PB99-115636

U.S. Trade & Development Agency
Infrastructure Opportunities in South America II
"Partnerships for the Twenty-first Century"

REPRODUCED BY: NTIS
U.S. Department of Commerce
National Technical Information Service
Springfield, Virginia 22161

The Westin Peachtree Plaza • Atlanta, Georgia • November 5-7, 1997

Project Identification and Analysis Conducted By:
CG/LA Infrastructure

THE U.S. TRADE AND DEVELOPMENT AGENCY

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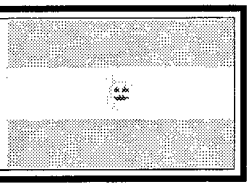
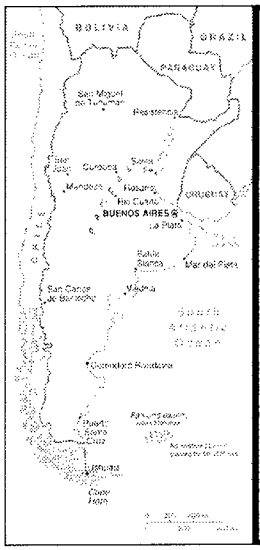
Republic of Argentina





GDP ('96)	US$ 214 bn	**Per Capita GDP**	US$ 6,191
Real GDP growth (forecasts)	1997: 5.0 % 1998: 6.0 %	**Population**	34.6 million
		CPI('96)	0.2 %
		S&P Rating	BB

Market Size	**1997-2005**
Energy	*US$ 11 billion*
Environment	*US$ 17 billion*
Telecommunications	*US$ 27 billion*
Transportation	*US$ 14 billion*

Executive Summary

Following a highly successful macroeconomic stabilization plan and sweeping privatization program, Argentina is experiencing an investment and export-led economic boom. Although the collapse of the Mexican peso brought economic growth in Argentina to a standstill in 1995, the economy has accomplished a swift recovery, with economic growth rates of 5-6% and record-low levels of inflation.

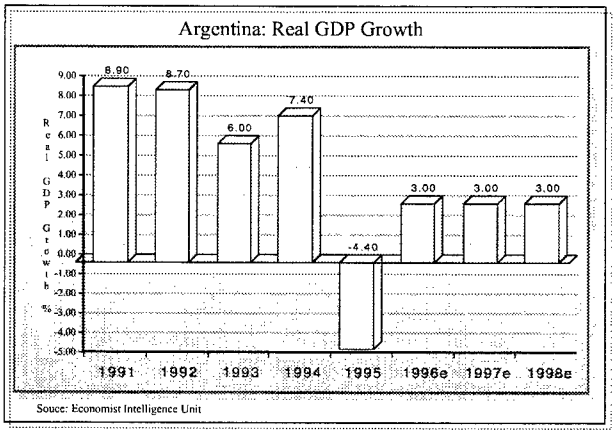
Argentina's comprehensive privatization program transferred the state-owned telephone company, airlines, most railroads, electric power generation companies, the Argentine oil company (YPF), steel mills, ports, television stations and most public services to the private sector. By year-end 1995, the combined value of privatized firms surpassed US$ 27.1 billion.

Foreign direct investment is a key component of Argentina's economic growth. The administration of President Carlos Menem has fostered a foreign investment climate that is among the most favorable in Latin America, characterized by free foreign exchange and capital movements and the absence of wage or price controls.

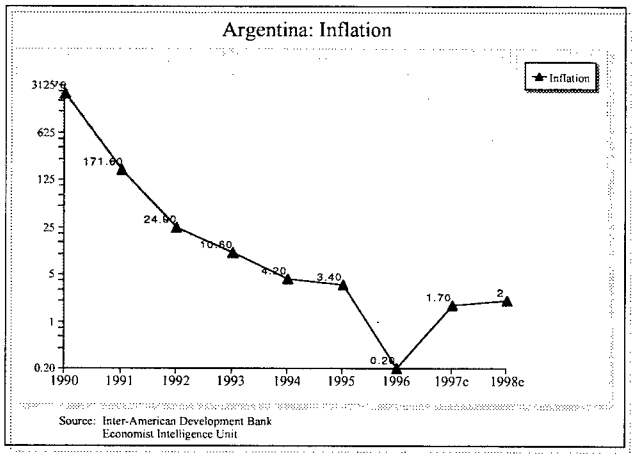
Economic and Political Climate

Argentina's swift recovery in the wake of the "tequila effect" of the Mexican peso devaluation is largely attributed to the macroeconomic reforms instituted under the *Convertibility Plan*, which was launched in early 1991 by former economic minister Domingo Cavallo. The *Convertibility Plan* pegged the Argentina peso at parity with the US dollar, backed by cash and gold reserves, in addition to restricting the domestic money supply to the level of foreign exchange reserves.

Following the Plan's inauguration, GDP soared from 0.1% in 1990 to an impressive 8.9% in 1991 and 8.7% in 1992. The fall of the Mexican peso, which caused Argentine banks to fold in 1995 as US$ 8 billion in deposits fled the country, led to a 4.4% GDP downturn. A multi-sectoral privatization program and a wave of both local and foreign investment have revitalized the Argentine economy, which is expected to surpass a 5% growth rate in 1997.



Inflation, which soared to a high of 4,924% in 1989, plummeted to 3.6% by 1994 and registered a minute 0.3% from mid-1995 to mid-1996. Although heavy reliance on foreign investment and a fixed dollar-peso exchange rate continue to expose Argentina to fluctuations in capital flows, significant economic reforms implemented under the Menem Administration are reducing the country's vulnerability to future capital movements.



President Carlos Menem, a member of the Peronist Party, initiated his first term in July 1989. Although President Menem has been hailed for the highly successful macroeconomic stabilization achieved as a result of the Convertibility Plan, critics argue that he has not completed the task of reforming Argentina's institutions, particularly with regard to health, education and social services.

These issues, in addition to nagging high unemployment and public sector inefficiency problems, are expected to be debated during the 1999 presidential election. First, however, he will have to secure the Peronist nomination to run for a third term. Eduardo Duhalde, governor of the province of Buenos Aires, is expected to challenge Menem for the Peronist nomination.

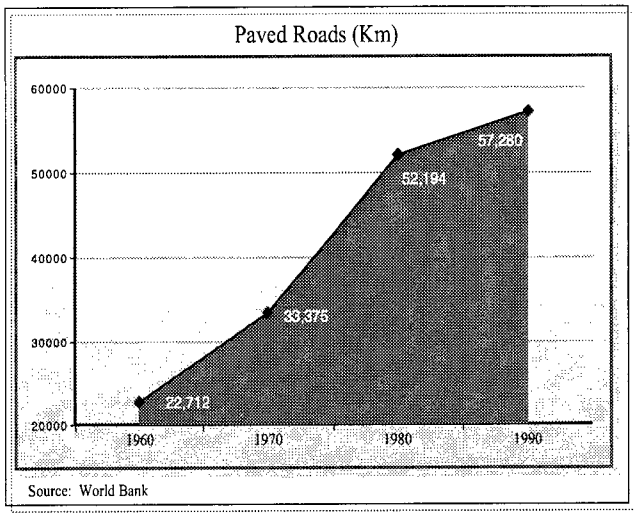
Sectoral Trends

Transportation

Growth in domestic and international trade has far outpaced the capacity of Argentina's aging transportation infrastructure. Although the country has an extensive transportation network, chronic public deficits over the past several decades have brought only minimal investments into this sector. The Argentine government intends to finance the rehabilitation and modernization of the country's overland, air and water transportation infrastructure through private sector concession agreements. Private firms have already started bidding on and investing in the management and operation of Argentina's national railroads, highways, airports and seaports.

Since 1992, all but one of Argentina's state-owned railways have been privatized. Private sector investment has pumped over US$ 2.5 billion into the freight network and passenger lines. Six independent private companies now control 25,920 Km of track and transport 14 million tons of freight per year. Investment and equipment sales opportunities for US firms include the Ferrocarriles Belgrano Modernization, which includes an extensive US$ 400 million rehabilitation project on the company's 10,000 Km rail line and the US$ 220 million Southern Transandean Railroad, which will unite Chile's Talcahuano Port on the Pacific with Argentine ports on the Atlantic.

For passenger rail, 3 rail network franchises were created, including intercity passenger services, passenger service in the Buenos Aires-Mar del Plata corridor, and metropolitan Buenos Aires commuter and subway services. Privatized franchisees are now in the process of upgrading and expanding the capacity of passenger rail. The Metrovias US$ 672 million capacity increase program and Subte's US$ 320 million expansion of Buenos Aires Metro Line H will yield substantial equipment sales opportunities for US firms, including signaling, communication and security systems, rolling stock, overhead power cable and ventilation systems.



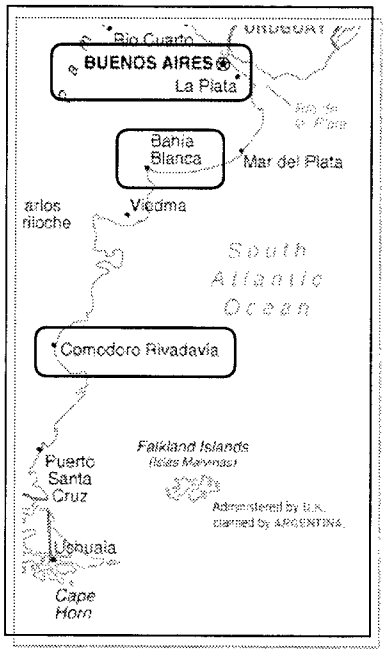
Argentina's 208,350 Km road network carries approximately 87% of passenger and 85% of domestic freight traffic in Argentina. However, only 19% of that network is paved. The remaining 81% consists of gravel and improved or unimproved dirt roads. Major highway projects include a US$ 180 million pass through the Andes Mountains which will facilitate transport between Argentina and Chile, BOT toll roads throughout the provinces, such as the US$ 600 million Cordoba Beltway and several large bridge construction projects, including the proposed US$ 1 billion BOT concession which would link Buenos Aires and Colonia, Uruguay.

Argentina has 200 airfields capable of handling small, domestic and commercial flights, and ten airfields which cover international flights. Ezeiza International and Aeroparque Jorge Newbery serve Buenos Aires, the country's largest market. These two airports handle 65% of the nation's air traffic, totaling approximately 8 million passengers per year.

The Argentine government plans to privatize both the Ezeiza and Aeroparque airports in Buenos Aires, in addition to 58 smaller airports throughout the country. The Argentine air force will retain authority over air traffic control and security. The legislation required to initiate the concession process has been approved by the Senate and is now in the Cámera de Deputados (final phase). The bidding process is expected to open by year-end 1997.

Seaports, which handle nearly nine-tenths of the country's foreign trade, are an integral component of the Argentine transportation sector. Primary port operations are concentrated on the port of Buenos Aires, which handles approximately 480,000 TEUs on an annual basis.

Other key seaports within the country's 3,500 Km of navigable waterways include La Plata, Bahía Blanca, Quequén Necochea and Comodoro Rivadavia. Opportunities for investors include BOT concessions for terminal construction and infrastructure development of Puerto Seco and the Port of Santa Fe, as well as substantial equipment and service procurement under the San Lorenzo Port terminal expansion.



Energy

Privatization has also propelled investment in the energy sector. The Menem Administration has privatized more than 80% of the thermoelectric and 60% of total hydroelectric power on the national grid, including power transmission, line maintenance and most regional and provincial distribution companies. The remaining power stations, including the Yacyreta Hydroelectric Plant and generators in the provinces, are currently on the auction block.

Several US-based companies, including Entergy, AES, Duke, Dominion, CMS, PSI and Southern Electric have already invested in electric power generation and transmission, a market whose demand exceeded 7% in 1996. Foreign investment is generating elevated demand for imported equipment and services. Promising subsectors from US equipment suppliers include: meters, circuit breakers, conductors and hardware, electrical wires, fuses, switches and transformers.

Argentina accomplished a series of petroleum company privatizations from 1985-1993, culminating in the sale of the Yacimientos Petroliferos Fiscales (YPF), the country's state oil company. These

privatizations, coupled with the liberalization of regulations governing foreign participation in the oil and gas sectors, have effectively reversed years of declining oil production. In 1990, Argentine crude oil production was 483,000 barrels per day. By 1995, however, production soared to 700,000 and 1 million barrels per day of crude are anticipated by the year 2000. US direct investment in Argentina's petroleum industry rose from US$ 452 million in 1989 to over US$ 800 million in 1995.

Energy sector projects include the 700 Km Atacama pipeline, which will supply power plants in northern Chile with approximately 300 million ft^3 of Argentine natural gas on a daily basis, and the competing 800 Km Norgas pipeline, which is expected to carry natural gas from the northwest basin of Argentina to the Pacific coastal city of Tocopilla in northern Chile. In addition, Marubeni, a major Japanese trading house, has formed a partnership with Mobil Corp., Alberta Energy Co. and Petrolera Argentina Sun Jorge S.A. for a US$ 1.5 billion project to construct a 3,100 Km natural gas pipeline linking an underground natural gas field in northern Argentina with three cities in Brazil and Paraguay.

Environment

Minimal investments in potable water and wastewater treatment infrastructure during the 1980s and early 1990s have hindered necessary expansion and upgrades. Although potable water coverage in Argentina is 83%, an estimated 6 million urban residents have no access to a safe water supply. Wastewater treatment service is also inadequate, with 54% coverage and 16 million urban residents lacking sewage connections. According to Argentina's National Sanitation Plan, approximately US$ 4.3 billion will be required to meet infrastructure requirements in potable water and wastewater through the year 2001.

The Argentine government hopes to stimulate investment in potable water and wastewater treatment through private sector participation. Concessions have already been granted for the provision of water and sanitation services in Córdoba, Tucumán, Formosa, Corrientes, Santa Fe and Greater Buenos Aires. Additional concession agreements are planned throughout the provinces, including Neuquén, Misiones, Maipu, Paraná and Salta.

The gradual implementation of stronger environmental regulations is expected to increase demand for pollution control equipment, particularly in the chemical, petrochemical, food processing and tanning industries. The total market size for pollution control equipment was approximately US$ 18.5 million in 1996 and is estimated to reach US$ 22 million 1997.

Telecommunications

Privatization has enabled Argentina to achieve the highest telephone line density in South America. Approximately 400,000 lines are replaced and 500,000 new lines are added throughout the country each year. In 1996, the Argentine telecommunications equipment market totaled approximately US$ 1.8 billion. The market is expected to exceed US$ 1.9 billion in 1997.

Local telephone services were transferred to the private sector in 1990, through the privatization of state-owned ENTEL. Two privately-owned companies, *Telefónica* and *Telecom*, now control local

service throughout Argentina. These two companies have invested over US$ 2 billion in telecommunications systems expansions and upgrades and installed over 3 million lines over the past 7 years.

Telintar is Argentina's sole long distance services is provider, servicing the country through 2 INTELSAT earth stations and 40 ground stations in a domestic satellite network. The cellular telephone market offers the most lucrative investment opportunities for US firms, due to the tremendous growth of this market in recent years. Three firms currently provide cellular services to 305,000 customers throughout Argentina, with an average subscriber utilization of approximately 400 minutes per month.

Industry

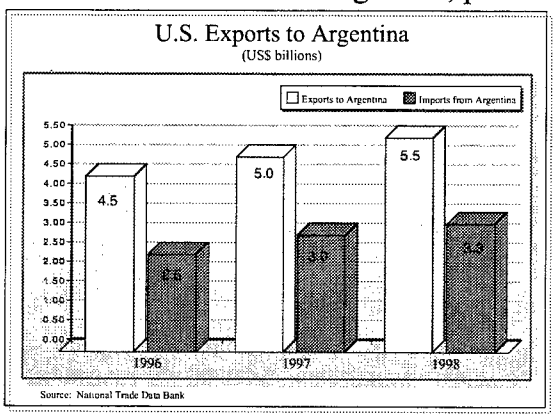
A 1993 revision in Argentina's mining law transformed the industry's prospects for investors and is fueling the country's international competitiveness in this sector. The new mining law guarantees that the tax level which prevails at the time that a mining feasibility study is presented will remain in force for 30 years and allows for accelerated depreciation on mining equipment.

The mining sector is expected to register its first trade surplus in 1997, and mineral exports should reach US$ 1.3 billion by the year 2000. Key projects include the US$ 1.1 billion Alumbrera gold and copper mine, which is predicted to become the word's 9th largest copper mine and the 14th by the year 2000.

Investment Climate and Business Rules

Foreign direct investment has been a crucial component in Argentina's recent economic growth. The country has a freely mobile foreign exchange and capital movement regime and the Menem Administration has eliminated wage and price controls. Foreign investors do not need to seek any kind of prior approval and are free to repatriate the full amount of their capital and earnings at any time.

Foreign and domestic companies are treated equally under the law. Both have access to all economic sectors and are eligible for incentive programs and state procurement. The "Buy Argentina" program, which restricted government procurements to Argentine companies, was eliminated in October 1991. The only remaining restriction on government procurements is a 10% preference for domestic goods and services. Public sector corruption continues to hinder trade and investment in Argentina, particularly in procurement, regulatory systems and tax collection. However, a brighter media spotlight on this area is helping to remedy the situation.



Although intellectual property protection has improved over the years, it is generally inadequate, with patent law being the weakest component. Current patent law contains no pipeline protection and has wide provisions for compulsory licenses. No specific laws protect trade secrets or extend copyright protection to software to combat piracy.

Financial Sector

Much-needed reforms and successive economic crises over the past several decades have left the Argentine banking sector highly undercapitalized and plagued by inefficiency. The Mexican peso devaluation in December 1994, sent 18% of total deposits (US$ 8 billion) out of Argentina as foreign and domestic investors feared a similar crisis. Although the country's GDP per capita, exceeding US$ 8,700, is one of the region's highest, Argentine bank deposits only total approximately 19% of GDP. Bank deposits in neighboring Chile have surpassed 40%.

However, foreign investment in the banking sector is beginning to transform the industry through increasing competition. Five out of six of Argentina's largest private-sector banks are foreign-operated and only Banco de Galicia remains fully under domestic control. Recent banking reforms are also strengthening the country's financial sector. For example, the central bank's US$ 6.1 billion standby financing program, signed in 1996 with 13 international financial institutions, is aimed at preventing the Argentine banking system from experiencing another run.

International Trade Agreements

Argentina entered the MERCOSUR customs union with Brazil, Paraguay and Uruguay on January 1, 1995. Since that date, Chile and Bolivia have entered into the union as associate members and similar negotiations are underway with Peru. The combined population of the four core member countries is 200 million and the total GDP is approximately US$ 1 trillion. Since January 1995, a common external tariff has been established and most products are freely traded within MERCOSUR.

Argentina is also a member of the World Intellectual Property Organization (WIPO) and the World Trade Organization (WTO).

Republic of Bolivia

GDP ('96)	US$ 6.9 billion	**Per Capita GDP**	US$ 916
Real GDP growth (forecasts)	1997: 5% 1998: 5%	**Population** **CPI('96)**	7.6 million 5.2%
		S&P Rating	N/R

Market Size	**1997-2005**
Energy	*US$ 560 million*
Environment	*US$ 360 million*
Telecom	*US$ 890 million*
Transport	*US$ 450 million*

Executive Summary

Bolivia is undergoing a dramatic transformation. Adopting progressive policies much like Chile and yet improving its social and economic impact, the country is slowly and progressively transforming itself as a major natural resource producer. Considered one of the poorest countries in South America, Bolivia has implemented proactive public policy initiatives that are providing positive economic growth and advancement. These new initiatives demonstrate to wealthier nations that creativity in public policy reform and government divestiture are a favorable mix for success and prosperity.

Bolivia's famed Capitalization program has provided the country with financing similar to the privatization of the pension system in Chile. Adopting basic privatization principles, Bolivia under the Capitalization program sold 50% participation to private companies, retained 40% in the hands of the government to be sold at a later time, and left the remaining 10%

Bolivia
Crossroads of the Southern Cone

Highest elevation and deelevation	=	Large potential for Hydroelectric Power
Large unexplored mineral wealth	=	Huge export opportunity
Oil and Natural Gas Reserves	=	Exceed internal demand
Borders 5 countries Chile,Argentina,Brazil,Paraguay,Peru	=	Export and import corridor to Merosur and others

in the country's pension plan. Although the program has received some criticism, it marks a turning point in the country's stabilization strategies.

Socially, the country has also made great strides. A country diverse in cultural heritage, Bolivia has recently instituted educational standards that include primary school studies in indigenous languages (Aymarán, Guaraní, and Quecha) in addition to the "traditional" Spanish. Such changes should result in further cohesion and understanding throughout the country. Adding to such reforms, 75% of federal funds have been reallocated to local governments. Such changes are radical and point to the country's desire to grow and develop.

While all is not perfect, it is clear Bolivia is on the move. Although capitalization has brought stabilization, the country continues to rely heavily on multilateral support which negatively affects its external debt. The current debt burden is 303.7% of the country's exports of goods and services (estimated in 1995 by the World Bank). Such numbers, make the country the second highest debt nation in Latin America after Nicaragua. In addition, the country is still one of the poorest in South America with a per capita income of less than US$ 1,000 annually.

Economic and Political Climate

The successful presidency of Gonzalo Sánchez de Lozada, which ended in August 1997, marked a political and economic stabilization trend that is believed to continue in the new administration. The newly elected president, ex-dictator General Hugo Banzer, has signaled his determination to continue democratic reforms. Under a recent new law, all citizens are eligible to run for president -- including ex-dictators. Elected under a coalition government joining Banzer's ADN and the NFR, the process has shown itself to be egalitarian and democratic under any standards.

On the assumption that the new government will follow in Sanchez de Lozada's footsteps, inflation will remain moderately low while export led growth and FDI (foreign direct investment) are expected to carry growth in the future. A complete economic outlook is relatively difficult to ascertain in the short run in terms of infrastructure development. Banzer's ministerial positions have just been appointed or are in the process of appointment. Such circumstances make it difficult to ascertain the government's position on future projects. A few projects have been discussed but none have been awarded the seal of approval.

The economy has been steadily improving. The election of Banzer's party has had no detrimental effects on the country's development. Fiscal policy has been shaped by the priority to meet inflation targets. Government deficit was approximately 2% of GDP with an increase in both revenues and expenditures. A surplus of funds in the government coffers was primarily a result of higher gasoline

prices and the successful privatization policy providing US$ 180 million and US$ 33 million respectively. Overall, the economy has kept in line with IMF goals, however, at the cost of GDP growth and civilian employment.

Foreign direct investment by 1996 increased due to the sharp rise in capitalized companies. Recently there has been large growth in funds for airport modernization and industrial projects.

International trade has also demonstrated success in various ways. Bolivia's total exports have grown by 34% since 1990, mainly in the nontraditional sector. Soy has made up a large portion of such growth, now ranking Bolivia as the 5th largest Soy producer in the world. Imports, however, have increased at a greater rate than exports. This has created a trade deficit of US$ 309 million for 1996, which is expected to remain unchanged for 1997.

Bolivia's Capitalized Companies

State-owned company	New Company	New Shareholder	Amt. Capitalized (US$ mil)	Minimum Value (US$ mil)
Ende	Corani	Dominion Energy (US)	59	25
Ende	Valle Hermos	Constellation (US)	47	20
Ende	Huaracachi	Energy Initiative (US)	34	15
Lloyd Aereo Boliviano	LAB	Vasp (Brazil)	48	10
Entel	Entel	STET (Italy)	610	250
YPFB	Andina	YPF/Pérez Compac (Arg	264	170
YPFB	Chaco	Amoco (US)	306	170
YPFB	TransRedes	Enron (US)	263	180
Enfe	Andino	Cruz Blanca (Chile)	13	26
Enfe	Occidental	Cruz Blanca (Chile)	26	26

Source: Latin Finance *Capitalizing on Reforms*, June 1997, p.38.

Sectoral Trends

Transportation

In a country of 7 million inhabitants and a land mass of 1.1 million square Km, projects to integrate the entire Bolivian transportation system are difficult and expensive. The population is concentrated in the major cities of La Paz, Cochabamba, and Santa Cruz. Therefore, it is possible to integrate the three regions providing access from the high plains of La Paz to the low lands of Santa Cruz. Currently the country contains 46,300 Km of roads, of which only 4% is paved. Paved roads are concentrated within the major metropolitan areas and the surrounding urban districts.

Understanding the limitations of providing a fully integrated system, the Bolivian Government has devised a strategy to prioritize roads that make up viable export corridors for Bolivian minerals and agriculture. In most cases, the possibility for private sponsorship is limited. Financing such projects under BOT or BOO models is not considered viable. Loans for such development come from international governmental assistance through multilateral agency support.

Air transportation, on the other hand, has been privatized with the Brazilian airline VASP acquiring 40% of the national airline Lloyd Aéreo Boliviano (LAB) in 1995. The company has recently purchased a new Boeing 737-300, the first new plane to be added to the fleet in 28 years. In addition, air traffic control and other services, the feasibility of which was established through a TDA-funded study, have been concessioned to Airport Group International, a US company that plans to invest US$ 100 million over the next 25 years.

The antiquated rail network has been sold to Chile's Cruz Blanca which plans to invest US$ 20 million for track maintenance, locomotive refurbishment, new rolling stock, computer system, spare parts and new offices.

Energy

The energy sector could very well be the nation's road to export-led growth and subsequent development. With construction of the US$ 2 billion Bolivia-Brazil Pipeline (first announced in April 1936 and for which ground was broken in July 1977), the country could be poised to export natural gas to all of the Southern Cone. This could be extremely lucrative as international environmental standards have caused countries, including those in the Southern Cone, to use cleaner forms of power. The project, according to the World Bank will cost US$ 1.88 billion of which 20% (US$ 380 million) will be invested in Bolivia.

The major catalyst for such an endeavor was the opportunity to participate in the development of a Southern Cone gas distribution network, in which Bolivia would be the hub for distribution. Multinationals such as Amoco, Enron/Shell. and an Argentine consortium agreed to follow through with a BOT capitalization plan that purchased 50% of the project. The consortium headed by YPFSA (Yacimientos Petrolíferos Fiscales), the new name given to YPFB (Yacimientos Petrolíferos Fiscales Bolivianos) under the capitalization contract, signed in December 1996. The total amount invested by the parties is US$ 850 million. While at the moment the country is engaged in building the pipeline, projects to develop the distribution lines of natural gas to Chile, Argentina and Peru are expected to follow.

The electrical energy sector is also undergoing dramatic shifts. Following another TDA-funded feasibility study, the breakup and capitalization of ENDE (Empresa Nacional de Electricidad) in 1995, led to the formation of three independent companies Corani, Valle Hermosa, Huaracachi that were purchased by Dominion Energy, Constellation Energy and Energy Initiatives, respectively. Concession contracts stipulated that perpetual investments be undertaken. Such investments present large opportunities for US equipment manufacturers. Although for the next two years most investments have already been scheduled and sourced, there are ample possibilities for future project development.

Environment

Water and wastewater distribution are currently handled by the government utilities. SEMAPA provides treatment and distribution to La Paz and Cochabamba while SEGUAPAC, AAPOS, CORPAGUAS service Santa Cruz, Sucre, Potosi and minor populations, respectively. Capitalizing these industries has been discussed but no changes have been made.

Due to its population growth, the government of Cochabamba is examining its water distribution. Two projects, Misicuni and the Corani, are under consideration. Currently there has been speculation on the projects. Misicuni is a difficult and expensive (US$ 70 million) yet will provides a long-term water supply for the city . On the other hand, Corani, is short term in nature and will supply water within two years. Constellation energy has attempted to finance the Corani project, fulfilling part of its contract. Both projects, however, are considered necessary to provide the region with sufficient water supply. A decision is expected year end 1997 or in the early part of 1998.

Telecommunications

The telecommunications sector was purchased by the Italian firm, Stet International (ETI Euro Telecom), for US$ 610 million. According to the agreement, Stet has been granted a 6-year monopoly on long distance services. Local calling, within cities, will be handled by independent cooperatives which will maintain monopoly status for the next six years. Provisions were built into the concessions to provide ample cash flows and to modernize the systems with advanced digital switching equipment and connections to satellite systems. Although such attempts have been made to modernize the system, the quality and service is still low resulting in a surge for wireless telecommunication systems provided by Telecel and Entel.

Industry

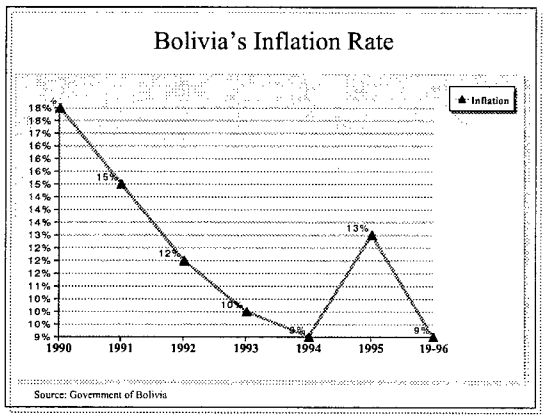
The Bolivian Industrial base is expanding rapidly in the areas of metallurgic exploration and agricultural production. In March 1996, the state-owned tin smelter, Empresa Metalúrgica Vinto (EMV) became the last of six major state-owned companies in the mining sector to be privitized. In 1996, the company produced 16,689 fine tons of tin and 6,600 tons of antimony. Agricultural production in Bolivia has grown at a modest rate (1.9% since 1986) currently making up 16% the country's GDP. In the last 5 years, Bolivia has expanded its agricultural base and become the fifth worldwide soy producer.

Other industries that show great promise include ore deposits, chemical base products, and fertilizer. The ore deposits of El Mutún in the department of Santa Cruz, are estimated to produce 10 million tons of sponge iron, generating sales of US$ 1.8 billion. The greatest potential for producing chemical reserves is in the production of Uyuni and Coipasa, in addition to minerals in trona and lithium. Under Bolivian Law, foreign investment receives equal treatment to that of national funds.

Investment Climate and Business Rules

There are no restrictions for the repatriation of capital, dividend transfers or the convertibility of funds.

Bolivia has been able to maintain low inflation rates, spurring foreign investment. The government has also created incentives for investment through RITEX, the trade and industrial free-trade zones, the tax refund on nontraditional exports and incentives for joint ventures. Bolivia also guarantees freedom of production, commercialization, import and export of goods and services, as well as the right to freely determine prices.



Financial Sector

Bolivia's banking system is made up of the Central Bank and 18 privately-owned banks. Of the 18 institutions, 4 are foreign owned of which one, Citibank, is a US bank. Commercial banks account for 80% of the deposits and loans in the formal sector while the remaining 20% is tied to credit unions and other financial institutions. Eighty-ninepercent of deposits are made in dollar denominations.

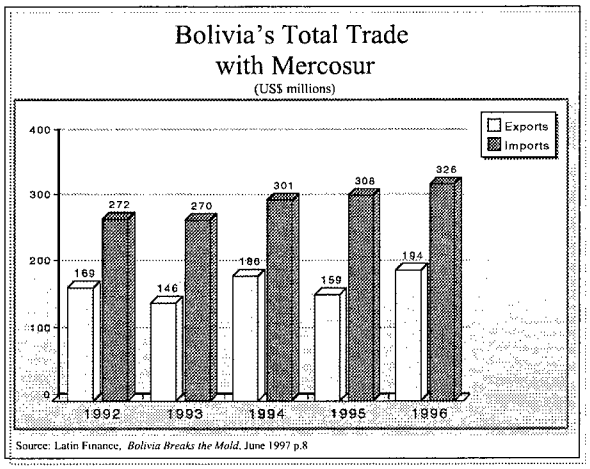
The banking system in Bolivia provides short and medium term loans, as well as regular banking services such as checking and savings accounts. The Central Bank serves the traditional function and also provides sovereign guarantees on loans to official agencies. In recent years the banking sector has come under scrutiny of the government. As a result, it passed a law in 1995 imposing needed controls over the banking sector, including higher reserve requirements and a prohibition of insider lending for three years. In the long term, such restrictions should stabilize business and expenditure, increasing Bolivia's credit standing.

Credit is difficult to obtain in Bolivia and is mostly available on a short-term basis with interest rates ranging from 14% to 18% for US dollar denominated loans and 38% to 43% for loans in Bolivianos (1996 rates). Collateral requirements remain high for most clients.

There are no foreign exchange controls.

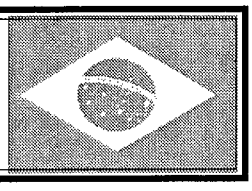
International Trade Agreements

In 1996 Bolivia sought to lower its intra-regional trade costs by becoming part of Mercosur and , at the same time, to maintain agreements made with its Andean Pact partners of Colombia, Ecuador, Peru, and Venezuela. The successful conclusion of negotiations opened up trade in the southern cone and did not affect the 35% of Bolivian nontraditional exports sold through the Andean Pact.



Bolivian trade with Mercosur has resulted in a deficit. A reduction of tariffs will exacerbate the trade deficit in the short run but the long-term effect should prove beneficial to the country's development of an industrial base.

Federal Republic of Brazil



GDP ('96)	US$ 766.5 bn	**GDP per Capita**	US$ 4 ,730
Real GDP growth (forecasts)	1997: 4.5% 1998: 5.0%	**Population**	162 m
		CPI('96)	16.5%
		S&P Rating	BB-

Market Size	**1997-2005**
Energy	*US$ 45 billion*
Environment	*US$ 20 billion*
Telecom	*US$ 100 billion*
Transport	*US$ 50 billion*

Executive Summary

Accounting for over 40% of South America's Gross Domestic Product, Brazil boasts the region's most dynamic economy as well as the broadest industrial base. Brazil is celebrating the third anniversary of the Real Plan with a stable economy, manageable inflation rates and healthy growth figures.

Brazil has begun to decisively open its markets, and now effectively competes in the global market. It imposes average import tariffs of 11% and has favorable foreign investment rules. Macroeconomic stability and liberalization have made the country an attractive destination for domestic and foreign investment, which are offsetting the increase in unemployment that occurred following the Real Plan's austerity and credit restriction measures.

A major move toward private sector infrastructure creation has occurred both due to the public sector's inability to meet investment demand and the surge in new infrastructure demand induced by economic growth and stability. Brazil's privatization program continues to move, at times, at a fast pace. Planning Minister Antonio Kandir has adjusted forecasts for funds raised through privatizations this year from US$ 10 billion to US$ 14 billion. Privatization revenues for the three-year period from 1997 to 2000 should surpass US$ 74 billion.

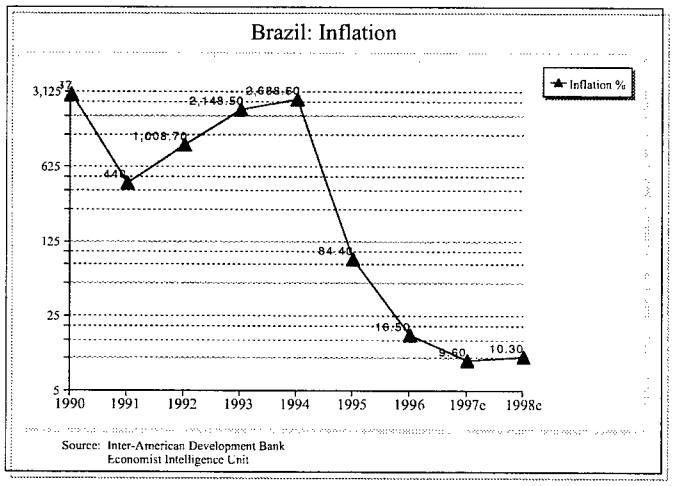
Brazil has been successful in passing its privatization programs through Congress. In August of this year, the Lower House approved the use of the FGTS, the Social Security Guarantee Fund, for use in the privatization of state-owned companies.

The Federal Government has outlined 42 priority infrastructure projects in its "Brazil in Action" Plan which will be executed over the next 15 months. The investment requirements exceed US$ 16 billion, largely to be financed by the private sector. In an attempt to reduce the country's fiscal deficit, at both the national and state levels, the government has undertaken sales of major public sector holdings such as the mining conglomerate, Companhia Vale do Rio Doce, which has set a precedent for further privatizations.

The Brazilian National Development Bank (BNDES), whose annual loan levels exceed those of the IDB, is increasingly facilitating private participation in infrastructure projects. BNDES has lent 33% of its budget for infrastructure-related projects during 1997. This has already translated into US$ 2.8 billion.

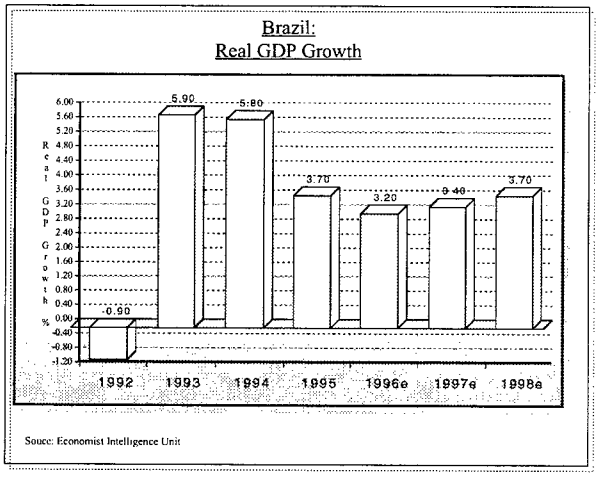
Economic and Political Climate

The economic reform package known as the *Plano Real* has succeeded in providing much needed stability to the Brazilian economy since its introduction on July 1, 1994. The plan reined in uncontrolled government spending and reduced monthly inflation from 50% in June 1994 to approximately 2% a month later. Inflation for 1997 is expected to be under 10%, yet high enough to put pressure on the Real.



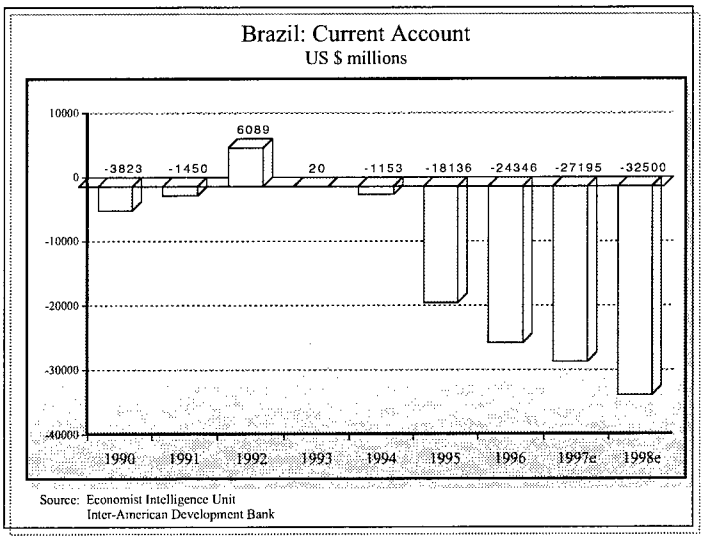
Controlled inflation has resulted in an ability to plan and create the necessary structures to sustain growth. The Cardoso administration has prioritized major infrastructure projects to ensure that Brazil realizes its growth potential given, the increase in direct investment into the country. While the Real Plan has brought price and currency stability, overall economic growth has slowed. National and foreign direct investment have helped fuel moderate growth.

Average growth figures over the next two years are estimated at 4.5% and 5% respectively, meaning real per capita GDP growth. Such GDP growth will have a positive effect on infrastructure projects which are financed through end-user fees.

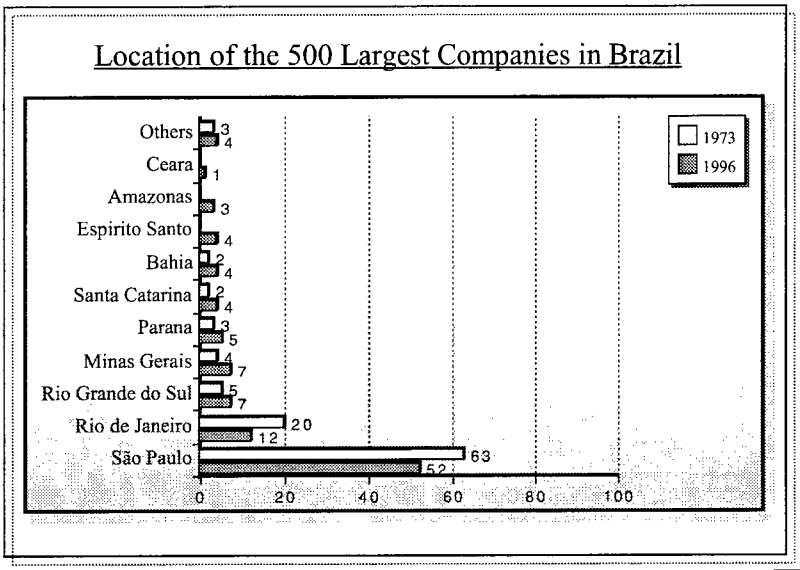


Growing balance of trade deficits as well as the slow pace of fiscal and social security reforms are threatening the Real Plan's continued success, and consequently, President Cardoso's reelection. Analysts agree that the exchange rate is overvalued by between 15 and 20%. Nevertheless, a devaluation is not anticipated until after the presidential election in October 1998.

Balance of trade figures are a major driver in infrastructure investments by the Federal and State governments, as the country tries to level the playing field and reduce the *Custo Brasil.* The *Custo Brasil* refers to the additional costs incurred by Brazilian manufacturers and is composed of social security burden, inefficient infrastructure and cumulative taxation system, among other factors.



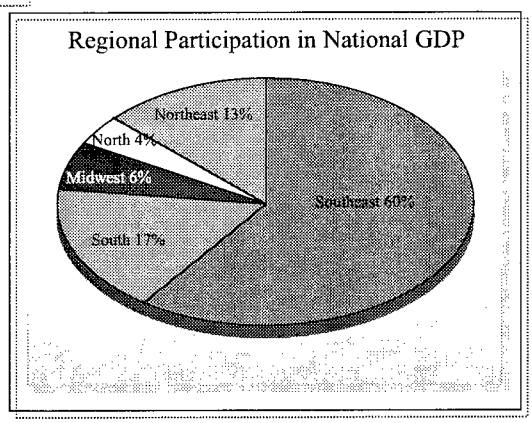
The Ministry of Economy and the Central Bank have taken measures to reduce the balance of trade deficit by imposing credit restrictions on consumer good imports as well as extending export credit lines through the BNDES and the Caixa Economica Federal. Additionally, implementation of the Brazilian credit insurance program (Seguradora Brasileira de Credito), after an absence of six years, should contribute to increasing exports.



Decentralization:

The southeastern and southern portions of the country are the most prosperous and comprise the bulk of agricultural and industrial production. Due to a lack of public investment in these regions, private sector projects are required to meet demand.

Rising labor costs in Brazil's traditional industrial poles, the principal one being the Triangulo Mineiro (area in the Southeast encompassed by the state of São Paulo, Rio de Janeiro and Minas Gerais states), are causing companies to relocate to more inexpensive labor areas in Brazil. The most visible migration has been to the northern zone of the country. This trend is illustrated by the relocation of companies rated as the 500 largest in Brazil.



Company relocation has created a need for new infrastructure investments in these growing regions of the country.

The federal government's "Brazil in Action" plan prioritizes the creation and support of 12 new integrated development axes in order to reduce the costs of doing business in Brazil and to better integrate the country's economy with global trade.

Sectoral Trends

Transportation

Among the most important components of the Custo Brazil is the high cost of transportation within the country. It is estimated that 40% is added to Brazil's grain exports due to its domestic transportation costs. In light of this and in order to reverse the country's balance of trade deficit, the federal government has prioritized transportation projects. US$ 4.6 billion has been earmarked for transportation projects over the next five years within the "Brazil in Action" Plan.

The "Brazil in Action" Plan includes the construction of:
- 16,000 Km of highways
- 4,500 Km of waterways
- 500 Km of rail
- 4 ports

Existing transportation infrastructure is inadequate to meet the growth in merchandise trade, boosted by the opening of markets, stabilization of the economy and the success of the Southern Cone Trade Agreement. Transportation of raw materials and capital goods rely heavily on the country's aging truck fleet and highway infrastructure. The country's waterways and rail potential have only recently begun to be exploited. The bulk of the freight transported through ports and airports is concentrated in the Southeast, which has resulted in higher costs and bottlenecks.

Railroad

The formerly federally-owned rail system (RFFSA) is now mostly private, with the exception of the Northeast System. Concessions were awarded for 30 years with renewal clauses for an additional 30 years. The new concessionaires have investment plans surpassing US$ 4 billion over the life of the concession which include the maintenance, upgrades and expansion of the rail systems. The other major rail system, São Paulo's FPASA, is also being privatized. Both the Ferronorte and Ferrovia Norte Sul projects are securing private sector participation. Rail system modernization and expansion is being administered by the private sector and have resulted in enormous efficiency gains.

