350-276
Fax (591-2) 392-841

German Technical Cooperation Agency (GTZ)

Edif Dallas, Piso 8
Av Ecuador
Casilla 11400, La Paz, Bolivia
Tel (591-2) 413-131
Fax (591-2) 414-431

ECUADOR

U S Government Contacts

The Commercial Service

U S Embassy, Quito
Av 12 de Octubre y Patria
Quito, Ecuador
Tel (593-2) 561-404
Fax (593-2) 504-550

U S Agency for International Development

Av Colombia 1573 y Queseras del Medio
Quito, Ecuador
Tel (593-2) 232-100
Fax (593-2) 223-701

American Chamber of Commerce in Ecuador

Av 6 de Diciembre y La Nina
Edif Multicentro, Of 404
Quito, Ecuador
Tel (593-2) 507-450
Fax (593-2) 504-571

Ecuadorian Government Contacts

Ministry of Environment

Ministerio de Medio Ambiente
Av 10 de Agosto 3560 y Mariana de Jesus
Edif Metrocar, Piso 3
Tel (593-2) 540-455
Fax (593-2) 565-809

Ministry of Industry, Trade and Fisheries

Ministerio de Comercio, Integracion y Pesca (MICIP)
Av Amazonas y Eloy Alfaro
Quito, Ecuador
Tel (593-2) 527-988
Fax (593-2) 504-922

Ministry of Energy and Mines

Ministerio de Energia y Minas
Direccion General de Medio Ambiente
Santa Prisca 223 y 215
Quito, Ecuador
Tel (593-2) 570-767
Fax (593-2) 570-350

Ministry of Public Health

Ministerio de Salud Publica
Juan Larrea 444 entre Checa y Riofrio
Quito, Ecuador
Tel (593-2) 521-411
Fax (593-2) 521-811

Ministry of Urban Development and Housing

Ministerio de Desarrollo Urbano y Vivienda (MIDUVI)
10 de Agosto y Cordero
Quito, Ecuador
Tel (593-2) 521-311
Fax (593-2) 566-785

National Modernization Council

Consejo Nacional de Modernizacion del Estado
Patria y Juan Leon Mera
Edif CFN, Piso 9
Quito, Ecuador

Tel (593-2) 509-432
Fax (593-2) 509-437

National Council of Water Resources

Consejo Nacional de Recursos Hidricos
Av Amazonas y Eloy Alfaro, Piso 3
Quito, Ecuador
Tel (593-2) 541-774
Fax (593-2) 543-096

Central Bank of Ecuador

Banco Central del Ecuador
10 de Agosto y Briceno
Quito, Ecuador
Tel (593-2) 582-577
Fax (593-2) 580-158

Municipality of Quito – Environmental Directorate

Districto Metropolitano de Quito – Direccion de Medio Ambiente
Checa 127 y Av 10 de Agosto
Quito, Ecuador
Tel (593-2) 545-277
Fax (593-2) 221-634

Ecuadorian Industry and Trade Associations

Chamber of Industries of Pichincha (Quito)

Camara de Industriales de Pichincha
Av Republica y Amazonas
Edif De las Camaras, Piso 11
Quito, Ecuador
Tel (593-2) 452-500
Fax (593-2) 456-660

Quito Chamber of Commerce

Camara de Comercio de Quito
Av Republica y Amazonas
Edif De las Camaras, Pisos 5 y 6
Quito, Ecuador
Tel (593-2) 443-787
Fax (593-2) 435-862

Guayaquil Chamber of Industries

Camara de Industrias de Guayaquil
Blvd 9 de Octubre 910 y Rumichaca
Guayaquil, Ecuador
Tel (593-4) 562-705
Fax (593-4) 561-375

Guayaquil Chamber of Commerce

Camara de Comercio de Guayaquil
Av Olmedo 414 y Boyaca
Guayaquil, Ecuador
Tel (593-4) 323-130
Fax (593-4) 323-478

Cuenca Chamber of Industries

Camara de Industrias de Cuenca
Av Florencia Astudillo y Alfonso Cordero
Edif Camara de Industria, Piso 12
Cuenca, Ecuador
Tel (593-7) 845-053
Fax (593-7) 840-107

Cuenca Chamber of Commerce

Camara de Comercio de Cuenca
Avs Federico Malo 1-90 y 12 de Abril
Edif De las Camaras, Piso 2
Cuenca, Ecuador
Tel (593-7) 827-531
Fax (593-7) 833-891

Ecuadorian Association of Consulting Companies

Asociacion de Companias Consultoras del Ecuador (ACCE)
Av Republica de El Salvador 890 y Suecia
Edif Delta, Piso 4
Quito, Ecuador
Tel (593-2) 465-047
Fax (593-2) 465-048

Other Relevant Ecuadorian Organizations

Quito Potable Water and Sewerage Company

Empresa Municipal de Alcantarillado y Agua Potable (EMAAP)
Av Mariana de Jesus e Italia
Quito, Ecuador
Tel (593-2) 501-256
Fax (593-2) 501-387

Quito Metropolitan Waste Company

Empresa Metropolitana de Aseo (EMASEO)
Briceno 605 y Guayaquil
Quito, Ecuador
Tel (593-2) 583-345
Fax (593-2) 583-413

Guayaquil Potable Water and Sewerage Company

Empresa Cantonal de Agua Potable y Alcantarillado de Guayaquil (ECAPAG)
Calles Panama 419 e Imbabura
Guayaquil, Ecuador
Tel (593-4) 303-804
Fax (593-4) 561-006

Cuenca Potable Water and Sewerage Company

Empresa Publica Municipal de Agua Potable y Alcantarillado de Cuenca (EMAPA)
Benigno Malo y Sucre, Cuenca, Ecuador
Tel (593-7) 831-900
Fax (593-7) 833-048

Fundacion Natura

Psje Guayas 105 y Av Amazonas
Quito, Ecuador
Tel (593-2) 447-922
Fax (593-2) 434-449

Corporacion Oikos

Luxemburgo 172 y Holanda
Quito, Ecuador
Tel (593-2) 462-012
Fax (593-2) 461-212

Multilateral and Bilateral Donor Agencies in Ecuador

The World Bank

Banco Mundial
Calle Juan Leon Mera 130 y Av Patria
Edif Corporacion Financiera Nacional, Piso 6
Quito, Ecuador
Tel (593-2) 566-861
Fax (593-2) 566-862

Inter-American Development Bank (IDB)

Banco Interamericano de Desarrollo
Av Amazonas 477 y Roca
Edif Banco de Los Andes, Piso 9
Quito, Ecuador
Tel (593-2) 561-141
Fax (593-2) 564-660

Andean Development Corporation

Corporacion Andina de Fomento (CAF)
Edif World Trade Center, Piso 13
Av 12 de Octubre No 1942 y Cordero
Quito, Ecuador
Tel (593-2) 224-080
Fax (593-2) 222-107

United Nations Industrial Development Organization (UNIDO)

Organizacion de Las Naciones Unidas para El Desarrollo Industrial
Foch 265 y Av 6 de Diciembre
Edif Naciones Unidas
Quito, Ecuador
Tel (593-2) 500-361
Fax (593-2) 500-552

Japanese International Cooperation Agency (JICA)

Calle Robles 653
Edif Princo Calisto, Piso 13
Quito, Ecuador
Tel (593-2) 230-426
Fax (593-2) 564-883

German Technical Cooperation Agency (GTZ)

Av Italia 280 y Vancouver
Quito, Ecuador
Tel (593-2) 223-699
Fax (593-2) 567-953

PERU

U S Government Contacts

The Commercial Service

U S Embassy, Lima

Av La Encalada cdra 17 s/n
Surco, Lima 33, Peru
Tel (51-1) 434-3040
Fax (51-1) 434-3041

U S Agency for International Development

Av Arequipa 351
Lima 1, Peru
Tel (51-1) 433-3200
Fax (51-1) 433-7034

American Chamber of Commerce in Peru

Av Ricardo Palma 836
Miraflores, Lima 18, Peru
Tel (51-1) 241-0708
Fax (51-1) 241-0709