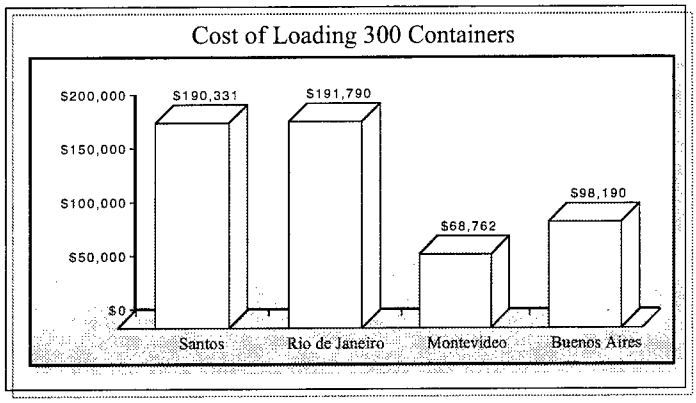
Roads

Brazil has close to 55,000 Km of paved roads, which transport nearly 60% of the country's cargo. The government has launched a privatization program in order to improve and expand the existing network in high-volume highways. Major projects include the doubling of the Fernão Diaz and Regis Bettencourt Highways, as well as the construction of the Mercosul Highway with global investments exceeding US$ 3 billion. Examples of successfully structured projects exist, such as the concessioning of the Niterói Bridge and the Presidente Dutra Highway (linking Rio de Janeiro and São Paulo), which involve investments of US$ 60 million and US$ 500 million respectively. Southern States are also implementing privatization programs such as Desenvolvimento Rodoviáno S.A. (Dersa) in the State of São Paulo which has benefitted from TDA-funded technical assistance.

The state governments are undertaking major urban mass transit projects. Brazil's stability has fostered the role of private-sector participation to complement the traditional multilateral role in developing major projects, as is the case with the São Paulo metro system. Progressing urbanization (73% of the population in 1990 as opposed to 31.2 % of the population in 1940) is the impetus for these projects, which present the best opportunities in the South and Southeast.

Seaports

The Brazilian seaport system is outmoded and suffers from undercapacity. Major ports along Brazil's 7,491 Km coastline include: Belém, Fortaleza, Ilhéus, Manaus, Paranagua, Porto Alegre, Recife, Rio Grande, Salvador, Rio de Janeiro and Santos. All Brazilian ports have high costs and a high backlog which result in approximately US$ 300 million in annual demurrage charges, a significant penalty when compared with competing ports within the Southern Cone.



Demand for port handling capacity increases by 80,000 tons per year for general and granulated cargo, while containerized cargo demand has been growing at 1% per year since the introduction of the *Real Plan*. Increased demand has induced the government to create new port facilities, coupled with industrial parks which are primarily being developed in the Northeast. The government is also promoting private-sector participation in the operations of existing port facilities and creation of new port terminals within existing ports, as is the case with the Port of Santos (Latin America's largest port).

Inland Waterways

Despite a total navigable length of 50,000 Km, Brazil's waterway system is significantly under-utilized. The federal government has prioritized the development of the Araguaia Tocantins waterway in the North with total investments of US$ 260 million. Another major on-going development is the Tietê- Paraná system, with 1,600 Km in length and 20 terminals already in operation.

Airports

Increased cargo and passenger air traffic has propelled the need for new regional airports to complement Brazil's existing infrastructure. Airports are controlled by Infraero and major opportunities lie within small airport developments in the state of São Paulo, exemplified by the Ribeirão Preto airport, the subject of a TDA-funded feasibility study to evaluate the expansion of this regional airport into an international cargo hub.

Energy

Brazil's energy sector is undergoing important changes as the country attempts to meet new demand, anticipated to grow at an average of 5.2% per year, and to increase its network efficiency. The government began privatizing power distribution companies in July 1995, and has created an oversight agency for the industry -- Agencia Nacional de Energia Eletrica (ANEEL) -- which will be responsible for ensuring that a favorable investment climate exists for concessionaires, while safeguarding consumer interests.

Brazil's current installed base is 57.6 GW, which, under Eletrobrás' (the National Electric Utility) direction, is expected to be expanded to 90.2 GW by the year 2006. The share of hydroelectric generation will decline from its current 92% to 83%, through an increase in fossil fuel fired generation.

Construction of the long awaited Brazil-Bolivia Natural Gas Pipeline project, first announced in 1936 and commenced in July 1997, is resulting in major opportunities in fossil fuel generation, with a projected investment of US$ 12.5 billion over the next five years alone. The gas is expected to arrive in the southeastern part of the country by 1999. Petrofertil, a subsidiary of the Brazilian state- owned oil conglomerate, Petrobrás, is administering the procurement.

Transmission lines will also be expanded by 45,900 Km, from its current level of 168,400 Km, by the year 2006. Several projects exist to connect the separate Brazilian grids as well as regional projects to connect with Argentina, Uruguay and Venezuela. The most important project is the North/South Interconnection Project, which connects the northern energy grid with the southeastern grid. The North/South interconnection and has been included within the federal government's 14 priority projects, with estimated investments of US$ 738 million.

Projected Investment
in US$ billion

(Eletrobras)	1997	1998	1999	2000	2001	Total
Generation	$3.30	$3.40	$3.90	$3.80	$4.50	$18.90
Transmission	$2.20	$3.10	$1.70	$1.60	$1.40	$10.00
Distribution	$1.40	$1.40	$1.40	$1.40	$1.40	$7.00
General Facilities	$0.50	$0.50	$0.60	$0.60	$0.60	$2.80
Total	$7.40	$8.40	$7.60	$7.40	$7.90	$38.70

Source: Electrobras

Projected Investment
in US$ billion

	Installed Capacity (GW)		Transmission Lines (1000 Km)		Substations (1,000 MVA)	
	1996	2006	1996	2006	1996	2006
South/South East/ Midwest	41.7	65.5	118.9	140.5	164.3	225.1
North/North East	14.2	21.3	48.1	69.3	49.2	78.7
Isolated Systems	1.7	3.4	1.4	4.5	2.7	8
Total	57.6	90.2	168.4	214.3	216.2	311.8

Source: Electrobras

An additional emerging sector in Brazil which presents opportunities for US companies is oil exploration, production and refining, in partnership with Petrobrás. In November 1995, Congress revoked Petrobrás' 44-year-old constitutionally authorized monopoly, and the Lower House passed a bill earlier this year deregulating the petroleum sector. Petrobrás is under pressure to seek out partnerships in order to maintain market share and to obtain the maximum number of oil field blocks possible within the deadlines set in the petroleum bill. Open competition should increase national petroleum production to 1.2 million barrels per day, from its current 920,000 barrel threshold.

US companies should be aware of opportunities generated by the implementation of the Independent Power Producer (IPP) Plant legislation. IPP opportunities are likely to surface after the completion of the privatization of the state owned utilities. One example in this book of an IPP plant is the Manaus Thermal plant in Brazil.

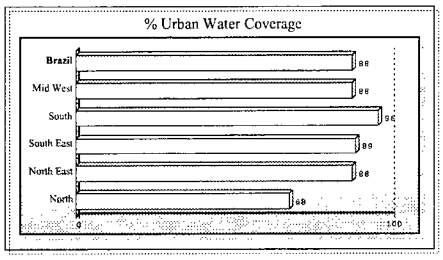
Environment

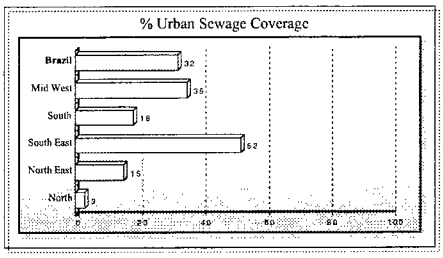
Brazilian environmental markets are very dynamic and present excellent opportunities for US firms in all subsectors. Major opportunities are in water and wastewater projects, followed by industrial and hazardous waste treatment, solid waste disposal and air pollution control.

Environmental regulation in Brazil remains fragmented, with jurisdiction over regulation and enforcement at all three government levels. Environmental standards are issued by entities of the federal government such as the National Environment Council (CONAMA) or the Health Ministry. Nevertheless, most activity occurs at the state and municipal levels, and the best opportunities present themselves in the southern and southeastern regions.

Brazil has under-invested in all areas of environmental treatment and control for decades, and is attempting to rectify this through private-sector participation. The estimated investments necessary for Brazil to increase its water and sewage coverage ratios and to comply with international pollution discharge standards surpasses US$ 40 billion over the next 10 years. The country historically has lacked the political will to invest in the environmental sector, a situation which has changed during the past political term.

Principal opportunities lie in increasing potable water and sewage coverage and in treating sewage.





The federal government approved the Federal Concession Law (*Law No. 8987/95),* providing the legal and political base to expand private involvement in the water and wastewater sector. The federal government, through BNDES, is currently studying a privatization model for the water and sanitation sectors. It concluded by the end of 1997. The potential for private participation is immense given the lack of investment resources at state and municipal levels. An estimated US$ 6.75 billion will be invested to increase coverage of potable water and sewage collection over the next five years, and an additional US$ 2.8 billion will be invested in sewage and industrial effluent treatment in the same time-frame.

The best opportunities may be in multilateral-funded bay cleanup projects and in concessions to state-owned water and sanitation companies, as is the case with the subconcession to Sanepar, (Paraná's state water company) and Sabesp's (São Paulo's state water company) Juquitiba project.

Currently, 95% of all waste in Brazil is disposed of in landfills without treatment. Approximately, 2% is recycled and 3% incinerated. The government's present lack of investment in recycling projects will result in future project opportunities for the private sector.

Telecommunications

Brazil is the largest telecommunications market in Latin America, estimated to be US$ 8.5 billion in 1997. The Brazilian Congress has approved a new telecom law which sets up a regulatory body (ANTE) for the industry and clears the way for privatization of the sector, scheduled for 1998. The Brazilian government will likely issue a single bid document for the privatization of the federal system (Telebrás) composed of 27 regional subsidiaries. The subsidiaries will be sold as four companies, in addition to the long distance monopoly, Embratel.

Aggregate investment projections in the telecommunications sector over the next 6 years approach US$ 76 billion, 80% of which is expected to be made by the private sector. Only 15.2 million Brazilians (less than 10%) have access to fixed-phone telephone services. The government's goal is to increase the wire-line services by a factor of 3 and the public phone service by a factor of 4 over the next 3 years. More than 10 million people are currently waiting for fixed telephone lines, and it is estimated that Brazil's teledensity of 8.5 lines per 100 people can be tripled within six years.

Wireless services in Brazil will also present enormous opportunities, both through the equipment and service demands of the cellular Band B concessions, and the privatization of the state-owned systems. On average, Brazilians who have wireless service spend US$ 150 per month on cellular phone bills, and there is an overwhelming back-order for new service. A consortium led by Bell South, Nortel and Brazilian financial conglomerate, Banco Safra, paid US$ 2.5 billion for a 15-year concession to offer cellular service to the greater São Paulo metropolitan area. Company sources credit the deal as being very favorable despite being four times the minimum bidding price. Bell South also successfully won a US$ 512 million bid to provide cellular service to six states in the northeastern Brazil The cellular markets present the best short-term opportunities. US companies interested in participating must get involved now in developing consortiums for bidding on new projects.

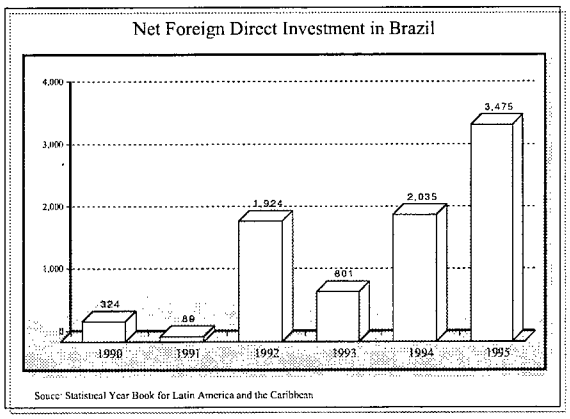
Industry

Brazil has a very diversified industrial base, which is expanding and modernizing rapidly. Industrial based and consumer-oriented industrial sectors have grown at rates exceeding 8% per annum since the introduction of the *Real Plan*.

Forty-nine of the top 100 publicly traded companies in Latin America are Brazilian and represent diverse areas such as petrochemicals, telecommunications, steel mills, mining, rubber, automobiles, airplanes, paper, textile and information technology.

This poses interesting ramifications for US businesses: on one hand, Brazil is self sufficient in most of its needs for procuring equipment and services and has a very technically competitive environment. On the other hand, as Brazilian companies strive to cope with the new openness and inflow of foreign investments, they are seeking partners and strategic working alliances with US companies and others.

Investment Climate and Business Rules



Brazil has made significant progress in lifting foreign investment restrictions. In 1995, Congress approved constitutional amendments eliminating distinctions between foreign and domestic investments. The flow of both portfolio and long-term foreign direct investment into the country has been significant.

Brazil has or is opening traditionally restricted sectors such as petroleum, telecommunications, mining and power generation to foreign investors, as the country strives to meet the investment needs in these sectors. Privatization of state enterprises is now fully accessible by consortiums composed of foreign firms, and government procurement standards have been unified for distinguishing between national and foreign content.

Brazil has a consistent investment policy, but has been sporadic with regard to international trade issues. The government has recently ended the duty free status on imports of machinery and other capital goods, placing a 17% tariff. Similarly, it has imposed several quotas and tariff increases on other commodities in response to the negative trade balance figures experienced since the opening of the economy and the introduction of the *Real Plan*.

Progress has been made in the intellectual property area, but much more progress is still needed.

Financial Sector

The Brazilian banking sector is among the most modern and well established in the world. Included within the banking structure are high margins, and hence, high real interest rates, which has resulted in BNDES becoming the primary source for all medium and long-term loans in Brazil. The cost of BNDES financing has dropped to between 12.5 and 17.5% for a period of ten years. This has resulted in the unavailability of project financing through commercial banks and a severe lack of medium and long-term lending to infrastructure projects, a traditional impediment to development.

The stabilization plan has enabled financial institutions, as well as established companies, to raise capital abroad, through trading as "ADR" shares in US markets and by issuing debentures or euro-bonds. This phenomenon, together with the inflow of capital in the form of portfolio investments, has revitalized the Brazilian financial sector. Currently, strong Brazilian companies (as well as projects) are gaining access to long-term, "inexpensive" (relative to domestic rates) secured capital.

An increasingly important role in infrastructure project finance will likely be played by pension funds, which have an asset base of US$ 62.5 billion. Congress is currently analyzing what role pension funds will be allowed to play in the privatization of state assets. In August 1997, Congress approved a decree which allows workers to use up to 50% of their social security credit fund to invest in the privatization process.

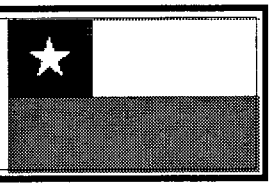
All multilateral institutions are active lenders and insurers in Brazil. OPIC (Overseas Private Investment Corporation) investment insurance programs are increasing as are IFC's (International Finance Corporation), IDB's (Inter-American Development Bank) and US Ex-Im Bank's project and trade financing.

International Trade Agreements

Brazil is a member of the World Trade Organization and belongs to the Rio Group. The country is also a member of the Mercosur Regional Trade Block, together with Argentina, Uruguay and Paraguay. (Bolivia and Chile are associate members.)

Brazil continues to be ambivalent regarding free trade. It promotes it, yet it has taken several protectionist measures over the past two years in order to restrain the country's increasing balance of trade deficit. This is frustrating to its trading partners and undermines Brazil's credibility when promoting free trade.

Republic of Chile



GDP ('96)	US $74 billion	**Per Capita GDP**	US $5,140
Real GDP growth (forecasts)	1997: 5.1% 1998: 6.5%	**Population**	14.4 million
		CPI('96)	7.0%
		S&P Rating	A-

Market Size	**1997-2005**
Energy	*US$ 6.0 billion*
Environment	*US$ 3.8 billion*
Telecommunications	*US$ 9.6 billion*
Transportation	*US$ 4.8 billion*

Executive Summary

The guiding principle of Chile's economic policy is regional integration, a principle which has woven the Chilean economy tightly into the international economic scene. Increasing participation in international trade is fueling dynamic growth in the Chilean economy, which has achieved uninterrupted expansion over the past thirteen years and average annual GDP growth rates exceeding 6%.

Economic expansion and rising levels of international trade, however, have placed increasing strain on Chile's key infrastructure sectors. It is imperative that substantial increases in infrastructure-related investment be maintained to ensure that Chile's future economic growth is not obstructed by deficiencies in infrastructure.

Chile is geographically positioned to serve as a commercial gateway which would effectively link the South American economies of MERCOSUR with the APEC-member economies of the Asia-Pacific and the NAFTA trading zone in the Atlantic. Recognizing the potential economic benefits inherent in this proposition, the Frei Administration has placed a high priority on developing the vital infrastructure necessary for its realization.

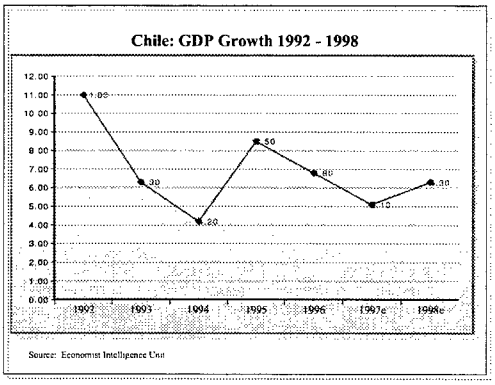
Chile: Gateway to the Pacific

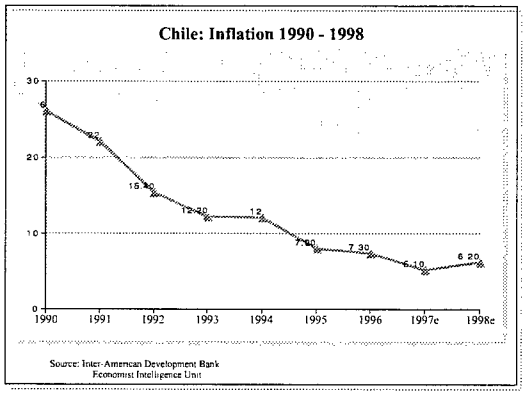
- Dynamic economy; Political stability
- Transparent regulations favor internat'l trade and promote foreign investment
- Major player in Telecom & Energy
- 12 yrs of 6.0% avg. GDP growth
- Geographically positioned to link APEC, MERCOSUR and NAFTA.
- Dedicated to infrastructure investment

The Chilean government expects that over US$ 9 billion will be required to finance transportation and environmental infrastructure projects alone during the next five years. This figure includes: US$ 6 billion in urban roads and highways, US $1.4 billion in ports, airports, and railways, and US$ 2 billion in water treatment and sewage systems.

Economic and Political Climate

The Chilean economy grew at 6% in 1996 and is forecasted to grow at 5.1% in 1997. Chile's Pension Fund Administrators (AFPs), which have transferred large amounts of funds formerly under state control to the private sector for investment, continue to provide a substantial contribution to these high economic growth rates. Inflation plummeted from an annual rate of 26% in 1990 to 7.3% in 1996, and is expected to decline to about 6% in 1997.





Eduardo Frei Ruiz-Tagle was elected President on December 11, 1993, supported by the Coalition of Parties for Democracy. The Frei Administration is firmly committed to continued economic liberalization and increased private sector participation in the Chilean economy. The next presidential election will be held in December 1999.

Chile's economic successes over the past 12 years can be linked to a broad consensus within the Chilean population on an economic development strategy. It is a consensus which encompasses targeting the private sector as the primary driver of economic development, maintaining government in a regulatory and compensatory role, achieving global economic integration, promoting exports, removing trade barriers, and ensuring macroeconomic stability.

Sectoral Trends

Transportation

The Public Works Ministry has initiated a 4-year concession program for infrastructure investment in the transportation sector, which will address Chile's most pressing infrastructure bottlenecks. An example of one such bottleneck is Santiago's International Airport, (Arturo Merino Benitez), whose facilities have lacked substantial investment for the past 27 years and are failing to meet Chile's current passenger and cargo traffic demands. The 1997 Airport Concessions Program will put five airport projects up for bid — the largest of these being the US$ 75 million investment for a new cargo terminal and streamlining the operation of cargo services at the Santiago International Airport.

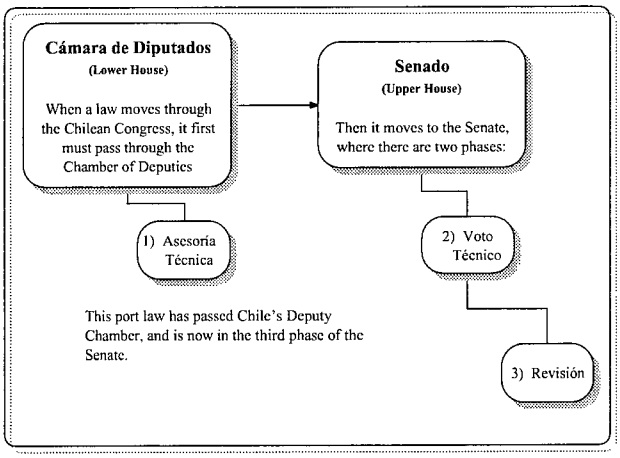
Chile's State-owned Ports

Source: Ministry of Public Works - Chile

The Public Works Ministry has also developed concessions programs for private investment in ports and highways to ensure that Chile is able to meet the logistical demands required to transport elevated volumes of international commerce in the future. EMPORCHI, Chile's state-owned port authority, currently administers a total of eleven ports, which together cover approximately 50% (21.3 million metric tons/yr) of the country's ocean freight. In addition, 19 private ports are in operation and transferred 23 million metric tons of cargo in 1996.

The EMPORCHI Modernization Law, which will grant concessions to private investors for the investment and operation of Chile's state-owned ports, has passed Chile's Chamber of Deputies. The law has also passed phase one (the technical vote) and is currently in its second and final phase (revision) in the Senate. EMPORCHI estimates that Chilean ports will require a total investment of US $800 million to reach the goal of increasing port capacity by 50% over the next 4-5 years.

Chilean Port Law and the History of Its Passage Through Congress
"Ley de Modernización de la Empresa Estatal"



Short-term highway projects include US$ 610 million in urban roads concessions, US$ 500 million in inter-urban roads, and an additional US$ 400 million in multi-sectoral concession projects. The long-term outlook in highway construction also offers substantial investment opportunities. Chile, in cooperation with Brazil, Bolivia and Paraguay, plans to build at least two coast-to-coast Transamerican roadways which will link the Brazilian port of Santos with Northern Chile's ports of Arica, Iquique and Antofagasta. Discussions are also underway with Argentina to open two more land corridors which will serve as an alternate route for countries interested in transporting their products from the Atlantic or the Pacific.

In December 1995, President Frei officially announced the privatization of Chile's passenger railroad system. The system will be transferred by year-end 1997 via an infrastructure, operations and maintenance concession. A total of sixteen Chilean and foreign companies (from the US, France, Spain, and Germany), are participating in the bidding process.

Since nearly all railroad equipment in Chile is imported, manufacturers of railroad equipment and spare parts should closely monitor the outcome. The railroad equipment market reached nearly US$ 59 million in 1996 and is expected to double once transfer to private ownership is completed. Empresa de Ferrocarriles del Estado (EFE), Chile's largest government-owned railway, estimates that the private sector will need to invest US$ 350 million to modernize Chile's rapidly decaying railroad infrastructure, which has not been improved over the past ten years.

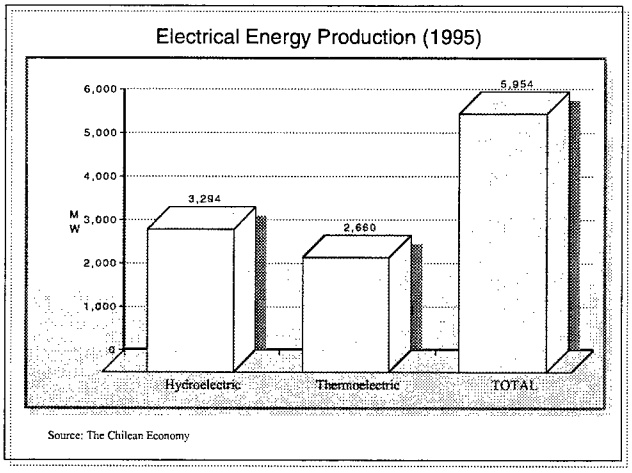
Energy

The Chilean energy sector is extremely dynamic, having experienced an annual increase of 7.9% over the past decade. Chile's total installed energy potential is 5,954 MW, which satisfies an annual per capita consumption of approximately 1,741 kW/h.

Growth of Energy Consumption
1995

	Consumption	Rate of Growth
Electricity	24,576 GWh	9.20%
Fuel	10,980,000 M 3	7.40%
Coal	3,593,000 tons	14.30%

Source: National Energy Commission (Preliminary Estimate)



Hydroelectric power is Chile's primary source of energy generation, representing over 70% of total installed capacity. Other generating fuel sources include coal, petroleum, natural gas and wood. Although alternative energy sources, such as solar and wind power, have only proven competitive in isolated areas of the country, the Chilean government is actively promoting investment in environmentally sensitive energy sources such as wind and solar power.

US investors should keep in mind that the Chilean energy market is highly competitive, with a

total of 58 companies participating in the generation, distribution and transmission of electricity. However, the vast amount of investment which will be required to meet Chile's future energy demands (expected to achieve a 60% increase by 2003) should open the door to additional US investment and procurement opportunities. Best prospects for equipment sales include watertube boilers, generators, switches, insulators, electric connectors, hydraulic turbines and parts, and dielectric liquid transformers.

ENERGY INVESTMENT
Projects Under Construction or
In Advanced Stages of Design ($Millions)

Power Transmission and Distribution	$50-100
Enlarging Petroleum Refineries	$150-200
Hydroelectric Plants	$800-1,000
Thermoelectric plants	$1,000-1,300
Gas Pipelines and Distribution Networks	$600-1,500
Total Investments	$2,600-4,100

Source: National Energy Commission of Chile - 1996

Environment

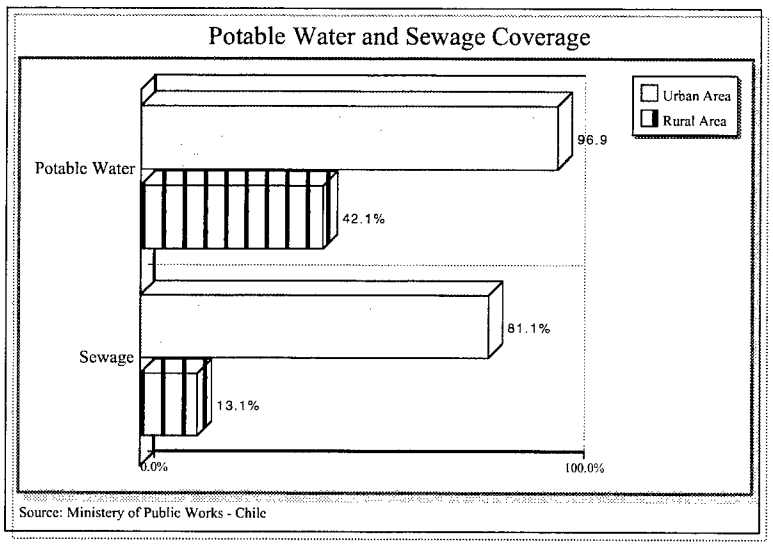
Chile implemented its Basic Framework Law on the Environment in March 1994, which systematized the country's environmental statutes. This framework has since expanded into a series of new standards for environmental quality and emissions, pollution control and clean-up plans, and an Environmental Impact Assessment System which governs the review and approval process for all industrial and mining investment projects.

Conama (the National Environmental Commission), which reports to President Frei through the Ministry's General Secretariat, is Chile's highest environmental authority. Conama does not develop infrastructure projects in the environmental sector. Rather, it serves as a coordinating body whose responsibility is to oversee environmental impact studies. Such studies typically relate to emissions and toxic waste standards in the energy and mining sectors, as firms in these areas are responsible for complying with Chile's new environmental legislation.

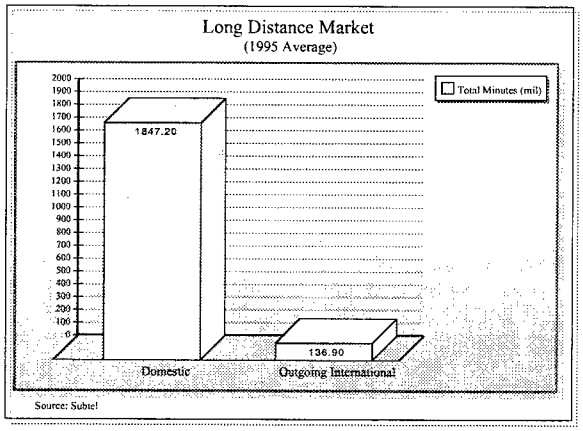
Nearly US$ 1.2 billion has been invested over the past several years in pollution control for the mining, wood pulp and fishmeal industries alone. CODELCO, Chile's largest copper mining company, invested US$ 260 million to control liquid effluents and particle emissions from 1990-1994 and plans to invest another US$ 550 million in the near future. These investments offer a competitive niche to US environmental services companies which should not be overlooked. Local environmental experts estimate Chile's current pollution control market to be approximately US$ 660 million, a figure which could reach US$1 billlion within five to ten years.

Potable water and wastewater treatment also offer procurement and investment opportunities for US firms in the environmental sector. Thirteen of Chile's water supply and sewage companies are state-owned and operated by the Enterprises Division of CORFO (Chile's Economic Development Agency). These thirteen companies alone serve 92.1% of the total Chilean population, covering 98.6 % of urban water needs and 89.4% of sewage services.

CORFO is currently in the process of transferring the operation of these companies into private hands. By the end of 1997, a law should be in place which will define the privatization strategy of the state-owned companies. In 1998, ESVAL (5th region) and ESSAL (7th region) are expected to be privatized, followed by ESSAN (2nd region) and ESSAR (9th region).



Investments in water sector-related equipment and services present ample opportunities for US companies, particularly in sewage and wastewater treatment. CORFO has estimated that water and sewage-related investment requirements from 1997-2010 will reach nearly US$ 3.4 billion, including US$ 1.5 billion in water production/distribution improvements, US$ 530 million in sewage networks, and US$ 1.3 billion in wastewater treatment plants.



Telecommunications

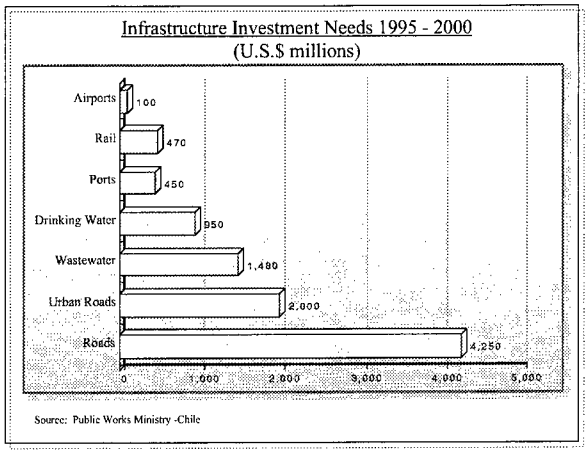
High levels of investment in the telecommunication sector continue to flow into upgrading Chile's already modern and efficient networks. Chile currently has approximately 1.8 million lines (13 lines per 100 inhabitants), more than 17,000 public telephones, three fiber-optic networks (owned by CTC, Entel and Telex) and the country's multicarrier networks have been 100 % digitized since 1996.

The telecommunications sector in Chile is extremely competitive and offers little breathing room for new competitors who choose not to partner up with an already established company. Further strategic alliance opportunities should open, however, as local telecommunications companies are aggressively positioning themselves to expand into other Latin American markets.

US equipment and service providers should also keep an eye on procurement opportunities offered through the expansion programs of Chile's telecom giants such as Entel, VTR, BellSouth and CTC. Local equipment production is minimal, with imports supplying nearly 95% of Chile's telecommunications needs. The market size for telecommunications imports in Chile soared to US$ 440 million in 1996 and is expected to grow by another US$ 100 million in 1997.

Industry

Mining, fishing, fruit growing, and forestry form the backbone of the Chilean industrial sector. Mining, with copper production at the forefront, remains a critical sector of the Chilean economy. Chile leads the world in the production and export of copper and is the word's foremost producer of nitrate and lithium, ranks second in output of iodine and molybdenum, eighth in silver and ninth in gold production. Mining accounts for the largest investment projects in Chile, both domestic and foreign.

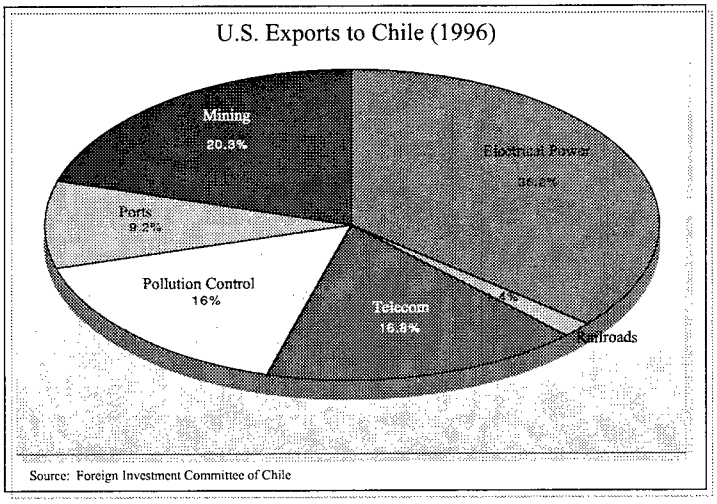


Tourism, which is expanding at an annual rate of 12 %, is another sector which yields attractive investment opportunities for foreign investors. Investment projects totaling US $1 billion are already in motion, primarily involving real estate development.

Investment Climate and Business Rules

Chile is firmly devoted to free trade. Imports enter at a flat 11 % tariff and import licenses are granted by the Central Bank as a routine procedure for nearly all products. A number of Free Trade Zones have been established to promote investment in the northern cities of Iquique and Arica, as well as in Punta Arenas at the southern tip of Chile.

Chile's Foreign Investment Statute, Decree Law 600, legally guarantees foreign investors equal (to domestic investment) treatment. Foreign investors may repatriate capital and remit profits after one year and access the local foreign exchange market for profit and capital remittances.



An attractive investment climate has resulted in foreign direct investment in excess of US $4.3 billion. From 1990-1995, the United States was the country which poured the most investment dollars into Chile (38.6%), followed by Canada (17.7%), Finland (7.5%), the United Kingdom (4%), Japan (3.5%) and Australia (3.2 %). Leading sectors for 1996 US exports include Electrical Power (US$ 1.5 billion), Mining (US$ 840 million), Telecom (US$ 697 million), Pollution Control (US$ 662 million), Ports (US $382 million) and Railroads (US $58 million).

Intellectual property rights covering trademarks, invention patents, copyrights, utility models and industrial design are regulated by Chile's Political Constitution of the Republic under Decree Law 958. In 1991, the law was expanded to incorporate court of arbitration to assist in conflict resolution; however, intellectual property coverage in Chile remains deficient in certain areas including computer software (software piracy is estimated by industry sources at 64%), trade secret protection and trademark registration.

Financial Sector

Chile has a modern banking and financial sector, with financial services providers including Pension Fund Administrators, commercial and savings banks, insurance companies, leasing firms, securities exchanges and foreign capital funds. The majority of these institutions are private, and many are foreign including US-owned. Chile maintains a "crawling peg" foreign exchange rate, which is allowed to float within a 20% band around a central rate.

The country also has three securities exchanges. The largest, measured by trading volume, is the Santiago Stock Exchange, followed by Chile's Electronic Stock Exchange and the Valparaíso Securities Exchange. The Santiago Exchange has established on-line links for the past five years with its counterparts in São Paulo, Mexico City and Buenos Aires.

The US Ex-Im Bank and the Overseas Private Investment Corporation have established credit and insurance programs for US exporters and investors in Chile. Ex-Im Bank offers project financing in Chile for up to 85% of the value of US content in a project. The Inter-American Investment Corporation (IIC) and the International Finance Corporation (IFC) are also active in financing projects in Chile.

International Trade Agreements

Chile is a charter member of the World Trade Organization and belongs to the Río Group, the Asia-Pacific Economic Cooperation forum (APEC), the Pacific Economic Cooperation Council, and the Pacific Basin Economic Council. Chile already holds trade accords with Argentina, Bolivia, Colombia, Ecuador and Venezuela, and is negotiating a similar agreement with Peru.

In June 1996, Chile became a MERCOSUR associate and signed a cooperative framework agreement to establish political and economic ties with the European Economic Community. Also in 1996, President Eduardo Frei and Prime Minister Jean Chrétien endorsed a Chile-Canada bilateral free trade agreement which, coupled with Chile's bilateral agreement with Mexico, is designed to hasten entrance into NAFTA. Chile was invited to join the North American Free Trade Agreement at the first Summit of the Americas, which was held in Miami in 1995. The Clinton Administration has been pushing hard for congressional approval of "fast track" legislation which would expedite Chile's official entrance into NAFTA.

Republic of Ecuador

GDP ('96)	US$ 18.8 bn	**GDP Per Capita**	US$ 1,520
Real GDP growth		**Population**	11.7 m
(forecasts)	1997: 2.5%	**CPI('96)**	24.4%
	1998: 4.5%	**S&P Rating**	N.R.

Market Size	**1997-2005**
Energy	*US$ 1.53 billion*
Environment	*US$ 974 million*
Telecommunications	*US$ 2.44 billion*
Transportation	*US$ 1.20 billion*

Executive Summary

Ecuador has experienced growth and prosperity in the past several years, partially offset as a result of military skirmishes with Peru and the ousting of President Abdala Bucaram. As a country striving for growth, Ecuador has undergone difficulties in its various policy initiatives. Under a new and transitional government, investors have invested cautiously. The future of continued liberalization rests in the hands of the current administration and the next elected government.

Long-term economic and political stabilization is possible and expected. Exports to the United States continue to rise, as well as trade with other nations. In addition, the country is beginning to play a larger role in the export of nontraditional products such as minerals and shrimp, while also modernizing existing production of traditional products.

Infrastructure creation will drive the country's growth over the next five years. Revamping the regulations for the energy sector has permitted capital flows into electricity generation which will avoid the need to ration power and with it, the promise of uninterrupted productive capacity. Other changes include the improvement of oil production, exploration and refining. Together with these advancements, growth in telecommunications and transportation will improve Ecuador's infrastructure.

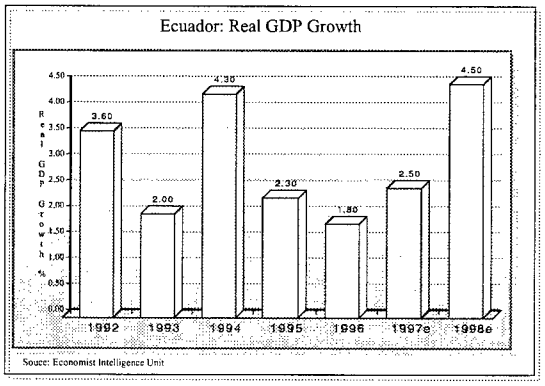
Ecuador -- the Country of Eternal Spring

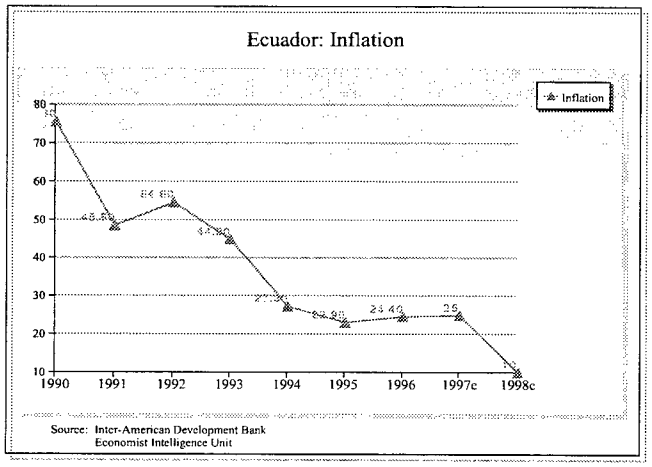
- Stable year-round climate
- Growing export market
- Rich in minerals and oil
- Uninterrupted Agricultural Production.
- 180% growth in past 6 years
- Huge untapped minerals and oil wealth

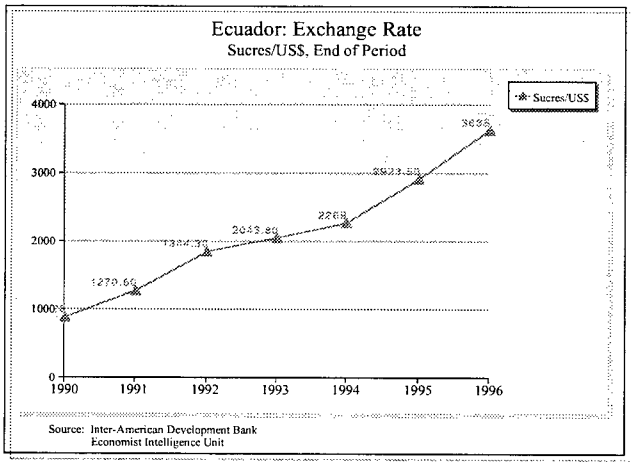
Economic and Political Climate

Ecuador's export oriented economic policies have been successful. Since 1990, exports have grown from US$ 2.7 billion to US$ 4.9 billion with expectation of added growth in 1997. Key exports in sectors such as oil, bananas, flowers and cocoa experienced increases. Furthermore, today the petroleum sector accounts for 10% of GDP, while agriculture and seafood total 11%.

Export growth has assisted the country in reducing international debt, thus helping to stabilize exchange rates. Forecasted GDP growth for 1997 is estimated at 2.5% while consumer prices continue to rise at a rate of 30% (considered reasonable if Alarcón's economic team maintains monetary discipline). The 30% inflation rate is higher than in 1996. Imports declined by 10.3% in 1996, but trade with the US remained strong at 37% of all product imported, totaling US$ 1.5 billion. In addition, the country's manufacturing sector grew by 2% in 1995 and 3.5% in 1996.







Congressional leader Fabián Alarcón has been appointed the interim President. Known for his ability to solve even the most difficult issues, Mr. Alarcón has brought back stability to the country's economic policy. As an administration headed for replacement in less than a year, it is focused on a modest economic program of keeping government spending at a minimum and containing inflationary pressures through prudent monetary and fiscal adjustments.

In addition to the economic policy, the Alarcón administration is committed to seeing through infrastructure modernization initiatives. Such positive change will prepare the country to take advantage of regional and international trading blocks.

Sectoral Trends

Energy

Ecuador's energy sector has a current electrical capacity of 8,674 Gw/h and a demand of 10,029 Gw/g. The existing deficit along with the current natural demand growth, provides ample opportunity for firms interested in pursuing projects in Ecuador.

The Ecuadorian energy sector is undergoing dramatic changes intended to help fulfill the current deficit and curb the possibility of power rationing experienced in 1995. In doing so, the country has instituted a new Electricity Law as of September 1996, but it is feared that reforms may not go into effect, however, until late 1998 or early 1999. INECEL (Instituto Nacional de Electrificación), the state electricity monopoly will be divested of all its assets in much the same way as the capitalization process undertaken in Bolivia. Although it is hopeful that reforms will be instituted quickly, labor parties continue to slow the process.

The law allows for private investment in generation, transmission, and distribution according to the modalities and rules of each. The capitalization process for existing generation will consist of selling up to 39% of the equity to private investors, 10% to electric sector workers, while keeping the remaining 51% state-owned. New projects will be concessioned as BOTs (build operate transfer). The bidding process will be conducted by CONELEC, the newly organized council of electrification acting as the central planning unit for the energy sector.

The transmission of electricity will be awarded in the same manner as generation. Assets awarded through public auction will oblige companies to improve the current grid and expand power generation as approved by CONELEC in conjunction with their electrification plan. CONELEC will allow only one energy distributor per geographic area. CONELEC also requires that distributors not have generation capability; however, it will allow private erection of transmission systems connecting to the power grid.

Telecommunications

The Ecuadorian telecommunications market approximated US$ 92 million in 1994 with growth projections to US$ 102 million for 1996 and an expected impressive jump of 25% when privitizaiton is concluded. The telecommunications market in Ecuador is lucrative for US companies interested in exporting equipment and services, as 42% of all telecommunications equipment entering the country have historically originated in the United States.

With the ousting of President Bucaram, the privatization process nearly halted the privatization of Emetel, the state telecommunications company. Seven companies have purchased the documents for the concession expected to take place in late November 1997. Emetel will be split into two distinctive units, Andinantel S.A. and Pacifictel S.A., and sold off to pre-qualified and experienced operators. The 35% of equity for sale will be bid internationally while the remaining 65% will be apportioned at 10% to Emetel employees and 55% to the Government. The 55% government stake will be held for future sale. The privatization will grant the concessionaires fifteen years of ownership with a monopoly of five years.