Peruvian Government Contacts

National Environmental Council

Consejo Nacional del Ambiente (CONAM)
Av San Borja Norte 226
San Borja, Lima 41, Peru
Tel (51-1) 225-5363
Fax (51-1) 225-5369

Ministry of Energy and Mines

Ministerio de Energia y Minas (MEM)
Direccion General de Asuntos Ambientales (Directorate General for Environmental Affairs)

Av Las Artes 260, Ofic 224
San Borja, Lima 41, Peru
Tel (51-1) 475-0065
Fax (51-1) 475-7712

Ministry of Industry, Tourism, and International Trade

Ministerio de Industria, Turismo, Integracion y Negociaciones Comerciales Internacionales
(MITINCI)

Subdireccion de Supervision y Fiscalizacion Ambiental (Environmental Authority)
Calle 1 Oeste s/n, Urb Corpac
San Isidro, Lima 27, Peru
Tel (51-1) 224-3393
Fax (51-1) 225-5110

Ministry of Fisheries

Ministerio de Pesqueria
Direccion del Medio Ambiente (Environmental Directorate)
Calle 1 Oeste s/n, Piso 6, Urb Corpac
San Isidro, Lima 27, Peru
Tel (51-1) 224-3329
Fax (51-1) 224-3221

Ministry of Health

Ministerio de Salud
Direccion General de Salud Ambiental (DIGESA)
Las Amapolas 350, Urb San Eugenio
Lince, Lima 14, Peru
Tel (51-1) 421-0274
Fax (51-1) 440-6562

Municipality of Lima

Municipalidad de Lima Metropolitana
Encargado de Asuntos Ambientales (Environmental Section)
Palacio Municipal, Piso 3
Plaza de Armas
Lima 1, Peru
Tel (51-1) 427-0720
Fax (51-1) 433-1550

Peruvian Industry and Trade Associations

National Association of Industries

Sociedad Nacional de Industrias (SNI)
Los Laureles 365
San Isidro, Lima 27, Peru
Tel (51-1) 421-8830
Fax (51-1) 442-2573

National Trade Association

Confederacion Nacional de Comerciantes
Av Abancay 210, Piso 3
Lima 1, Peru
Tel (51-1) 427-4914
Fax (51-1) 427-2567

Lima Chamber of Commerce

Camara de Comercio de Lima
Gregorio Escobedo 398
Jesus Maria, Lima 11, Peru
Tel (51-1) 463-3434
Fax (51-1) 463-9864

Other Relevant Peruvian Organizations

Lima Potable Water and Sewerage Service Company

Servicio de Agua Potable y Alcantarillado de Lima (SEDAPAL)
Placido Aguirre Alata
Monte Azul 176
Chacarilla del Estanque, Lima 33, Peru
Tel (51-1) 438-8422
Fax (51-1) 438-7013

PROMAR – Wastewater Management Project for Metropolitan Lima

Proyecto de Manejo de las Aguas Residuales de Lima Metropolitana
Av Benavides 2199, Piso 7
Miraflores, Lima 18, Peru
Tel (51-1) 271-9638
Fax (51-1) 271-2703

Peruvian Environmental Law Association

Sociedad Peruana de Derecho Ambiental (SPDA)

Prol Arenales 437

San Isidro, Lima 27, Peru

Tel (51-1) 422-2720

Fax (51-1) 422-4365

Peruvian Association for Clean Air and Environmental Management

Sociedad Peruana Pro Aire Limpio y Gestion Ambiental (SPAGAL)

28 de Julio 363, Of 203

Lima 1, Peru

Tel (51-1) 424-8833

Fax (51-1) 497-2709

Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS)

Centro Panamericano de Ingenieria Sanitaria y Ciencias del Ambiente

Calle Los Pinos 259, Urb Camacho

Lima 12, Peru

Tel (51-1) 437-1077

Fax (51-1) 437-8289

Multilateral and Bilateral Donor Agencies in Peru

The World Bank

Banco Mundial

Av Pardo y Alhada 640, Piso 16

San Isidro, Lima 27, Peru

Tel (51-1) 422-0282

Fax (51-1) 421-7241

Inter-American Development Bank (IDB)

Banco Interamericano de Desarrollo

Paseo de la Republica 3245, Piso 14

San Isidro, Lima 27, Peru

Tel (51-1) 442-3400

Fax (51-1) 442-3466

Andean Development Corporation

Corporacion Andina de Fomento (CAF)

Av Enrique Canaval Moreyra 380

Torre Siglo XXI, Of 1002

San Isidro, Lima 27, Peru

Tel (51-1) 221-3566

Fax (51-1) 221-0968

Japanese International Cooperation Agency (JICA)

Av Angamos Oeste 1381, Urb Santa Cruz

Miraflores, Lima 18, Peru

Tel (51-1) 221-2433

Fax (51-1) 441-9679

German Technical Cooperation Agency (GTZ)

Av Prolongacion Arenales 801

Miraflores, Lima 18, Peru

Tel (51-1) 422-6477

Fax (51-1) 422-6188

APPENDIX C

MULTILATERAL AND BILATERAL DONOR AGENCIES

C.1 THE WORLD BANK

The World Bank is the largest financier of environmental infrastructure projects world-wide. There are two types of Bank lending. The first type is for developing countries that are able to pay near-market interest rates. The money for these loans comes through the *International Bank of Reconstruction and Development (IBRD)*. The second type of loan goes to the poorest countries, which are usually not creditworthy in the international financial markets and are unable to pay near-market interest rates on the money they borrow. Lending to the poorest countries is done by a World Bank affiliate, the *International Development Association (IDA)*.

Its numerous publications include *Environment Matters*, which summarizes its environmental operations. The World Bank conducts one-day seminars on upcoming business opportunities developing within the Bank. The program includes strategies on how to keep informed about projects, upcoming contracts, and how to pursue foreign investment opportunities. The World Bank publishes *Facing the Global Challenge: A Progress Report on the World Bank Global Environment Operations* summarizing its portfolio of environmental projects. The World Bank advertises its project opportunities in *Development Business*. The World Bank's procurement procedures are well established and offer opportunities for U.S. equipment suppliers, engineers, and consultants.

Contact information

The World Bank
1818 H Street, N.W.
Washington, D.C. 20433
Public Information Center
Tel. 202-458-5454, Fax 202-522-1500, <http://www.worldbank.org>

The two institutions affiliated with the World Bank Group that deal with the private sector are

International Finance Corporation (IFC) IFC is an affiliate of the World Bank that provides project financing for private investment in developing countries. IFC offers long-term loans and equity investments, as well as other financing services. IFC will generally invest up to 25% of the total project cost. In addition to project finance, IFC also provides legal and technical assistance to private enterprises. U.S. companies seeking direct investment should contact IFC. Contact information: Tel. 202-477-1234, Fax 202-974-4384, <http://www.ifc.org>

Multilateral Investment Guarantee Agency (MIGA) MIGA was established in 1988 to encourage the flow of foreign direct investment in developing member countries. It provides investment guarantees against the risks of currency transfer, expropriation, and war and civil disturbance.

("political risks") and certain non-commercial risks to foreign investors in developing member countries MIGA can insure new investments originating in any member country and destined for any developing member country New investment contributions associated with the expansion, modernization, or financial restructuring of existing projects are also eligible The maximum amount of coverage MIGA will issue for a single project is currently \$50 million Contact information Tel 202-473-2060, Fax 202-522-2630, [http //www miga org](http://www.miga.org)

C 2 INTER-AMERICAN DEVELOPMENT BANK (IDB)

The IDB is a multilateral development bank that focuses on Latin America and the Caribbean The IDB is the largest source of public finance for development projects in the region, lending \$6-7 billion per year It funds a variety of environmental infrastructure projects and supports the development of environmental institutions in Latin American countries The loans are made in the borrowing countries, and operations are carried out by governmental agencies The main source of information about the upcoming procurement and business opportunities generated by the Bank's lending is the monthly magazine *IDB Projects*, which contains a listing of individual projects being considered for possible financing by the IDB

Contact information

Inter-American Development Bank

1300 New York Ave , N W

Washington, D C 20577

Public Information Center

Tel 202-623-2096, Fax 202-623-1928, [http //www idb org](http://www.idb.org)