To date, the five companies that have been pre-qualified for bidding include: Stet International (an Italian firm), GTE International Telecommunications Incorporated, GITI (US owned), MCI International Telecommunications Corporation (US owned), Telefonica Internacional de España S.A. (Spanish) and Korea Telecom (Korean).

Mobile telephony for Ecuador is practically closed due to the fifteen year concession held by the country's two operators, Conecel, and Otecel. At an annual growth rate of 15%, the oligopolies have 30,000 subscribers combined. The current market is closed to suppliers and services providers, but may shift to a more open market in the next few years.

Transportation

Ecuadorian transportation infrastructure is relatively strong, linking the country through a system of all weather roads, two international airports, and three major ports. Recently the country has begun privatization of the airports, completed construction of the Quito Trolley system, and is attempting to expand its port system.

Expansion of Ecuador's road system is needed. Concessioning of road maintenance and expansion to the private sector is expected in the following years, which should provide US companies with ample opportunities to export tolling, lighting and maintenance services. Recent government plans include expansion of the Guayaquil to Quito and Guayaquil to Salinas roads, in addition to a national plan of transportation that includes expansion to the east. The airport system in Ecuador is inefficient. The government received bids for privatization in July 1997, but no action has yet been taken.

The port system is currently overrun with exports, and is being expanded through the port concession of Manta. The port should alleviate the congestion in Guayaquil and allow for further trade development.

Industry

Ecuador has primarily been driven by an agricultural economy of banana, cocoa, flowers and shrimp. Today, the country is diversifying its export production through growth in its industrial base. In doing so, Ecuador is beginning to tap its wealth in minerals, in addition to increasing petroleum output and distribution.

The mining sector has grown due to recent investments (US$ 12 million) in exploration. The funds, originated mainly in Canada, have helped establish 26 international companies residing in Ecuador. Future activity in the extraction of gold is expected, as well as, the development of metallic and nonmetallic ore mining; of which studies show there is sizable reserves.

In an attempt to increase the extraction of the countries mineral wealth, Ecuador has instituted the Mining Law of 1991 which grants special advantages to the mining sectors. Exploration and extraction rights, are considered to be real property rights under the law and may be transferred, mortgaged and traded. Imports of products for the development of mining has also been granted special privileges with a 5% customs duty and no value added tax.

Environment

Ecuador's regional climate provides the country with an abundance of water. Although the natural supply of water is plentiful, the government continues to strongly subsidize water and sanitation services provision. There have been proposals for the concessioning of such services, but none reached the point where concessions would be granted.

In an attempt to begin the process of possible transfer, the IDB granted ECAPAG (Empresa Cantonal de Agua Potable y Alcantarillado de Guayaquil) US$ 2.1 million to conduct feasibility studies of several areas of the city of Guayaquil. The estimated cost of the project is US$ 380 million covering 6,579 acres and benefiting 400,000 people. Bids will be analyzed toward the end of 1997 and studies will be conducted soon afterward. Export opportunities for the project are great and it is recommended that companies stay abreast of the changes occurring in the market place.

Investment Climate and Business Rules

Ecuador has provided an open environment for foreign investments. The foreign investment law is governed by Ecuador's membership in the Andean pact which calls for providing investors with rights equal to those of Ecuadorian citizens. By the end of 1993, total foreign investments exceeded over US$ 100 million, as a consequence of favorable laws and stronger opportunities (please find foreign investment chart on the following page.)

Financial Sector

The Ecuadorian securities market was introduced by the Securities Market Law of May 1993 which regulates the supply and demand of securities.

There are currently two securities exchanges, located in Quito and Guayaquil. They provide one of the only affordable alternatives to financing available in the country, by offering equity and corporate debt to the investing public. In addition, funds are available through local banks and dollar based financing institutions, albeit at high real annual rates. The national finance corporation offers long-term financing through private banks for the development industrial capacity and exports.

In addition to the domestic financing, the US Ex-Im Bank offers loan guarantees and direct long-term financing of US exports. Funding is also available for projects from the World Bank, the International Development Bank and the Multilateral Investment Guarantee Agency. Latin American multilateral assistance also includes, the Inter-American Investment Corporation and the Andean Development Corporation.

Net Foreign Investment
by sector (1994)

Agriculture	3,982
Mines and Quarries	364,031
Manufacturing	138,520
Electricity, Gas and Water	43
Construction	653
Commerce	9,937
Transport, Storage and Communications	3,739
Business Services	9,643
Social and Personal Services	263

Source: Superintendent of Companies, Hydrocarbons National Registry, Petroecuador

Ecuador currently has a floating rate market for all private sector transactions. Attempts at stabilization have been undertaken by the central bank which announced monthly exchange rate targets manipulated through balance of payment initiatives, monetary and fiscal policies. Bucaram's plan to fix the currency at a specific exchange rate has been abandoned by the Alarcon administration which favors the crawling-peg exchange policy. The targeted currency depreciation rate has been increased from 18.5% to 21% till the end of 1997. The government will continue to control the exchange rate through an auction system.

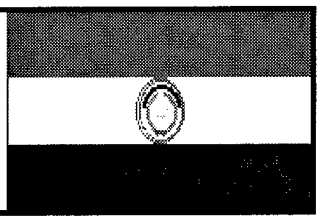
International Trade Agreements

Ecuador has been aggressively expanding its trade liberalization policies principally throughout the Americas and most recently on a global level. Regionally, the country is a member of the Andean Community along with Colombia, Bolivia and Venezuela and has full participation in the Cartagena Accords. Recently in January 1995, Ecuador extended a common tariff with Colombia and Venezuela, negotiating lower tariffs for some of its most important imports. Specific bilateral trade agreements have also been developed with Chile, Colombia and Venezuela. Such agreements have assisted in the country's export growth.

Globally, Ecuador became a member of the WTO in January 1996. Membership has become a bit problematic as the country attempts to pass legislation to meet the strict environmental standards and trade regulations proposed by the WTO.

Today, Ecuador is negotiating trade agreements with the G3, a trade association comprised of Colombia, Venezuela and Mexico. In addition, the country is undergoing discussions to join the Mercosur customs union and is participating in the Free Trade of the Americas Working Groups.

Republic of Paraguay



GDP ('96)	US$ 8.20 bn	**Per Capita**	$1,640
Real GDP growth (forecasts)	1997: 4.7%	**Population**	5 million
	1998: 1.2%	**CPI('96)**	8%
		S&P Rating	N.R.

Market Size	**1997-2005**
Energy	*US$ 417 million*
Telecommunications	*US$ 664 million*
Environment	*US$ 265 million*
Transportation	*US$ 332 million*

Executive Summary

The government of Paraguay -- the first democratically elected government in two generations -- has not made much progress in its privatization program. Most of Paraguay's infrastructure is still owned by the state, including energy, water and transportation. There is room in the telecommunications sector for private investment. In addition, the waterway sector is growing, and there are opportunities in private ports development.

Paraguay's President, Juan Carlos Wasmosy, is scheduled to leave office in May 1998. There are not likely to be successful privatization attempts between now and that time, especially given the wide divergence of opinion between Paraguay's executive and legislative branches. There are still some opportunities in Paraguay, particularly concerning the many relatively large multilateral and bilateral projects that have been recently funded.

Paraguay occupies a potentially valuable geographic position in Mercosur, but has failed to capitalize on its natural assets. The southern South American waterway drains, through Paraguay, the rich soy growing regions of Bolivia and Brazil. Paraguay itself has a rich agricultural sector.

Economic and Political Climate

The political climate in Paraguay is very poor. In 1996 the democratically-elected President Wasmosy was nearly overthrown in a military coup. The President's relations with the legislative branch have been antagonistic since his 1993 election, which accounts for the lack of progress in most areas of policy initiative -- especially in the last two years.

The economic outlook is not promising. Paraguay's large informal sector is being hurt by a weak currency, and by the low tariffs and high levels of transparency mandated by Mercosur. Trade along Paraguay's border with Brazil declined by 66% between 1995 and 1997.

There are significant bright spots. Inflation is relatively low at 8%. Energy revenues from Itaipu and Yacyreta are up to date, and total about 5% of GDP per year. The agricultural sector traditionally has been Paraguay's major strength.

Investment Climate and Business Rules

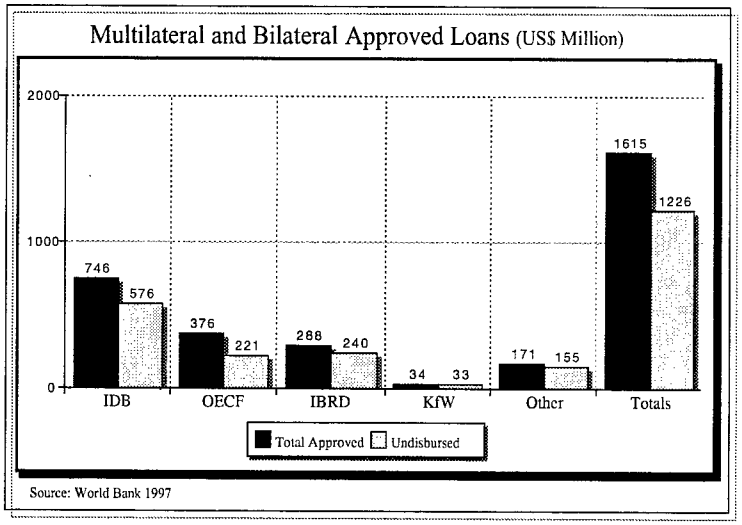
Paraguay is not participating in the region's general drive toward privatization of infrastructure, primarily because of the antipathy between the executive (which has put forth a series of initiatives) and the legislature (which has rejected them).

Nevertheless, there have been a series of fundamental reforms since the onset of the Wasmosy government, including:

- unification of the exchange rate
- reform of the tax system
- normalization of relations with external creditors
- steady integration into Mercosur

The best sources of projects and contracts are projects that benefit from an active multilateral sector. As you can see from the graph, Paraguay benefits from a wide variety of international loan programs, but -- it might be argued -- is not particularly efficient at putting these loans to work.

The regulatory environment is uncertain in all sectors.

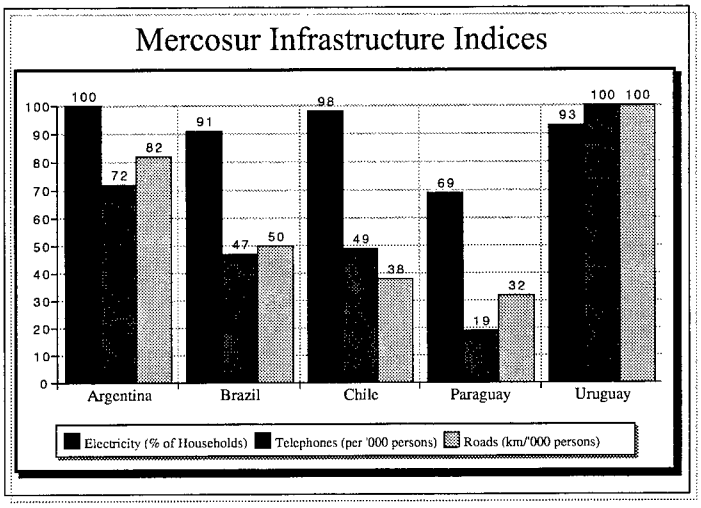


Sectoral Trends

Energy

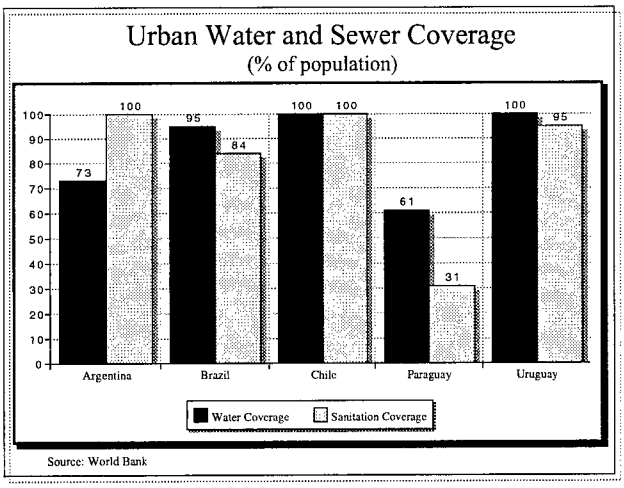
Paraguay is truly an energy rich country, given its hydroelectric resources. The sector is controlled by ANDE, the national distribution company, which offers opportunities in the areas of services and equipment sales.

Paraguay clearly is behind the regional average in household electrification. The Inter-American Development Bank recently made a US$ 50 million loan available to modernize the sector and increase coverage. The project has three aims: 1) increase the supply of power in the Asunción area, from 645 MW to 925 MW; 2) improve both the system's efficiency and coverage; and, 3) prepare the legal and regulatory framework for greater private investment. In addition, there is continuous discussion regarding the privatization or capitalization of Yacyreta (Argentina has announced plans to privatize their share).



Environment

Environmental conditions in Paraguay are generally good. Exceptions are air pollution, caused by heavy traffic, in downtown Asunción; and river pollution during periods of heavy rainfall -- as industrial wastes are washed into nearby rivers and streams creating hazards for coastal inhabitants.



The greatest environmental issue in Paraguay is with water and sanitation. According to the World Bank, in order to reach appropriate coverage levels Paraguay would have to invest US$ 35 million per year over the next 15 years.

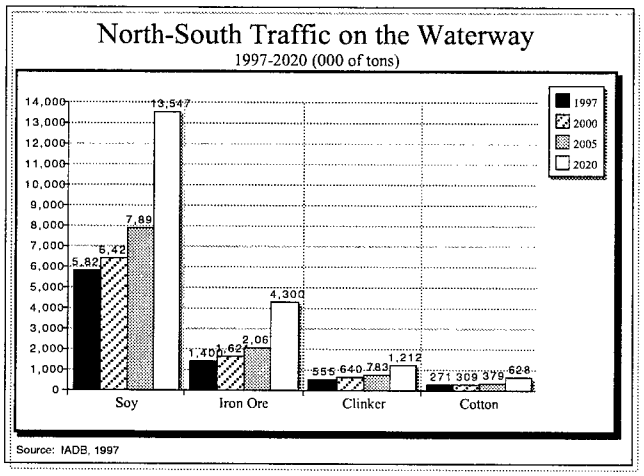
This demand provides good opportunities for the sale of services, operations and equipment. CORPOSANA is responsible for sanitation in all urban areas and is overseeing an aggressive public works system. The entity does not generate sufficient revenue to provide investment capital. Its capi-

tal needs are partially met through loans from the Inter-American Development Bank (nearly US$ 80 million) and the Japanese OECF (US$ 52 million).

Transportation

The Paraguayan transportation system is adequate at the main road level, given that two highways bisect the country, connecting it from east to west with Argentina and Brazil, and from north to south with Brazil and Argentina.

The real need and opportunity is the waterway, which is navigable from the Bolivia/Brazil border in the north all the way to Buenos Aires. The potential is for Paraguay's waterway to serve as an international commerce highway -- primarily consisting in barge traffic -- uniting the great soy producing regions of Brazil to the San Lorenzo terminals in Argentina, and there to be transshipped via ocean-going vessels.



Clearly the waterway is a delicate project because of environmental concerns. At the same time, if the waterway were to be developed there would be a series of complementary small and targeted port projects, including: the modernization of the port of Asunción; the much needed creation of a modern port at Villeta; and, perhaps, the development of Concepción as a grain cargo point.

There is also the possibility of an urban transit project in the city of Asunción, given that the municipality is located on a peninsula jutting into the Paraguay river that is truly bottlenecked for the entirety of each business day.

Telecommunications

Policy and regulations for all telecommunications are established by the state-owned enterprise, ANTELCO. The government has attempted to increase private sector participation in telephony, most notably in 1995 with an attempt to double the number of lines available in the country, but has had very limited success.

Conditions are in place for private participation in telephony, most notably the 1995 Telecommunications law, and the subsequent creation of a functioning regulatory entity. Paraguay has one of the lowest telephone densities in South America -- and one of the highest costs of service to the consumer.

Financial Sector

The government's economic policies attempt to attract capital and promote trade; however the on-going political crisis along with simmering financial crisis, mean that it is extremely difficult to initiate support for private sector infrastructure projects.

International Trade Agreements

Paraguay is one of the four members of the Southern Cone Common Market, Mercosur, along with Brazil, Argentina and Uruguay. Since the formation of Mercosur, Chile and Bolivia have entered into the union in 1996 as associate members. Similar negotiations are underway with Peru. As of January 1995, a common external tariff has been established and most products are freely traded within Mercosur.

Republic of Peru

GDP ('96)	$50.2 bn	**Per Capita GDP**	US$ 2,058
Real GDP growth		**Population**	24.3 m
(forecasts)	1997: 3.2%	**CPI('96)**	11.5%
	1998: 5.0%	**S&P Rating**	N.R.

Market Size	**1997-2005**
Energy	*US$ 4.1 billion*
Environment	*US$ 2.6 billion*
Telecommunications	*US$ 6.5 billion*
Transportation	*US$ 3.2 billion*

Executive Summary

Peru has experienced dramatic changes over the past decade, largely due to a crucial reform process set in motion with President Alberto Fujimori's entrance into office in 1990. President Fujimori was inaugurated for his first term during a period of profound economic and social crisis, characterized by hyperinflation, distorted relative prices, bankrupt fiscal accounts and a financial system on the verge of collapse and uncontrolled terrorism from the "Shining Path."

Over the past seven years, the Fujimori Administration has succeeded in reestablishing Peru's position on the global economic map through a comprehensive stabilization program which restored fiscal and monetary balance, redefined the state's role in the economy, opened the door to foreign investment and strengthened capital, and put the "Shining Path" leadership in prison.

Perhaps the best indication of Peru's dynamic recovery is the record level of direct foreign investment flowing into the country. Attracted by a wave of privatizations, concentrated mainly in the energy sector, foreign investors poured US$ 6.5 billion dollars into the Peruvian economy from 1992-96. A substantial natural resource endowment, coupled with a strengthened institutional frameworks and sustained levels of economic growth, are laying the groundwork for Peru to become a major player in the future Latin American economic scene.

Peru: Positioned for a Brighter Future

- Crucial economic and political reforms
- Sustained GDP growth
- Key privatizations in energy and mining sectors
- Natural resource endowment
- US$ 6.5 billion in foreign investment from 1992-96
- Social order, strong political leadership

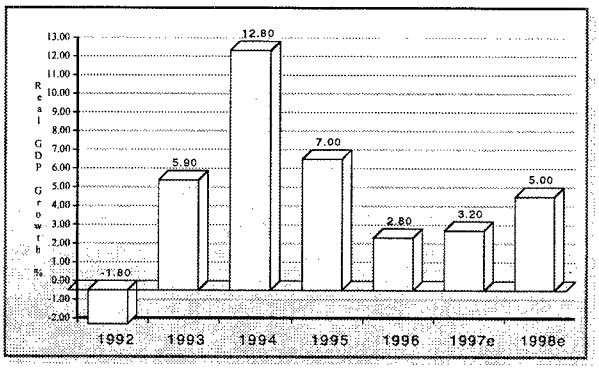
Economic and Political Climate

The Peruvian economy has achieved a remarkable turnaround. After near economic collapse in the early 1990s, GDP growth peaked at 12.8% in 1995 and hit 7% in 1995, before slowing to a disappointing 2.8% in 1996. Peru's GDP is forecasted to grow by 3.2% in 1997 and should achieve higher growth in 1998. Tight monetary and fiscal policies have successfully curbed inflation, which fell from a rate of 71.6% in 1992 to 11.8% in 1996.

After experiencing a three-year downturn, Peru's Private Pension Funds (AFPs), are expected to show gains this year and in 1998. The country's five AFPs currently hold a total of US$ 950 in private pensions; these funds are expected to grow to nearly US$ 8 billion by 2004.

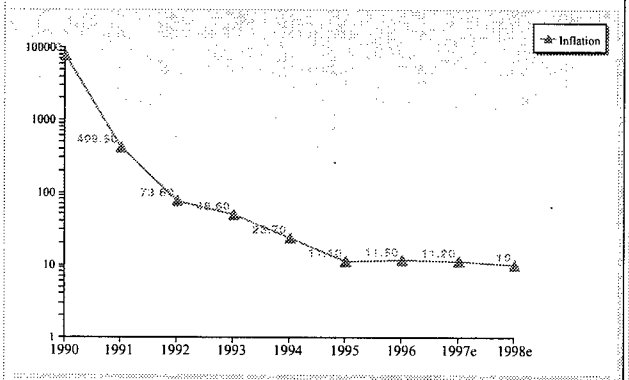
Alberto Fujimori was elected President on July 28, 1990, supported by the Cambio 90-Nueva Mayoría (C-90/NM). He was reelected on April 9, 1995, following a national referendum. Although President Fujimori is determined to run for an unprecedented third term in the year 2000, he faces substantial government opposition. Peru's Constitutional Tribunal recently ruled against Fujimori's eligibility for reelection and public opinion is turning against his continued attempts to circumvent the Tribunal's decision.

Peru: Real GDP Growth 1992-1998



Souce: Economist Intelligence Unit

Peru: Inflation 1990-1998



Source: Inter-American Development Bank
Economist Intelligence Unit

Sectoral Trends

The Peruvian Government has opened up public services to private investment and now grants concessions in the transportation, energy, telecommunications, urban development and environmental sectors.

Transportation

Peru's *1992-98 Plan to Rehabilitate, Maintain and Improve Transport Infrastructure* will require a total of US$ 1.13 billion for upgrading and maintaining more than 4,700 Km of roads throughout the country, repairing 117 Km of railways, repairing and replacing 2,600 m of bridges and improving the primary runway at the Jorge Chávez International Airport in Lima. In addition to government funding, these works are being financed through loans from the Inter-American Development Bank, the World Bank, the Andean Development Fund and OPEC.

The Peruvian road network totals 73,300 Km and is divided into national highways (22%), state roads (20%) and district roads (58%). Under the Transport Infrastructure Plan, 28% of national highways will be rehabilitated under concession, including the North and South Pan-American, the Central and Amazon and the Jungle Marginal highways.

Transport Infrastructure Repair, Maintenance and Improvement Plan
1992-1998

Scheduled Main Works	Goals	Investment (in US$ Millions)
Roads	4,724 km	850
Bridges	2,623 m	47
Railways	117 km	45
Jorge Chávez Airport Runway	3,506 km	8
TOTAL		950
Complementary Works		45
Total Scheduled Investment		1,139

Source: Ministerio de Transportes, Comunicaciones, Vivienda y Construcción. Peru

Road Program Progress

Road	Objective	Progress
North Panamerican Highway	1,717.0	1,711.0
South Panamerican Highway	1,292.0	1,289.0
Central Highway	380.0	291.0
Amazon Highways	315.0	65.0
Penetration Roads	746.0	-
Jungle Marginal Highway	275.0	-
Total	**4,725.0**	**3,356.0**

Source: Ministerio de Transportes, Comunicaciones, Vivienda y Construcción. Peru

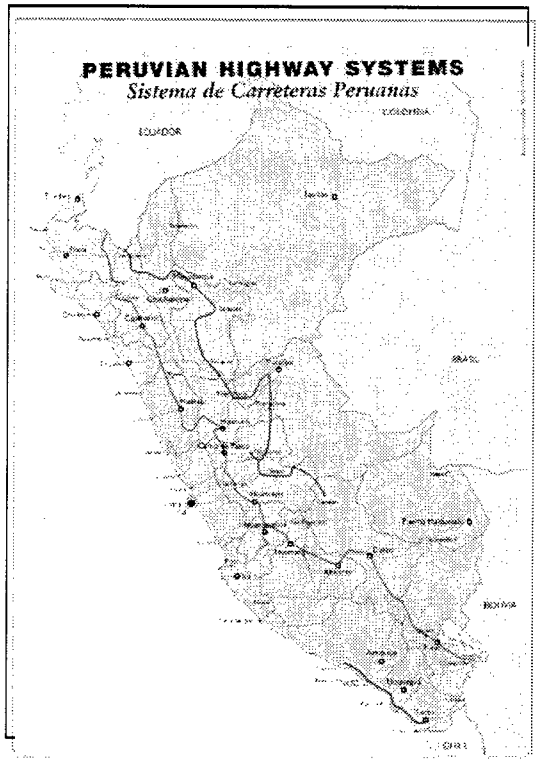
The railroad network includes eight links, totalling 2,120 Km. ENAFER, Peru's national railway company, currently operates five of these links, while the remaining three links belong to the Southern Peru and Centromin mining companies. The railway section of the Infrastructure Plan targets an upgrading of the ENAFER network, to include the rehabilitation of 117 Km of track, 30 locomotives and 200 wagons, totalling US$ 45.5 million.

To facilitate the rehabilitation process, ENAFER has created three companies: Ferrovías del Centro, Ferrovías del Sur and Ferrovías del Sur Oriente. Ferrovías del Centro is narrow gauge and controls the line which runs Callao- Huancaya-Huancavelica (609 Km); Ferrovías del Sur is standard gauge and operates the Mollendo-Arequipa-Cuzco and the Tacna-Arica routes (915 Km); and Ferrovías del Sur Oriente is standard gauge and controls Cuzco-Machu Piccu-Quillabamba (185 Km). ENAFER is selling each of the companies, and has released all bidding information regarding the sale. Potential owners must bid for each company separately, although it is possible that a bidder could purchase two or even all three companies.

Railroad Network

Company	Track (km)
Empresa Nacional de Ferrocarriles (ENAFER)	**1610**
Ferrovías del Centro:	
Callao - La Oroya - Huancayo	380
Huancayo - Huancavelica	129
Ferrovías del Sur:	
Mollendo - Matarani - Arequipa - Julianca - Puno - Cusco	915
Ferrovías del Sur Oriente:	
Cusco - Quillabamba	185
Tacna - Arica (International)	60
Empresa Minera del Centro (CENTROMIN)	**271**
La Oroya - Centro de Pasco	187
Pachacayo - Chauca	84
Southern Peru Copper Corporation	**240**
Toquepala - Ilo - Cuajone	240
Total	**2121**

Source: Ministerio de Transportes, Comunicaciones, Vivienda y Construcción. Peru



The Peruvian government intends to have new owners for each line by the end of 1997. ENAFER will eventually be liquidated; its goal in this process is to sell the three lines to private firms. New owners will have the right to concession investment work in coordination with ENAFER, and the concession contract will dictate the supervision of the three companies. Concessions will be granted for 40-year periods, with the possibility of lengthening the contract after every 10 years, up to a 90-year maximum.

Peru has a total of 60 airports, 39 of which handle commercial flights. Most airport services are run by CORPAC, the Peruvian Airport and Commercial Aviation Corporation, which also handles investments in equipment and services for airport upgrades. The bulk of these investments is being concentrated on the modernization of Lima's Jorge Chávez International Airport, which is scheduled to receive US$ 200 million in investment over the next decade, as a result of a TDA-funded Feasibility Study. In addition, the Peruvian government plans to invest another US$ 190 million for modernization of the regional airports of Arequipa, Cusco and Iquitos.

Characteristics of Main Airports

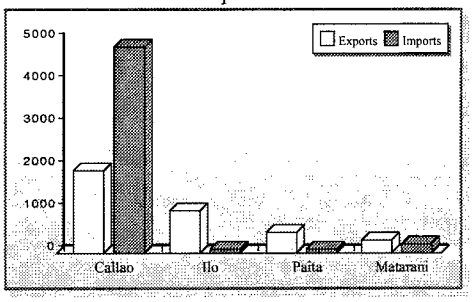
	Altitude (masl)	Runway Dimensions Lenght	Width	Aircraft Largest Allowed
Arequipa	2561	2980	45	B-737-100
Cusco	3248	3400	45	B-747
Chiclayo	29	2520	45	B-727-100
Iquitos	123	2500	45	B-727-100
Juliaca	3824	4200	45	B-737-200
Lima	34	3506	45	B-747
Piura	53	2500	45	B-737-400
Pucallpa	157	2800	45	DC-8
Tacna	468	2500	45	B-727-100
Trujillo	23	2405	45	B-737-300

Source: Ministerio de Transportes, Comunicaciones, Vivienda y Construcción. Peru

ENAPU, the National Port Company, operates Peru's 12 seaports and 4 river ports. The country's most important ports, located on the coast, handled over US$ 10 billion in cargo in 1995. The Peruvian government plans to privatize ENAPU to concession out investments in port rehabilitation and modernization. Although the government intends to complete the privatization by year-end 1997, the process has become highly politicized.

Whether or not the privatization will be completed in the near future will depend on the legal actions which the Peruvian government must take to transfer control of ENAPU, which currently falls under the Private Investment Promotion Commission (COPRI), to the Commission for the Promotion of Private Concessions (PROMCEPRI). PROMCEPRI is the umbrella organization which controls the Special Committees that are legally authorized to grant concessions for public infrastructure works and utilities to the private sector. PROMCEPRI has the option of allowing current ENAPU staff and port studies to dictate the privatization process or PROMCEPRI may dissolve ENAPU entirely and authorize a new committee and a new set of studies to handle the privatization.

Commercial Cargo Activity in Main Seaports - 1995

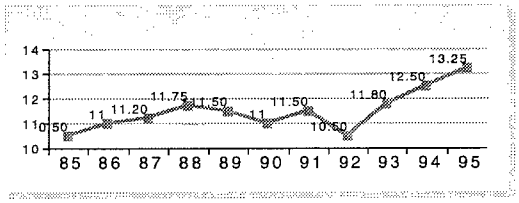


Source: Ministerio de Transportes, Comunicaciones, Vivienda y Construcción. Peru

Energy

Peru's total electricity production rose by 3% in 1996 to 16,479 Gw/h. Private firms operating under concession arrangements produced 80% of this amount and independent generators produced the remaining 20%. The government intends to invest US$ 755 million in new electrification projects throughout the country under its plan to achieve a 75% rate of electricity coverage for the Peruvian population by the year 2000.

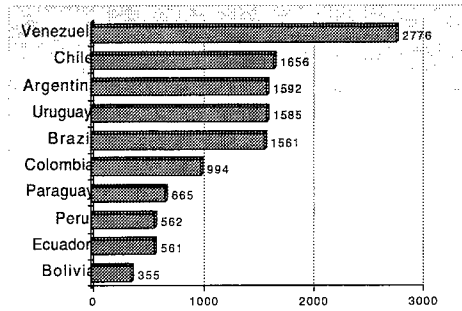
Total Energy Consumption
Thousands of GWh



Source: Ministry of Energy and Mines. Peru

The Peruvian energy market offers extremely attractive investment opportunities for US firms. Formerly state-owned Electrolima's distribution utilities (Luz del Sur and Edelnor), sold in 1994, and generation utility (Edegel), sold in 1995, have achieved a market capitalization which is double their price at privatization. Peru's low per capita energy consump-

Per Capita Electricity Consumption
KWh per inhabitant



Source: Ministry of Energy and Mines. Peru

tion should translate into a highly lucrative rationale for investing in power generation.

> Investment Opportunity
>
> Privatization of Regional Power Utilities: large growth potential given relatively low coverage of the power grid outside Lima.

US investors should closely monitor the upcoming privatizations of two generation and nine regional distribution utilities which will be privatized over the next year. The bidding process for Empresa de Electricidad de los Andes ("Electroandes") power generator is expected to begin during the third quarter of 1997. Bidding for the Mantayo Hydropower Plant is slated for the second semester of 1998, however, the privatization method is yet undefined.

The chart on the right outlines the system, main cities served and total number of users for each of the regional distribution utilities to be privatized during 1997-1998.

Regional Distribution Utilities

Utility	System	Main Cities Served	Users
Electro Norte Medio	SICN	Trujillo, Chimbote	241423
Electro Norte	SICN	Chiclayo, Cajamarca	125544
Electro Nor-Oeste	SICN	Piura, Paita, Sullana	139250
Electro Sur Medio	SICN	Ica, Pisco, Chincha, Nazca	81885
Seal	SIS	Huancayo, Pasco	186297
Electro Sur S.A.	SIS	Arequipa, Mollendo	159575
Electro Sur Este S.A.	SIS	Cuzco, Puno, Juliaca	168461
Electro Oriente S.A.		Iquitos, Moyobamba, Tarapoto	66070
Electro Ucayali S.A.		Pucallpa	25914

Source: PeruInc.

The privatization program of Petroperu also provides attractive investment opportunities for US investors. Included in the program will be the privatization of the Talara (62,000 barrels/day) and Iquitos (10,000 b/d) refineries, as well as operations contracts for the Conchán Refinery (6,000 b/d) and Oleoducto 1106 Km oil pipeline. Bids for all four are expected to be closed by mid-1998.

Environment

Peru's *Programa de Adecuación y Manejo Ambiental* (PAMA), which requires energy, mining and fishing companies to present environmental plans for pollution prevention and control, is expected to stimulate demand for pollution control equipment. Additional legislation over the next decade should also increase demand for water contamination-related equipment, as well as demand for environmental impact studies and consulting services.

Pollution Control Equipment Market Size
US$ millions

	1995	1996	1996	Est. Avg. Ann. Real Growth Next 3 Years
Import Market	60.2	80.2	110.0	15.0%
Local Production	N/A	N/A	N/A	
Exports	N/A	N/A	N/A	
Total Market	60.2	80.2	110.0	15.0%
Imports from the US	18.0	24.0	33.0	

1996 Import Market Share:
US 30%, Canada 15%, Sweden 12%, Germany 10% , Others 33%

Source: National Trade Database

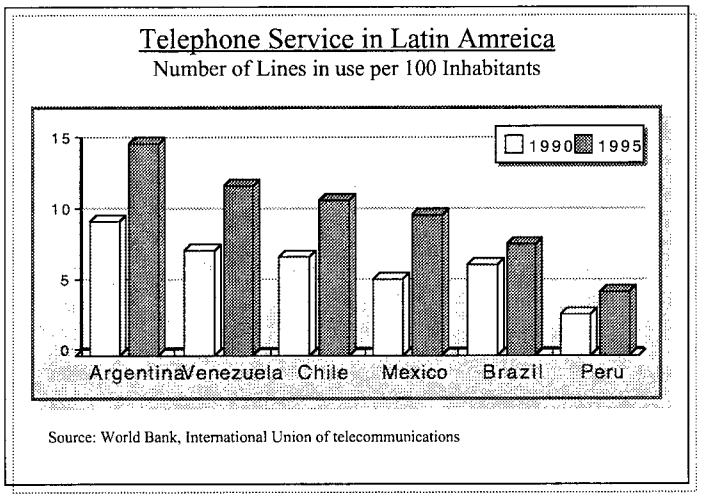
Peru's fishmeal and fish oil plants, which discharge large quantities of waste into the ocean, are investing heavily to modernize production. Although many of the small and midsize fishmeal factories are still not in compliance with environmental legislation, the fishing industry as a whole will need to invest at least US$ 33.2 million over the next several years to achieve PAMA targets.

SEDEPAL, Lima's Water and Sewage Company, estimates that approximately US$ 810 million will be required through the year 2000 to improve potable water and sewage service in Lima. The Programa Nacional de Agua Potable y Alcantarillado (PRONAP) is responsible for coordinating potable water, sewage and wastewater treatment requirements outside of Lima. The Inter-American Development Bank is lending US$ 140 million for a program to rehabilitate potable water and sewage facilities in the provinces of Peru.

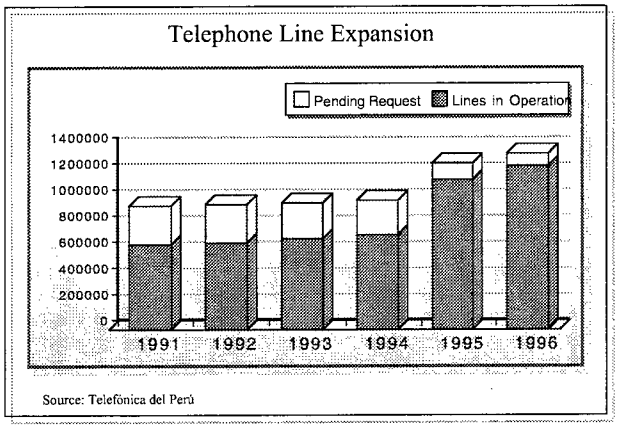
The United States is the primary supplier of environmental equipment in Peru. The US holds 30 % of the market, followed by Canada, Sweden, Germany, Japan and England. Within the pollution control sub-sector, US firms have virtually no domestic and few foreign competitors.

Telecommunications

The Law of Telecommunications and the Law of Progressive Demonopolization, passed in the early 1990s, dictate the Peruvian government's priority to reform and modernize telecommunications infrastructure and to bring quality and quantity of services up to international standards. Telecommunications services, with the exception of local, long-distance and international services, have been freed from the monopolistic control of state-owned CPT (Peruvian Telephone Company), which operated Lima telephone lines, and ENTEL PERÚ (National Telecommunications Company), which operated in the rest of the country. The State monopoly on local, long-distance, and international telecommunications will expire in June 1999.



In 1994, Telefónica Internacional of Spain (now called Telefónica del Perú) won a public tender for a 35% share in CPT and ENTEL PERÚ. The tender included the global administration of both companies, as well as the concession of local, long-distance and international telephone services for a 20-year period, with the right to exclusivity during the first five years. To regulate and supervise the newly privatized telecommunications market, the Peruvian government's goal is to promote modernization through private investment, encourage free competition and enhance quality. The Supervisory Body for Private Investment in Telecommunications (OSIPTEL). OSIPTEL's promotes efficiency, safeguards consumer rights and oversees the development and application of a tariff system which will be compatible with competition.



Telefónica and Tele 2000 have also established a cellular infrastructure, which reaches more than 30 cities which have 50% of the Peruvian population. From 1994-96, Telefónica invested approximately US$ 1.3 billion in telecommunications infrastructure, including corporate services such as video conferencing and connections via VSAT networks. Tele 2000 invested US$ 150 million during the same period, and introduced a multi-service network which allows for simultaneous communication with images, voice and information.

Evolution of Telephony Services

Service	1991	1992	1993	1994	1995	1996*
Fixed Telephony:						
Lines	585,864	604,603	664,989	759,191	1,088,176	1,234,432
Lines per 100 persons	2.7	2.7	2.9	3.3	4.6	5.2
Waiting Period for New Line (months)	81.0	73.0	70.0	33.0	5.0	1.5
Pending Requests	362,425	361,525	308,247	280,177	136,535	101,010
Pay-phone Lines	8,050	9,108	8,032	13,199	24,580	29,700
Mobile Telephony Lines	12,479	21,140	36,625	48,523	75,068	107,721

* Up to 6/30

Source: Telefónica del Perú, Tele2000

Telecommunications companies in Peru have announced expansion plans for the investment of another US$ 1 billion from 1997-98. Telefónica del Perú plans to increase the number of phone lines from 5.2 to 7.9 per 100 inhabitants, reduce the new line waiting period from 45 to 15 days and achieve a network digitalization of 96%. Telefónica also intends to connect Peru to international video conferencing networks via fiber-optics and through the Panamerican Cable System, in addition to installing pay-phones in rural areas and expanding cellular, beeper and cable TV coverage.

Fixed Telephony Services By Country Department (1995)

Region	Lines Installed	Lines in Services	Lines/100 person
North	155,300	129,012	2.28
East	34,144	28,364	1.64
Center	971,460	807,018	6.68
South	149,004	123,782	3.05
Total	1,309,908	1,088,176	4.63

Source: Telefónica del Perú, Tele2000

The Telefónica expansion plan will cost over US$ 900 million, while Tele 2000 will invest US$ 100 million to extend coverage and improve service quality via digital fiber-optic connections. Investments in Peru's telecommunications infrastructure should continue to provide substantial procurement opportunities for US firms, particularly following the expiration of the state monopoly on local, long-distance and international telephone services in 1999.

Industry

Mining and fishing continue to fuel growth in the industrial sector. The mining sector grew by 3 % in 1996, led by a 17.2% rise in copper output. Gold, zinc and lead output also achieved steady growth, reaching 16.1, 9.1 and 6.1% respectively. Second only to China in the world's fisheries ranking, Peruvian exports in this sub-sector totaled over US$ 1 billion in 1996.

Investment Climate and Business Rules

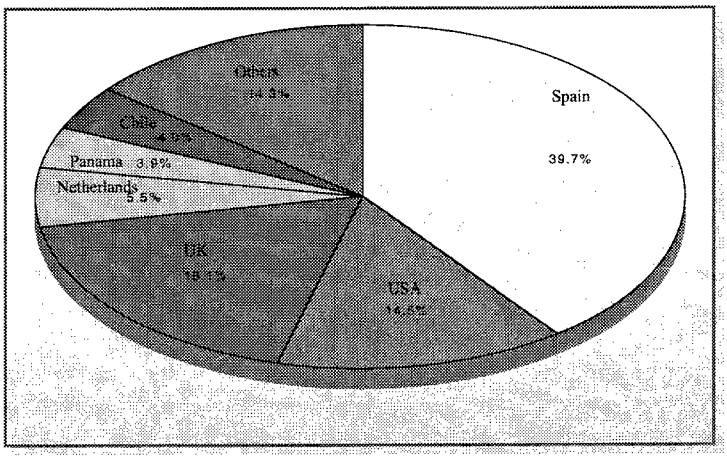
The Foreign Investment Promotion Act, passed in 1991, has created a favorable climate and institutional framework for foreign investors seeking opportunities in Peru. The new framework has opened all sectors of the economy to foreign capital and does not discriminate between foreign and local investors. It grants corporations the right to freely remit capital and dividends and offers clear and stable rules for the availability and exchange of foreign currency.

Foreign investors benefit from tax stability agreements signed with the National Commission for Foreign Investment and Technology (CONITE). These agreements, which cannot be altered by the State, guarantee a corporate tax ceiling set at the prevailing rate at the time the contract was signed.

Tariffs have been reduced to two ad-valorem rates — a 25% rate and a lower 15% rate, which applies to nearly 97% of all imports. The cost of importing products into Peru has also declined due to port facility and customs service modernization. The upgrading of port facilities has led to a 50% reduction in storage and unloading costs.

According to CONITE, Foreign Direct Investment (FDI) achieved a record US$ 6.5 billion from 1992-96, driven largely by the privatization of state-owned assets. In 1996, 85% of all FDI inflows came from the US, the UK, Spain, Holland and Argentina. A total of 80% of these inflows were concentrated in the energy, industrial and financial sectors of the economy. Energy sector investments were generally privatization-related, while investments in the financial and industrial sectors were new project developments.

Direct Registered Foreign Investment in Peru by Country
As of April 30, 1996



Source: National Trade Data Base

Financial Sector

The Financial Act (Decree 337) removed restrictions and regulations hindering banking system efficiency. The Fujimori Administration effectively turned commercial banking over to private hands with the sale of Interbanc and Banco Continental in 1994. New legislation and greater economic stability have helped to enhance growth in the capital markets. Peru's private pension fund system, modeled after Chile's highly successful AFPs, began operating in 1993 and has contributed to capital market expansion.

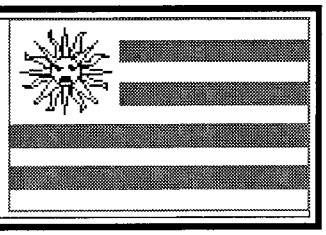
The Peruvian Government has signed and ratified contracts and agreements with multilateral agencies such as the Multilateral Investment Guarantee Agency (MIGA) and the Oversees Private Investment Corporation (OPIC) to protect foreign investors from noncommercial risks.

International Trade Agreements

Although still a member of the Andean Pact, Peru has decided not to participate fully in the Pact's free-trade area or customs union until a common external tariff is established. Nevertheless, Peru does continue to maintain bilateral trade agreements which grant duty-free treatment to a wide range of products with each of the Pact's other four members (Venezuela, Bolivia, Ecuador and Colombia).

In August 1996, Peru formally requested membership in the Asian Pacific Economic Cooperation Forum (APEC). Peru is also currently negotiating free trade agreements with Chile, Mexico and the Southern Cone common market, Mercosur.

Oriental Republic of Uruguay



GDP ('96)	US$ 7.4 bn	**Per Capita GDP**	US $2,300
Real GDP growth (forecasts)	1997: 4.2% 1998: 4.4%	**Population**	3.2 m
		CPI('96)	21.1%
		S&P Rating	BBB-

Market Size	**1997-2005**
Energy	*US$ 600 million*
Environment	*US$ 383 million*
Telecommunications	*US$ 958 million*
Transportation	*US$ 480 million*

Executive Summary

As the second smallest country in South America, Uruguay has recently experienced an economic resilience not seen in the larger economies. Uruguay boasts the most equitable wealth distribution in Latin America, and is the only country in the continent to significantly reduce poverty in the 1990s. Urban poverty has fallen to 6% in 1994 from 12% in 1990.