The IDB has several programs to assist the private sector

Private Sector Department (PRI) PRI has a program to provide long-term financing and guarantees for *large private infrastructure projects*, including water supply, sanitation, and waste management projects The Bank's participation in a single project is limited to \$75 million or 25% of the project's total cost, whichever is lower Contact information for PRI Tel 202-623-1501, Fax 202-623-3639

Inter-American Investment Corporation (IIC) IIC promotes private sector development by making equity investments and providing term loans for projects where traditional financing is not available IIC focuses on small and medium-sized projects in all economic sectors as opposed to large-scale infrastructure projects Contact information for IIC Tel 202-623-3900, Fax 202-623-2360

Multilateral Investment Fund (MIF) MIF undertakes activities that promote broader private sector investment in the economy MIF funds projects designed to provide a legal and institutional framework amenable to private investment MIF projects, among others, assist

privatization efforts and provide advisory services for specific private sector-related transactions, such as preparing contracts for concessions Contact information for MIF Tel 202-942-8211, Fax 202-942-8291

C 3 ANDEAN DEVELOPMENT CORPORATION (CAF)

The Andean Development Corporation (Corporación Andina de Fomento, CAF) is a multilateral financial institution which promotes sustainable development and regional integration by attracting capital resources for the provision of multiple financial services to the public and private sectors of the shareholders countries

CAF's principal members are Bolivia, Colombia, Ecuador, Peru, and Venezuela Other shareholders countries are Brazil, Chile, Jamaica, Mexico, Panama, Paraguay, and Trinidad and Tobago Twenty-two private banks in the region are also shareholders of the Corporation

CAF's headquarters are located in Caracas, Venezuela The Corporation also maintains regional offices in the capital cities of its member countries La Paz, Santafe de Bogota, Quito, and Lima

CAF offers its clients a wide range of financial products and services The Corporation

- ♦ Acts as a financial intermediary, primarily attracting funds from industrialized countries to the region
- ♦ Provides loans and lines of credit to financial entities and public and private banks to finance foreign trade and working capital
- ♦ Offers global credits and lines of credit to the financial sector in order to channel resources to various productive sectors, particularly to small and medium-sized enterprises, providing them with indirect access to CAF
- ♦ Offers development banking services to governments and their agencies for the financing of priority projects, mainly in the physical infrastructure and integration sectors
- ♦ Provides technical cooperation in order to facilitate the transfer of know-how and technology, complement the technical capacity existing in the shareholder countries, and increase the external competitiveness of the productive sectors
- ♦ Finances projects that promote sustainable human development in the low-income socio-economic sectors of the population and supports the growth and consolidation of microenterprises
- ♦ Contributes to the development of national and regional capital markets

Contact information

Corporacion Andina de Fomento

Av Luis Roche, Torre CAF, Altamira

Caracas, Venezuela

Tel (58-2) 209-2111, Fax (58-2) 284-5754, [http //www caf com](http://www.caf.com)

C.4 UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)

USAID is an independent U S Government agency that provides economic development and humanitarian assistance (in the form of grants) to advance U S economic and political interests overseas U S foreign aid also creates markets abroad for U S goods and services

USAID projects in Bolivia, Ecuador, and particularly Peru represent an important market opportunity for U S consulting firms USAID's Bureau for Latin America and the Caribbean uses three basic approaches to promote environmental improvements in the host countries

- 1 *Technical demonstrations* to help industries recognize the need for and benefits of cleaner production and create demand for cleaner technology
- 2 *Policy and institutional support* to help host country governments develop effective policies and regulations that encourage sound environmental management and pollution prevention
- 3 *Information/training/partnerships* with local nongovernmental organizations (NGOs), educational institutions, industrial associations, and other key host country organizations to distribute and provide access to environmental information, services, and tools

USAID advertises its procurement opportunities in *Commerce Business Daily*

Contact information

U S Agency for International Development

Information Center

Ronald Reagan Building

Washington, D C 20523-0016

Tel 202-712-4810, Fax 202-216-3524, [http //www info usaid gov](http://www.info.usaid.gov)

C.5 JAPANESE BILATERAL DONOR AGENCIES

Japan is the top donor in the world in terms of net official development assistance disbursement and in 1992, it was the major donor in 25 countries Japan provides three types of development assistance bilateral grants, bilateral loans, and contributions and subscriptions to multilateral donor organization The major portion of bilateral grants is undertaken by the Japan International

Cooperation Agency (JICA), while the Overseas Economic Cooperation Fund (OECF) is in charge of bilateral loans

Part of Japanese bilateral aid is tied, i.e. only Japanese contractors are eligible to bid on Japanese-funded projects. U.S. companies should inquire in advance about their eligibility for each particular project.