Changes in the Uruguayan economy have led to an investment grade rating and increased economic efficiency. Known as a fiscally conservative country, the Uruguayan economy has grown at an average rate of 3.6%. A higher growth rate is expected in the next few years due to liberal economic policies.

Liberal trade policies are becoming part of the norm throughout Latin America, including Uruguay. The country has begun to move valuable government services to the private sectors through concessions and privatizations.

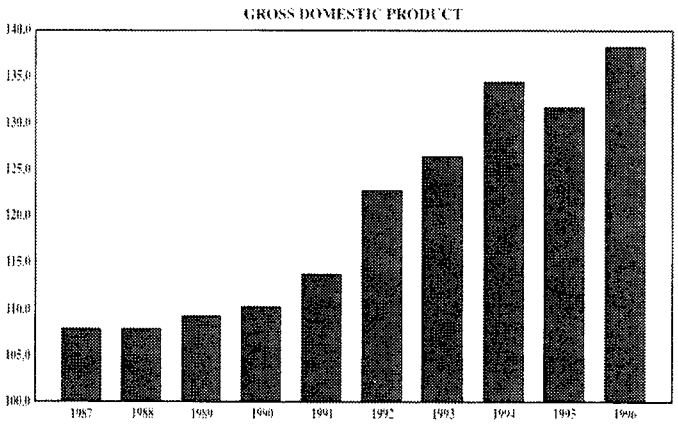
Strong political leadership has followed through with policy initiatives that reduce the powers of government and move economic drivers to the private sector. The momentum seems to be moving in the right direction, but there are still obstacles to overcome.

Economic and Political Climate

The Uruguayan economy has performed well in the past decade without large shifts. Characterized as a steady upward moving economy, the country has grown at 3.6% rate with annual growth rates per capita of 3.4%. Consumption and gross investment have also demonstrated strong performance at 6%, with the ratio of investment to GDP growing from 12% to 15%.

Although the change in the past decade has not been dramatic, there are signs that the pace of change is increasing in intensity and diversity. The last few years have witnessed a GDP growth rate near 4% while gross investment has jumped to 10.3% per annum.

Uruguay has once again been considered the investment haven of Latin America much like Switzerland has in Europe. The country levies a low tax burden on income and investment. Argentines, Chileans, Brazilians and Paraguayans continue to invest there in order to avoid the high taxes in their respective economies. In addition to lower taxes and no income tax, the government continues tight control of the banking sector and maintains secrecy regarding international investors.



Inflation has plagued the economy as a result of a low income tax, high government spending and increased investment from abroad not contributing fully to the economy. Although steadily decreasing for six years, from 130% in 1990 to 22% in 1997 (the lowest rate since 1982), inflation continues to play an adverse role in the country's economy. Private analysts believe that a target rate of 15% is possible with single digit inflation possible in 1998.

Politically the country has experienced a history of problems related to the Falkland /Malvinas Islands War, customs controls in the late 1980s with Argentina and Brazil, and high external debt payments. In 1993-1994 the president and legislature were in massive disagreement, the military was dissatisfied, numerous strikes impeded economic progress ultimately creating a general malaise in the country. The situation caused high external debt, 8% unemployment and underemployment of 20%.

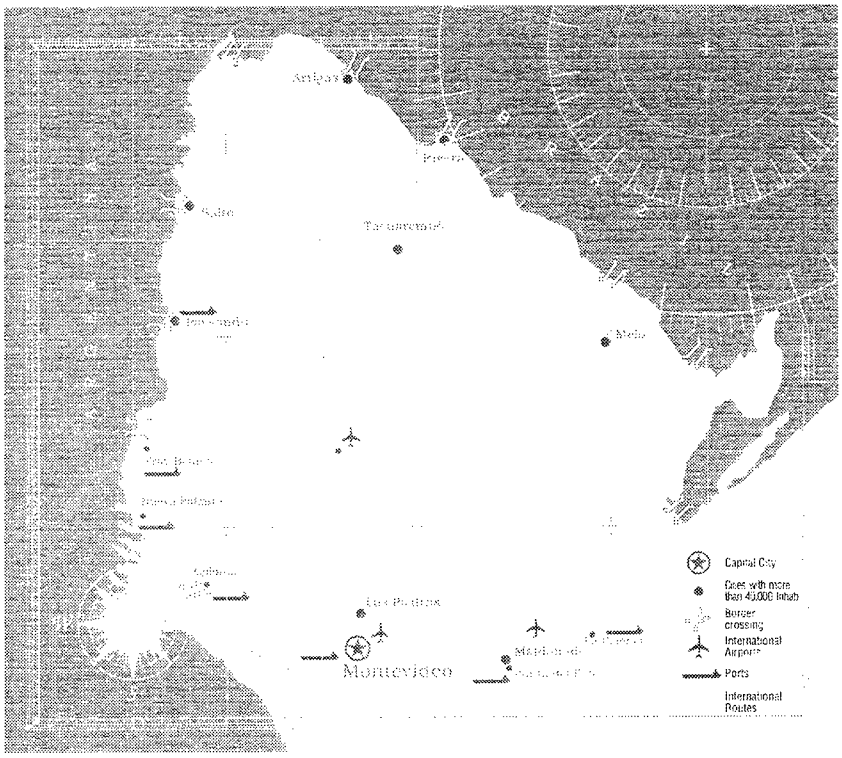
Today the country is attempting to implement liberal free market principals that reduce the role of the state in economic affairs. These efforts have resulted in an increase of exports of 13.8% in 1996, more than offset by a rise in imports of 16%. Over the past few years, the traditional sectors run by the state were deregulated and opened to private competition. They include the production of alcohol and distilled beverages, the insurance market, the social security system and the production of electricity. UTE, the electric monopoly, is currently seeking private sector partners to develop a grassroots, gas-fired, 400 MW plant to serve domestic and southern Brazilian markets. TDA recently sponsored a bidders briefing in Houston where UTE presented its project to potential partners.

Sectoral Trends

Transportation

Due to its geographic location, Uruguay is a critical link for land and maritime communications with the largest economies of Mercosur, Argentina and Brazil. The road network is considered among the most dense in South America, with a 200 Km paved road density per 1,000 Km^2 . Bridge access from Uruguay to Argentina is made up of 3 bridges, Salto, Paysandú and Fray Bentos, each crossing the Uruguay River at strategic locations.

The infrastructure for improved transportation in the country is made up of directives to build bridges, increase road infrastructure, rebuild rail access, and improve river and sea access.



The Colonia-Buenos Aires bridge which will be 41.5 Km long, represents an investment in the region of US$ 2 billion to be recovered through tolling receipts. The project will join Buenos Aires with Colonia, a major tourist destination. Major road infrastructure for the country includes the directive to build a toll road that will span 2,500 Km joining Brazil, Uruguay and Argentina.

Rail transportation in the country is adequate, considering the country's access to the sea and to rivers for shipping goods. In any case, as a result of a TDA funded study, a new project to develop the network for timber exports is underway and should provide an avenue for further traffic integration and growth.

TDA hosted an orientation visit led by Minister of Transportation, Lucio Cáceres Behrens, and federal railroad President, Victor Vaillant. They presented various railroad opportunities including the suburban rail transportation line of 33 miles that has been under consideration by the government. Recent press articles have announced the imminent call to bidders for a project that would extend from the capital city of Montevideo to nearby communities along the Plata river.

The Paraguay Paraná Waterway is in full expansion mode and is expected to increase cargo movement considerably in the region. The 3,442 Km long river is considered one of the most important in the region. The project consists of integrating five countries in the region to provide internal access and access to the Atlantic Ocean. The regional integration project is expected to be completed by the year 2000.

Air transpiration is also undergoing considerable change with the remodeling program currently underway. The program will expand and improve the existing infrastructure. Private investment has also been used and is providing considerable capital to the sector.

Telecommunications

On September 30, 1997, Uruguay became the first county in the Americas, and the sixth in the world to have a 100% digitized telephone system. ANTEL, the state-owned telephone company completed the process which began in 1985. The result has been increased line capacity, clearer connection and lower maintenance costs. ANTEL is a responsible monopoly service provider. Teledensity is currently at 24 lines per 100 inhabitants with less than 1% unsatisfied customer demand. The sector serves 103,000 internet users with 14,000 miles of fiber optic cables. Concessions for value-added services have been granted to the private sector, including the operation of an A-Band cellular concession, the installation and operation of local wireless loop systems and the installation and maintenance of public phone systems throughout the country. The result has been one of the most advanced in the region, not to mention one of the most reliable.

Energy

The primary native source of energy in the Republic of Uruguay is hydroelectric. In the face of increasing demand for electricity in Uruguay, and limited hydroelectric potential Uruguay must look for alternative methods. Current efforts include the importation of natural gas from Argentina. A 16" gas pipeline is planned between Buenos Aires and Montevideo. The pipeline will allow the transportation of between 2 and 2.5 million cubic meters per day of natural gas. Most of the supply will be used to generate electricity directly by the aforementioned UTE joint venture. In addition to gas, hydro, and oil, the country is looking to solar power and other alternative sources. The new regulations will allow for privately produced power to be marketed to large consumers or UTE itself

Current projects include the construction of a 70 Mw converter station on the border between the cities of Rivera in Uruguay and Santana do Livramento in Brazil. The construction of a power plant fueled by rice husks was granted a Feasibility Study by the TDA in 1995 and will provide enough power sufficient to run the rice mills that supply the husks.

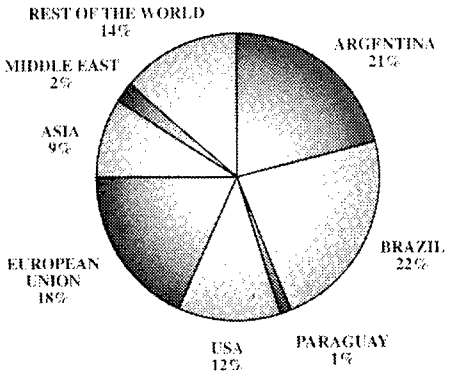
Environment

In compliance with the World Health Organization, potable water is available throughout the country. The state company in charge of water, OSE, is undertaking several measures for improving the system by contracting private local and foreign companies for the expansion of services throughout the country. The agency undertook a TDA-sponsored Orientation Visit to present BOT opportunities to US companies and has now begun the concessioning of the Maldonado water and wastewater services. OSE will be receiving bids for the concession in the short-term. In addition, the water and wastewater management service in Montevideo will conduct a concession on its facilities. The BOT scheme will transfer the operations to the private sector for improvement and efficiency initiatives.

Industry

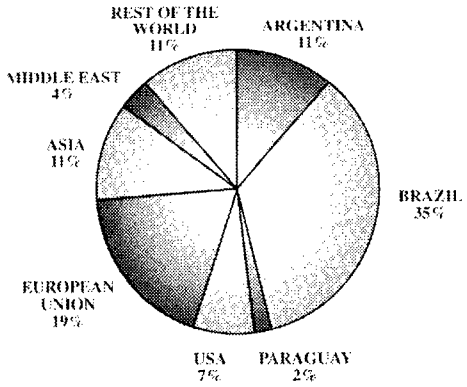
The Uruguayan industrial sector is growing at an ambitious rate. Imports of machinery have comprised 22% of all imported goods, thus providing the country with an industrial base from which it may export finished and semi-finished goods. Major exports include beef, wool, rice and other cereals. Primarily driven by an agricultural based economy, the country is attempting to diversify its productive base through the production of plastics, rubber, transportation material, textiles and specialized chemicals.

IMPORTS OF GOODS 1996



MAJOR IMPORT ITEMS		
MACHINERY AND FITTINGS, ELECTRICAL MATERIAL	*708.162*	*22,0%*
CHEMICALS AND CONNECTED PRODUCTS	*451.389*	*14,0%*
TRANSPORTATION MATERIAL	*373.171*	*11,6%*
OIL AND BY-PRODUCTS	*359.021*	*11,1%*
PLASTICS, RUBBER AND BY-PRODUCTS	*217.102*	*6,7%*
FOOD, BEVERAGES, AND TOBACCO	*213.593*	*6,6%*
TEXTILE AND CONNECTED MANUFACTURES	*192.848*	*6,0%*
ORDINARY METALS AND CONNECTED MANUFACTURES	*192.474*	*6,0%*
PLANTS, SEEDS, ETC.	*126.823*	*3,9%*
MEDICAL AND PRECISION INSTRUMENTS	*72.095*	*2,2%*
MISCELLANEOUS PRODUCTS	*69.203*	*2,1%*
OTHER IMPORT ITEMS	*246.917*	*7,7%*
	3.222.798	*100,0%*

EXPORTS OF GOODS 1996



Investment Climate and Business Rules

The Uruguayan government actively promotes foreign investments in the country. From a tax perspective, foreign and domestic investors receive equal treatment. Public works concessions are allowed under specific accords. No prior authorization is required for foreign investment. There is one exception to the foreign investment rules, as noncitizens may not own radio or television broadcasting companies. Such ownership is restricted to Uruguayan citizens.

Foreign investment is allowed at 100% level. The type of incorporation should be analyzed in terms of the types of endeavors being proposed under the incorporation and the types of liabilities undertaken. The government does provide incentives to high technology projects and those that promote exports. Such incentives are available for both local and foreign firms. Most incentives are in the form of tax incentives and customs duties. The current tax code treats foreign loans differently than loans obtained in the internal market.

Profits and repatriation of capital are allowed without limitation. In addition, the money markets are free without central bank intervention. The country also provides for security for the foreign investor through membership in multilateral agencies. Such agencies include MIGA (Multilateral Investment Guaranty Administration) and the International Center for the Settlement of Investment Disputes.

The foreign investment laws of the country establishes a convertibility guarantee for the transfer of earnings and the repatriation of capital. Such guarantees generally last 10 years and are normally based on the strength of the contract signed between the investor and the Government. Although considered a strong avenue for securitization, few companies have not joined the program due to its control of the transfer of profits and repatriation of capital.

Financial Sector

The private banking system is made up of 22 banks mostly funded with foreign capital, 10 financial houses, 8 saving and credit cooperatives, and 11 entities conducting external financial intermediation. There are two government owned banks, the Banco de la Republica Oriental del Uruguay (BROU) which operates as a commercial bank and the Banco Hipotecario (Mortgage Bank) engaged in housing loans.

The central bank conducts monetary and fiscal policy for the Republic. The entity is in charge of regulating the monetary system through issuing money, handling credit for the central government, administering external and internal public debt and supervising international reserves and exchange operation.

In addition to these or most basic functions, the Central Bank acts as the Superintendency of Banks and Other Financial Institutions, the Superintendency of Insurance and reinsurance. The social security funds and the stock exchange are also controlled through the Central Bank.

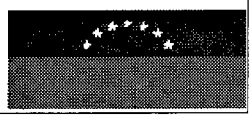
The Montevideo stock exchange has traditionally exchanged public bonds but has, in the recent past, increased volume substantially through trading long-term corporate debentures. Such changes have been partially driven by government tax advantages through investments in the exchange. The creation of the AFAP following reform of the Social Security system has signified a large increase in the demand for securities. The stock market dynamics have also been fueled by demobilization of the insurance market and the regulation of investment funds.

International Trade Agreements

Uruguay together with Argentina, Brazil, Paraguay, Bolivia and Chile is member the of Mercosur Customs Union. Established in 1995 with the objective to creating a common market within the Southern Cone, the pact has increased trade with and through Uruguay.

In addition, a Frame Agreement for interregional cooperation with the European Union was concluded to regulate spheres of cooperation.

Republic of Venezuela



GDP ('96)	$US 69 bn	**Per Capita GDP**	US$ 3,143
Real GDP growth		**Population**	21.9 m
(forecasts)	1997: 4.3%	**CPI('96)**	103.3%
	1998: 3.3%	**S&P Rating**	B+

Market Size	**1997-2005**
Energy	*US$ 3.6 billion*
Environment	*US$ 5.6 billion*
Telecommunications	*US$ 8.9 billion*
Transportation	*US$ 4.5 billion*

Executive Summary

After years of recession, currency controls, banking crises and high inflation, Venezuela's investment climate is slowly beginning to generate confidence among both domestic and foreign investors. Although the country is undergoing economic recovery, the pending 1998 presidential election has created uncertainty and stagnation in place of rapid economic development and policy change.

The Venezuelan government recognizes that infrastructure development is a key ingredient in building the country's future productive capacity. However, the government does not have the resources to develop the infrastructure necessary to achieve economic growth. Therefore, as in many other Latin American countries, Venezuela has begun to stimulate private-sector participation by privatizing its state-owned enterprises through concession arrangements.

In Venezuela, the Law of Concessions of Public Works and National Public Services was signed by President Rafael Caldera on April 26, 1994. The concessions law was designed to provide an open and equitable environment for private sector participation in infrastructure development.

Economic and Political Climate

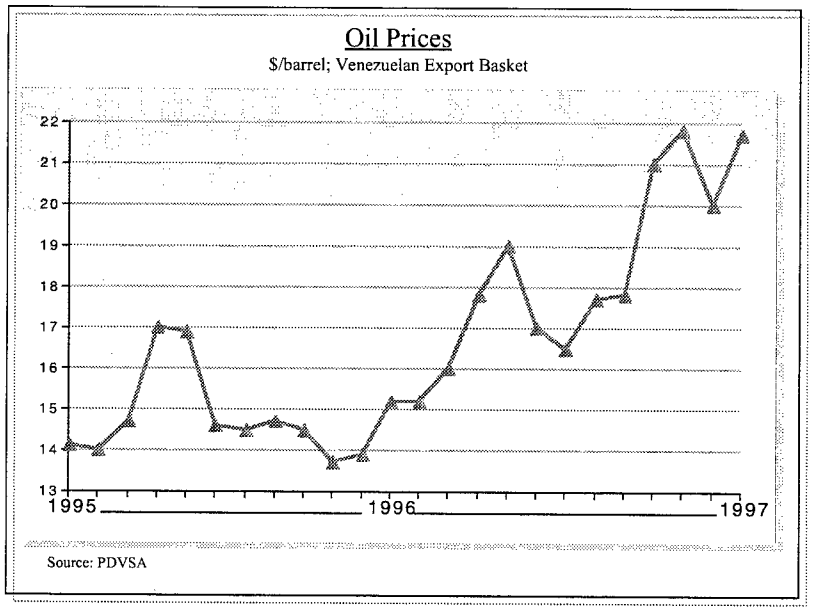
In 1996 Rafael Caldera's government broke away from the country's historical interventionist and protectionist policies through the ratification of the *Agenda Venezuela*. The plan, developed with the technical assistance of the International Monetary Fund, is based on the privatization of state-owned enterprise, the downsizing of the government payroll, and the general opening of Venezuela's economy to encourage foreign investment.

Agenda Venezuela has had some measured success. CANTV, the telephone company formerly owned by the state, was successfully privatized. In addition, executive and congressional approval has stimulated the creation of a number of strategic associations which allow PDVSA, the state owned petroleum company, to form joint ventures with foreign petroleum operators. PDVSA, itself, is undergoing substantial restructuring and reform, and continues to be the bright light in the Venezuelan economy.

Agenda Venezuela has also been successful in reviving the country's banking industry. Three years ago, as a result of massive fraud, many of Venezuela's largest banks collapsed, resulting in a three-year recession, massive capital flight and ultimately costing the state an estimated US$ 11 billion in bailout funds (13% of GDP).

Today, the initiative has enabled the entire banking system to be reconstructed under a stricter regulatory framework. The new players in the revitalized banking industry are largely international investors who have acquired nearly half of all the assets previously in the hands of poorly managed institutions.

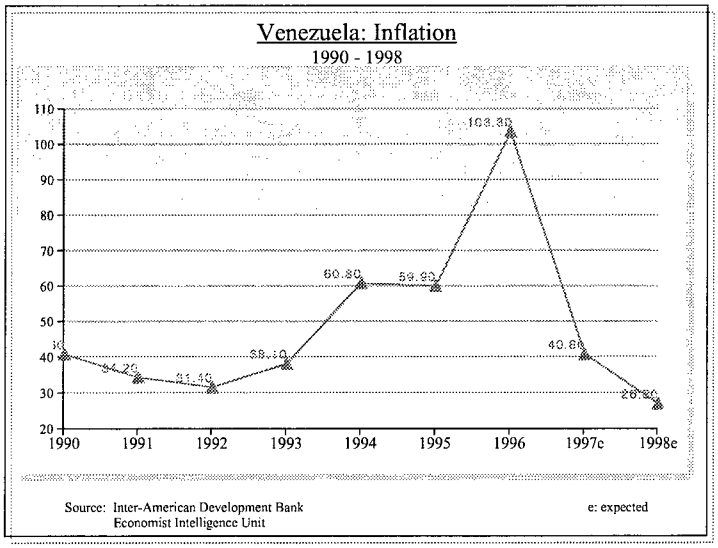
Much of the government's success can also be attributed to high oil prices over the last couple of years. Venezuela's 1997 budget is based on a price of US$ 15 per barrel, but the average price to date has been over US$ 20 per barrel. Without the windfall in oil income, Venezuela's famed Agenda may not have made even the modest progress it claims today. Although the Agenda has been deemed a success, the second phase (involving structural reforms) may be jeopardized as authorities in governmental sectors have become overdependent on a strong exchange rate.



Government policy in Venezuela is still far from eradicating the main causes of economic strife. Unemployment is high, inflation is falling but is still at nearly 24% per annum and interest rates are

prohibitive. Poverty still stands at 74%. The government has been slow in its efforts to restructure labor benefits, eliminate subsidies and withdraw from non-profitable industries.

The country is still in a vulnerable position, and the timing of the presidential election is neither good for the overall economy nor for the further liberalization of government policies.



Sectoral Trends

Transportation

The Ministry of Transportation and Communication has taken its first reform step by launching a number of highway concessions. The execution of the first concession, the Caracas - La Guaira Highway has experienced a number of problems which are delaying the roll-out of other highway projects.

The Ley de Concessions de Obras y Servicios Publicos Nacionales of 1994 was developed by the Venezuelan Ministry of Transportation and Communications to provide a framework by which the state can grant concessional contracts for the construction, preservation and maintenance of public services and assets. The results of the law have been favorable to date. It grants the concessionaire exchange rate risk protection, tax payment extensions, tariff revisions, concessional extension (up to 50 years), and a 75% investment guarantee. The concessionaire assumes the risks of exploiting the services, incorporating in Venezuela, ensuring ample capital infusion, instituting a trust, and establishing a guarantee fund.

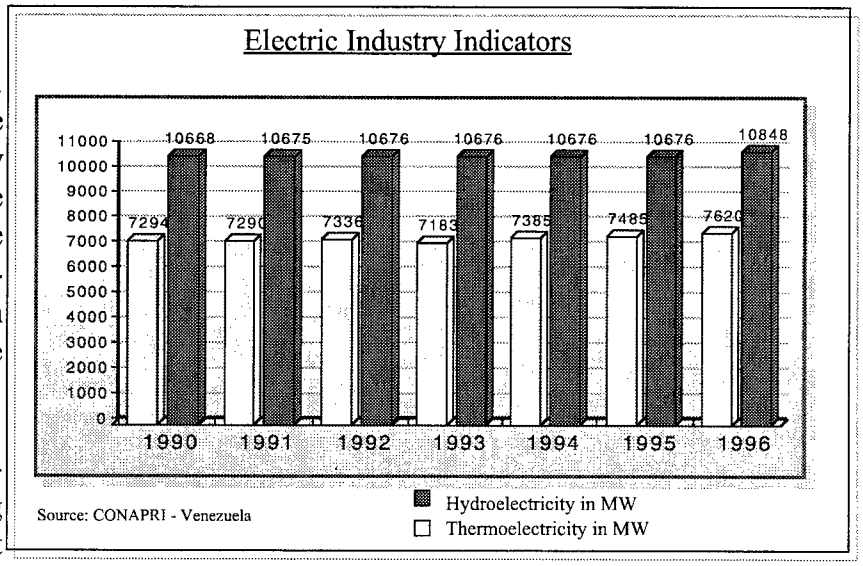
According to the Ministry of Transportation and Communication, an estimated US$ 1 billion plus in concessions are being offered for highways, technical revision of automobiles and vehicle registration.

The first concession (Caracas - La Guaira Highway) has been granted. This project is experiencing delays due to conflict of interest between the MTC and the consortium which is constructing the highway.

Social implications (difficulty in raising tolls to a market level) play a major role in the ability to successfully finance these projects.

Energy

Venezuela has 21 Gw of electric generating capacity, of which approximately 60% is hydropower a rapidly growing source of economical energy in the country. The majority of hydroelectric power is generated in the eastern region of Venezuela, where the force of the Orinoco and Caroni rivers is harnessed.



Electricidad de Caracas, (ELECAR), is the largest private utility in Venezuela serving nearly one million customers in the Caracas area. Electric service in the metropolitan area is efficient; however, the company estimates that an energy shortage will occur by the year 2003.

For this reason, a number of alternatives are being studied, including a 1,400 MW combined cycle plant to be constructed along the outskirts of the city. TDA has approved funding of a Feasibility Study on behalf of ELECAR.

Tariff schedules for electricity in Venezuela are regulated directly by the government, which currently maintains tight control.

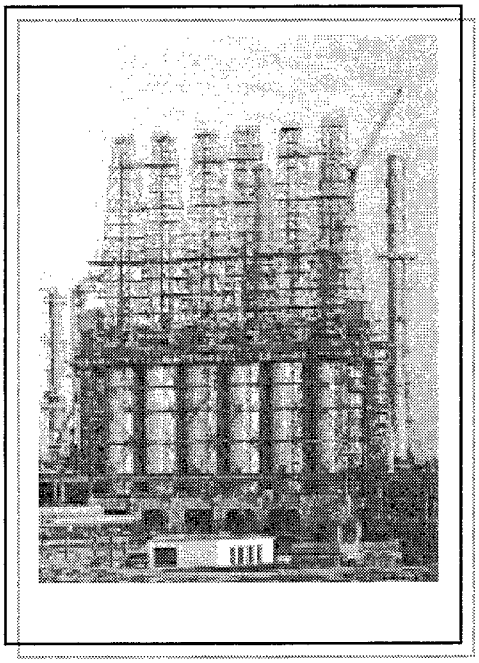
Privatization of the electric sector has been attempted on several occasions, failing largely due to the lack of a legal framework defining pricing and distribution. The Venezuelan Investment Fund is currently privatizing and selling off the assets of a number of electric companies.

The oil industry in Venezuela accounts for 80% of total export revenue. In the oil and gas industry, the government has had great success in accelerating the country's privatization program. A number of international operators have won bids to exploit Venezuela's marginal oil fields. Contracts made with private companies stipulate that investors must assume all of the risk but will share in the profits with the government.

PDVSA has entered into a number of accords and strategic associations with international operators for heavy crude extraction and refining. PDVSA estimates that total investment in the oil sector will top US$ 68 billion over the next decade.

A number of deals between private operators and various subsidiaries of PDVSA have been congressionally approved or are near approval. These include: Maraven - Conoco (US$ 2.2 billion); Maraven - SINCOR (US$ 2.8 billion); Corpoven - Atlantic Richfield (3.5 billion); Corpoven - Texaco; Lagoven - Mobile (US$ 2.3 billion).

Environment



The Venezuelan market for wastewater treatment and equipment is estimated at US$ 44 million for 1997, and it is expected to increase by approximately 9% over the next two years. US companies are strong suppliers of pumping systems, water filtering laboratory equipment to measure physical and chemical concentration parameters, bulldozers and trucks. Other prospects for analytical instrumentation, automated control and monitoring equipment, physical-chemical processes, filtration products, as well as sludge treatment, chemical and biochemical processes, pumping systems, pipes and fittings are also encouraging.

The Venezuelan oil sector has budgeted US$ 60 Billion in invested capital, of which, US$ 820 million has been allocated for environmental protection funding for the years 1994 through 1998. Sludge treatment, biochemical processes and physical-chemical processes are utilized in the oil sector to limit environmental hazards. These needed processes will grow by US$ 20 million between 1997 and 2001. Within the next three years, the US Commerce Department estimates that the need for imports of water and wastewater treatment will be 8-10%.

With the restructuring of HIDROVEN, Venezuela is attempting to distribute its organizational structure down to the municipal level. The projected investment for public utilities is estimated at US$ 350 million in the next five years. The major portion of investments will be used in the construction of sewers and collectors. Even though the sector is not expected to be privatized , the changes do include private sector service contracts for providing the water and wastewater to the municipalities. The entire water sector is expected to require US$ 43.8 million in equipment with growth expected to reach US$ 62 million in 2001. Major investments expected by the country include upgrades and maintenance of existing networks.

Telecommunications

In 1996 the Venezuelan government raised US$ 1.03 billion from a public offering of shares in the national telecommunications company CANTV. This sale was actually Part Two of CANTV's privatization, the first 40% having been sold to a GTE led consortium in 1991. CANTV currently has a legal monopoly over the telecommunication industry in Venezuela. This status ends, however, in July of 2000.

The Ministry of Transportation and Communications is currently in the process of restructuring Venezuela's telecommunication regulatory framework. Estimated investment in Venezuela's telecommunications sector is nearly US $ 10 billion over the next five years.

Bell South has been successful in Venezuela, partnering with the local cellular provider Telcel and winning an outsourcing contract to manage PDVSA's internal telecommunications network.

Most recently, CONATEL, the Republic's telecommunication regulatory office has offered three rural telephony concessions, the first having been won by a US company.

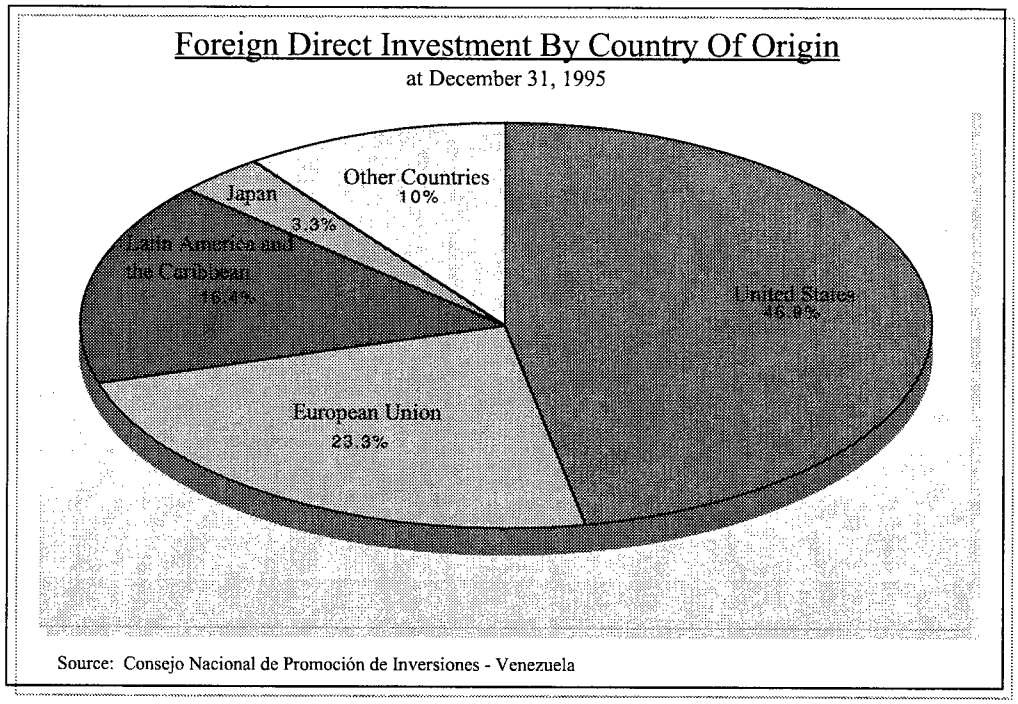
Investment Climate and Business Rules

Venezuela's economic opening under the framework of the Agenda Venezuela coupled with the privatization and concessions process, is generating an important flow of foreign investment.

Presidential Decree No. 2095 of February 1992 requires equal treatment of foreign and national investors. The requirements of special authorization to invest in the country were also lifted. Nearly all sectors are 100% open to foreign investment. Sectors which are still exempted under the Presidential decree include broadcasting, Spanish language newspapers and television.

One of the most successful examples of a positive investment and business climate in Venezuela can be seen in the banking and insurance sectors where 100% of equity shares may be purchased.

Private investment in Venezuela can be protected through insurance policies against noncommercial risk granted by MIGA.



Financial Sector

The Venezuelan banking sector has, in the past several years, experienced a crisis which it is now beginning to overcome. The sector, dominated by a small group of financial players, has begun to consolidate and concentrate, further strengthening the banking sector. Today there are only 7 banks, down from eleven . US banks have found new representation in the sector, with the exception to Citibank, which has been in the marketplace for 80 years and providing a full range of services. US banks in Venezuela offer trade financing, securities underwriting, and depository services.

Financing is expensive but readily available now that foreign exchange controls have ended. Long term financing is problematic as the rate of inflation remains a concern.

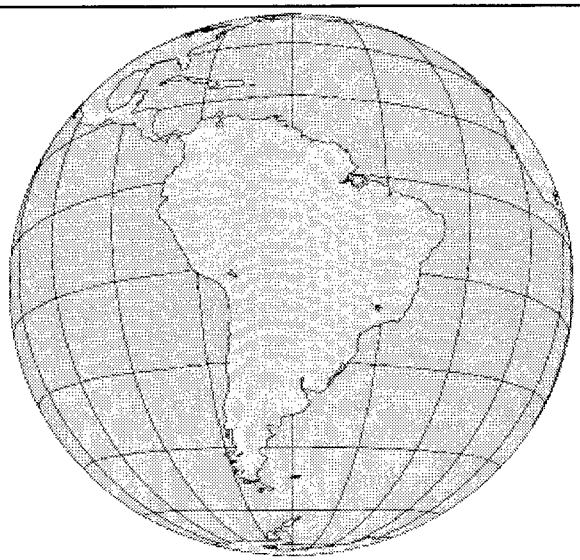
The investment law in Venezuela is liberal in its policies. The regulation establishes equal treatment for foreign and national investors, eliminates the requirement for special authorization to invest and preserves the right to repatriate profits up to 100% of capital and profits. Currently, all sectors are open to foreign capital.

International Trade Agreements

Venezuela has been opening the economy and fostering private investment since 1990. As part of this process, the country has become a member of the WTO (World Trade Organization), ALADI (Latin American Association for Integration), the Andean Community and the Group of Three. Additionally, Venezuela is part of the goods and service trading working committees, aimed at the creation of the Free-Trade Area of the Americas (FTAA) by the year 2005.

Venezuela is also a member of the Caribbean Community (CARICOM), and has reciprocity agreements with Chile and Brazil, attempting to build closer relationships to integrate into the Southern Common Market (Mercosur). The country also benefits from the general preference system of guarantees with the European Union.

South America as a Region:
Partnerships for the Twenty-first Century

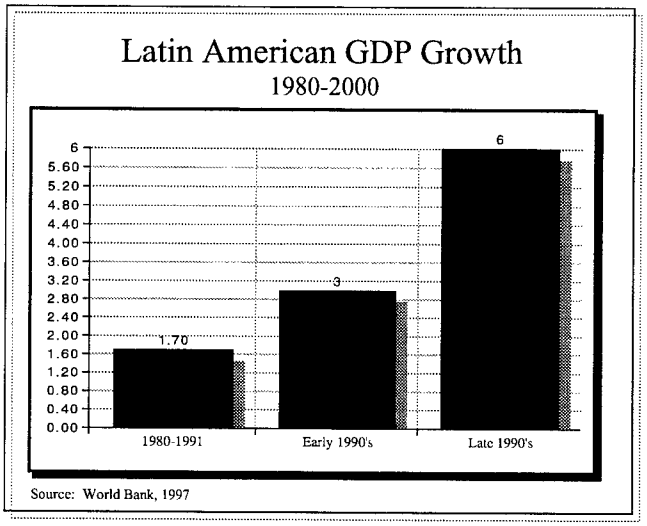


The theme of this Briefing Book is "Partnerships for the Twenty-first Century." Latin America is at a crossroads. The region is in the midst of a period of sustained growth, and increasing optimism. Internal policy changes, privatization and integration seem to be creating a solid foundation for a generation of growth. In this context, business partnerships should be thought of as long-term affairs, as executives not only participate in the creation of long-term physical assets but also structure relationships to participate in operations and maintenance, multi-year equipment sales and mature equity renovation. The new fact under the sun is that GDP growth and infrastructure creation are creating vast new areas for partnerships that will be sustainable for a generation or more.

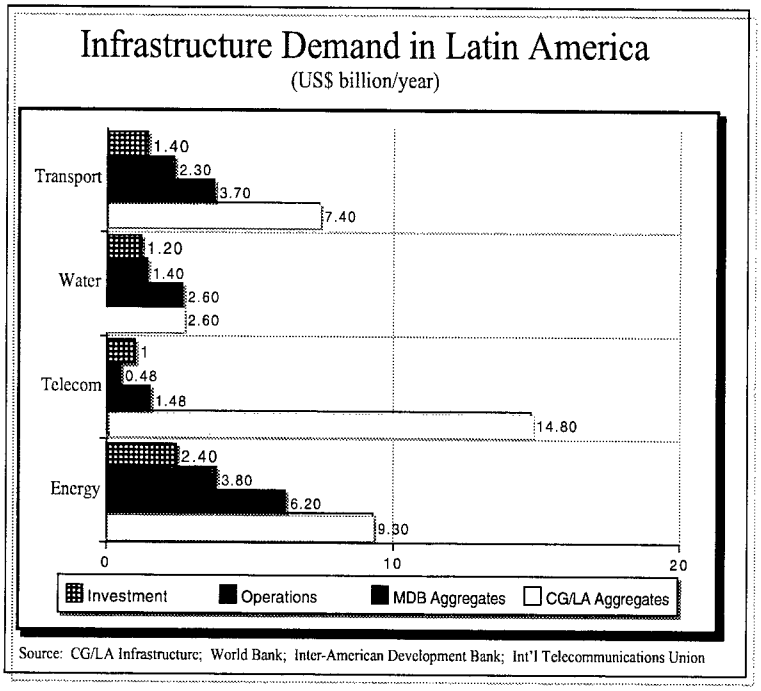
Modern infrastructure, well-managed, is a prerequisite for sustained growth—presenting the best of both worlds for the business mind, immediate opportunity, and at the same time the direct creation of a set of physical facts that strongly promote future growth (particularly in a region of such rich agricultural and mineral wealth).

We assume sustained growth, and we see the projects presented in this book as a strong sample of mature and cutting-edge opportunities. The sponsors representing these projects are representatives of a new generation of business and policy decision-makers, men and women who are seeking to permanently plug Latin America into the world economy as a major participant.

It is true that the region's place in the world is, and always has been, an ambivalent one. Latin America was never a part of the Third World—rather it is a hodgepodge of nearly first world living standards (in every capital city, and in entire regions) combined with truly desolate areas of under development.



Historically, Latin America has been present in the world economy in 20-30 year cycles. The current "recovery" follows a lost decade, that followed a 20-year plus boom. One of the key issues to keep in mind is whether the region is taking care of business, in terms of laying a strong growth foundation, or are there fundamental features that are being ignored, sowing the seeds of the next downturn? Keep that in mind as you read through the following five Mega Trends that we have identified in the following pages.



Infrastructure development in Latin America has hit surprising heights. New investment in all sectors is explosive—much higher than predicted by the "past as predictor" models used by the development banks. Yearly investment in Latin American infrastructure is almost $40 billion (as against a 1995 development figure of less than 1/2 of this number). This figure, huge as it is, does not count capital market investment in infrastructure-based firms.

In addition, note that a large percentage of this market is in "services"—operations, maintenance, plant modernizations and new equipment. For each $1.00 of new project activity spent around the continent there is in every case an additional $1.00 to $1.50 spent on existing infrastructure—and these funds are often spent by the same people.

Five Mega-Trends

There are five Mega Trends that are rewriting the map of the region—and useful to keep in mind as you construct your own mental map of the area. An awareness of these trends will allow you to better assess projects, better analyze where projects are likely to spring-up, and which kinds of South American business people will serve as your best partners now, and in the years ahead.

Trend #1—The Export Imperative: The new economic model that has been adopted throughout Latin America requires significant year-on-year export growth, and this, in turn, creates sustained demand for infrastructure projects.

Trend #2—The Savings Condition: Business and government decision-makers are dealing with the notoriously low levels of domestic savings, and as the savings rate increases good things happen to infrastructure projects, particularly the increase in availability of local equity capital.

Trend #3—The Government as "Just" the Catalyst: Increasingly the long-term success of infrastructure projects depends on the way that governments carry-out their regulatory function—government has moved from owner to regulator.

Trend #4—Decentralization: There is an incredible and sustained move toward increased decision-making (including revenue raising and spending) at the sub-national level.

Trend #5—Integration as Market Creation: Free trade within Latin America is creating huge new markets—and huge new possibilities—all of which are realizable only through the creation of new infrastructure.

The success or failure of the South American countries in executing these trends will determine the sustainability of GDP growth, and the robustness of infrastructure markets in the year's ahead.

A special section has also been added on how the Knowledge Revolution is both driving and transforming Latin American infrastructure. This is meant to provide sales and marketing insight, because much of the competitiveness and innovation of the US (not to mention the bulk of exports) lies in knowledge products (e.g. water billing systems; ports inventory control; power grid management; etc.).

The Knowledge Revolution—How it Plays

It is a curious fact that all of these trends are, if not driven by technology, intensely facilitated by information technology. Exports, savings regulation and reporting, government oversight, local revenue raising and decision-making, and even integration, not only have huge appetites for technology—they are trends that are possible and, then, attractive, because of technology. And US information technology, the most competitive in the world, makes up a large portion of US exports to infrastructure projects.

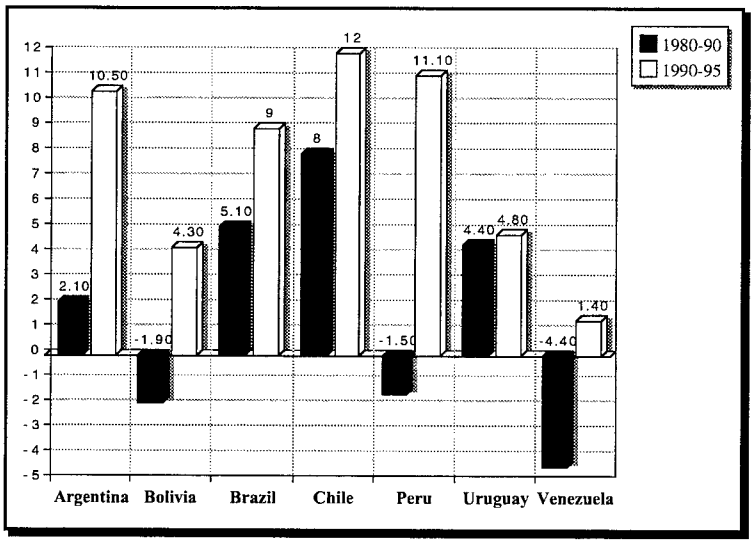
Trend #1—Export Imperative

Virtually every South American economy is focused on export-led economic growth. This inevitably prioritizes the kind of physical infrastructure that will cut costs, speed transit and generally lead to export success. Throughout the region port projects, feeder systems, waterways, rail and inter-modal systems are all projects of the most extreme strategic value.

Export growth from South America has been phenomenal. The total average annual increase in the 1990s has been nearly 9%, as against only 1.7% in the 1980s (see graph below). In the case of Brazilian exports, for example, this is an astonishing average of over $6 billion in export growth, each year. The turnaround is even more dramatic in Argentina, which saw its rate of export growth explode from just over 2% in the 1980s to 10.5% year on year in the 1990s. This explains that country's dynamic requirements for transportation infrastructure, in waterways, mountain passes, inland waterways and ports and terrestrial connections with Uruguay and Brazil.

In this context, an argument can be made—is being made—that these factors alone are guarantees of a sustainable GDP growth rate. Internal costs of production are declining: tax systems are becoming more rational, infrastructure is becoming more efficient, and whole new areas of production are opening up. In this last area, mining and agriculture in Argentina, automobile manufacturing in Brazil, and petroleum partnerships in Venezuela stand out as highly dynamic production generators.

Export Growth in South America



Source: World Bank, 1997

The "tale of the tape" in the graph above shows that Argentina, Brazil and Chile must be saturated in terms of port infrastructure, and in desperate need of new facilities. This is in fact the case. For example,

Specific Projects

Port projects are most obvious projects resulting from this trend—are perhaps the most interesting, and are certainly the most complex. But are they happening?

- San Lorenzo Terminals. The system of terminals at San Lorenzo, two hundred miles upstream from Buenos Aires, is a good example—at the end of a private rail line, just off a new toll highway, more than $400 million dollars has been invested in this highly modern complex in the 1990s. This project is featured in the Briefing Book.

- Brazilian Ports. Of Brazil's 42 priority infrastructure projects, four are port projects, and a total of 13 deal with export-oriented infrastructure projects. Five Brazilian ports are featured in the Briefing Book.

- Chilean Ports. On the other side of the continent, Chile is making a strategic bid to become the Mercosul's gateway to Asia, through an aggressive Andean Pass, highway and port initiative. Six of these projects are featured in the Briefing Book, including the mega project at Mejillones.

Because of the shear volume of export growth, this also means that there are huge numbers of collateral projects—including modernizations, expansions and privatizations. In addition, there has been tremendous growth in imports of all types, led especially by intra-regional trade.

All of these projects demand the most modern, efficient and high-volume operations imaginable. And they are located in areas of strategic validity: close to production sources; at the end of highly efficient infrastructure; and in areas uninhibited by extraneous costs (downturn urban areas, for example).

Prognosis:

The drive to increase exports is one of the organizing principles of Latin America's new economic model. It is likely to be dominant into the foreseeable future. This trend is vigorous, and it is—in great part—well-executed. Because it is such an imperative, and even though there is a large state component, the private sector is taking care of this business. The San Lorenzo terminal complex in Argentina is a very good example of that fact.

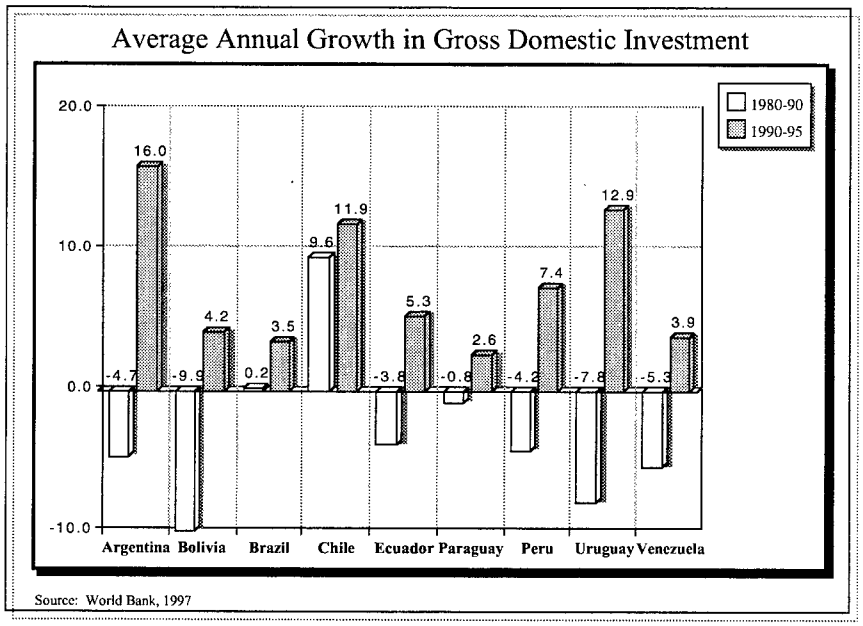
The Knowledge Revolution - Trend #1

One example that cuts across all sectors: In the series of reforms that sum to tremendous increases in export growth, a key driver is the fact that Latin production is plugged-in to the just-in-time production and sales decisions of the rest of the world. An example is the $15 billion plus in auto investments announced over the last two years for Brazil and Argentina. Modern ports benefit greatly from the Knowledge Revolution, using information technology to manage all critical operations— including storage facility allocation, transportation management and container tracking. This is a huge area of immediate growth throughout South America.

Trend #2—The Savings Condition

Perhaps the critical variable in judging the sustainability of South America's current boom is the savings rate. This is a strong shorthand indicator of the amount of money available for long-term investment. Savings have always been very low in Latin America—and are now increasing (see the graph on this page). This issues goes directly to GDP sustainability, and also, in the shorter run, to the viability of current projects. A healthy local savings rate dramatically improves the possibility of generating local capital for long-term investment.

Latin America's saving rate (as measured as a percentage of GDP) is generally in the high teens to low 20s. However, the advent of private pension funs, first in Chile and now prevalent in virtually every country, is provoking much greater rates of savings. Chile introduced the system in the early 1980's, and now has a savings rate of nearly 32%, much closer to the kind of levels necessary for the development of sound local capital markets.

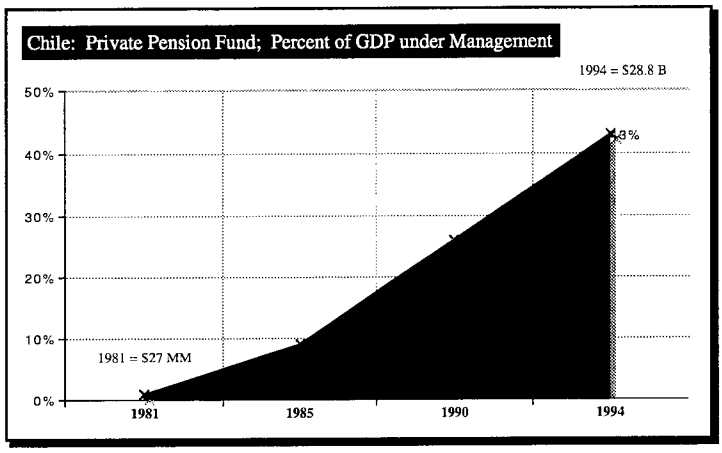


This savings is critical for South American infrastructure creation—and for US business decisions on South American infrastructure projects. The investment interests of private pension funds, for example, provide a good indicator of projects that are attractive, that will go to financial closing, and that might purchase your goods and services. Certainly for investors pension funds, while not yet

very active as equity investors, tend to be among the best barometers of project opportunities in the region.

There is now about US$ 130 billion under private pension fund management in Latin America, and this figure is growing by about US$ 1 billion per month. Chile, for example, is now a force in the rest of Latin America because of the country's internal savings rate. This is an extraordinary performance (see graph on this page), and even more so because of the strategic manner in which these assets are deployed by Chile's private pension fund firms.

Chile's pension fund system has more than US$ 28 billion under management; this is spectacular growth, given that the system started with only US$ 27 million in 1981. Brazil's pension fund system, mostly public, and in a much larger economy, has US$ 68 billion under management—but would have almost US$ 600 billion under management under a mature Chilean-type system; Argentina currently at US$ 8 billion would be at US$ 117 billion. This is the trend—a powerfully positive one in such a capital-starved region.



A full 5% of Chilean GDP is invested overseas. This investment not only provides Chile with valuable information on neighboring countries but, through the creation of business partnerships and equity investments in local firms, leads directly to demand for ports, roads, and other key infrastructure services—as Chile increasingly serves as the trade route between the volume producing countries of Brazil and Argentina, on the one hand, and the Far East, on the other.

Specific Projects

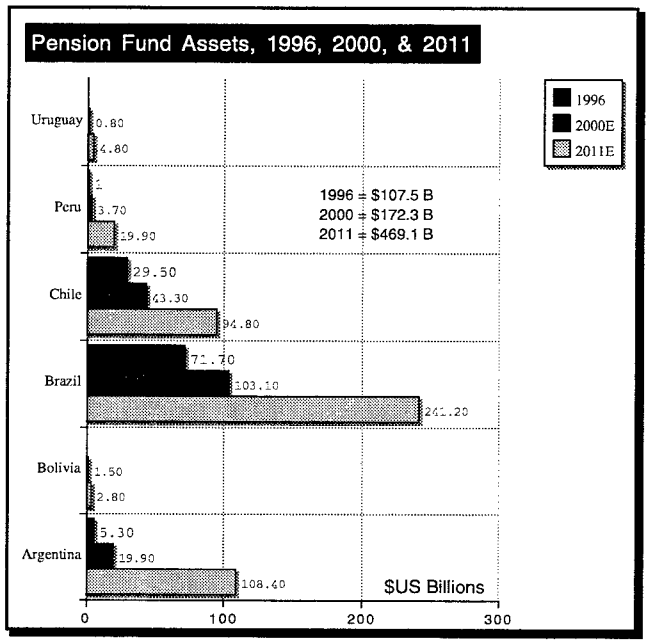
A higher savings rate in Latin America, catalyzed by the private pension fund mechanism, creates a series of "intelligence" opportunities for US infrastructure investors and equipment sellers. This includes the businesses these firms develop, the equities in which these firms invest, and also the fact that a domestic ratings market is developing for local firms, thus increasing information reliability and transparency. Indeed, improvements in corporate governance is a huge direct benefit of local pension fund growth and investment.

Prognosis:

This is a critical, and very difficult, issue. Cultural factors, just as much as free market opportunities, determine savings rates. If the region can sustain economic growth, then it appears that the general rate

of savings and investment will continue to increase. For anyone concerned about the long-term health of the region, these figures should be monitored closely.

At the same time, pension funds are increasingly powerful in every country, and they make extraordinary partners—in terms of local knowledge, and in terms of local equity. This is a strong positive trend.



The Knowledge Revolution - Trend #2

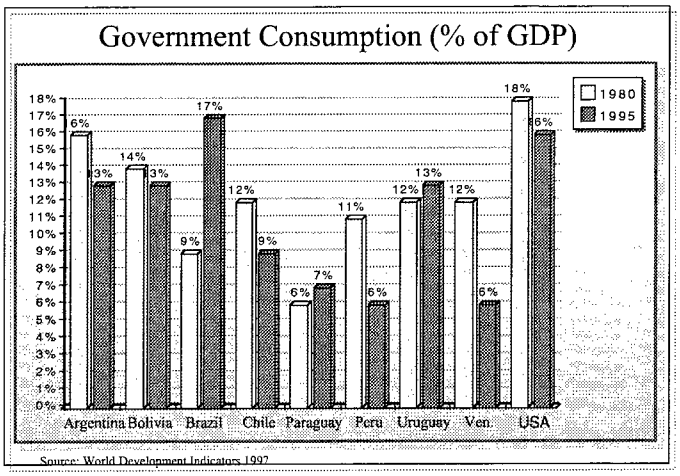
Once you have begun to accumulate wealth, what do you do with it—particularly if you are a risk-averse institution that must ensure a good rate of return for investors, and have funds available for people's retirements? You gather and monitor a stream of information, on (a) investment opportunities, (b) the performance of existing investments, and key variables affecting that performance, and (c) the performance of key competitor's investments. That is, you use the power of information technology to increase your range of decision, while both increasing control and reducing risk. The drive to saving is even more imperative as you increase your options—and raise the value of those options, as a source of return and—indeed—national competitive advantage.

Trend # 3—Government as a Catalyst

A curious thing is happening to governments in Latin America. They are redefining their roles, grappling with smaller budgets (as a percentage of GDP),—and all the while moving into new areas of activity. In terms of infrastructure, the best general description of this trend is that they are moving from the role of owners and guardians to that of facilitators and overseers.

This powerful trend is creating a number of interesting results. First, the disappearance of the ownership mentality, coupled with a return to democratic decision-making, means that government decisions tend to pay serious attention to constituent's needs—even when those 'constituents' are foreign investors.

Second, a preeminent—and little talked-about—fact is that new branches of government are being created all over Latin America, and at all levels. These are the "regulators," and regulatory bodies are being created at local, state and national levels in every country. This is extraordinarily important, because once rules are established for the regulation of utilities, then these bodies determine compliance and, even more important, pass judgment on investment plans and rate hike requests.



Third, the creation of mission de-limited group of knowledge workers in government has become a priority. And this requires a completely different philosophy of governance—much less operational; increasingly consensual; certainly strategic and hungry for the motivated and well-educated. For these reasons, government expenditures as a percentage of GDP are declining—while overall government expenditures are increasing.

Specific Projects

There are two relevant issues. First, virtually all of the projects in the Briefing Book are dependent on regulatory bodies. The biggest issue in project finance is determining—perhaps "guaranteeing" is a better term—a payment stream against the financial package needed to create the project. Regulatory bodies tend to play a large role in this process.

Second, as governments increasingly become rational actors a number of new projects will come onto the scene that will institutionalize this process.

Prognosis:

The role of government as catalyst—because it is so new, and because it is such a profound shift from the previous model—is the weakest area in Latin America's drive for sustained economic growth.

At the same time, progress in virtually every country is dramatic. However, finding the kind of trained professionals to properly execute this kind of oversight role is not an easy task; in addition, these individuals must be remunerated with both money and status so that they might exercise their function over a sustained period. Harvard has instituted a program along these lines, in both Brazil and Argentina. In Brazil the Kennedy School of Government, in a series of two week seminars, trained nearly 180 public and private decision-makers—in the areas of water, energy and transport—in how to facilitate private investment in infrastructure projects. A similar program was undertaken in Argentina, focusing on municipal-level government decision-making.

The Knowledge Revolution - Trend #3

At this level, the Knowledge Revolution seems to be driving government reforms. Governments will increasingly become involved in knowledge infrastructure—providing, for example, basic competitiveness information for businesses, so that they might best compete in the world economy, or in contracting for the re-engineering of whole government processes, in order to increase efficiency and service, and reduce redundancy (e.g. the digitization of public pension funds, tax billing and collecting and voting). There is a brilliant confluence between what Latin America's new model needs and what information technology is now capable of doing.

Trend #4—Decentralization

The decentralization trend signifies nothing short of a revolution. States, provinces, municipalities and regions are developing the ability—and the machinery—to make key infrastructure decisions. This trend was first pointed out by CG/LA in 1994, in an Economist Intelligence Unit publication, *Infrastructure in Latin America*. It has only picked up speed since that time.

Note in the graph below that in Argentina a full 45% of government expenditures are decided upon at the sub national level—this is equal to the US, and a radical shift from 20 years earlier. In Brazil $27 billion was spent at the sub national level in 1993; and $59 billion in 1996—this is fully 8% of GDP. As an illustration of this reality 1.5 new municipalities were created in Brazil each day in 1996.

The result is that regions are actually initiating, structuring and seeing to the financing of an increasing number of infrastructure projects. Decision-making, especially in terms of project origination and procurement, is ever more resident at the local level. US business decision-makers have an increasing challenge in meeting their sales and investment targets. Not only must they (or their agents) develop and maintain contacts throughout an entire country, but they must maintain and nurture a much wider set of relationships in each area.

Another issue coming to the fore is municipal and state-level creditworthiness. As these governmental units earn improved credit ratings from the ratings agencies, they become ever more capable of raising money—and acting quickly and professionally in the infrastructure game. Indeed, the province of Mendoza in Argentina has done the previously unimaginable and pierced the sovereign ceiling—generating a credit rating that is better than that of the federal government.

Specific Projects

Argentina leads the pack in terms of originating infrastructure projects at the state and municipal level. This is not to say, however, that this trend is any way limited to that country—the trend is clear and evident throughout the continent.

Three specific projects might best illustrate this trend:

- Cordoba Transport System. The municipality of Cordoba is developing an urban transit system that will be funded through general municipal revenues.

- Port of Paranagua. This is the privatization and modernization of a port in the southern, agricultural state, of Parana, Brazil, and it is entirely originated and overseen by the state.

- San Luis Water Project. This is one in a series of municipal water projects featured in the report (Brazil, Chile, Peru, Venezuela; this particular project originates in Mendoza, Argentina.

Perhaps the most important fact is that these states and municipalities are making decisions, based on underlying capability to fund, originate, build, operate, procure for, and maintain an ever increasing stock of infrastructure. And this stock will largely be owned and operated by the private sector.

Prognosis:

This is a solid trend that (a) bodes well for Latin America's long-term development, and (b) is all the more amazing because of the region's tradition of extremely centralized authority. The unanswered question has to do with whether or not the management and oversight expertise exists at this level—or can be developed quickly enough—to ensure well-managed local project origination, operation and management.

The trend in this area is positive; however, it is an open question as to whether capability and execution will follow, especially in some of the regions with low per capita income and under investment in education.

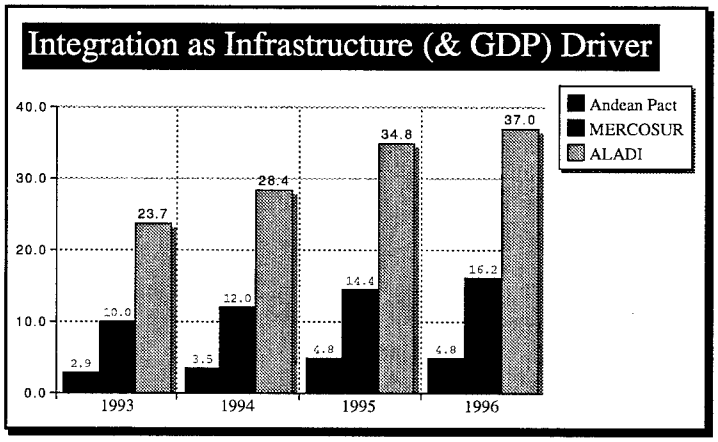
The Knowledge Revolution - Trend #4

Decentralized revenue raising was not possible in the past, for a whole series of practical reasons. Now, largely because of the magic of information technology, two of those reasons no longer exist. First, systems of revenue collection can be put into place that are then administered along routinized pathways. And, second, central oversight—not management—is an easy task, given that all collection and distribution systems are on-line and can be easily monitored. The Knowledge Revolution is likely to provide for the constant increase of this decentralization trend, and the ever-increasing ability of municipalities and states to originate, pay for, and manage infrastructure projects.

Trend #5—Market Creation Through Integration

The movement toward economic integration in Latin America creates a direct and obvious impact on infrastructure demand. Intra-regional trade growth is increasing in many instances by rates as high as 20% per year—South America is both out-growing its current infrastructure stock, and under market pressure to create much improved infrastructure efficiencies. This creates tremendous demand for improved highways, new bridges and, in general, safe and modern surface transportation between countries. It also has a real, though somewhat more subtle, effect on environmental infrastructure—since environmental investment can be thought of in a "costs of production" context, and these costs must be similar across trading partners.

An additional, if controversial, fact is that integration seems to be creating real synergies among the economies of the region, and seems to favor sustained growth. Auto investments are perhaps the best example; at least $15 billion is earmarked for automobile plants and related parts factories in the region from Rio de Janeiro in the North, through Curitiba, to Cordoba in the South. This creates a host of infrastructure demands, in every single area.



The Southern Cone is an example of this point, and its importance cannot be over-emphasized (as you can readily see in the above graph). Intra-regional trade was $7.2 billion in 1992, and rose to more than $16 billion last year. Argentina, for example, will invest nearly $8 billion in the transport sector in the 1997-2000 period, including more than $1 billion in ports and waterways, and at least $400 million in rail modernization.

Specific Projects

Perhaps twenty-five percent of the projects featured in the Briefing Book have an integration driver.

- Andean Passes: TheAndean pass feasibility examines transport between Argentina and Chile, through at least five passes, and with Chile's Pacific ports as the destination.

- Natural Gas Pipelines: There are a number of multi-state pipelines that are featured in the Briefing Book, including the Camisea project in Peru (which might eventually feed Bolivia and Brazil), the northern Argentinean pipelines into Chile, and the—now famous—Bolivia/Brazil gas pipeline.

- Waterways. Another big winner in this process are the region's waterways, especially the Tiête-Paraná waterway, which drains from São Paulo westward, and the Paraná Waterway, which drains from the Bolivia-Brazil border, through Paraguay, and through the Argentine Pampas—to San Lorenzo's terminals, and Buenos Aires.

Prognosis:

Integration appears to be an irreversible phenomena, particularly in terms of the increasingly robust Southern Cone Common Market. Trade growth is driving infrastructure creation, and is also proving to be a driving force for substantive economic reforms and—in the end—a magnet for significant, relatively long-term, foreign investment. Automobile and agro-industrial investment seem to be the drivers in this area.

The Knowledge Revolution - Trend #5

Economic integration, with its requirement for documentation, quick and accurate tariff assessments and central government oversight of such a efficient and decentralized system of collection, is a strong market for information technology. Indeed, the Knowledge Revolution—with its accurate and real time ability to capture and model trade flows—makes negotiation and administration of integration possible.

Summary

This is a growth region and a booming infrastructure sector; demand should increase for the next generation or so, as GDP growth continues, and new investment is complemented by modernization and ever increasing demand for services and equipment. The result is that business partnerships are likely to be long-term and highly lucrative—and consequently great care should be taken in identifying and developing business partnerships.

Partnerships: Some areas of strong new partnerships (all well-represented among the 125 projects in this book) include:

1. Emerging Latin American Multinationals. There is a large group of Latin firms, especially Chilean firms, that are beginning to operate beyond their borders and act as true multinationals. These are ideal long-term business partners.

2. Pension Fund Executives. These executives have the best macro-level view of business opportunties in Latin America, and are investing in firms and structures that are your marketplace—and will be for the next generation.

3. Sub National Decision-makers. Power is going to these decision-makers, and they will be originating projects in their areas for the next generation.

4. Regulatory Officials. These are the most important executives for the long-term viability of projects, especially in terms of investment levels, performance criteria and tariff rates.

5. New Generation of Opinion-leaders. In a real sense this is a unique moment for Latin America, as the shift to a private sector model takes hold, and many of the project sponsors are key intellectual leaders of this shift.

Assessing the Five Trends: In this context you must closely watch key trends, especially the determination and quality with which countries (and regions) are performing the key trends identified above. We believe that sustained GDP growth exports will continue, but we are less sure of the region's ability to generate savings (and productively use investment) over the long-term.

Perhaps the greatest concern is the goverment's ability to monitor and develop a series of highly professional and successful regulatory bodies. There is no great evidence that this task is well-understood; nor is it clear that the necessary policy and financial resources are being spent in these areas.

In a very different way, decentralization and regional integration present solid business opportunities for infrastructure executives—and are almost roadmaps to those opportunities.

Knowledge Partnerships: Interestingly enough, most of the information technology sales opportunities imply long-term relationships, since buyers and sellers are interested in long-term joint success—through constantly increasing productivity.

Annex 1—Key Information and Knowledge Contacts *

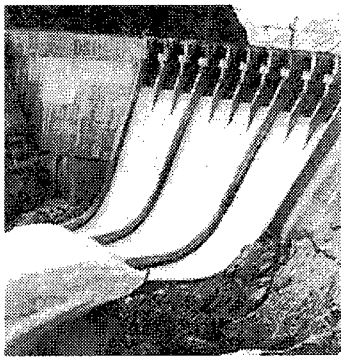
Monitoring Growth and Economic Progress

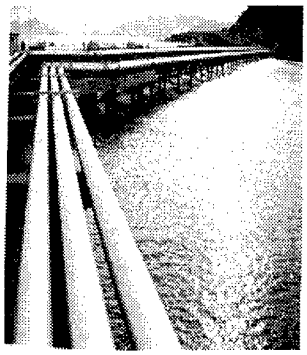
1. Bank of Boston	www.BankBoston.com
2. US Department of Commerce	www.Stat-USA.com
3. World Bank	www.worldbank.org www.laix.org
4. Inter-American Development Bank	www.iadb.org

Other Key Web Sites for Understanding and Monitoring the Region

1. Latin America Infrastructure Exchange	www.laic.com
2. Water-on-Line	www.water-on-line.com
3. Transportation	www.trafficworld.com
4. Telecommunications	www.teleconsult.com
5. Energy	www.doe.gov

The Energy Sector in South America





Introduction

The wave of privatization sweeping across Latin America has significantly impacted all aspects of the energy sector. Traditional energy monopolies are being and have been quickly dismantled and free competition, with its accompanying rewards and risks, is emerging in this market. Even the oil sector, long the bastion of national governments in South America, has opened to direct private ownership.

Increasing demand for energy of all kinds has been a facet of Latin American development over the past two decades, impervious even to the economic crisis of the 1980's. This steady growth of demand is expected to increase now that the region has placed itself on more sound economic footing and is attracting ever greater new foreign and domestic investment. Electric energy demand jumped by 7% in Latin America in 1996 alone.

33 Energy Projects

Total Project Cost	US$ 17.66 Billion
US Export Potential	US$ 6.35 Billion
Hydroelectric	11
Thermal Electric	6
Natural Gas	9
Solar	1
Oil Refinery	1
Transmission	5

Liberalization

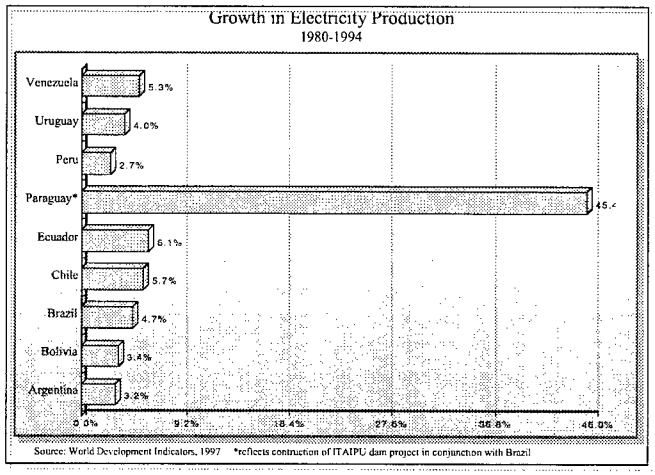
Energy demand is driven by the unmet needs of a growing population combined with the steady industrialization and commercialization of Latin American economies. Although Latin America is energy rich — possessing large potential in hydroelectric power generation as well as substantial reserves of oil, natural gas and even coal, it lacks the capacity to efficiently bring these resources to domestic and export markets. Increasingly, governments are turning to international capital and technology in the mutually beneficial goal of more rapidly and efficiently exploiting these untapped resources.

This combination of privatization, growing demand and abundant yet under-exploited resources, make Latin American energy markets extremely attractive for US companies. Research for this book has identified just a small fraction of the enormous opportunities to be found in this sector over the next decade.

Electrical Power Generation

South America has tremendous needs for new electrical generating capacity to power economic growth and to increase the quality of life for under-served populations. The region as a whole produces only 1,574 Kw/h per capita compared to the worldwide average of 2,365 Kw/h per capita and less than a fraction of the 8,914 Kw/h produced in high income countries.

In order to mitigate these deficits, South America will need an additional 120,000 MW over the next decade in new capacity.



The model for the electricity sector has changed radically over the past few years, with private sector participation now well entrenched. These changes are noted not only in generation, including industrial cogeneration, but in transmission and distribution as well. Countries such as Argentina, Chile and Peru have led the way with large state-owned companies divided into components and sold off to the private sector. US companies such as Entergy, AES, Duke, Dominion, CMS, Southern Electric and PSI have all been active in these privatizations, which further stimulates demand for US goods and services.

Even countries that have not advanced as far in the privatization of their systems, offer strong opportunities for Build-Own-Operate (BOT) and Build-Lease-Transfer (BLT) contracts as well as industrial cogeneration. Industrial cogeneration projects will also benefit from the deregulation of natural gas markets as this inexpensive, efficient fuel source becomes more readily available.

Brazil, by far the largest electricity market in South America, will be especially dynamic over the next several years. Brazil recently began the privatization of its state-owned distribution companies, creating significant investment opportunities. The country began this process with the sale of the Rio de Janiero-based distribution system, with a consortium including Nations Bank winning the concession.

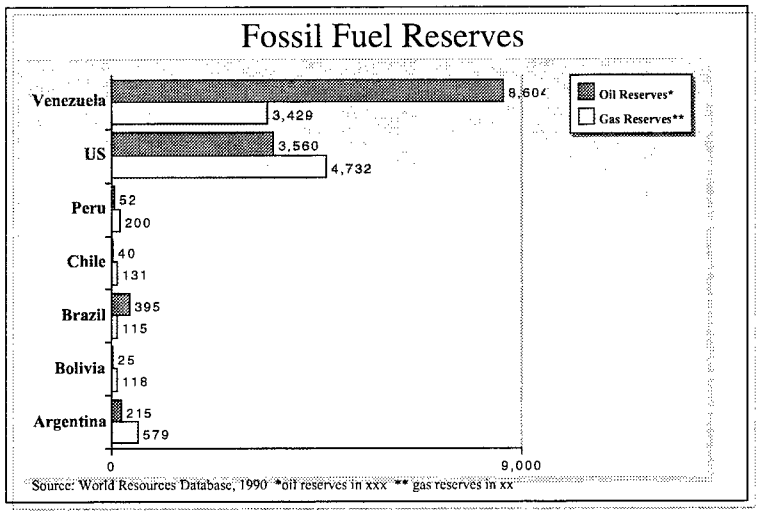
Additionally, predominantly hydro-based generation capacities are being augmented with thermal generation units planned throughout the region. Hydro-generation projects are still very important, as the region's needs drive the investments to increase its installed base.

New generation, combined with the growth of new economic sectors, is requiring growing investments in transmission and distribution systems. These existing systems have often been neglected as countries placed limited financial resources in generation projects and therefore are in need of modernization.

Integration between country grids (as is the case with Brazil) coupled with regional integration, is driving the need for large transmission projects. The largest project is profiled within the Brazilian integrated networks (North - South Transmission Line), although smaller regional projects exist linking country grids, in particular the Mercosur countries.

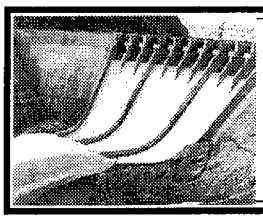
Fossil Fuels

South America is fortunate to have abundant supplies of fossil fuels and the region offers important opportunities both for investment and equipment as it strives to better exploit these resources. South American governments are now inviting foreign participation and even ownership in the goal of increasing the production of these fossil fuel resources.



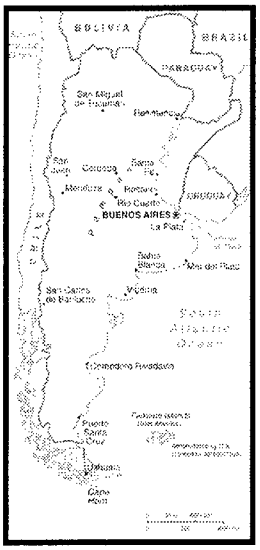
Deregulation is presenting opportunities in natural gas in South America. US companies have successfully participated in exploration, distribution and thermal generation in the region. The largest project to date is the US$ 2 billion Bolivia to Brazil pipeline which is underway after years of negotiation and planning. The projects outlined in this report are just a fraction of the likely gas projects to be developed over the next several years. There are major gas distribution and transportation projects planned in almost every South American country.

Even the petroleum sector, which traditionally has been the most tightly held by national governments, is going through revolutionary change. Argentina completed the sale of Yacimientos Petroliferos Fiscales (YPF) which stimulated up to US$ 800 million in direct investment in sector by 1995. Brazil recently stripped powerful Petrobrás of its monopoly over petroleum exploitation. In Venezuela, by far the region's largest oil producer, private companies can now explore for and gain concessions to exploit oil fields although the government retains the right of ownership.



Energy / Argentina

Rio Bermejo Irrigation / Energy Generation



Project Summary

Project No:	**ENE-01**
Subsector:	**Irrigation**
Location:	**Province of Salta, Argentina**
Project Cost:	**US$ 450 million**
Export Potential:	**US$ 200 million**
Type:	**BOT Concession**
Sponsor:	**Province of Salta**

The Province of Salta, in an effort to increase energy distribution in the region, has enacted laws to facilitate private-sector participation through concession agreements, including the Rio Bermejo Irrigation/Energy Generation Project. The Rio Bermejo project is actually the synthesis of three smaller projects which will harness the power of the Bermejo River. The projects include two reservoirs with hydroelectric plants, "Peña Colorado" and "Zanja del Tigre" and a dam with a hydroelectric plant, "Elordi."

Technical Description

Topographical studies of the Bermejo River have indicated a drop-off level of 66 m. The energy potential generated from the slope, during years of both heavy and light rainfall, is significant.

Moderate rainfall between 1971 and 1972 generated a water flow of 223m^3 per second with an overflow of 7,055 hm^3 per year. Even during years of moderate rainfall, the project should generate 1.061 Gw/h per year.

During years with heavy rainfall, between 1978-1979, water flow was 464 m^3 per second. The total overflow per year was estimated at 14,657 hm^3. Energy potential during years with heavy rainfall is 2.2 Gw/h per year.

The 3 hydroelectric plants to be constructed under the Rio Bermejo Irrigation/Energy Generation Complex include:

Peña Colorado Hydroelectric Plant:

Cascade:	27 meters
Reservoir Volume:	1,300 hm3
Light Year Estimated Electricity:	440 Gw/h per year
Heavy Year Estimated Electricity:	915 Gw/h per year

Zanja del Tigre Hydroelectric Plant:

Cascade:	26 meters
Reservoir Volume:	300 hm3
Light Year Estimated Electricity:	425 Gw/h per year
Heavy Year Estimated Electricity:	883 Gw/h per year

Elordi Hydroelectric Plant:

Cascade:	12 meters
Light Year Estimated Electricity:	196 Gw/h per year
Heavy Year Estimated Electricity:	407 Gw/h per year

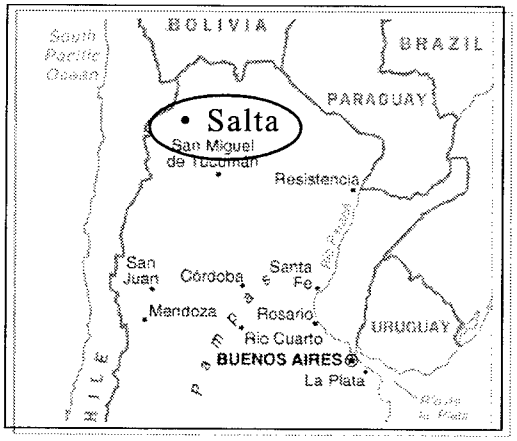
Project Total:

Cascade:	66 meters
Reservoir Volume:	1,600 hm3
Light Year Estimated Electricity:	1.061 Gw/h per year
Heavy Year Estimated Electricity:	2.205 Gw/h per year

The project guarantees a consistent water flow of 60 m3 per second for irrigation and other uses. Bermejo will reduce the peak costs for water in the region as well as sedimentation and erosion occurring in the low regions.

Site

The project is located in the province of Salta on the confluence of the Rio Bermejo and Rio Tarija, on the Bolivia-Argentina border, nearby to the confluence of the Colorado River and the Bermejo River.



Nature of Demand

Demand for this project is created by agricultural output and industrial growth in the province of Salta, in addition to increased trade within the Southern Cone. Demand estimates are based on guaranteed electrical energy, potable water, water for irrigation, industrial water and environmental preservation. Currently, the region is experiencing energy supply shortages, in addition to water shortages for irrigation in the Pampas Region of Argentina.

Project Status

The Peña Colorado Hydroelectric Plant is currently undergoing prefeasibility studies, which should be completed in the medium-term. From that point, the feasibility studies will be conducted. Formal bidding is expected to open by the first quarter of 1999.

Zanja del Tigre has undergone basic studies and designs up to the feasibility stage. The advancement of formal bidding will take place within the next 12 months. Elordi has undergone basic studies at the prefeasibility level. Within the next year and a half, the project will have completed full feasibility studies, including the formal bidding for concession.

Financing

The project's total investment of US$ 450 million is broken down in the following manner. An investment of US$ 200 million is needed for Zanja del Tigre, while the second plant, Peña Colorado will require US$ 170 million. Elordi is expected to require an investment amount of US$ 80,000.

Financing will be conducted on a private basis based on a 40 -year BOT concession arrangement. The concession requirements will be regulated per the laws on private initiative. The concession will include the generation, maintenance, operation and control of the complex.

Equipment and Service Procurement

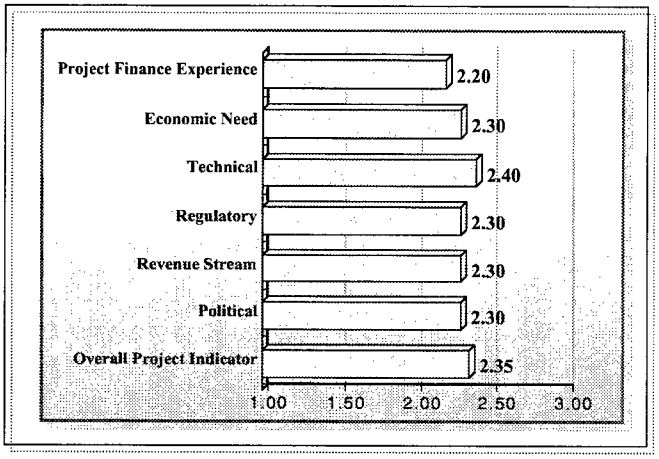
Equipment:

- Earth-moving equipment
- Excavators
- Front loaders
- Hydroelectric units
- Control panels
- Transmission lines
- Trucks
- Flooding control equipment
- Sub stations

Services:

- Feasibility and prefeasibilty studies
- Construction engineering
- Environmental Impact Consultants
- Project Finance Specialists
- Electrical Engineering

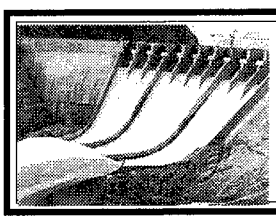
Critical Project Indicators



Key Decision Makers

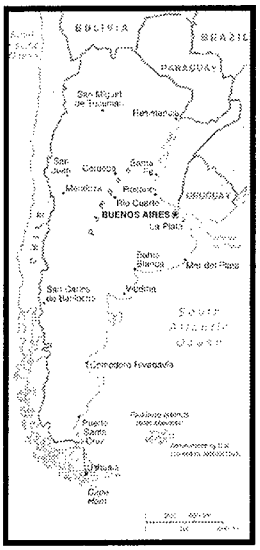
Company	Regulador de los Servicios Públicos de la Provincia de Provincia de Salta
Name	Ing. Lopez Días
Title	Director
Address	Alvarado 677 (ENRESP) Salta, Argentina
Telephone	5487-214-574 / 396-115
Fax	5487-213-021 ext 24

Company	Private Consultant
Name	Ing. Antonio Alberto Roldán
Title	Consultor en el proyecto
Address	Paraguay 3304 4000 San Miguel de Tucumán
Telephone	5481-345-760
Fax	5481-342-283



Energy / Argentina

Rio Juramento Hydroelectric Generation



Project Summary

Project No:	**ENE-02**
Subsector:	**Hydroelectric**
Location:	**Province of Salta, Argentina**
Project Cost:	**US$ 120 million**
Export Potential:	**US$ 60 million**
Type:	**BOT Concession**
Sponsor:	**Regulador de los Servicios Públicos de la Provincia de Salta**

The Ministry of Production and Employment has developed a program to harness the energy potential of the Juramento River. In doing so, the ministry is looking for private investment in the form of a concession to develop a hydroelectric project on the river.

Technical Description

The Juramento project complements existing structures from which the project will be able to take advantage. The current system includes:

Existing Structures

- Cabra Corral Dam and Reservoir

  The Corral Dam consists of a dam and a reservoir located in the confluence of the Guachipas and Arias Rivers in the region dominated by "Cobra Corral." The system regulates the flow of water through a deep valley of 32 km with an annual flow of 928 Hm^3. The dam's central hydraulic system consists of three turbines of 43 Kw each. The project is attached to a reservoir that contains excess water from the dam.

- Dike of Miraflores
  The dike provides water for land irrigation of 11,500 Ha.
- El Tunnel Dam and Reservoir
  The dam and reservoir provide for the additional irrigation of 25,000 Ha and additional production of 45 Kw, supplying irrigation and energy to the province of Salta, as well as the province of Santiago del Estero.
- Irrigation Canal in Miraflores
  The canal has a 14-Km long channel with a capacity of 7.3 meters per second that serves 3,500 Ha. The canal's capacity will be extended to cover an additional 8,000 Ha.

The project has established complete control of the river in the middle and lower valley and now irrigates 120 million acres. Total energy generation is 300,000,000 Kw/h annually.

Phase 2 - Rio Juramento Hydroelectric Generation

- Hydroelectric Plant de Juramento

  The plant will exploit the power production potential of a 350 m waterfall at the foot of the Peías Blanca and the Miraflorres dams. Net production total is expected to be 560,000,000 Kwh per year. Total volume of water through the plant is expected to be 900 m^3 per annum. Medium water flow will constitute 28 m^3 per year (regulated flow).

- Tunnel Project (Additional Possibility)

  The second phase of the project (Tunal - Figueroa) involves the construction of a conduction tunnel. The total length of the tunnel will be 200 Km long, the first 7 Km of which have already been constructed and 40 Km more will be built by the governments of Salta, Santiago del Estero y la Nación next year.

  When completed, the project will generate an installed potential of 12.5 Kw which would generate with a 100% guarantee 60,163.718 Kw/h.

Site

The hydroelectric project will be located in the valley of Rio Juramento in the Province of Salta, in Northwestern Argentina.

Nature of Demand

Salta, together with the provinces of Tucumán, Jujuy, Santiago del Estero, Catamarca y la Rioja, make up the region called NOA (Northwestern Argentina). Currently, the NOA generates 485 Gw/h per year with Thermal generation at 2,041 Gwh. The total generation production is 2,526 Gw/h.

At the current generation capacity, the country will continue to have energy deficits. The current annual demand for electricity is provided in the chart on the right:

With a total demand of 3,211 Gwh per year, the region is short 685 Gwh per year.

Energy Demand per Province in NOA

NOA PROVINCES	Demand (GWh/yr)
Salta	581
Tucumán	1195
Jujuy	378
Sgo. Del Estero	361
Catamarca	320
La Rioja	377
TOTAL	**3,212**

Project Status

Although backed by government support, the project is in its initial phases and prefeasibility studies will be conducted in the short term. Nevertheless, the bidding process is expected to open by the third quarter of 1998. Concession terms have not yet been completely defined. Geological studies have been executed which may be used for the tunnel.

Financing

The project is expected to be financed through investment from the private sector. A concession in the form of a BOT is being considered for 50 years.

Equipment & Service Procurement

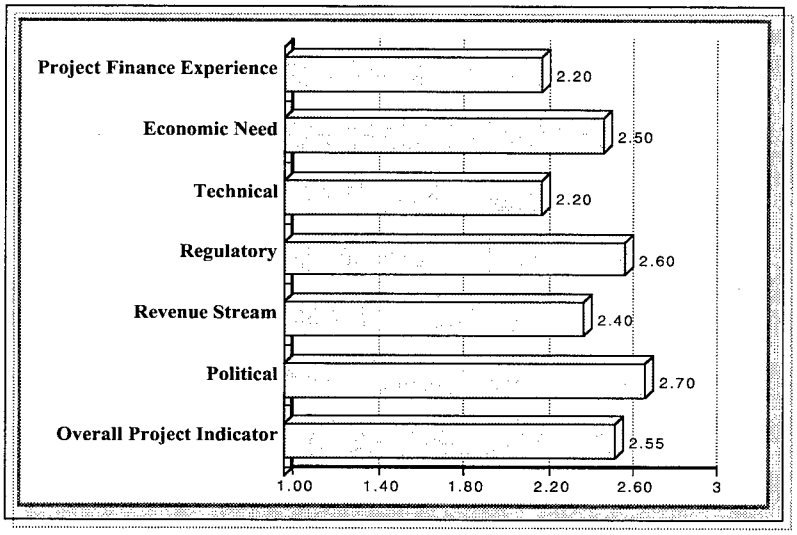
Equipment:

- Electromechanical and hydro-pneumatic equipment
- Turbines
- Generators
- Control panels
- Transformers
- Circuit breakers
- Equipment support

Services:

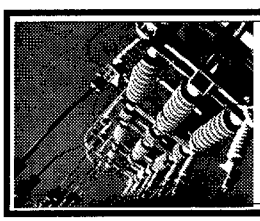
- Mechanical engineering
- Electrical and hydraulic engineering
- Geo-technical and geological studies
- Structural engineering

Critical Project Indicators



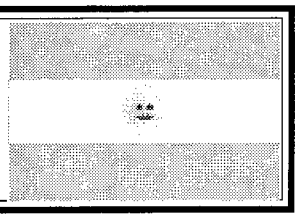
Key Decision Makers

Company	Regulador de los Servicios Públicos de la Provincia de Salta
Name	Ing. Lopez Díaz
Title	Director
Address	Alvarado 677 (ENRESP) Salta, Argentina
Telephone	5487-214-574
Fax	5487-213-021 (ext. 24)



Energy / Argentina

Rural Electrification



Project Summary

Project No:	**ENE-03**
Subsector:	**Solar Energy**
Location:	**Salta, Argentina**
Project Cost:	**US$ 6 million**
Export Potential:	**US$ 6 million**
Type:	**Concession / Procurement**
Sponsor:	**EDESA / ESED**

EDESA (Empresa de Distribución de Energía Eléctrica) is the state-owned electric company of Salta, responsible for the development of power generation and distribution projects. The entity is looking for opportunities in photovoltaic generation in order to provide coverage for areas not reached by the central electric distribution network. EDESA has formed ESED S.A. (Empresa de Servicios Electricos Dispersos Sociedad Anonima) to provide disperse electrical generation systems to border areas and townships outside of the electrical grid.

Technical Description

The project will provide three types of electrical distribution systems. Each of the systems will cover the needs of the regions not currently reached by electrical services.

Individual Systems (Solar Powered Panels):

These are single-user systems that accommodate the use of one household. Total usage is estimated at 3.75 and 30 kW/h per month. Energy distribution would be carried continuously at voltages of 12, 24, and 48.