Contact information

Overseas Economic Cooperation Fund

Takebashi Godo Building

4-1, Otemachi 1-chome, Chiyoda-ku,

Tokyo 100-0004, Japan

Tel 81-3-3215-1419, Fax 81-3-3215-1307, [http //www oecf go jp](http://www.oecf.go.jp)

Japan International Cooperation Agency

Shinjuku Mines Tower

2-1-1, Yoyogi, Shibuya-ku,

Tokyo, Japan

Tel 81-3-5352-5311, Fax 81-3-5352-5586, [http //www jica go jp](http://www.jica.go.jp)

APPENDIX D

U.S. GOVERNMENT PROGRAMS TO ASSIST EXPORTERS

D.1 FINANCING ASSISTANCE

Export-Import Bank of the United States (Ex-Im Bank) Ex-Im Bank is an independent U S Government Agency that helps finance the overseas sales of U S environmental goods and services to developing countries It provides export credit support either to U S exporters on a short-term basis or to foreign purchasers on a longer term basis (2-10 years) Ex-Im Bank does not compete with commercial lenders, but assumes the risks they cannot accept

Ex-Im Bank has designed a special *Environmental Exports Program* that provides enhanced levels of support for a broad range of environmental exports The program demonstrates Ex-Im Bank's resolve to reach out to small and large exporters of environmental products and services The major features of the program are

- ◆ A short-term *Environmental Export Insurance Policy* will provide enhanced short-term, multi-buyer and single-buyer insurance coverage for small environmental exporters The program features policies that deliver 95% commercial coverage and 100% political coverage with no deductible
- ◆ Enhanced medium- and long-term support for environmental projects, products and services These enhancements, which are reflected in Ex-Im Bank's *loan and guarantee programs*, include local cost coverage equal to 15% of the U S contract price, capitalization of interest during construction, and maximum allowable repayment terms permissible under OECD guidelines

Contact information

U S Export-Import Bank

811 Vermont Avenue, N W

Washington, D C 20571

Tel 800-565-EXIM or 202-565-3946, Fax 202-565-3380, [http //www exim gov](http://www.exim.gov)

The Overseas Private Investment Corporation (OPIC) OPIC finances medium- to long-term investment projects through loan guarantees and direct loans Direct loans are geared for small businesses or cooperatives and usually range between \$2 million and \$10 million Loan guarantees range between \$10 million and \$100 million OPIC protects U S business activities in emerging markets through its Investment Insurance Programs against 1) currency inconvertibility (the inability to convert profits, debt service, and other investment remittances from local currency to U S dollars), 2) expropriation (loss of investment due to expropriation, nationalization, or confiscation by a foreign government), and 3) political instability due to war, revolution or civil strife The insurance programs also can be used to cover expanding

investments OPIC also offers the Small Contractor's Guarantee Program which assists small business construction and service contractors Through its investment missions, OPIC promotes U S business by bringing groups of U S executives to a selected number of countries to meet with host country government officials, local business leaders, and potential joint venture partners Reverse missions bring foreign government officials and local business leaders to the United States to meet with their counterparts

Contact information

U S Overseas Private Investment Corporation
1100 New York Avenue, N W
Washington, D C 20527
Tel 202-336-8799, Fax 202-408-9866, [http //www opic gov](http://www.opic.gov)

OPIC Allied Capital International Small Business Fund This is a \$20 million equity fund which invests in OPIC-designated countries Eligible companies are small U S businesses seeking risk capital to expand overseas The preferred investment size is \$2-5 million One of the sectors targeted by the Fund is environmental services

Contact information

Allied Capital Corporation
1666 K St , N W
Washington, D C 20006
Tel 202-331-1112, Fax 202-659-2053

OPIC Global Environmental Emerging Market Funds I and II These funds focus primarily on equity investments in natural resource-related sectors related to the developing, financing, operating or supplying of infrastructure in clean energy, clean water and waste management Investment size can reach \$10 million

Contact information

GEF Management Corp
1201 New York Ave , Ste 200
Washington, D C 20005
Tel 202-789-4500, Fax 202-789-4508

U S Small Business Administration (SBA) SBA has an Export Finance Program that guarantees up to \$750,000 for either short or long-term loans to help small businesses increase their export sales This program is designed to assist small businesses requiring capital to expand sales or manufacturing for international markets, as well as meet their working capital needs Loan proceeds may not be used to establish operations overseas

Contact information

U S Small Business Administration
409 3rd Street, S W , 6th Floor
Washington, D C 20416
Tel 800-U-ASK-SBA, [http //www sbaonline sba gov](http://www.sbaonline.sba.gov)

D 2 BUSINESS DEVELOPMENT ASSISTANCE

D 2 1 U S Department of Commerce (U S DOC)

Office of Environmental Technologies Exports (ETE) provides U S firms with market and project information focusing on key emerging markets, upcoming trade promotion events, other organized activities for environmental exports, and key overseas contacts in this markets It also promotes U S environmental exports by leading environmental business missions around the world The Office issues a series of publications, including *Environmental Technology Exports A Guide to U S Government Resources* and Environmental Export Market Plans for many of the big emerging markets

Contact information

U S Department of Commerce
International Trade Administration
HCHB Room 1003
Washington, D C 20230
Tel 202-482-5225, Fax 202-482-5665, [http //www infoserv2 ita doc gov/ete](http://www.infoserv2.ita.doc.gov/ete)

The U S and Foreign Commercial Service (The Commercial Service) has offices located in over 220 cities to assist U S exporters This service provides advocacy support for U S businesses and services such as export counseling, trade finance information, customized market research, and identification of trade leads It also organizes trade missions and events and offers a *Gold Key Service* to link U S firms with agents and distributors around the world by allowing visiting U S company representatives to get a first-hand understanding of the local market and make key contacts so critical to successful exporting See Appendix B (Local Contacts) for Commercial Service's contact information in Bolivia, Ecuador, and Peru

The Advocacy Center promotes U S firms through advocacy by high-level U S Government officials and tracks environmental projects worldwide Contact information Tel 202-482-3896, Fax 202-482-3508

The Trade Information Center is a comprehensive resource for information on all federal government export assistance programs Center staff counsel small- to medium-sized U S companies that are entering the export market through one-on-one counseling Contact

information Tel 1-800-USA-TRADE (800-872-8723) or 202-482-0543, Fax 202-482-4473, [http //www ita doc gov/tic](http://www.ita.doc.gov/tic)

The Office of Multilateral Development Bank Operations provides the U S exporting community with comprehensive information on all multilateral development bank programs and opportunities Contact information Tel 202-482-3399, Fax 202-273-0927

Export Assistance Centers are a joint effort of the U S Department of Commerce's Commercial Service, the Small Business Administration (SBA), the U S Export-Import Bank, and the U S Agency for International Development The Centers' staff members provide one-on-one counseling to small and medium-size export-ready businesses by evaluating the needs of clients and helping them develop customized international business strategies Offices are located throughout the United States and in nearly 70 countries abroad To find the nearest Export Assistance Center, visit their website at [http //www ita doc gov/uscs/domfld html](http://www.ita.doc.gov/uscs/domfld.html) or contact the following EAC offices Tel 310-980-4550, Fax 310-980-4561 (California), Tel 312-353-8040, Fax 312-353-8098 (Illinois), Tel 305-526-7425, Fax 305-526-7434 (Florida), or Tel 410-962-4539, Fax 410-962-4529 (Maryland)

Copies of all U S Department of Commerce publications and other trade information are available through the National Trade Data Bank, Tel 202-482-1986, Fax 202-482-2164 For general information on the Department of Commerce, call Tel 202-482-2000 Website [http //www doc gov](http://www.doc.gov)