Reduced Collective Systems (Diesel Powered Generators):

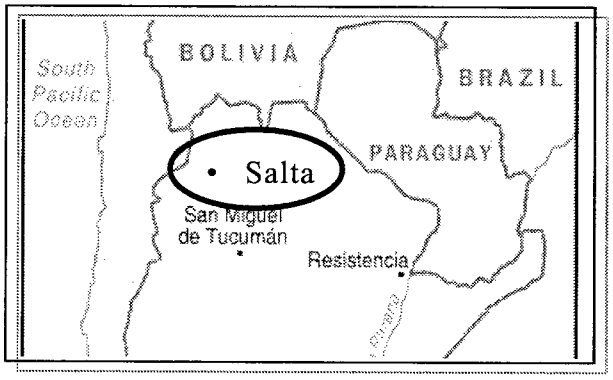
These systems will service more than one household. Total demand is estimated to be 4 households, at 60 kW/h per month. The energy would be available for a total of 5 hours per day. The distribution of current would flow at a frequency of 50 Hz, with a voltage of 220.

Continuous Collective Systems (Solar Powered Panels):

These systems would be similar to the Reduced Collective Systems, supplying more than one household. Total maximum demand is expected to be 10 households, at 90 kWh per month. Unlike the previous scenario, energy would be available 24 hrs per day. The distribution would be carried at a frequency of 50 Hz with a voltage of 220.

Site

The project is located in the province of Salta, in Northwestern Argentina.



Nature of Demand

The majority of the population of Salta is urban. The electrical system is connected to the regional grid flowing through the distribution network. The distribution of energy is not uniform throughout the region and rural areas tend to be disconnected from the system.

The photovoltaic system will address this situation, offering a decentralized method of electrical generation (e.g. Photovoltaic systems, mini/micro hydroelectric generators).

The market for this system consists of some 2,500 families that have sufficient incomes to pay for the service.

Project Status

EDESA is currently seeking a company to develop the necessary components for the successful distribution of solar-powered energy. The system is set up as a concession without operation or transfer. The five-year concession will cover the costs of installation.

ESED S.A. would be responsible for providing the services to the customers. They would also be in charge of billing either a fixed amount of an individual amount according to usage.

Financing

Payment for the photovoltaic system and structures will be covered by EDESA's compensatory funds and through funding emanating directly from Fondos del Estado Para Desarrollo é Inversiones (FEDEI).

Investment Period

Year 1	US$ 1,790,000
Year 2	US$ 3,469,000
Year 3	US$ 700,000

Equipment and Service Procurement

Equipment:

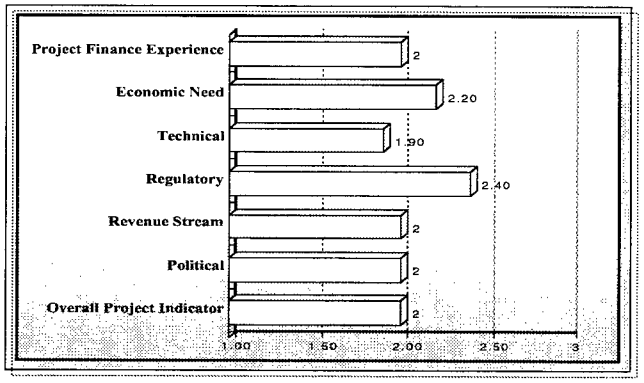
Regulators 12v, 12a	160 Units
Regulators 12v, 20a	69 Units
Regulators 12, 30a	37 Units
Regulators 12-24v, 20-10a	48 Units
Regulators 12-24v, 40-20a	112 Units
Regulators 48v, 40a	37 Units
Batteries of 300 Ah en C20	160 Units
Batteries of 295 Ah en C100 or 218 Ah en C10	23 Units
Batteries of 400 Ah en C100 or 293 Ah en C10	24 Units
Batteries of 465 Ah en C100 or 344 Ah en C10	22 Units
Batteries of 650 Ah en C100 or 481 Ah en C10	37 Units
Batteries of 544 Ah en C10	20 Units
Batteries of 904 Ah en C10	28 Units
Batteries of 1,113 Ah en C10	13 Units
Batteries of 1,363 Ah en C10 or 48v	9 Units
Batteries of 2,222 Ah en C10 of 48v	13 Units

Continuos Inventors CC ⇒CA of 150 W	9 Units
Continuos Inventors CC ⇒CA of 300 W	24 Units
Continuos Inventors CC ⇒CA of 400 W	20 Units
Continuos Inventors CC ⇒CA of 550 W	28 Units
Continuos Inventors CC ⇒CA of 1500 W	112 Units
Continuos Inventors CC ⇒CA of 3 kW	24 Units
Continuos Inventors CC ⇒CA of 6 kW	13 Units

Services:

Electrical engineers
Specialized engineering
Solar Power specialists
Contractors
Panel installation specialists

Critical Project Indicators



Key Decision Makers

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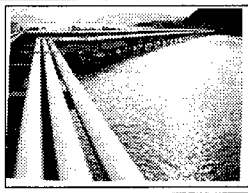
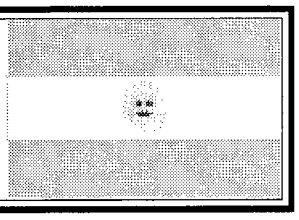
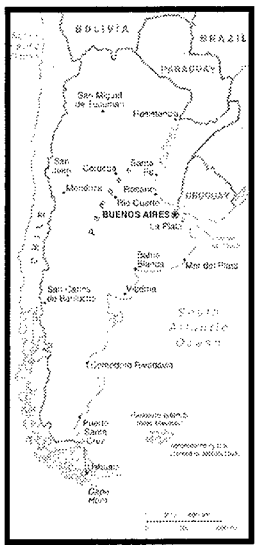


Energy / Argentina

Gas Pipeline Spur





Project Summary

Project No:	**ENE-04**
Subsector:	**Natural Gas**
Location:	**Province of Salta, Argentina**
Project Cost:	**US$ 13 million**
Export Potential:	**US$ 10 million**
Type:	**BOT Concession**
Sponsor:	**Subsecretaria de Minería - Dirección Nacional de Minería**

The Undersecretary of Mining is an agency of the government tasked with promoting the growth of the mining industry. The government has created incentive programs for companies interested in exploiting the region's rich mineral deposits, including tax-free imports of mining machinery and services. In addition, the Undersecretary believes that building a gas pipeline spur in the region will attract mining and processing companies eager to take advantage of inexpensive energy.

Technical Description

The objective of constructing the natural gas pipeline spur is to provide a sub-distribution point extending out of the Atacama gas pipeline currently under construction. The spur would provide gas to mining companies, industrial parks and the nearby urban population.

The Atacama Natural Gas pipeline is divided into 14 sections of various lengths and altitudes. They include:

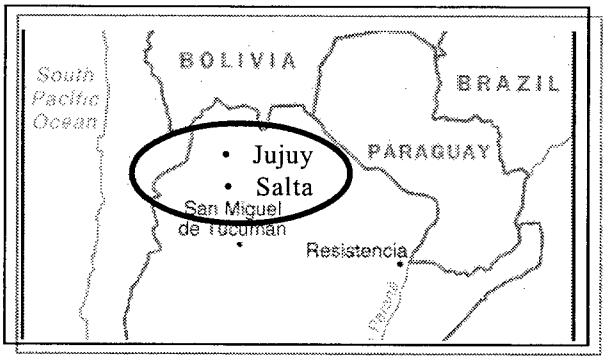
- Coronel Cornejo-Embarcation
- Embarcation-Colonia Santa Rosa
- Colonia Santa Rosa -Rio Zora
- Rio Zora - Chalican
- Chalican-extremo south of Tierra de Zapla
- Las Lajitas - San Salvador de Jujuy

- Purmamarca - Casa Colorada
- Casa Colorado - Angostso de Las Burras
- Angosto de las Burras - Susques
- Susques-Eastern Border of Salar de Alaroz
- Salar de Alaroz-Pampa de Jama
- Pampa of Jama-Límite with Chile

The Atacama natural gas pipeline will ultimately provide an alternative source of power generation for 22 localities.

Site

The project is located in the Argentine provinces of Salta and Jujuy.



Nature of Demand

The gas pipeline spur is expected to serve various mining and industrial companies in the area. The economic need for the project is justified by the low cost of natural gas compared to that of other forms of energy.

As the chart on the right illustrates, consumption per energy sector provides for ample opportunity and demand for the project:

Energy Consumption Per Sector

SECTORS	m3/month	m3/day
Sugar Sector	6.25 million	208,000
Industrial Sector	15.3 million	510,000
Mining Sector	3.4 million	113,000
Tobacco Sector	2 million	67,000
Total	26.950 million	898,000

Project Status

The Atacama natural gas pipeline is expected to begin construction in the third quarter of 1997 with a completion date of February 1999. The timeline for this project is tied to the Atacama project, and any delays of Atacama will extend the timeline of the gas pipeline spur.

The spur prefeasibility study is expected to begin in the short term with a completion date of early 1998, whereupon full feasibility studies will be underway. The construction of the project, with consideration to studies and delays of Atacama should begin in late 1998 or early 1999.

Financing

The project will operate as a BOT concession. Structure of the concession has yet to be determined. The state government may provide partial financing. In addition, the Banco Nacíon and the Provinces of Salta and Jujuy will be involved.

The financing is being pushed by the government as a means to further develop the mining sector in the region.

Equipment and Service Procurement

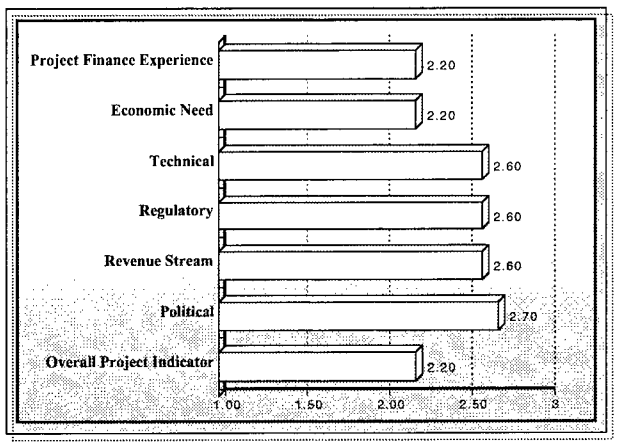
Equipment:

- Reduction station
- Steel piping
- Valves
- Associated equipment and connections of complementary size
- Equipment for flow station
- Pressure control, separation, filtration, and flow monitors

Services:

- Buried pipe construction
- Installation services
- Specialized engineering
- Design
- Feasibility studies

Critical Project Indicators



Key Decision Makers

Company	Subsecretaria de Minería
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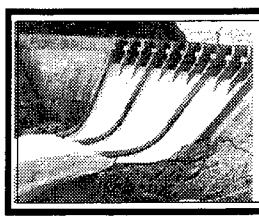
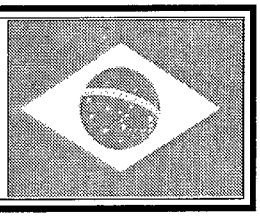


Energy / Brazil

Tres Figueras Hydroelectric Plant



Project Summary

Project No:	**ENE-05**
Subsector:	**Hydroelectric Generation**
Location:	**Paraná, Brazil**
Project Cost:	**US$ 170 million**
Export Potential:	**US$ 40 million**
Type:	**30 year BOT with 30% partnership**
Sponsor:	**COPEL**

COPEL (Companhia Paranaense de Energia) is the state-owned energy utility of Paraná. The company is financially sound and well managed, offering potential joint venture and concession opportunities to the private sector. The company is attempting to increase both its thermal and hydroelectric generation capacities to meet growing demand in the region.

COPEL has a net asset base of US $4 billion and current generation capacity of 13,100 GWh, servicing 2.4 million consumers. The company operates 9 hydroelectric plants, with a total installed base of 3,319 MW and 3 thermoelectric plants with a total installed base of 21 MW. COPEL has concluded preliminary studies placing 73 potential small-scale hydroelectric generation units in the state's river basins, for which it is seeking private sector participation.

Technical Description

The project calls for a 30-year BOT for a hydroelectric plant to be constructed on the Ivaí River, in the state of Paraná. The project is the first of several hydroelectric projects that COPEL plans to concession to the private sector.

The plant has a projected capacity for 120 MW and expected costs of US $243 million, guaranteeing energy supply of 67.8 MW. The project sponsors envision that a private-sector concessionaire will design and build the plant, based on technical preliminary studies already concluded by COPEL. The

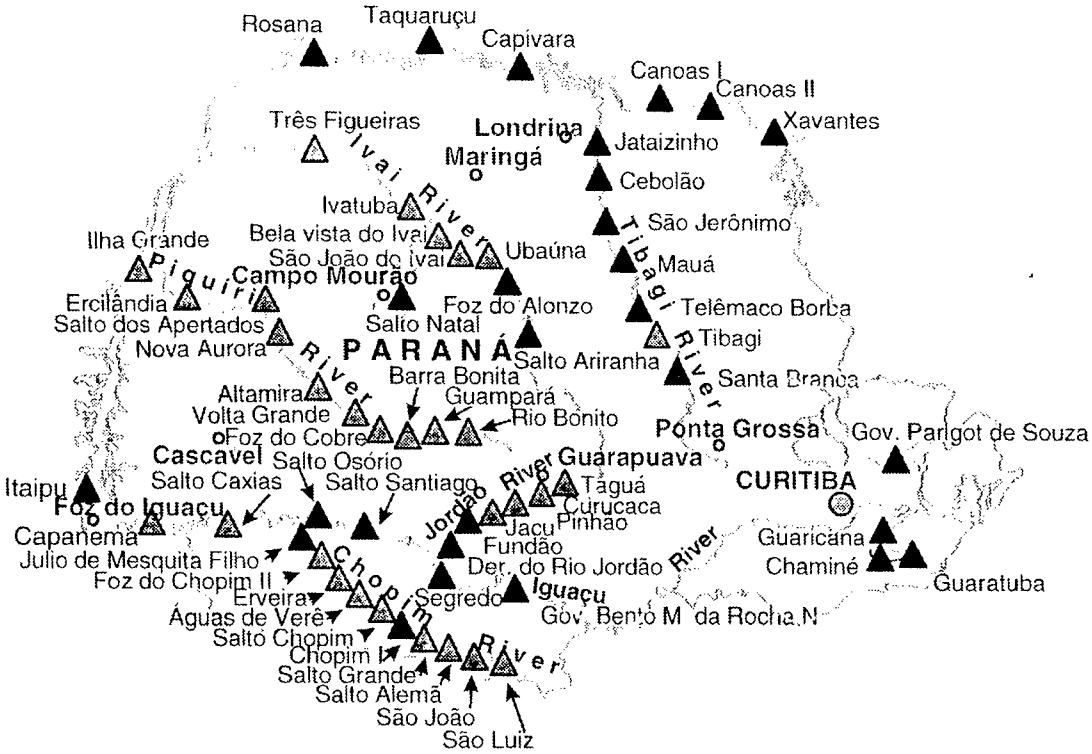
concessionaire will then sell the generated power back to COPEL under a long-term purchase agreement. COPEL will contribute 30% of the capital, with the private sector incurring 70% of the project's cost burden. The chart on the right illustrates the project's estimated costs.

Component	Cost (US$ Million)
Equipment:	97.2
Civil Works	72.9
Engineering Services	24.3
Environmental Consulting/ Permitting	48.6

This project will be the first of several that COPEL has pre-determined based on its technical studies on the hydroelectric generation capacities of the Ivaí and São Francisco rivers in the state of Paraná. The second plant to be built is the Ivatuba hydroelectric plant, with projected private sector investments of US$ 130 million and installed base of 144 MW.

Site

The project will be built on the Ivaí River, in the Northwest region of the state of Paraná.



Nature of Demand

COPEL currently meets approximately 68% of the state's electricity needs through the company's generation capacity, and is investing in increasing this percentage in order to be more self-sufficient.

Approaching a 25% share in the GDP, the state of Parana's 9 million inhabitants enjoy the country's highest living standards. Nevertheless, the state has an unmet demand of 1,000 GW/h, which is the impetus for this project. Furthermore, Paraná is growing at rates exceeding national averages due to its strategic proximity to Mercosur markets. Increased population growth, as well as new industrial parks, is driving the need for increased energy supply.

Project Status

COPEL has concluded an inventory of the river basins in the state and produced a preliminary report outlining the major opportunities for hydroelectric generation. The Três Figueiras plant would be the first plant to be built. Environmental permitting will be the responsibility of the private sector developer, and typically takes one year to be approved, once the project is won.

The bidding procedure for the project is still undetermined, since the project is a partnership with COPEL. However, the bidding process for the concession is expected to open by the third quarter of 1998. Other projects will be bid subsequently.

Financing

COPEL is in strong financial standing and has a track record of partnerships with the private sector. Nevertheless, the project's bidding procedure remains unclear. COPEL should define this by December 1997, enhancing the project's financial attractiveness.

The strategic importance of this project lies in the fact that it is the first of several that COPEL will execute jointly with the private sector.

Equipment and Service Procurement

The project's specific equipment and services demands will be determined upon publication of bids. Anticipated equipment and services for the project are:

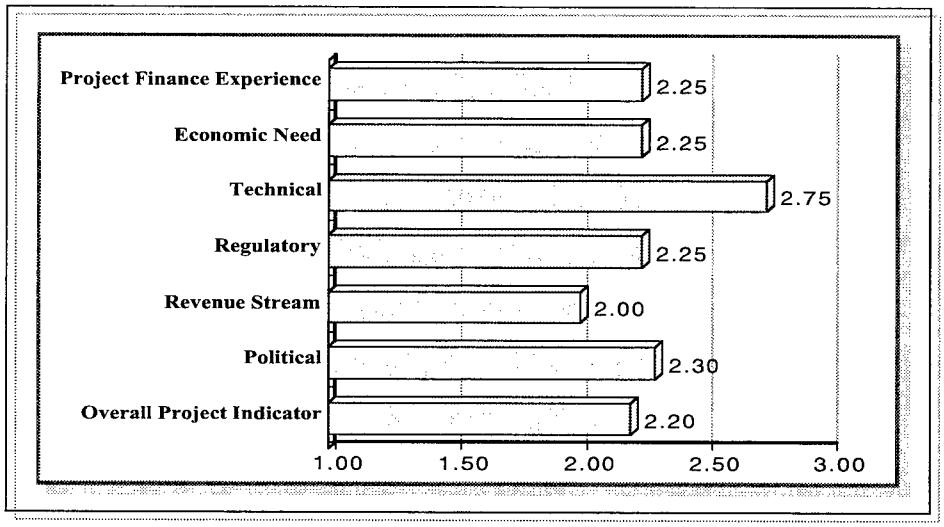
Equipment:

- Turbines
- Switches
- Hydraulics
- Transformers
- Transmission stations
- Ventilation equipment
- Communications and monitoring systems

Services:

- Environmental consulting
- Engineering and design

Critical Project Indicators



Key Decision Makers

Company	Companhia Paranaese de Energia
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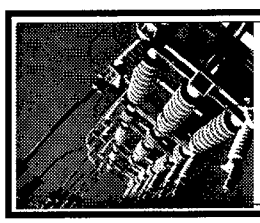


Energy / Brazil

Manaus Thermal Plant

Project Summary

Project No:	**ENE-06**
Subsector:	**Energy Generation**
Location:	**Manaus, Amazonas State**
Project Cost:	**US$ 270 million**
Export Potential:	**US$ 140 million**
Type:	**IPP**
Sponsor:	**Electronorte**

Eletronorte was created in 1973 as part of the Federal Eletrobrás system. It operates the Northern Brazil energy grid, which encompasses the states of Pará, Amazonas, Tocantins, Mato Grosso, Rondonia, Roraima, Acre, Amapá and Maranhão. The grid services a total population of 13 million people.

Over the past twenty years, Eletronorte has invested approximately US$ 14 billion to increase generation and transmission capacity. The company has played a critical role in the development of the Amazonas region, in particular, the capital city of Manaus. Manaus is responsible for 95% of the GDP of the Amazonas state and Eletronorte has invested approximately US $2.5 billion over the last 16 years to increase generation capacity and transmission capacity for the city of Manaus.

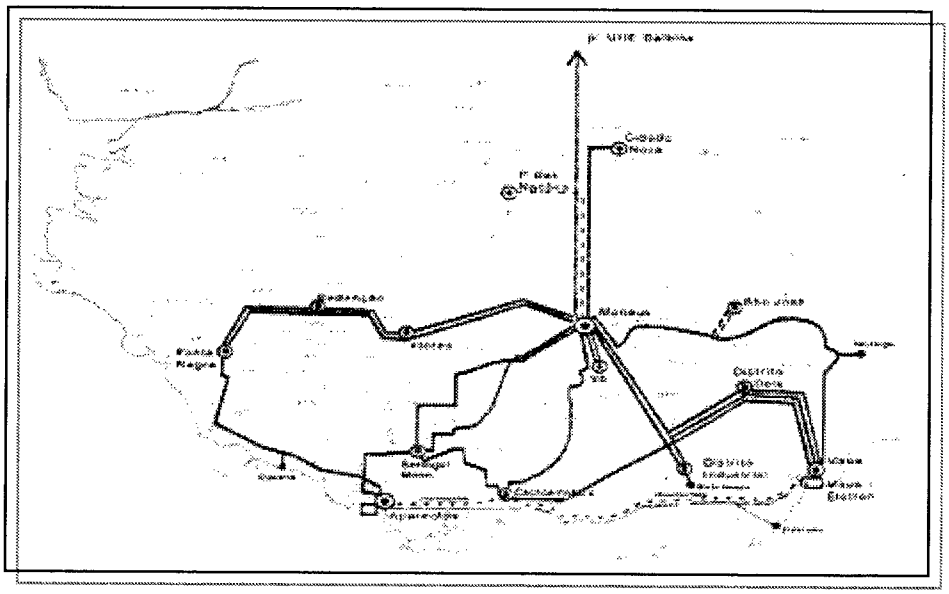
Technical Description

The Manaus thermal generation project is a 20-year IPP with an installed base of 350 MW. The project involves contruction of one combined cycle to generate 90 MW, followed by another two combined cycles of 90 MW each in six month intervals. Eletronorte will sign an agreement to purchase energy from the private sector through a public bid.

Energy should be supplied as 69 kV. According to planned production, the plant will utilize diesel prior to the arrival of natural gas from Urucu.

Site

The project will be located in the city of Manaus, capital of Amazonas state, in northern Brazil. Natural gas will be bought from the Urucu facility, which is explored by Petrobrás. Then, the natural gas will be liquefied on site and transported by barges to the thermal plant.



Nature of Demand

The Manaus system benefits a population of approximately 1.2 million people, equivalent to 50% of the state of Amazonas' population. Population growth in the region is high, and is estimated to reach 1.9 million people by the year 2006.

Manaus has a modern industrial park, with a concentration of electronic and household appliance production facilities. Growth in Manaus is influenced by Brazil's largest Industrial Free Zone within the city. The Free Zone status until the year 2013 drives the energy demand needed to fuel the industrial growth in Manaus.

The current installed base for Manaus is 740 MW. Energy consumption is estimated to increase by a factor of 10.3% per year between 1997 and 2000, and increase by 8.8% per year from 2000-2006.

The Manaus Thermal Plant has been included within the priority projects in the federal government's "Brazil in Action" plan.

Project Status

The project is being studied by Eletronorte and bidding documents are being prepared. Bids should go out by the third quarter of 1998.

Financing

Eletronorte will sign a contract to purchase the power produced by the public sector. The contract will be for 20 years and will be an exclusive arrangement.

The criteria for public bidding will follow the basic principals outlined in the "Law of Independent Power Production," Decree number 2,003, dated September 10, 1996.

The bidding process will run according to Law number 8,666.

Equipment and Service Procurement

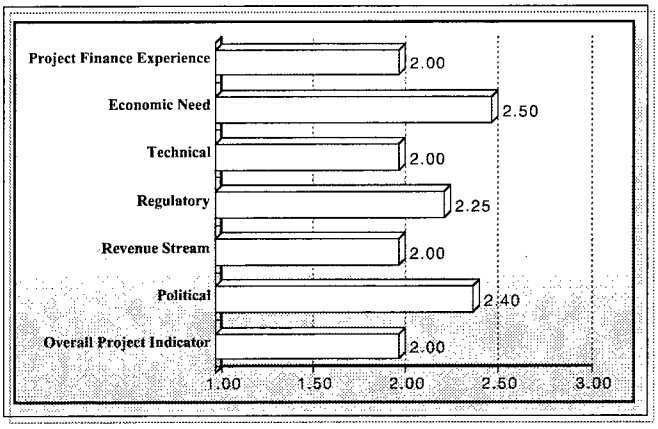
Equipment:

- 3 Combustion turbines (90 MW)
- Vapor generators for heat recovery
- Vapor turbine
- Transformers
- Surface condensers and cooling towers
- Industrial water supplier and auxiliary water cooler
- Fire prevention and emergency power generation
- Natural gas system
- Compressed air system
- Terminal equipment for generators
- Transmission lines

Services

- Basic and design engineering
- Operational services

Critical Project Indicators



Key Decision Makers

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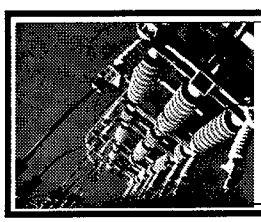


Energy / Brazil

Guararema Thermoelectric Plant

Project Summary

Project No:	**ENE-07**
Subsector:	**Thermal Generation**
Location:	**Guararema, Brazil**
Project Cost:	**US$ 240 million**
Export Potential:	**US$ 130 million**
Type:	**BOT Concession**
Sponsor:	**Agência de Desenvolvimiento Tietê Paraná**

The Agência de Desenvolvimento Tietê Paraná (ADTP) is a non-profit public/private partnership engaged in the economic development of Brazil's Tietê Paraná region. Members include approximately 120 Brazilian businesses, covering a 5-state region in Brazil, plus Bolivia and Paraguay. ADTP plans to grant a BOT concession for a 200-300 MW natural gas turbine thermoelectric plant.

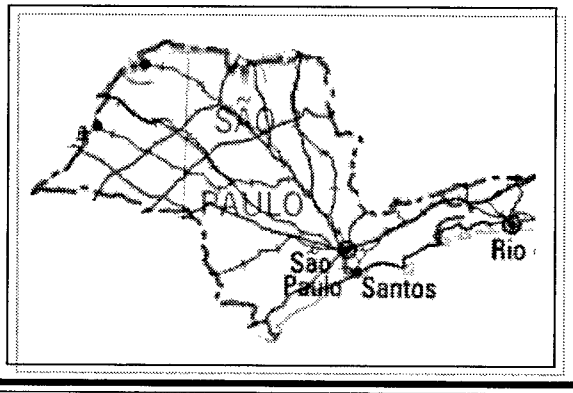
Technical Description

The project involves the construction of a 300-400 MW thermoelectric plant, valued at US$ 240 million. The plant is expected to use combined cycle gas turbines which will require between 1.2 and 1.6 million m^3 of natural gas per day.

Adjacent to the proposed plant site is a Petrobras pipeline which will be used to source natural gas from the Petrobras Campos/Santos basins, which hold 83% of Brazil's natural gas reserves. The pipeline currently possesses sufficient excess capacity to supply 200-300 MW of power generation. The Bolivia-Brazil pipeline will eventually provide an alternate fuel source for the project.

Site

The plant will be constructed near the city of Guararema, which is located 50 Km northeast of the city of São Paulo. The region is served with electric power by Electropaulo.



Nature of Demand

Brazil's energy sector is undergoing important changes as the country attempts to meet new demand. The energy sector will grow at an average of 5.2% per year, and increase its network efficiencies. The Cardoso administration has created a new national agency to oversee the electric energy sector, ANEEL, which is responsible for ensuring favorable investment climate for concessionaires.

Brazil's current installed base is 57.6 Gw/h, which, under Eletrobrás' direction, (the National Holding Utility) will expand to 90.2 Gw/h by the year 2006. The share of hydroelectric generation will decline from its current 92 percent to 83 percent, with an increase in thermal generation. Electricity demand in the Tietê-Paraná Region is increasing at a rate of approximately 1000 MW per year.

Existing generation plants in the Tietê-Paraná Region are heavily concentrated on hydroelectric power. However, hydro generating capacity in the Southeastern region of Brazil is expected to be exhausted by the year 2000. ADTP intends to utilize thermoelectric plants as a means of augmenting hydroelectric power sources and avoiding future energy deficits, particularly during dry periods.

Project Status

A US TDA-sponsored Desk Study for the Guararema Thermal Generation project was completed by Commonwealth Power Corporation in November 1996. The desk study recommended that the TDA provide funding for a feasibility study which will further define the viability, commercial constraints, financing and technical requirements for the plant.

The feasibility study, conducted by Parsons Power Group, will be carried out in two phases. The first phase will confirm the project's economic and financial viability and the second will finalize financial details so that construction can begin. The study will follow a 12-month timeline. Bidding for the BOT concession and subsequent plant construction will follow study completion. The project should be operative by January 2000.

Financing

The plant will require an investment of US$ 240 million, which will be financed under a BOT concession agreement. The project's final financing arrangements will depend upon the following factors: 1) the underlying economic characteristics of the project, including power pricing in the Power Purchase Agreement (PPA), 2) the non-price terms and conditions of the PPA, 3) the general state of the international and Brazilian credit markets and 4) the creditworthiness of the power purchaser.

Equipment and Service Procurement

US$ 130 million in equipment and services is expected to be imported to Brazil to meet the project's procurement requirements. The following equipment will be required:

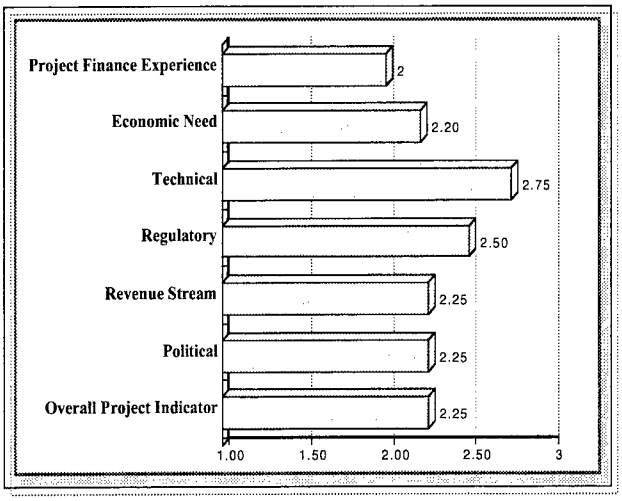
Equipment:

- Steam turbine-generator sets (US$ 20 million)
- Gas turbine generator sets (US$ 45 million)
- Heat recovery steam generators (US$ 50 million)

Services:

- Engineering services and construction management (US$ 15 million)
- Financing and financial services

Critical Project Indicators



Key Decision Makers

Company	Agência de Desenvolvimiento Tietê Paraná
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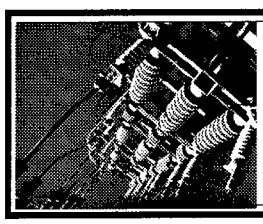


Energy / Brazil

Norte Fluminense Thermogeneration Plant

Project Summary

Project No:	**ENE-08**
Subsector:	**Thermoelectric Generation**
Location:	**Rio de Janeiro, Brazil**
Project Cost:	**US$ 350 million**
Export Potential:	**US$ 60 million**
Type:	**Procurement**
Sponsor:	**ELECTROBRÁS**

ELETROBRÁS is a federally-owned holding company responsible for the execution of Brazil's national energy policies. The company operates through generating subsidiaries in which it retains majority control. These companies in turn supply distributing concessionaires and certain industrial entities with energy.

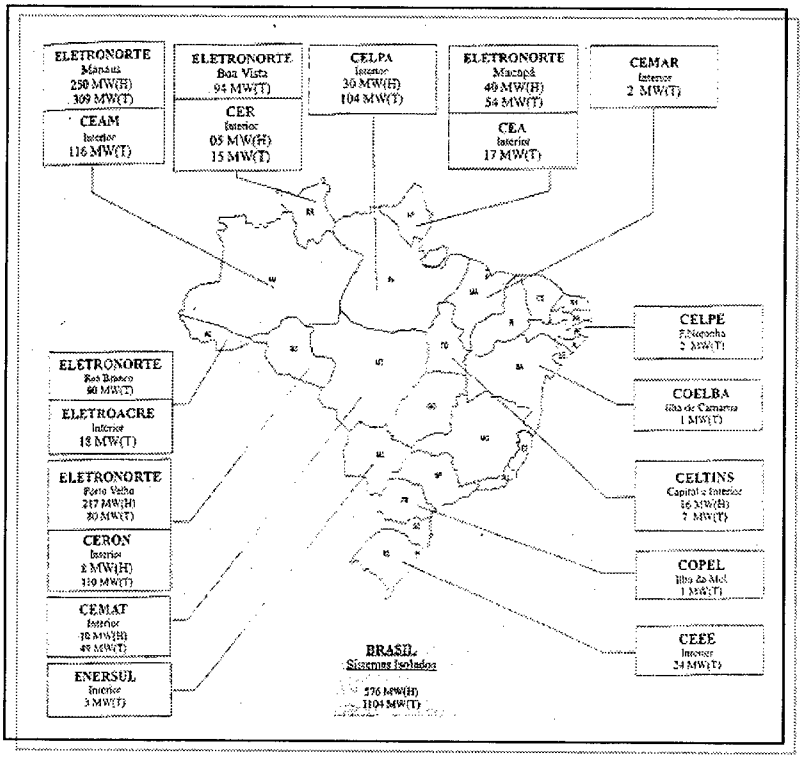
The concessionaires include:

ELETRONORTE (states in the North as well as the states of Tocantins, Maranhão and Mato Grosso); CHESF (states in the Northeast, with the exception of the state of Maranhão); FURNAS for the states in the Southeast and Federal District); ELETROSUL (states in the South as well as for the state of Mato Grosso do Sul). ELETROBRÁS also owns 50% of the ITAIPU bi-national company and has participation in State-owned energy companies.

Technical Description

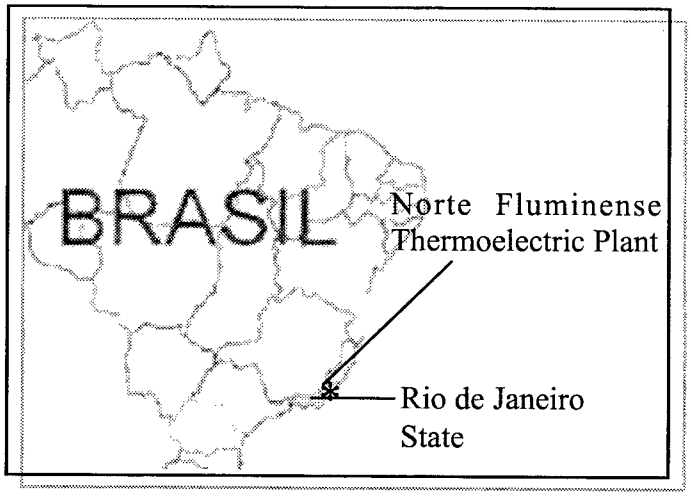
The project involves the construction of a 700 MW combined-cycle thermoelectric generation plant for a total investment of approximately US$ 350 million. The plant will be fueled with natural gas and located in northern Rio de Janeiro State. Eletrobrás intends to award the construction contract to a third party. The winner of the construction bid will determine the technical characteristics of the project.

Construction of the Norte Fluminense Thermoelectric Plant will be financed through a partnership between Eletrobrás and all the distribution utilities of Rio de Janeiro and Espirito Santo states which are: Light Servicos de Electricidade (LIGHT); Electricidade do Estado de Rio de Janiero (CERJ); Espirito Santo Centrais Electricas (ESCELSA); and Companhia Força e Luz Cataguazes (CFLCL).



Site

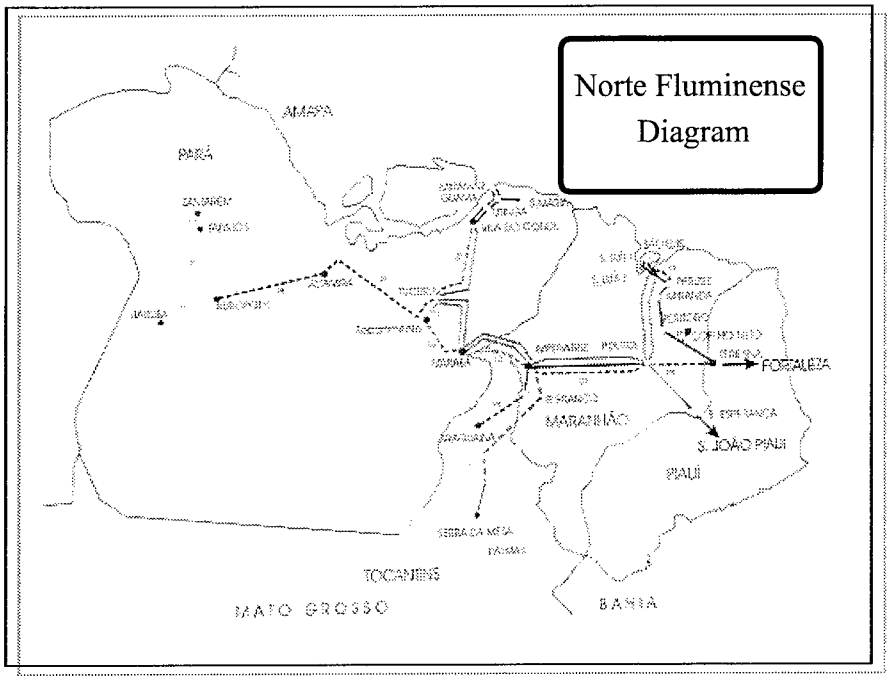
The plant will be located near the cities of Campos and Macaé, in northern Rio de Janeiro State.



Nature of Demand

Brazil's energy sector is undergoing important changes as the country attempts to meet new demand, which is anticipated to grow at an average of 5.2% per year. In addition, the sector is modernizing and increasing its network efficiencies. The Cardoso administration has created a new national agency to oversee the electric energy sector, ANEEL, which will be responsible for ensuring a favorable investment climate for concessionaires.

Brazil's current installed base is 57.6 Gw/h, which, under Eletrobrás, (the National Holding Utility), is expected to be expanded to 90.2 Gw/h by the year 2006. The share of hydroelectric generation will decline from its current 92% to 83%, with an increase in thermal generation. The Norte Fluminense Thermoelectric Plant will help to satisfy increasing demand on the Rio de Janeiro and Espirito Santo electric grids.



Projected Investment (in US$ billion)

(Eletrobras)	1997	1998	1999	2000	2001	Total
Generation	$3.3	$3.4	$3.9	$3.8	$4.5	$18.9
Transmission	$2.2	$3.1	$1.7	$1.6	$1.4	$10.0
Distribution	$1.4	$1.4	$1.4	$1.4	$1.4	$7.0
General Facilities	$0.5	$0.5	$0.6	$0.6	$0.6	$2.8
Total	**$7.4**	**$8.4**	**$7.6**	**$7.4**	**$7.9**	**$38.7**

Project Status

Although specific dates have not yet been defined, the bidding process for awarding a construction contract should open by the second quarter of 1998. Plant construction is expected to begin by year-end 1998, with a target for becoming operational by the third quarter of 1999.

Financing

The project will be financed through a partnership agreement between Eletrobrás and all the distribution utilities of Rio de Janeiro and Espirito Santo states (LIGHT, CERJ, ESCELSA and CFLCL). Eletrobrás will own 20% of the project, LIGHT, CERJ and ESCELSA will own 25% each and CFLCL will own 5%.

Equipment and Service Procurement

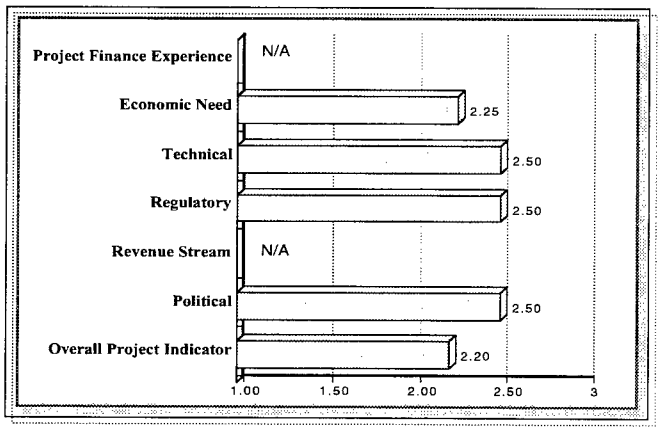
Equipment:

- Combustion turbines
- Vapor generators for heat recovery
- Vapor turbine
- Transformers
- Surface condensors and cooling towers
- Industrial water supplier and auxiliary water cooler
- Fire prevention and emergency power
- Natural and industrial gas systems
- Compressed air system
- Effluent collection system
- Electric substation
- Terminal equipment for generators
- Transmission lines
- Information and decentralized control

Services:

- Basic and design engineering
- Technical support
- Operational assistance

Critical Project Indicators



Key Decision Makers

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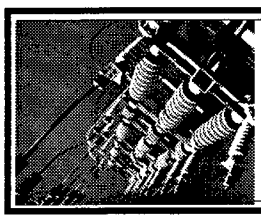
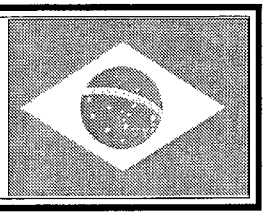


Energy / Brazil

North-South Interconnection



Project Summary

Project No:	**ENE-09**
Subsector:	**Transmission**
Location:	**Central Brazil**
Project Cost:	**US$ 907.1 million**
Export Potential:	**US$ 200 million**
Type:	**Procurement**
Sponsor:	**Electrobrás, Furnas, Electronorte**

ELETROBRÁS is a federally-owned holding company responsible for the execution of National energy policies over the entire Brazilian territory. The company operates through generating subsidiaries in which it retains majority control. These companies in turn supply concessionaires and certain industrial entities within the energy market.

Two of the five concessionaires are:

- ELETRONORTE for the states in the North as well as the states of Tocantins, Maranhão and Mato Grosso.
- FURNAS for the states in the Southeast and Federal District.

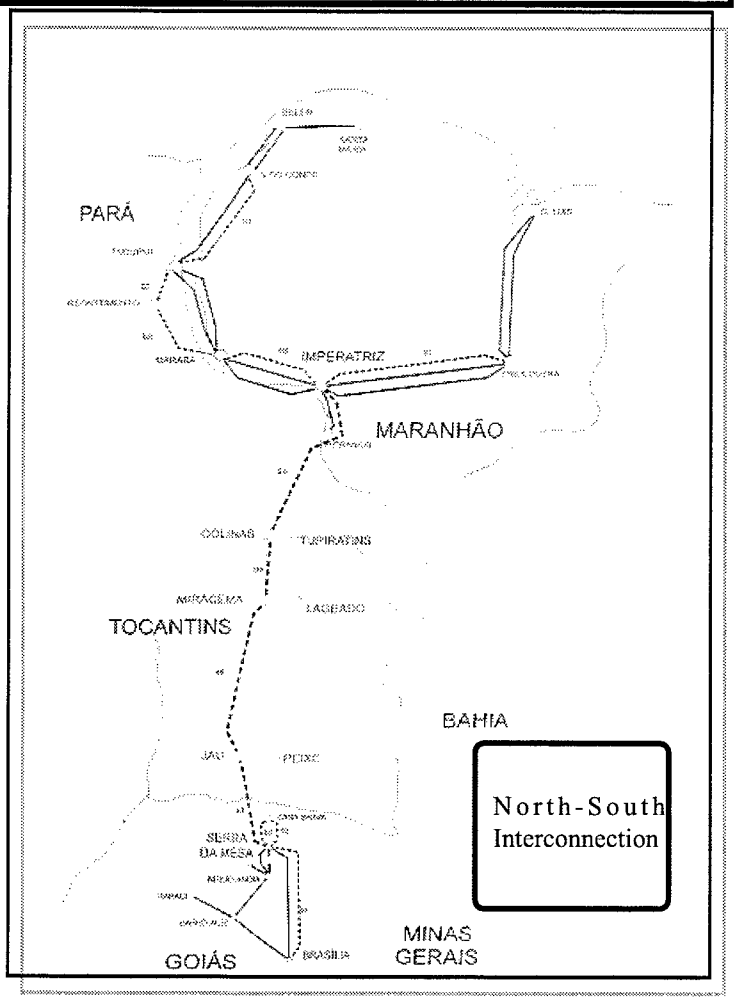
ELETROBRÁS coordinates and plans the expansion and operation of all electric systems and is responsible for channeling resources to its subsidiaries and concessionaires.

Technical Description

The project will connect 2 Brazilian energy grids through the substations of Imperatriz (in the State of Maranhão) and Samambaia (in the Federal District). It will involve the construction of 5 transmission lines (1,270 Km) for a total capacity of 1000 MW in the states of Maranhão, Tocantins, Goiás and the Federal District, as well as 3 new substations (Colinas, Miracema and Gurupi) in the State of Tocantins. The project will also entail the expansion of the Imperatriz and Presidente Dutra (both in Maranhão), Serra da Mesa (in Goiás) and Samambaia substations.

Site

The transmission lines will connect Substation Imperatriz in Maranhão State with substation Samambaia in Goiás State. The following map outlines the precise locations of the transmission lines and substations which the project will encompass.



Nature of Demand

The Brazilian electrical system is comprised of the North/Northeast and the South/Southeast Transmission Systems, which operate separately and generate approximately 95% of the country's electric energy consumption. Recent studies have demonstrated that the interconnection of these 2 systems will provide significant energy gains due to the existing hydrological diversity between them. Demand for the North-South Interconnection is driven primarily by the expansion of the electrical system and the construction of hydroelectric developments along the Tocantins River.

A substantial increase in energy demand throughout Brazil is accelerating the need for new power generation projects which will augment the country's electrical supply in the short-term. The chart on the right illustrates projected generation, transmission, distribution and general facility investments through the year 2001.

Projected Investment (in US$ billion)

(Eletrobras)	1997	1998	1999	2000	2001	Total
Generation	$3.3	$3.4	$3.9	$3.8	$4.5	$18.9
Transmission	$2.2	$3.1	$1.7	$1.6	$1.4	$10.0
Distribution	$1.4	$1.4	$1.4	$1.4	$1.4	$7.0
General Facilities	$0.5	$0.5	$0.6	$0.6	$0.6	$2.8
Total	**$7.4**	**$8.4**	**$7.6**	**$7.4**	**$7.9**	**$38.7**

The North-South Interconnection, which will have a 1000 MW capacity, will provide Brazil with an average of an additional 600 MW per year, at a cost of approximately US$ 15 for each additional MW/h generated. It has been included in *Brazil 2000* and is among the federal government's 14 priority projects.

Project Status

A bid for engineering studies and environmental impact analysis has been won by a Brazilian consortium consisting of the following companies: Promon, Themag, Engevix, and Iesa. Studies will be concluded by December 1997, and will determine the bidding dates. Currently, the bidding dates are set for the first quarter of 1998.

Financing

The project will require a total investment of approximately US$ 907 million, including indirect costs. Electrobrás intends to finance 30% of this amount, equalling approximately US$ 300 million. The remaining US$ 600 million will be financed through an Inter American Development Bank (IDB) credit and a US$ 300 million EXIMBANK loan. The IDB has pending financing of US$ 300 million for the project.

Equipment and Service Procurement

Equipment:

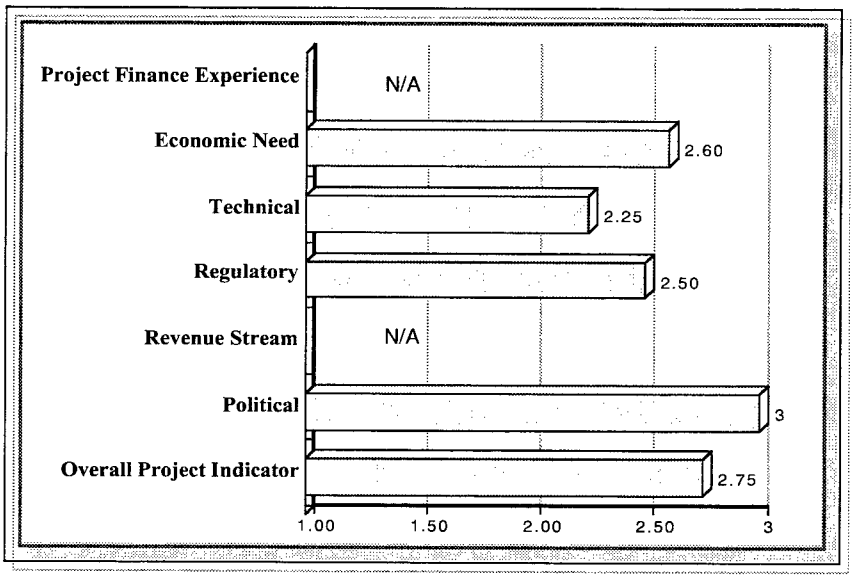
- 1.270 Km of 500 kV transmission lines
- 31,750 tons of towers
- 15,700 Km of conductor cables
- Protection command and control equipment
- 44 Single-phase, 55 MVAr reactors (2 controllable)
- 108 MVAr series capacitor banks (6 three-phased, fixed)
- 161 MVAr series capacitor banks
- breakers, switches and arresters
- 1 + 200/-200 MVAr Static Compensator
- OPGW cables

Services:

- Engineering and construction

Best equipment sales prospects for US firms: conductor cables, OPGW cables, series capacitors, protection command and control equipment, breakers, switches and arresters.

Critical Project Indicators



Key Decision Makers

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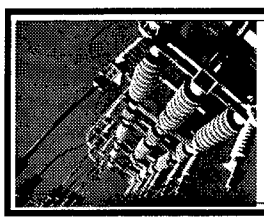


Energy / Brazil

Presidente Dutra - Fortaleza Transmission Line

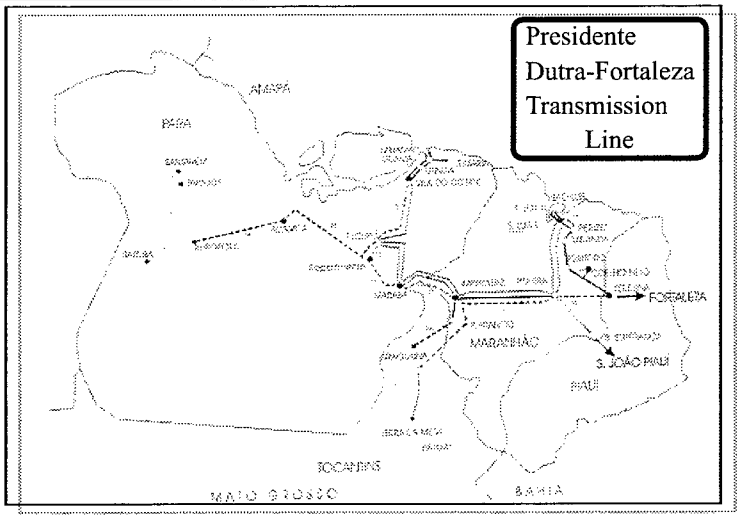
Project Summary

Project No:	**ENE-10**
Subsector:	**Transmission**
Location:	**Northeastern Brazil**
Project Cost:	**US$ 408 million**
Export Potential:	**US$ 150 million**
Type:	**Procurement**
Sponsor:	**Electrobrás, Chesf**

ELETROBRÁS is a federally-owned holding company responsible for the execution of National energy policies over the entire Brazilian territory. The company operates through generating subsidiaries in which it retains majority control. These companies in turn supply distributing concessionaires and certain industrial entities with energy. CHESF is the concessionaire responsible for the states in the Northeast, with the exception of the state of Maranhão.

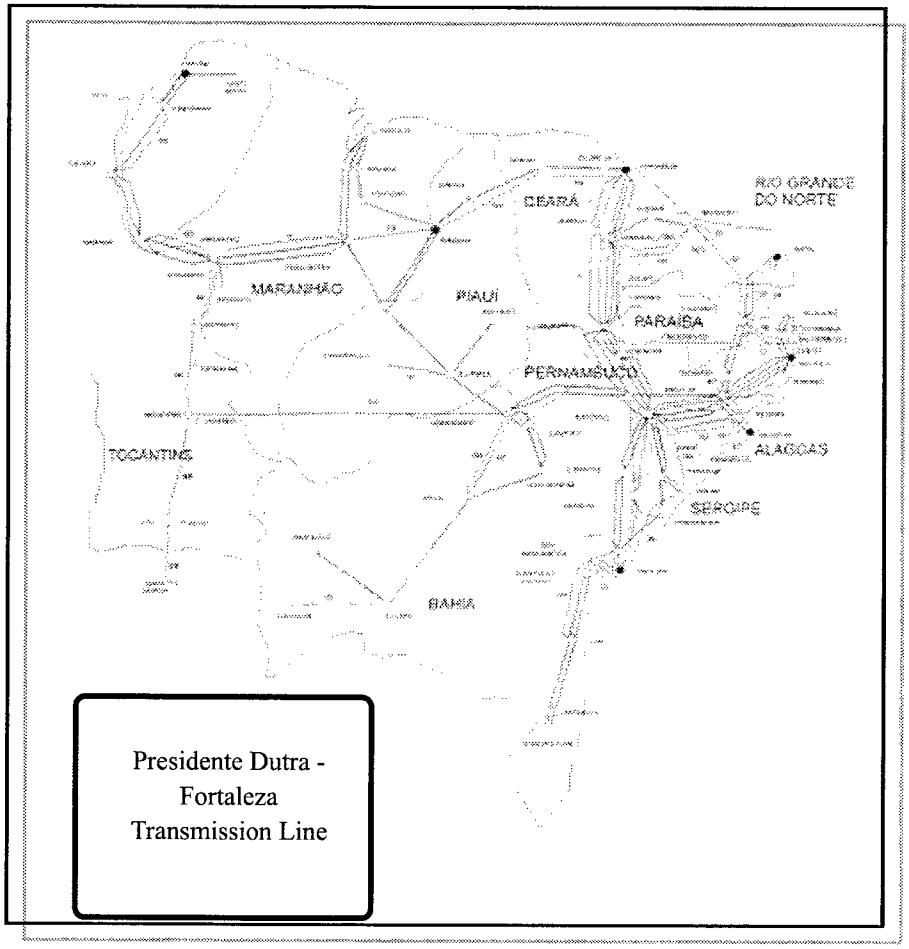
Technical Description

The project involves the construction of the 500 kV Presidente Dutra - Teresina - Sobral -Fortaleza transmission lines (741 Km), as well as the new 500 kV substations of Teresina, Sobral and Fortaleza.



Site

The transmission lines will be located in Northeastern Brazil, covering the states of Maranhão, Piauí and Ceará. The following map outlines the precise locations of the transmission lines and substations which the project will encompass.



Nature of Demand

The Brazilian electrical system is comprised of the North/Northeast and the South/Southeast Transmission Systems, which operate separately and account for approximately 95% of the country's electric energy consumption. Recent studies have demonstrated that the interconnection of these two systems will provide significant energy gains due to the existing hydrological diversity between them.

Demand for the Presidente Dutra - Fortaleza Transmission Line is driven primarily by the escalating load growth in the area served by Fortaleza, particularly to fulfill the requirements of the Pecém Industrial Port Complex. The line will convert the two 230 kV circuits joining Paulo Afonso-Milagres-Banabuiu-Fortaleza into a single 500 kV circuit.

Projected Investment (in US$ billion)

(Eletrobras)	1997	1998	1999	2000	2001	Total
Generation	$3.3	$3.4	$3.9	$3.8	$4.5	$18.9
Transmission	$2.2	$3.1	$1.7	$1.6	$1.4	$10.0
Distribution	$1.4	$1.4	$1.4	$1.4	$1.4	$7.0
General Facilities	$0.5	$0.5	$0.6	$0.6	$0.6	$2.8
Total	**$7.4**	**$8.4**	**$7.6**	**$7.4**	**$7.9**	**$38.7**

Project Status

The bidding process for selecting transmission line and substation construction contractors is currently underway, and is expected to close in October 1998. The entire line is expected to be operational by July 1999.

Financing

The project will require a total investment of approximately US$ 408 million. Eletrobrás intends to finance a portion of this amount. Additional financing sources are currently unidentified.

Equipment and Service Procurement

Equipment:

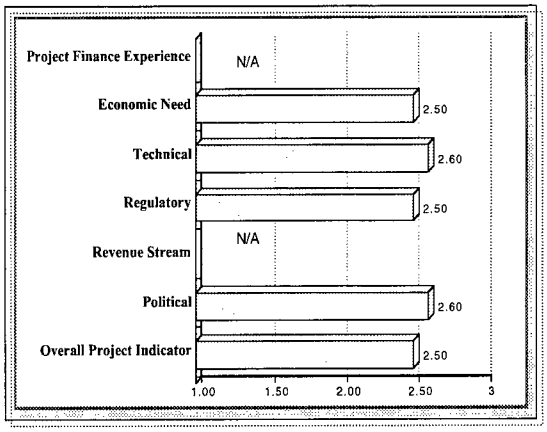
- 741 Km of 500 kV Transmission Line
- Substation Teresina II (500/250 kV - 2 x 300 MVA)
- Conductor Cables
- Protection Command & Control Equipment
- Substation Sobral II (with no transformer)
- Substation Fortaleza II (500/230 kV - 3 x 600 MVA)
- Substation Milagres (500/230 kV - 2 x 600 MVA)
- Breakers, Switches & Arresters
- Series Capacitors
- OPGW Cables

Services:

- Engineering and Construction

Best equipment sales prospects for US firms include: Conductor Cables, OPGW Cables, Series Capacitors, Protection Command and Control Equipment, Breakers, Switches and Arresters.

Critical Project Indicators



Key Decision Makers

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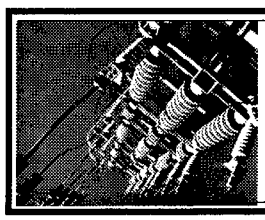
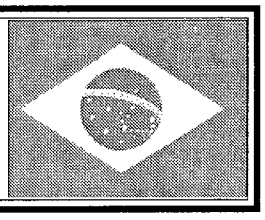


Energy / Brazil

Tucuruí Transmission Line



Project Summary

Project No:	**ENE-11**
Subsector:	**Transmission**
Location:	**State of Pará**
Project Cost:	**US$ 250 million**
Export Potential:	**US$ 70 million**
Type:	**Procurement**
Sponsor:	**Eletronorte**

Eletronorte was created in 1973, during the petroleum crisis in order to supply alternative fuel sources to the Northern states of Brazil. The need to develop the region was the impetus for the company's creation and expansion. Since its inception, Eletronorte has invested in tapping the region's particularly abundant hydroelectric potential and in transmission lines to supply the expanding urban areas and industrial parks developed in the North.

The largest wholly-owned Brazilian hydroelectric generation unit is the Tucuruí plant in the state of Pará, which has an installed base of 4,000 MW, making Tucuruí the fourth largest unit in the world. The energy generated by Tucuruí supplies much of the urban centers in the North of the country, and will soon supply the Northeast with the conclusion of the transmission line linking the regions' energy grids. Eletronorte is also responsible for supplying the less developed rural areas, which is the impetus for this project.

Technical Description

The project entails the construction of transmission lines between Tucuruí and Altamira and subsequently between Altamira and Rurópolis, linking the energy generated in Tucuruí to the Western rural section of the state of Pará.

The project also includes the construction of 3 substations (Altamira, Rurópolis and Tranzamazônica) and the expansion of the Tucuruí substation.

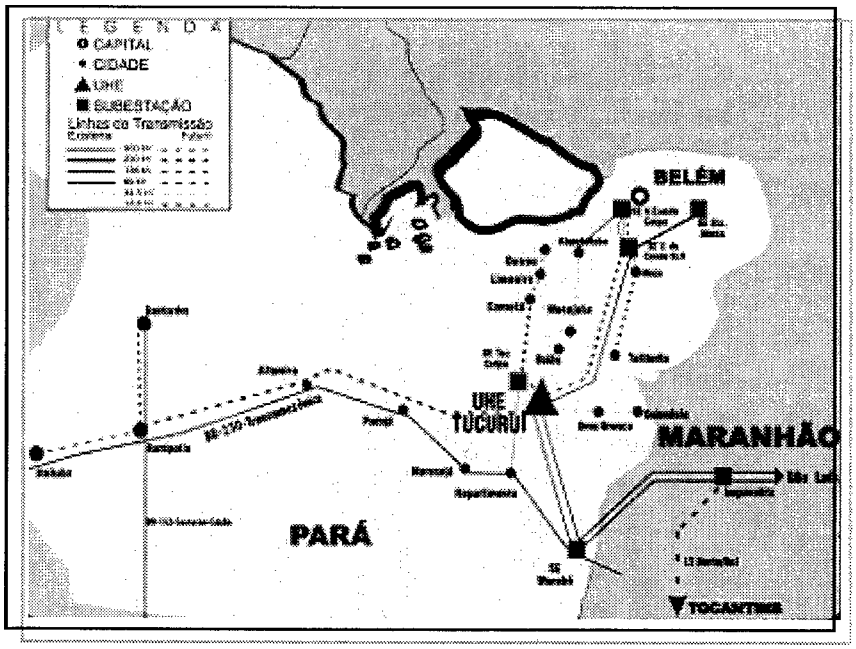
At a later phase, additional transmission lines will be constructed linking the Rurópolis to Santarém and to Ataituba. Specifically, 1,007 Km of transmission lines will be constructed as follows:

- 662 Km, 230 kV line linking Tucuruí to Altamira and subsequently Rurópolis
- 345 Km, 138 kV line linking Rurópolis to Santarém and to Ataituba

The line will create 500MW of energy for the region.

Site

The Tucuruí hydroelectric plant is located on the Tocantins river, 220 miles south of Belém, the state of Pará's capital. The plant supplies 96 % of the state's electric power. The project will link the generation capacity of Tucuruí to the west of the Pará state.



Nature of Demand

The project will supply the west of the state of Pará with low-cost energy, contributing to the region's development. There is much activity occurring in the North of Brazil, with companies migrating to the region to take advantage of cheaper labor and fiscal benefits. Increased migration is inducing the government to create the necessary infrastructure in order to attract and maintain companies and sustain agricultural as well as industrial growth.

Project Status

Construction is expected to commence during the first quarter of 1998, with completion slated for July 1999. The first phase of the project falls under the responsibility of Eletronorte, while the second phase, linking Rurópolis to Santarém and to Ataituba, falls under the responsibility of the State Energy Company of Pará, CELPA. ELECTROBRÁS has conducted the feasibility studies and will issue tenders during the first quarter of 1998.

Financing

The project has been included in the "Brazil in Action" Program, and will be financed with Federal Government funds. Political commitment to the project and to the development of the region will ensure that the project moves forward on schedule.

Equipment and Service Procurement

Equipment:

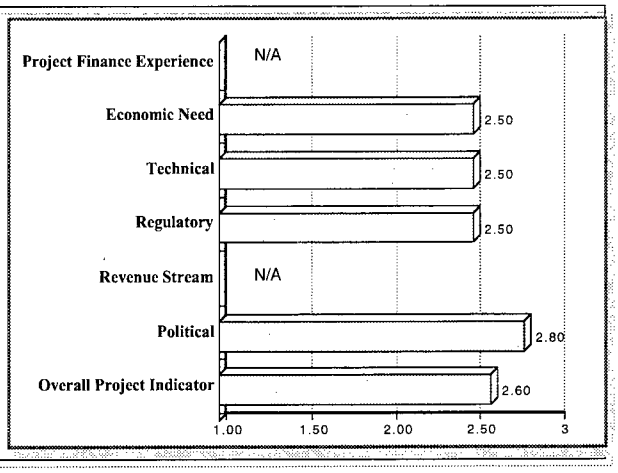
- 662 Km, 230 kV line linking Tucuruí to Altamira and subsequently Rurópolis
- 345 Km, 138 kV line linking Rurópolis to Santarém and to Ataituba
- Expansion of Tucuruí substation (500 kV – (3 + 1) x 150 MVA)
- Construction of Altamira substation (230 kV – 2 x 60 MVA)
- Construction of Rurópolis substation (230/ 138 kV – 2 x 100 MVA)
- Construction of Tranzamazônica substation (230 kV – 30 MVA)
- Conductor cables
- Protection command & control equipment
- Breakers, switches & arresters
- Series capacitors
- OPGW cables
- Telecommunications system

Best equipment sales prospects for US firms include: Conductor Cables, OPGW Cables, Series Capacitors, Protection Command and Control Equipment, Breakers, Switches and Arresters.

Services:

- Engineering and Construction
- Topographic Mapping Services

Critical Project Indicators



Key Decision Makers

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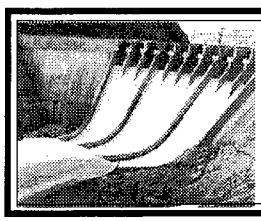


Energy / Chile

Hydroelectric Development of the Tinguiririca River

Project Summary

Project No:	**ENE-12**
Subsector:	**Hydroelectric Plant**
Location:	**San Fernando, Chile**
Project Cost:	**US$ 147 million**
Export Potential:	**US$ 103 million**
Type:	**Joint Venture**
Sponsor:	**Jorge Wachholtz Buchholtz**

Mr. Jorge Wacholtz Buchholtz holds the water rights to the Tinguiririca River. Under Chilean law, this also gives him the right to the surrounding land area needed to construct plant facilities.

Mr. Wacholtz has compiled the results of over a decade of prefeasibility studies carried out by various consulting firms contracted under Chile's National Energy Commission. He is seeking a company which will finance, construct and operate the Cuenca Hydroelectric Plant.

Technical Description

The project entails the construction of a hydroelectric plant in Tinguiririca River Basin. Preliminary designs indicate that the plant will have a 150 MW installed potential and will generate 960 Gw/h per year.

Although the company which constructs the plant will determine final designs and specific equipment needs, preliminary studies conducted by the British consulting firm *Knight Piésold* identify the following key parameters:

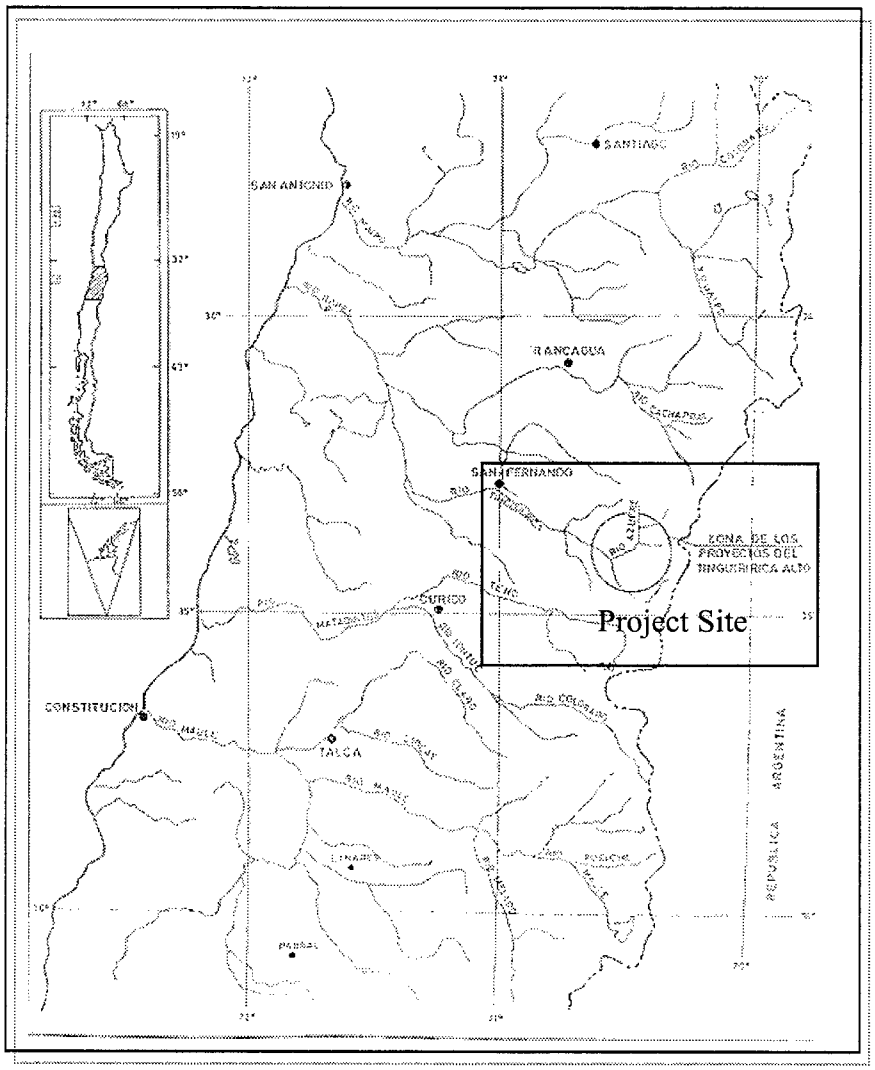
Water Flow	32.2 m3/s
Water Drop Height	563 m
Installed Power	150.155 KW
Plant Factor	0.73
Adduccion:	
a. El Azufre	
• Length:	14,300 m
• Water Flow:	14.1 m3/s
• Characteristics:	desilter, canals, tunnel
b. Tiguiririca	
• Length:	18,000 m
• Water Flow:	32.2 m3/s
• Characteristics:	desilter, tunnel
Pressure Pipe	2 steel pressure pipes (2.5 m diameter and 1000 m length)
Equipment	2 pelton turbines of 75,000 KW each
Transmission Lines	154 KV in double circuit (40 Km)

Site

The hydroelectric plant will be constructed approximately 36 Km east of the city of San Fernando, which is situated 125 Km south of Santiago. The total project occupies a 40 x 40 Km area in the upper riverbed of the Tinguiririca River.

The Tinguiririca draws water from a glacier on the Las Damas River, located near the Chilean-Argentine border. Water also flows into Tinguiririca from the Azufre River, which drains water from one of the most massive glaciers in the central zone of Chile.

The following chart illustrates the water resources and corresponding hydroelectric potential of this project:



Non-Consuming Water Rights Concessions

Riverbed	Intake Altitude	Outlet Altitude	Distance inbetween	Altitude Difference	Flow	Power
	MSMN	MSNM	M	M	M3/S	MW
1. Tinguiririca River	1030	663	18000	337	42.3	114
2. Tinguiririca River	1314	1030	8000	284	23.0	52
3. Tinguiririca River	1700	1314	11600	386	27.8	86
4. Azufre River	1314	1030	9000	284	22.0	50
5. Azufre River	1500	1314	6150	186	19.0	28
6. Estero San Andres	1500	1314	1850	186	3.0	4
7. Portillo River	1800	1500	3400	300	8.0	19
8. San Jose River	1800	1500	5200	300	7.8	19
9. Estero de los Humos	2100	1314	3850	786	2.2	14
10. Estero de la Pascua	2100	1314	4600	786	1.5	9

Source: Desarrollo Hidroelectrico de la Cuenca del Rio Tinguiririca

Project designs have been elaborated to take advantage of the hydroelectric potential of the entire Tinguiririca River Basin. Total nominal potential of the Basin exceeds 400 MW.

Nature of Demand

The Chilean energy sector is extremely dynamic, having experienced an annual increase of 7.9% over the past decade. Hydroelectric power serves as Chile's primary source of energy generation, representing over 70% of total installed potential. The demand driver for this project lies within the vast amount of investment which will be required to meet Chile's future energy demands, which are expected to achieve a 60% increase by the year 2003.

Project Status

As the graph on the right illustrates, a series of prefeasibility studies have already been completed.

By year-end 1997, Mr. Wachholtz intends to select a company which will finance and construct the hydroelectric plant. Definitive studies could begin as early as the first quarter of 1998. Once definitive studies are completed, construction will commence (year-end 1998).

Prefeasibility Studies Completed

Studies Realized	Year	Consulting Group	Lenght
Hydroelectric Development of the Tinguiririca River and Study of the Alternative Centrals of La Junta and El Azufre.	1985	Geoestudios Ltda	400 pages and 30 maps
Hydroelectric Opportunities in the Tinguiririca River	1993	Geotecnica Consultores	200 pages
Hydroelectric Projects in Upper Tinguiririca	1994	Megared Consultores	198 pages
Upper Tinguiririca Hydroelectric Project	1994	Knight Piesold	30 pages
Environmental Effect of the Tinguiririca Hydroelectric Central	1995	Gestion Ambiental Consultores	200 pages

Source: Desarrollo Hidroelectrico de la Cuenca del Rio Tinguiririca

Financing

This project will be 100 % financed by the private sector. Mr. Wachholtz is currently seeking investors to finance, construct and operate the facility.

Equipment & Service Procurement

Although final plant specifications will define equipment and services procurement, preliminary designs indicate the following:

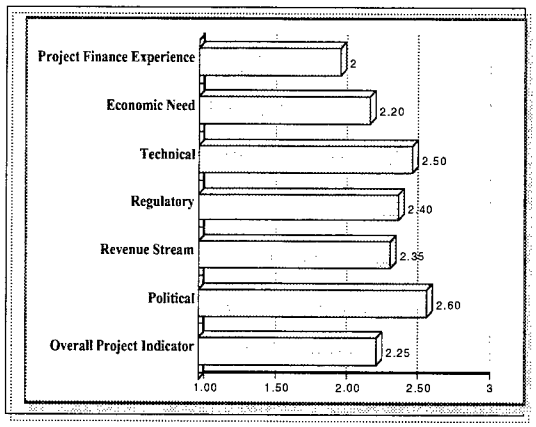
Equipment:

- 2 Pelton turbines with 75,000 Kw potential
- 40 Km Transmission Line (154 kV)
- Desilter
- 2 Pressure tubes
- Switchyard
- Tailrace
- Machine House

Services:

- Construction of 4 canals
- Construction/Design of 3 tunnels
- Specialized engineering

Critical Project Indicators



Comparative Advantages

1. Proximity to the highest demand centers and to Chile's interconnected central energy grid
2. Extensive historical data on the Tinguiririca River.
3. Absence of ecologic problems, environmental damage, and damage to third persons
4. Steep slope of the riverbed.
5. Access roads in good condition.
6. Large glacial coverage that guarantees water flow during dry years
7. Working conditions all year round

Source: Desarrollo Hidroelectrico de la Cuenca del Rio Tinguiririca

Key Decision Makers

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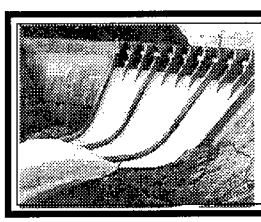


Energy / Ecuador

Rio Intag Hydroelectric Plant

Project Summary

Project No:	**ENE-13**
Subsector:	**Hydroelectric Power**
Location:	**Península de Sta Provincia de Imbabura, Ecuador**
Project Cost:	**US$ 371 million**
Export Potential:	**US$ 198 million**
Type:	**Procurement**
Sponsor:	**Emelinsa**

Emelinsa is a private corporation owned by a consortia of US and Ecuadorian interests that develops small hydroelectric projects in the Republic of Ecuador.

Under the country's electricity law, projects under 50MW may simply obtain a permit from CONELEC (Consejo Nacional de Electrificatión); the newly appointed body which will begin regulating and acting as the central planning unit for the Ecuadorian electricity sector in 1998.

Technical Description

Under studies conducted by *Noell Preussag*, the total installed capacity of the proposed hydroelectric plant will be 48 MW with an annual production of 295 Gw/h. Of the 295 Gw/h total, energy generation is 160 Gw/h, calculated at a 95% probability (numbers include 1 week maintenance time per year) while the remaining 135 Gw/h is considered secondary energy.

The net waterfall from which the project may take advantage is 177 m high with a volume of 32 m^3/sec.

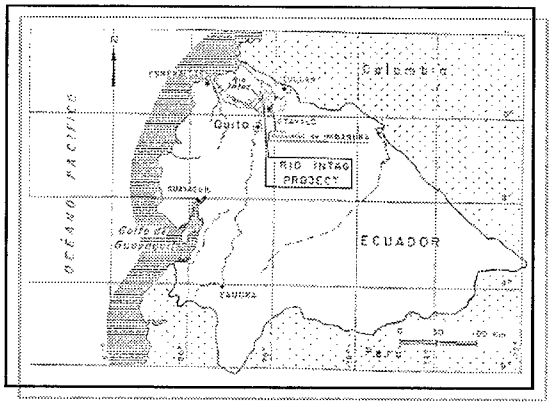
The geological and access conditions of the project are considered satisfactory for escavation and ground works. Favorable geometric studies have also identified the most favorable plant scheme,

facilities location and layout. Unsuitable for the entire project-scheme, implementation of a reservoir was eliminated and a run-of-river system which will include a mobile barrage was considered the most appropriate.

Additionally, a pressure tunnel is also being considered as a means of optimizing total river potential. Studies show that the tunnel is the most suitable in terms of costs, safety, operational conditions and construction schedules.

Site

The Intag Hydroelectric project is located in the province of Imbabura in the northern part of Ecuador, approximately 60 Km air distance north of Quito. The Intag River is a tributary of the Guayllabamba River, which flows north-west into the Pacific Ocean through Esmeraldas near the Colombian border.



The closest relevant town to the project is Otavalo, 100 Km north of Quito, with access to the Pan-American Highway. There are two paved roads that lead into the Intag Valley, but leave 80 Km of unpaved travel conditions from which to access the project.

Nature of Demand

Electricity shortages in Ecuador have been a rampant problem over the past few years; having cost businesses an estimated US$ 500 million from 1995-1996. The shortages were a result in part, to the lack of rainfall in the region around Paute; the country's primary hydroelectric plant.

With an average growth rate of 5% projected over the next 13 years, Ecuador is in great need of electricity supply. Current under-capacity levels have driven the country to enact new regulations and laws for the production, transmission and distribution of energy. Under INECEL's approved expansion plan, the country will aggressively implement various projects which will add 1,266 MW in hydroelectric generation utilizing both public and private funds.

The private sector will begin to play a larger role in energy. Projects smaller than 50MW will obtain permits from the new CONELEC; those of larger size will need to request permission to participate jointly with the government.

Project Status

Emelinsa has completed feasibility studies for the Rio Intag Hydroelectric Plant and is currently compiling a list of equipment and services to be procured.

Financing

The project is being fully financed by a consortium of Ecuadorian and US interests.

Intake Works	US$ 8 million
Headrace Tunnel	US$ 23 million
Surge Tank and Penstock	US$ 5 million
Powerhouse	US$ 22.6 million
Design, Construction, Supervision	US$ 4.4 million
Total Construction Costs	***US$ 61 million***

For project development, interests, and administrative costs during construction, as well as land rights, transmission line construction and capitalized costs, a total amount of US$ 19 million has been calculated.

Total project cost: US$ 80 million.

Equipment and Service Procurement

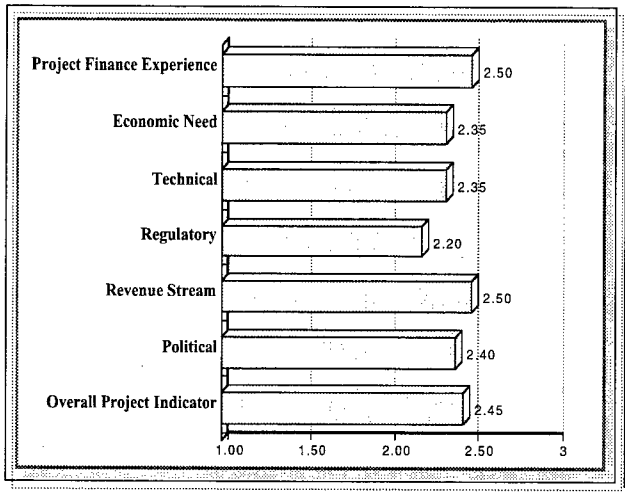
Equipment:

- Electromechanical and hydro-pneumatic equipment,
- Two Francis Turbines of 24 MW each
- Two Sincronic Generators of 30 Mva / 60 Hz
- Control Panels
- Transformers
- Circuit Breakers
- Equipment supports

Services:

- Mechanical, Electrical, Hydraulic, Geo-Technical, Geological, Structural engineering.

Critical Project Indicators



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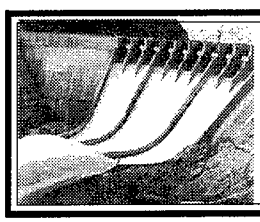


Energy / Ecuador

Presa Baba Hydroelectric Generation Phase

Project Summary

Project No:	**ENE-14**
Subsector:	**Hydroelectric Power**
Location:	**Provincia de Guayas, Ecuador**
Project Cost:	**US$ 54 million**
Export Potential:	**US$ 43 million**
Type:	**BOT Concession**
Sponsor:	**Cedegé**

Cedegé, the commission responsible for the development of the Guayas Basin, is tasked with developing the area through privatization and concession upheld by the Law of Modernization. The Presa Baba project initiative has been in existence since 1975, when numerous preliminary studies were conducted. TDA is currently funding an updated feasibility study. The electrical generation portion of the Presa Baba Dam, when completed, will add power generation capacity to existing flood control, irrigation, pollution abatement and water supply of Guayaquil.

Technical Description

The project will be operated in an integrated fashion with the Duale Peripa project. Together, the two projects will control up to 40% of the water flow in Guayaquil.

Electric Generation Portion

The electrical generation portion of the project will consist of semi-entrenched machines of 16 m in width and 45 m in length, with various levels of service. Turbines used will include two machines with an installed capacity of 45 Mw, Francis type. Turbines should have a rotative capacity of 225 rpm, resulting in a velocity of 364 n/s. A Francis motor of this type should have a rotor of approximately 2,700 mm in diameter.

Existing Dam Portion

The project will use an earth embankment dam encompassing tunnels for hydropower and controlled flow-through.

The Rio Baba Dam is designed to:

- Control destructive flooding
- Supply irrigation water
- Generate hydro power
- Control the saltwater portion in the estuary and aid in the Guayaquil water supply

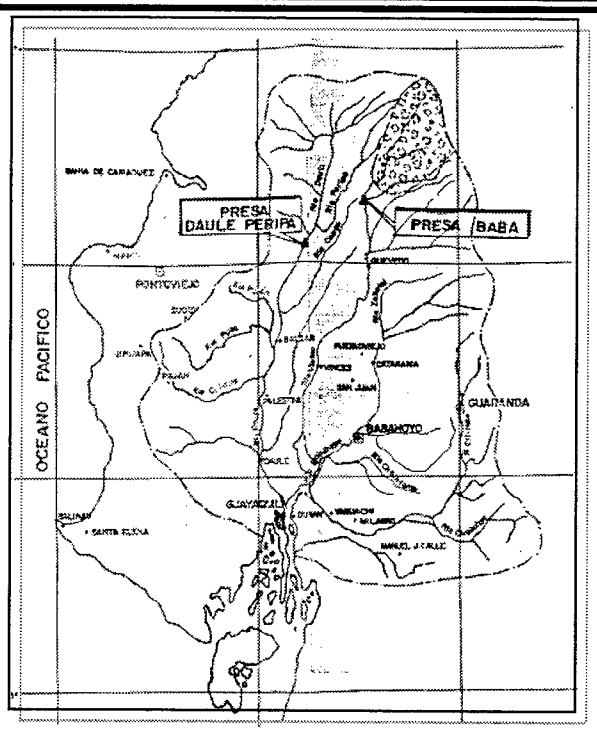
Structural specifics include:

• Elevation of the River Bed	100 meters
• Operation Level	147 meters
• Storage Area	75,000,000 m^3
• Basin Area	1,500,000,000 m^3
• Avg. Basin Yearly Rainfall	2.7 m
• Annual Avg. Flow	100 m^3/second
• Annual Flow Volume	3,000,000,000 m^3
• Storage Volume	1,400,000,000 m^3
• Storage Volume with Dikes	2,400,000,000 m^3
• Dam Fill Volume	8,000,000 m^3
• 100 Year Flood	1,300 m^3/ second
• Flow from Max. Probable Precipitation	6,450 m^3/second

Site

The project is located in the Guaya River basin between the low hills of the west and the Andes Mountains. The basin's mouth is formed at Guayaquil by the confluence of the Daule and Babahoyo Rivers. A flat and enclosed delta is formed 60 to 100 Km north of Guayaquil. The riverbed elevation at the existing Duale Peripa dam located 150 Km north of Guayaquil is 13 meters above sea level. Areas located south of Babahoyo are full of bayous.

The land to the west of the Guayan basin is arid and relies heavily on the water diverted from the Guayas basin.



Nature of Demand

The Presa Baba project is important to the Guayas Region mostly due to the agriculturally-dominated nature of Ecuador's economy and the importance placed on the export growth of its products. The area's population is large, totalling approximately 4 million inhabitants. While more than half of the population lives in Guayaquil, Ecuador's industrial export center, most are involved in the agricultural sector of the economy in the production of rice, corn, and bananas.

Presa Baba's electricity production will also add value to the region. Guayaquil, the country's fast growing city, is in need of an expansion of its electrical supply.

Growth Rates in Percentage

GNP Growth Rate	2.3 %	4.6 %
Agriculture	16.9 %	17.4 %
Petroleum and Mining	14.3 %	14.1 %
Industry	15.0 %	15.5 %
Electricity, Gas and Water	1.4 %	1.4 %
Construction	2.4 %	2.4 %
Commerce and Hotels	14.5 %	14.9 %
Transportation and Communications	8.8 %	9.1 %
Financial and Firm Services	7.5 %	7.6 %
Personal, Social and Community	12.9 %	13 %
Others	4.6 %	4.7 %
Inflation	22.8 %	25.6 %

Source: Ecuador, Country of Opportunities

Project Status

In 1993, US TDA partially funded a feasibility study on the dam, which was carried out by TAMS-GEA. Cedegé plans to conduct feasibility studies on the hydroelectric portion of the project, which should commence in the near term. The construction will be completed in approximately two years.

Financing

The costs of the hydroelectric segment are the following:

Central Hydroelectric Center	US$ 13,873,000.00
Electrical Equipment	US$ 23,145,000.00
Sub-Stations and Transmission lines	US$ 6,152,000.00
Sub-Total	US$ 43,170,000.00
Contingencies (15%)	US$ 6,475,500.00
Ing. y Admin. (10%)	US$ 4,964,550.00
Total	US$ 54,610,050.00

Cedegé is seeking a company to construct the plant under a BOT concession agreement. Specific arrangements and guidelines of the concession have yet to be determined.

Equipment and Service Procurement

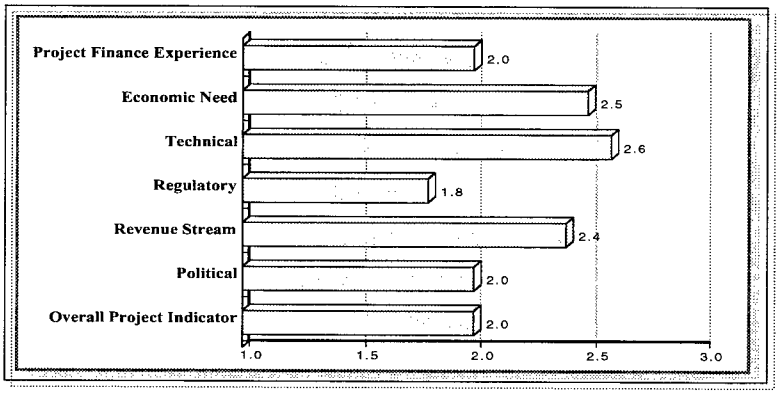
Equipment:

- Two Francis-Type Generators
- Sub-Stations
- Transmission Lines

Services:

- Structural Engineering
- Construction Engineering
- Environmental Impact Consultants
- Project Financing Specialists

Critical Project Indicators



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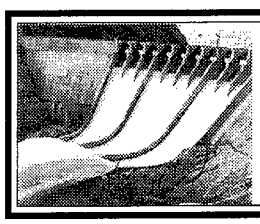


Energy / Ecuador

Toachi-Pilaton Hydroelectric Plant

Project Summary

Project No:	**ENE-15**
Subsector:	**Hydroelectric Power**
Location:	**Cuenca, Ecuador**
Project Cost:	**US$ 250 million**
Export Potential:	**US$ 125 million**
Type:	**Capitalization**
Sponsor:	**INECEL**

INECEL (Instituto Ecuatoriano de Electrificación) is Ecuador's Power Company with a mandate to provide the private sector with access to the country's power generation. The entity will be replaced at the end of October 1998 by two regulatory bodies: CONELEC (Consejo Nacional de Eletricidad) and COMOSEL (Consejo de Modernización del Sector Eléctrico). Currently, INECEL has been tasked with identifing possible power generation projects and contacting companies that may be interested in assisting in the projects. During the fourth quarter of 1998, CONELEC and COMOSEL will take over INECEL's task and will follow through with the privatization process. The objectives of proposed changes include greater transparency and a more streamlined process of encouraging public participation in Ecuador's Electricity Sector.

Technical Description

The plant will have an installed capacity of 190 MW generating a total of 1,074.5 Gw/h annually. Total construction time is estimated at 4 years, with start-up in 1998.