D 2 2 U S Agency for International Development (USAID)

The Global Technology Network (GTN) is operated and administered by USAID's Office of Business Development (BD) The primary objective of BD is to leverage Agency resources by establishing partnerships and networks with the private sector in support of USAID's global economic development mission This is accomplished through a number of services

Environmental Technologies Network for the Americas (ETNA) assists U S firms in identifying trade opportunities for environmental products and services in Argentina, Bolivia, Chile, Costa Rica, Mexico, Paraguay, Peru, Uruguay, and Venezuela Through a network of in-county technical representatives and environmental business advisors, the program identifies product, service, and infrastructure opportunities in target countries ETNA electronically matches technology trade and investment opportunities with U S environmental companies There is no charge for U S companies to participate in the ETNA program

Business Support Services (BSS) is the counseling and information services arm of the Global Technology Network and functions as the central point of contact at USAID for the U S business community BSS taps into the extensive information resources of USAID and other U S Government and multilateral sources to keep firms current on commercial developments in USAID-assisted countries BSS provides its clients with one-on-one counseling designed to

assist them in positioning themselves to take advantage of USAID business opportunities BSS also disseminates current market data, notices on promotional events, and other relevant business intelligence

Technology Assistance Centers (TACs) are USAID-funded business development operations designed to help private sector companies in developing countries access the technology and expertise needed to compete effectively in local and global markets TACs serve as a mechanism for organizing and assisting developing country firms, especially small and medium-sized enterprises seeking access to U S technology and expertise, primarily through GTN, as well as a source of business opportunities (trade leads) for U S firms seeking to market their products and services abroad

GTN develops and disseminates sector-specific guides about USAID programs and activities, including the *Guide to Business Assistance Programs for Energy and Environment Latin America and the Caribbean*, *A Resource Guide* and *Financing Guide Latin America and the Caribbean* Contact information Tel 202-663-2660 or 800-872-4348, Fax 202-663-2670, [http //www usgtn org](http://www.usgtn.org)

Latin America Fund for the Environment (LAFE) is a component of USAID's Latin American Initiative for Environmental Technology It is a small grants program administered by the National Association of State Development Agencies (NASDA) LAFE forms partnerships with small and medium-sized U S companies in order to increase their role in addressing Latin American environmental issues

The Fund provides matching grants of \$15,000 to qualified U S environmental technology companies to undertake innovative projects to stimulate business activities in Latin America The Fund supports pollution prevention, energy efficiency, and wastewater treatment technology demonstrations, technology workshops and seminars, focused business development missions, and reverse missions to the United States by industry representatives for facility tours In the Andean Region, the program focuses on the following industry sectors metal finishing, electroplating, metal surface treatment, leather tanning, non-ferrous metals mining and smelting, and food processing

Contact information

National Association of State Development Agencies
750 First St , N E , Suite 710
Washington, D C , 20002
Tel 202-898-1302, Fax 202-898-1312

D 2 3 U S Trade and Development Agency (U S TDA)

U S TDA is an independent federal agency with over \$40 million dedicated to assisting U S companies in pursuing business opportunities in developing countries and responding to foreign

competition It sponsors feasibility studies, definitional missions, and desk studies for major public and private sector projects in order to promote the use of U S goods and services in project implementation By funding feasibility studies that evaluate the technical, legal, economic, and financial aspects of development projects, TDA provide U S companies with an opportunity to get in on the "ground floor" of a project

TDA focuses primarily on infrastructure development projects Funding from the agency usually ranges from \$150,000 to \$750,000 for public sector projects These studies also advise project sponsors about the availability of specific U S equipment and services TDA publishes the *TDA Pipeline*, its bi-weekly newsletter, that highlights new definitional missions, feasibility study opportunities (also advertised in *Commerce Business Daily*), and upcoming orientation visits and conferences

Contact information

U S Trade and Development Agency

SA-16, Room 309

Washington, D C 20513-1602

Tel 703-875-4357, Fax 703-875-4009, [http //www tda gov](http://www.tda.gov)