Principal Work:

Rio Toachi:

- Dike 43 m high, in the Palo Quemado site
- Water reception area with a capacity of 83 m^3
- Conduction Tunnel 8.7 m long and 5 m of diameter.
- Equilibrium Chimney, 7.7 m diameter
- Central Turbine House
- 2 Turbines, 70 MW each
- Discharge Canal, 80 m long

Rio Pilaton

- Dike of 21 m high, in the Palo Quemado site
- Water reception area with a capacity of 45 m^3
- Conduction Tunnel of 8.7 m long and 5 m of diameter.
- Equilibrium Chimney, 7.7 m in diameter
- Central Turbine House
- 2 x Turbines, 25 MW each
- Reception and Conduction Canal, from the central turbine house to receptacle and derivation point of Rio Toachi (total length 1.6 Km)

Site

The project is located in the province of Pichincha, utilizing the rivers of Toachi and Pilatón, which are located within the Cuenca region, near the Esmeraldas River.

Nature of Demand

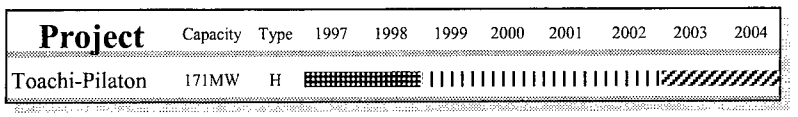
Electricity shortages in Ecuador have been a rampant problem over the past few years; having cost businesses an estimated US$ 500 million 1995-1996. The shortages were a result in part, of the lack of rainfall in the region around Paute; the country's primary hydroelectric plant.

With an average growth rate of 5% projected over the next 13 years, Ecuador is in great need of electricity supply. Current levels are under-capacity and have driven the country to enact new regulations and laws for the production, transmission and distribution of energy. Under INECEL's approved expansion plan, the country will aggressively implement various projects which will add 1,266 MW in hydroelectric generation utilizing both public and private funds.

The private sector will begin to pay a larger role in the Ecuadorian energy market. Private sector-sponsored projects smaller than 50MW will only need to obtain permits from CONELEC. Private sector projects larger than 50MW will need the permission of the government and must work in conjunction with the government.

Project Status

Definitive engineering studies required for concession, in addition to technical specifications and financial analysis have been completed. As soon as the electricity law is passed in the Ecuadorian Congress, INECEL will follow through with the concession process.



Bidding and Concession
Construction
Operation

Source: INECEL

Financing

Project financing will be provided by the concessionaire (private sector only).

Equipment and Service Procurement

Equipment:

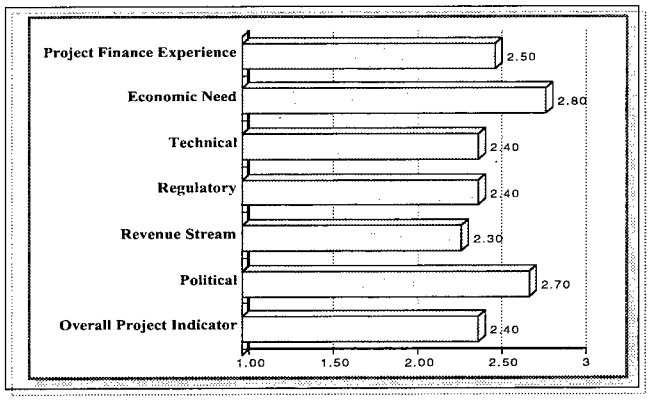
- Electromechanical and hydro-pneumatic equipment,
- Four turbines: 2 of 25 MW each and 2 of 70 MW each.
- Four generators
- Control panels
- Transformers
- Circuit breakers

Services:

- Mechanical, Electrical, Hydraulic, Geo-Technical, Geological, Structural engineering.

Procurement will be sourced externally. Notwithstanding, US firms will face competition from local professionals for services rendered.

Critical Project Indicators



Key Decision Makers

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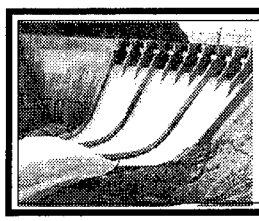


Energy / Ecuador

San Francisco Hydroelectric Project

Project Summary

Project No:	**ENE-16**
Subsector:	**Hydroelectric Power**
Location:	**Quito, Ecuador**
Project Cost:	**US $240 million**
Export Potential:	**US $151 million**
Type:	**Capitalization**
Sponsor:	**INECEL**

INECEL (Instituto Ecuatoriano de Electrificación) is Ecuador's Power Company under directive to provide the private sector with access to the country's power production.

Currently, INECEL has been tasked with locating potential power generation projects and identifying companies that may enter into their realization through either Concession or Capitalization. The entity will be replaced at the end of October 1998 by two regulatory bodies — CONELEC (Consejo Nacional de Eletricidad) and COMOSEL (Consejo de Modernización del Sector Eléctrico). These changes will facilitate a more transparent and streamlined process for enabling public participation in Ecuador's Electricity Sector.

Technical Description

This hydroelectric project utilizes waters of the Agoyán Plant that would pass through a 11.2 Km tunnel to two turbines generating 230MW. Total annual production is estimated at 1,564.2 Gw at a cost of US$16.7 per MW.

Principal Work:

- By-Pass of Agoyán Hydroelectric Plant - San Francisco
- Interconnection Chamber of Agoyán and the San Francisco Tunnel (width - 10 m, height - 20 m, and length - 60 m)

- Conduction tunnel (11.2 Km long and 7.5 m wide)
- Holding area, Rio Verde
- Equilibrium chimney
- High pressure tubing (270 m long and 5.7 m in diameter)
- Subterranean housing for machinery (76.2 m long, 19.2 m wide, and 45.5 m high)
- Inferior equilibrium chimney and redistribution section (Cavern of 7.5 m x 24 m x 21 m and restriction tunnel of 234 m in length and 6.4 m in diameter for discharging water to the Rio Pastaza.)

Site

The project is located in the eastern portion of the Ecuadorian Andes, in the middle basin of the Pastaza River which borders the Tungurhua and Pastaza provinces. The Pastaza River Basin is appropriate for the underground construction which this project requires.

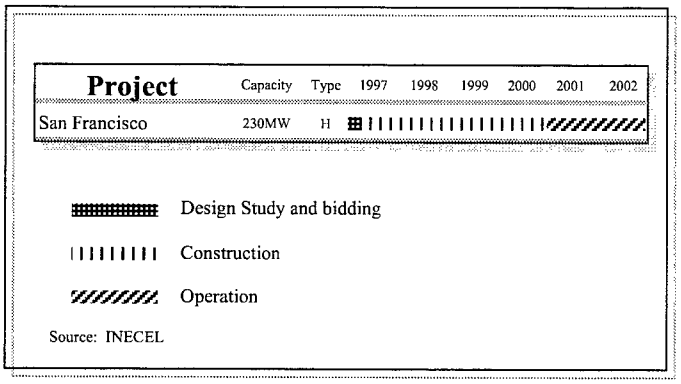
Nature of Demand

Ecuador's current electricity needs have become critical in the past few years — with electricity shortages costing businesses an estimated US$ 500 million in 1995. These shortages were due, in part, to a lack of rainfall in the region near the country's main hydroelectric plant. The Ecuadorian government plans to combat the country's recurring power supply shortages primarily through the construction of hydroelectric plants such as San Francisco.

Project Status

Although plant construction has not yet begun, engineering designs, technical specifications and procurement requirements have been confirmed for the definitive feasibility study.

With the induction of Conelec and Comosol, in addition to the Electricity Law under review, the capitalization process of San Francisco is expected to commence during the first quarter of 1998. Under the new law, projects that utilize existing electric infrastructure must be capitalized with the sale of 39% of current state ownership.



As San Francisco will utilize part of the Arayán Plant, the law may consider the project as a concession. Currently the general controller is studying the documents provided by INECEL to determine if, in fact, the project indeed calls for a capitalization or concession.

Financing

This project will be 100 % financed through the private sector. As of yet, the terms of the concession have not been identified. Contractual terms, once fully detailed, may consider risk of drought, length of the concession and continuous upgrading/reinvestment clauses.

Equipment and Service Procurement

Equipment:

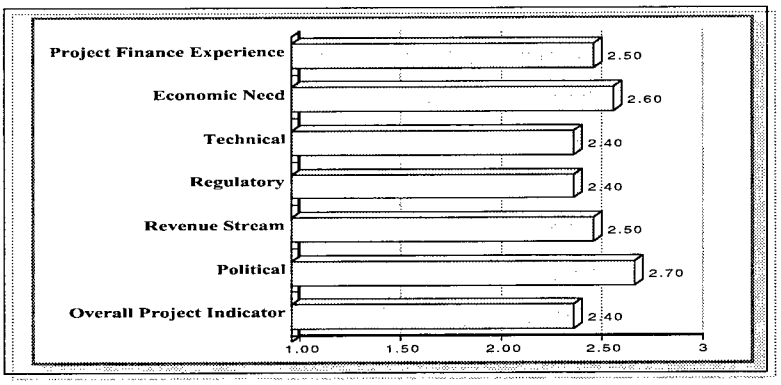
- Two Francis Turbines of 130 MW
- Control Panels
- Transformers
- Circuit Breakers

Services:

- Mechanical & Electrical Engineering
- Hydraulic Engineering
- Geo-Technical & Geological Engineering

Approximately, 85% of equipment needed for the project will be sourced externally. Services required by San Francisco may be provided by US firms, but they will face competition with local professionals.

Critical Project Indicators



Key Decision Makers

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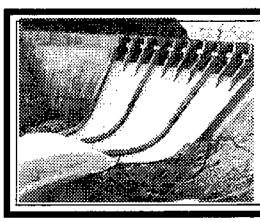


Energy / Ecuador

Mazar Hydroelectric Plant

Project Summary

Project No:	**ENE-17**
Subsector:	**Hydroelectric Power**
Location:	**Cuenca, Ecuador**
Project Cost:	**US$ 371 million**
Export Potential:	**US$ 198 million**
Type:	**Capitalization**
Sponsor:	**INECEL**

INECEL (Instituto Ecuatoriano de Electrificación) is Ecuador's Power Company with a mandate to provide the private sector with access to the country's power generation. The entity will be replaced at the end of October 1998 by two regulatory bodies: CONELEC (Consejo Nacional de Eletricidad) and COMOSEL (Consejo de Modernización del Sector Eléctrico). Currently, INECEL has been tasked with identifying possible power generation projects and following through with identifying companies that may enter into their realization During the fourth quarter of 1998, CONELEC and COMOSEL will take over INECEL's responsibilities and carry out the privatization process. The objectives of proposed changes include greater transparency and a more streamlined process of encouraging private sector participation in Ecuador's Electricity Sector.

Technical Description

Total installed potential will reach 180 MW with an annual production of 773 GW/h. Construction will include a subterranean central station with two Francis turbines of 90 MW each and a 100 MW generator.

Construction of the Mazar Hydroelectric Plant will include the erection of the Mazar Dam utilizing waters above the artificial lake Amaluza, approximately 300 m above the intersection of the Mazar and Paute rivers. The dam will ultimately hold 413 m^3 of water.

The Mazar dam has been designed to control sedimentation in Amaluza and to optimize current flows of the Paute River. Current water flows are 84 m^3 per second.

Site

The project is located at the crossing point of the Mazar and Paute rivers in the Cuenca region

Nature of Demand

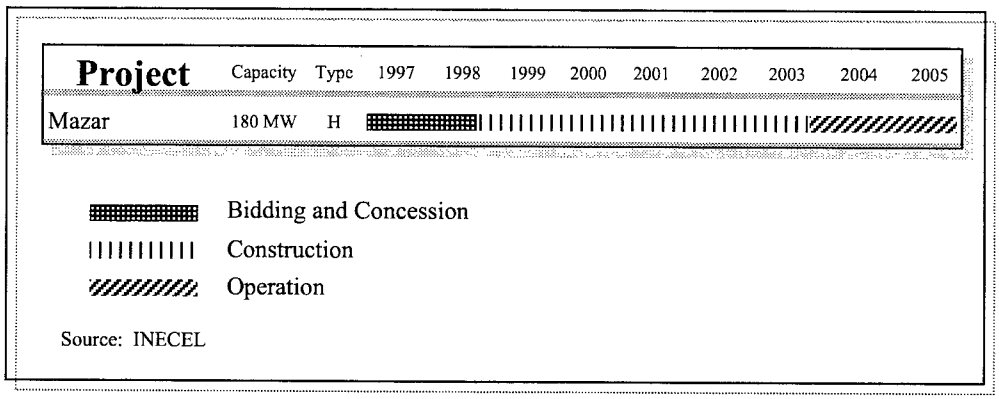
Electricity shortages in Ecuador have been rampant the past few year, costing businesses an estimated US$ 500 million in 1995-1996. The shortages were a result, in part, of the lack of rainfall in the region around Paute, the country's primary hydroelectric plant.

With an average growth rate of 5% projected over the next 13 years, Ecuador is in great need of electricity supply. Current under-capacity levels have driven the country to enact new regulations and laws for the production, transmission and distribution of energy. Under INECEL's approved expansion plan, the country will aggressively implement various projects which will add 1,266 MW in hydroelectric generation utilizing both public and private funds.

The private sector will begin to play a larger role in energy. Projects smaller than 50MW will only need to obtain permits from the new CONELEC; those of larger size will need to request permission to participate jointly with the government.

Project Status

The completion of all engineering studies has provided the project with a definitive building scheme. Following the approval of the *Electricity Law*, it is estimated that the project will commence in 1998.



Financing

Financing of the project would be provided by the concessionaire (private sector only).

Equipment and Service Procurement

Equipment:

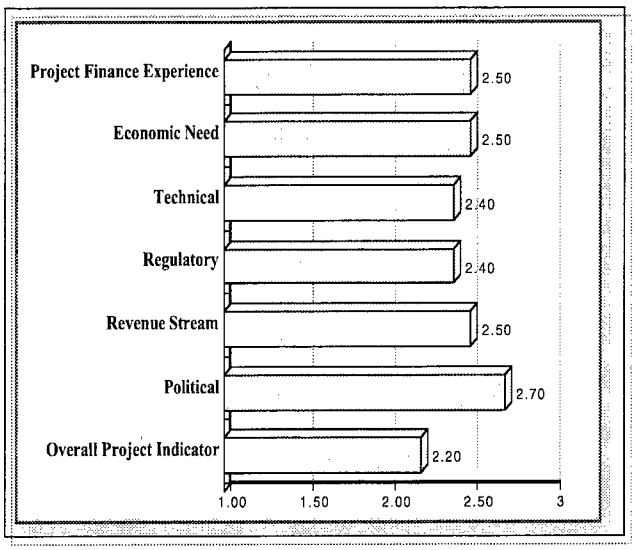
- Dam (171 m x 315 m), volume 4,500,000 m^3 and 36,000 m^3 flood gate capacity.
- Tunnel: diameter 6.1 m, length 459 m
- Equilibrium chimney, subterranean 12.5 m in diameter and 79.5 m high
- Vertical High Pressure Tubing, subterranean and partially armored , 50.3 m length & 5.7 m diameter.
- Central housing unit, 78 m long, 18.7 m wide, and 39m high.
- Electromechanical and hydro-pneumatic equipment.
- Two turbines, 90MW each.
- One generator.
- Control panels.
- Transformers.
- Circuit breakers.

Services:

- Mechanical, Electrical, Hydraulic, Geo-Technical, Geological, Structural engineering.
- Procurement

Most procurement will be externally sourced. Notwithstanding, US firms will face competition from local professionals or services available in Ecuador.

Critical Project Indicators



Key Decision Makers

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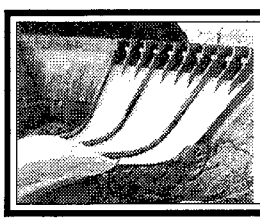


Energy / Ecuador

Pedro Carbo Dam and Irrigation System

Project Summary

Project No:	**ENE-18**
Subsector:	**Hydroelectric**
Location:	**Provincia de Guayas, Ecuador**
Project Cost:	**US$ 58.5 million**
Export Potential:	**US$ 15 million**
Type:	**BOT**
Sponsor:	**Cedegé**

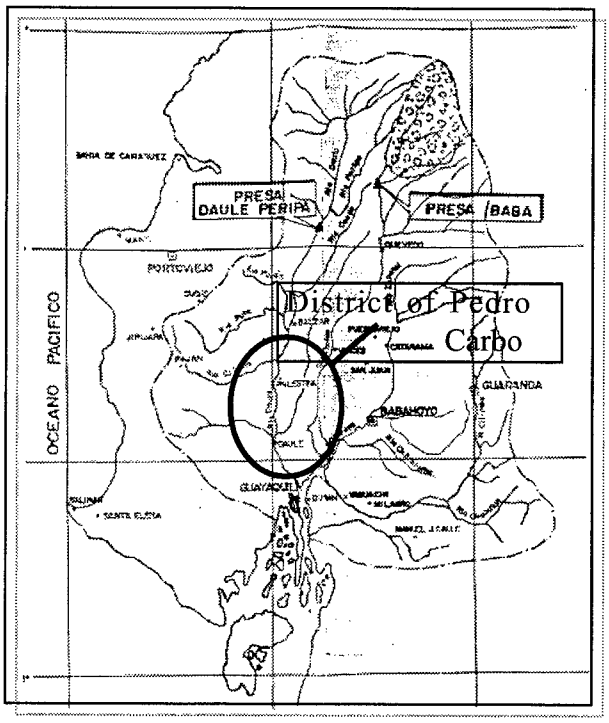
Cedejé is the commission responsible for the development of the Guayas Basin. The government body is the authority in developing the area through privatization and concession upheld by the Law of Modernization.

Technical Description

The project will irrigate 7,000 acres, requiring 65 x 10^6 m^3 of water annually. A total of 32% (2,150 acres) of the volume would originate from subterranean waters, while the remaining 68% would come through the Pedro Carbo dam located on the Pedro Carbo River. The river is approximately 15 Km from the city of Pedro Carbo in the Cuenca region. The dam will have the capacity to collect 85 x 10^6 m^3, with a brute inventory of 92 x 10^6 m^3, providing additional irrigative capacity of 3,700 acres.

Site

The project is located 40 Km from Guayaquil, in the district of Pedro Carbo and in the province of Guayas in the southwest portion of the river basin of Río Guayas.



Nature of Demand

Demand for the Pedro Carbo Dam is linked to the agriculturally dominated nature of Ecuador's economy. The Cuenca Region is strategically important for the country. With export growth in the area of flowers, asparagus, heart of palm, and other agricultural products, the region's temperate climate is fueling significant export initiatives. At current production levels, the region provides the country with much of its agricultural needs. The export potential is considered great. The temperate region produces crops that include blackberries, tree tomatoes, lemons, limes, and avocados, as well as cucumber, okra and melon in certain areas.

Growth Rates in Percentage

GNP Growth Rate	2.3 %	4.6 %
Agriculture	16.9 %	17.4 %
Petroleum and Mining	14.3 %	14.1 %
Industry	15.0 %	15.5 %
Electricity, Gas and Water	1.4 %	1.4 %
Construction	2.4 %	2.4 %
Commerce and Hotels	14.5 %	14.9 %
Transportation and Communications	8.8 %	9.1 %
Financial and Firm Services	7.5 %	7.6 %
Personal, Social and Community	12.9 %	13 %
Others	4.6 %	4.7 %
Inflation	22.8 %	25.6 %

Source: Ecuador, Country of Opportunities

Project Status

Prefeasibility studies have been done. Definitive studies have yet to be completed. According to preliminary estimates, the project will be finished in seven years. The current timeline considers definitive designs, financing, bidding, and the execution and development of the project.

Financing

The project will be financed through both the private and public sectors. CEDEGE will invest US$ 46,090 million (79% of total investment) while the private sector will be asked to contribute US$ 12,400 million (21% of total investment).

A BOT concession is being considered as the method for structuring project finance. Length of the BOT concession is yet to be decided and is expected to be between 15-25 years, depending on water tariff rates and development costs.

Total Investment Costs (million US$)

1. Irrigation System	
Subterranean Water System	8,488
Surface Water System	29,817
Pedro Carbo	14,235
2. Drainage System	462
3. Distribution Network	1,196
4. Administration and Financing	4,202
TOTAL	58,490

Equipment and Service Procurement

Equipment needs for the successful execution of the project include:

Dam Development:

- Earth-moving equipment
- Excavators
- Front loaders
- Tractors
- Motor trailers
- Dump trucks

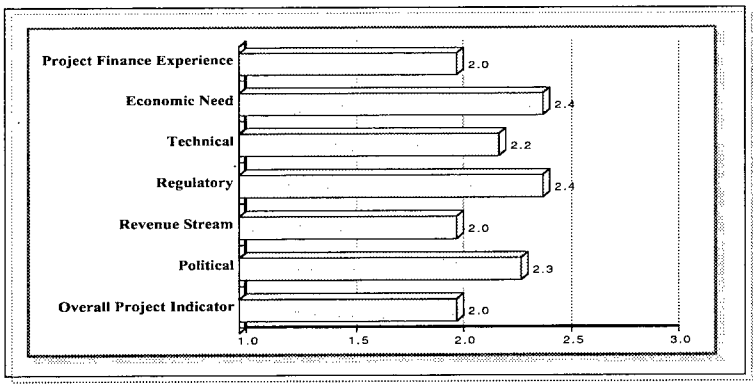
Irrigation System:

- Cropping machines
- Planting machines
- Fumigation equipment

Services:

- Structural engineering
- Construction engineering
- Dam engineering
- Irrigation and drainage engineering
- Agricultural specialists
- Environmental impact consultants
- Project financing specialists

Critical Project Indicators



Key Decision Makers

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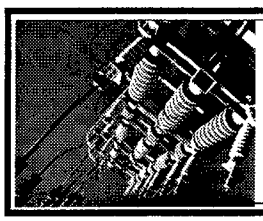


Energy / Ecuador

La Posta Thermoelectric Plant

Project Summary

Project No:	**ENE-19**
Subsector:	**Thermal Power**
Location:	**Provincia del Pastaza El Puyo, Ecuador**
Project Cost:	**US $25 million**
Export Potential:	**US $10 million**
Type:	**JV - Turnkey**
Sponsor:	**Electroambato**

Electroambato is a privately-held company run by Mr. J. Lorenzo Saa. The company was incorporated in October 1994, and is 100% privately owned by the Production Chamber of Commerce of the Province of Tungurahua and various private investors. Electroambato is dedicated in producing electricity to fill the country's much needed supply shortages.

Under the current law of electricity, projects of 50 MW or less may be fully developed, financed and run through the private sector without regulation or supervision by INECEL or other government entities.

Technical Description

The project is a 30MW Thermal Electric generation plant. The plant will contain 5 diesel standard generating sets of 5MW each.

The project will utilize heavy fuels as combustibles. Combustible fuels used for generating electricity will consist of Fuel Oil No. 6 - "Bunker C" purchased in the local marketplace or through state owned PetroComercial. Total consumption of fuel is estimated at approximately 11.5 Million US-gallons per year.

Transmission lines will be built to provide the principal client direct access to La Posta's electricity. The Transmission line will be 14 to 20 Km long with a distribution capacity of 69 kV.

Site

The project is located in El Puyo, in the Province of Pastaza. All land for the project is property of Electroambato.

Nature of Demand

The current needs of electricity for Ecuador have become critical in the past few years, costing businesses an estimated $500 million in US$ in 1995-1996. Rationing was due in part, to the lack of rainfall in the region around the countries main hydroelectric plant.

With an average growth rate of 5% projected over the next 13 years, the need for electricity for the country is great. With current levels at under-capacity, the country must invest in furthering electricity distribution in the urban and rural areas. Under INECEL's approved expansion plan, the country will aggressively implement various projects adding 1,266 MW in hydroelectric generation.

Although the government has failed in its attempt to find solutions to the power supply shortages, there are signs of reform and new project development.

Project Status

The project has undergone extensive studies conducted directly by Electroambato. Such studies have evaluated the demand structure of the region, in addition to analysis based on projected costs for fuel and labor. Project analysis has also included 35 persons and gasoline at $US2 per gallon.

In addition to construction, operations, and maintenance studies, Electroambato is currently negotiating a Power Purchase Agreement (PPA) from the Electrical Company of Quito and Electrical Company of Ambato which to date have provided commitment letters to purchase electricity.

Financing

Electroambato plans to finance 15% of the total investment internally, and is seeking private or multi-lateral financing to cover the remaining 85%.

Equipment and Service Procurement

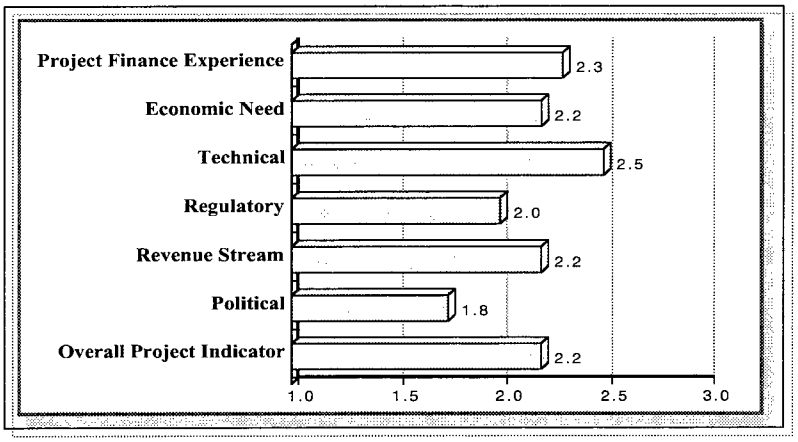
Equipment:

- Five diesel standard generating sets (5 MW each)
- Vapor generators for heat recovery
- Transformers
- Surface condensers and cooling towers
- Industrial water supplier and auxiliary water cooler
- Fire prevention and emergency power generation
- Transmission line (14-20 Km long, 69 kV capacity)
- Compressed air system
- Terminal equipment for generators

Services:

- Structural engineering
- Construction engineering
- Soil and water surveying
- Design Engineering

Critical Project Indicators



Key Decision Makers

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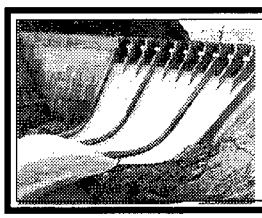


Energy / Peru

Privatization of Electroandes

Project Summary

Project No:	**ENE-20**
Subsector:	**Hydroelectric Generation**
Location:	**Peru**
Project Cost:	**US$ 240**
Export Potential:	**US$ 80**
Type:	**Privatization**
Sponsor:	**Electricidad de los Andes**

The Empresa de Electricidad de los Andes S.A (Electroandes) is a state-owned electrical utility which will be privatized by Empresa Mineral del Centro del Perú S.A. (Centromin). Past successful privatizations include the transfer of Antamina Copper, Quicay Gold, Casapalca Mine, and Oraja Smelting and Refining Complex.

The plan is part of a governmental directive to reduce its role in the electricity sector and improve operating efficiency and expansion through private investment. Under the Law of Concessions of 1992, the government has stipulated the separation of generation, distribution and transmission; the restructuring and functional separation of certain public utilities and the establishment of a wholesale electricity market. The initiative should greatly increase electricity supply and competition in a current market of 55% private power generation.

Technical Description

The privatization will include the transfer of Centromin's *Division of Electricity and Telecommunications (DET)*. DET's assets comprise four hydroelectric stations with a total installed capacity of 180 MW, impoundment reservoirs, transmission lines, substations, a control center and a telecommunication system. In addition, privatization will include water rights held by the corporation and temporary

concessions for two hydroelectric projects. They include the 80 MW El Caño Project and the 32 MW Uchuhuerta Project, both of which are currently undergoing preliminary studies.

Electroandes Assets:

The current power generating facilities of Electroandes have a rated capacity of 183 MW and an effective production of 169 MW with a firm capacity of 144 MW. According to historical data, the stations have produced an average of 1,019 Gw/h annually over the past 10 years.

Yaupi Station

The Yaupi Station is the largest amongst Electroandes' power producing inventory. Utilizing five 21.5 MW Pelton type units (totaling 108 MW), the plant provides most of the electricity for inhabitants of the region. The plant reached a maximum generation output of 795.7 Gw/h in 1993 with a minimum of 664.8 Gw/h in 1988 and has held an average production of 741.9 Gw/h for the past decade. An average rainfall of 1,064 mm per year has resulted in a drainage basin of 1,548.9 Km squared.

Located in the small town of Yaupi, in the district of Ulcumayo Province and the Department of Junín, the station is accessed through the central highway and an unpaved road joining Carhuamaho and Yaupi.

Malpaso Station

Malpaso is located in the District of Paccha and provides the Province of Yauli with a nameplate capacity of 54.4 MW and an effective capacity of 44 MW. The system is comprised of four 13.6 MW Francis type generators conduct an annual maximum generation of 277.5 Gw/h and an annual minimum of 92 Gw/h. The average production has come to 197.2.

The project contains an impoundment system with a full capacity of 441.17 million m^3, stored in lake Junín. An average rainfall of 837 mm per year have created a drainage basin of 5,144.1 Km squared. The privatization will provide the concessionaire with the right to use Lake Junín's water for further power projects.

Pachachuca Station

Equipped with four 3 MW Pelton type turbines, the Pachachuca station has produced a maximum of 61.8 Gw/h and a minimum of 13.6 Gw/h, comprising an average production of 36.7 Gw/h. Average generation for the ten year period has therefore been, 36.7 Gw/h.

The generation station is located in District of Pachacheca, Province of Yauli, in the Department of Yauli. The impoundment system has a capacity of 51.21 million m^3 with two reservoirs of 28.43 million m^3, and 11.08 million m^3. The drainage basin comprises an area of 237 Km consisting of an average rainfall of 773 per annum.

La Oroya Station

The smallest Electroandes production station, La Oroya is equipped with three 3 MW Pelton type turbines which have in the last 10 years produced an average of 42.8 Gw/h comprised of a maximum of 58.6 Gw/h and a minimum of 26.6 Gw/h.

The station is located in the District of La Oroya, Province of Yauli, Department of Juanín and operates in cascade with Pachachuca, sharing the same impoundment system. A plan to divert water from the Pomococha impoundment will effect the generation from 14.1 Gw/h to 28.7 Gw/h.

Transmission Lines

The transmission lines of Electroandes are of different makes and capacities. They are single or double, wooden or metal with copper or ACSR conductors. Operating at different rates, the conduction through the lines varies in voltage. For instance, the line between Yaupi to Carhuamayo was constructed for operation at 220 kV but is currently operating at 138 kV.

The system does currently utilize capacitor banks that are strategically located to maintain voltage levels. The lines also currently link Centrimin's current and privatized units by providing service to the departments of Lima, Junín and Pasco. The system provides open access to other generators and distributors who distribute energy for more than 30 townships and 15 free market customers.

Transmission Lines

Length	Voltage Level (KV)
55.0	220
128.1	138
101.8	69
466.5	5
Total 751.4	

Source: Electroandes

Power Substations

Power substations that receive energy from generating stations through the transmission lines provide distribution to industrial users. The system is comprised of 22 principal substations all containing electromechanical equipment, civil works, control room, access roads and perimeter fences. Loads are fed to customers through aerial lines and power cables.

Power Substations

Primary Voltage (KV)	Installed Capacity (MVA)	Number of Substations
220	100.0	1
138	245.0	3
69	22.8	2
50	186.0	16
Total	**553.8**	**22**

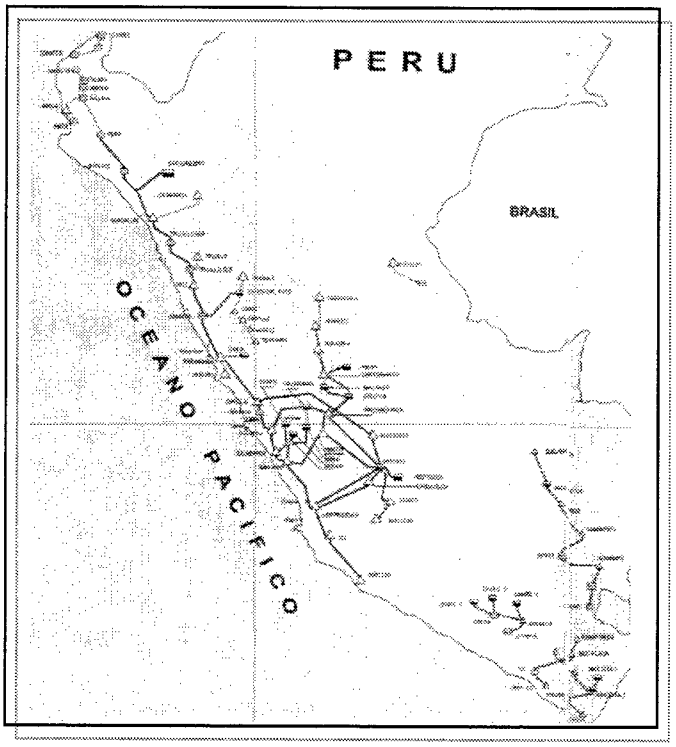
Source: Centromin

Development Projects

Elecroandes owns temporary concessions and water rights to develop the El Caño Project and has applied for similar concessions for the Uchuhuerta Project. Concessions last two years when feasibility studies for generating stations have already been conducted. They may be extended once for a similar period.

Site

Electroandes provides electricity for the entire country of Peru and does so through an extensive network of transmission lines, generating stations and power substations.



Nature of Demand

Peru's total electricity production rose by 3% in 1996 to 16,479 Gw/h. Currently 80% of the energy produced in the country is of private concession while 20% emanates from independent producers. The Peruvian energy market offers extremely attractive investment opportunities for US firms. Formerly state-owned Electrolima and Edegel sold through privatization have both doubled in price. In addition, Peru's low per capita consumption should translate into a highly lucrative rationale for investing in power generation; which is currently at 562 Kw/h annually per inhabitant.

Project Status

The privatization process will be administered by Credit Swiss First Boston and Macroinvest, acting as financial advisors to Electroandes. The investment opportunity and the foregoing sales process will be provided to bidders during the third quarter of 1997.

Financing

Financing for additional plant infrastructure will be undertaken by the company that wins the privatization bid.

Equipment and Service Procurement

Development Projects:

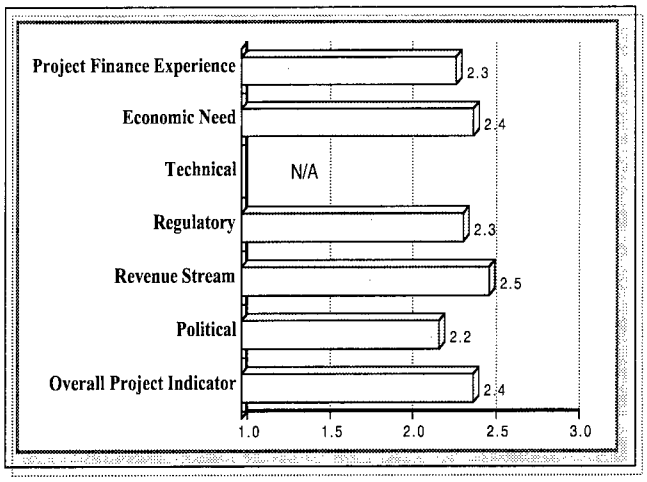
El Caño is an 80 MW project that diverts water from the Paucartambo River. It is located in close proximity to the Yaupi power house. The project calls for a 7.8 Km water tunnel leading to an underground penstock, providing for a drop of 264.5 m. Equipment would include 2 Pelton type turbines providing 655.5 Gw/h annually. The temporary concession was granted on September 25, 1995.

The Uchuhuerta project is a 32 MW facility located on the Huachón River before its confluence with the Paucartambo River, upstream from Yaupi. Recent studies call for a 7.3 Km tunnel of water leading into a penstock with an effective drop of 285 meters. The project is expected to produce 280.3 Gw/h per year through 2 Pelton type turbines.

Other Opportunities:

Privatization of Electronortemedio will commence in the near term. Electronortemedio is Peru's largest regional energy distribution company. Bids for the concession open July 98, closing December 98. In addition, bids for Electro San Martin will open on January 98, ending in May or June of the same year.

Critical Project Indicators



Key Decision Makers

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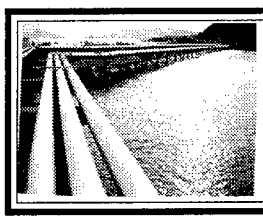


Energy / Peru

Camisea Natural Gas and Condensate

Project Summary

Project No:	**ENE-21**
Subsector:	**Natural Gas**
Location:	**Peru**
Project Cost:	**US $3 billion**
Export Potential:	**US $1 billion +**
Type:	**Procurement**
Sponsor:	**Bechtel / COSAPI / Odebrecht**

The scope of Camisea is to produce natural gas and condensate from the San Martín and Cashiriari reservoirs, transport the hydrocarbons by pipeline over the Andes to the coast, and deliver to market. On May 17, 1996, Shell Prospecting and Development Peru (SPDP) and its minority partner, Mobil Exploration and Producing Peru Inc., signed a license agreement with Peru-Petro to undertake appraisal drilling activities and to study options for the future development of the Camisea natural gas reserves. With a 57.5% interest, Shell Prospecting and Development is responsible for operating the venture.

In September 1997, SPDP decided to award the Bechtel/COSAPI/Odebrecht (BCO) Consortium the contract for the development of the infrastructure which will enable Camisea gas and liquids to be delivered to Lima and other markets.

Technical Description

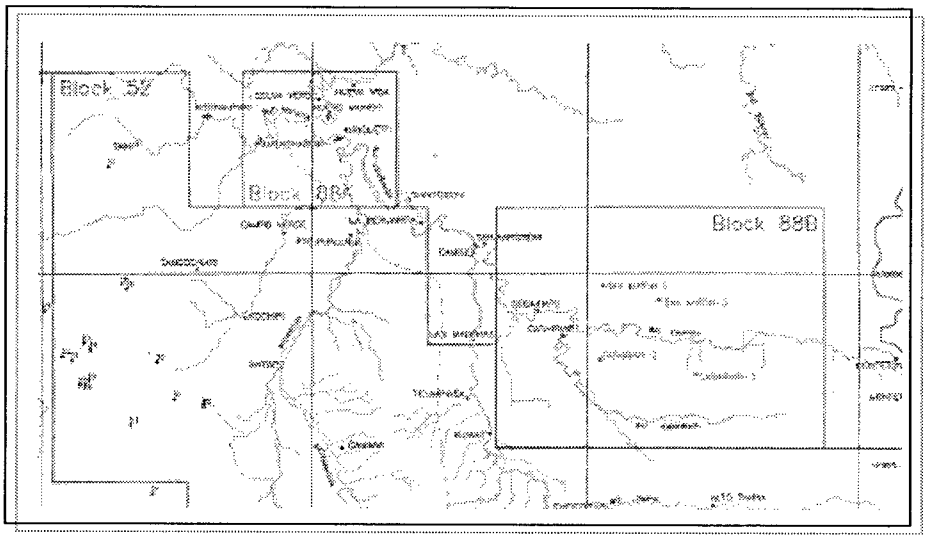
Phase 1: APPRAISAL ACTIVITY (US$ 200 million) --- MAY 1996-1998

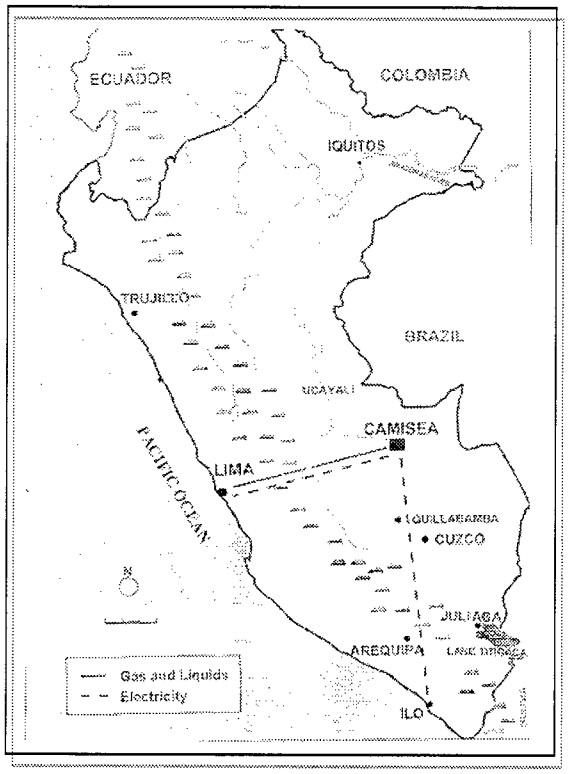
Appraisal Drilling

The license agreement applies to Block 88 B, which contains the San Martín and Cashiriari fields, and to Block 88A, which contains the Mipaya field. Under the terms of the agreement, an initial period of two years has been established for the appraisal drilling phase.

Shell expects to drill three appraisal wells in 1997 and possibly a fourth in 1998. The appraisal will be used to generate key information regarding the gas fields (e.g. quality and quantity of the hydrocarbons), as well as to supply the technical information which will assist in designing production facilities.

According to preliminary studies, Camisea gas reserves could total 2,200 million barrels of crude oil, almost seven times Peru's proven oil reserves and one of the largest gas deposits in Latin America. In addition, the Camisea gas deposits are of a retrograde condensation type, meaning that natural gas is present at the sub-surface while the surface contains liquid natural gas (liquefied petroleum gas).





Environmental Impact Assessments

Shell will carry out detailed independent Environmental Impact Assessments (EIAs) prior to each stage of the project. The first EIA was approved by Peruvian authorities following an open public hearing in Lima on August 15, 1996.

Phase 2: FULL FIELD DEVELOPMENT (US$ 2.5 billion)

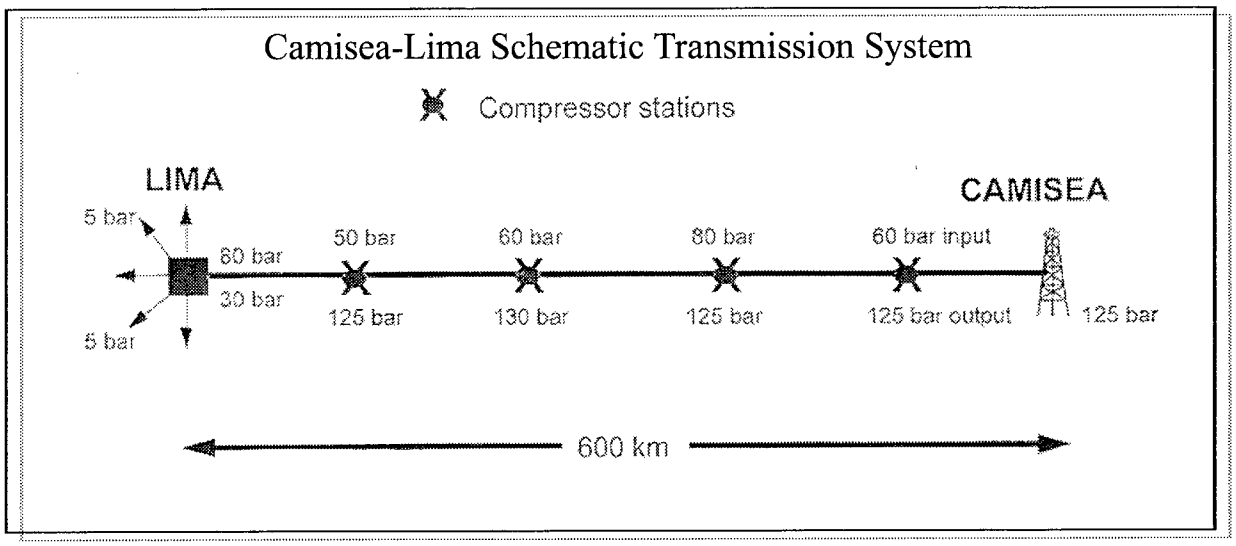
Phase two will involve the construction of fractionating and treatment facilities, as well as natural gas and natural gas liquids pipelines in the Camisea area. An accurate assessment of the characteristics and growth potential of the future market for Camisea gas will be crucial, as these factors, together with the confirmation of regulatory and fiscal issues, will determine the optimal design of pipelines and facilities.

Gas Processing

Gas processing facilities will be constructed in the Camisea area to separate the various hydrocarbons from each other and from any impurities which may exist, such as water and carbon dioxide. These facilities will be clustered together to minimize environmental impact. Some gas will be compressed and reinjected into the reservoirs.

Pipelines

Gas and condensates will be transported by two separate parallel pipelines — one for natural gas with a capacity of between 250 to 400 million cubic feet per day and the other for liquids (50% condensates and 50% liquid petroleum gas) with a capacity of 70,000 barrels per day. The pipelines will extend from the Camisea area through southern Lima. Although the route for the two pipelines is still undecided, a southerly arc is currently preferred.



The condensates will feed into a fractionation plant on the coast which separates the propane, butane and condensates. These products will be stored until they are locally dispatched and loaded into ships for transport to world markets.

> The Bechtel/ Cosapi / Odebrecht Consortium was chosen from a short list of six to construct a field-based gas plant, liquid and gas pipelines to Lima and liquid fractionation and export facilities. The consortia will be responsible for the detailed engineering, procurement, construction and commissioning of the Camisea development.

Power Plant

The License Agreement includes the option of early production of Camisea hydrocarbons by year-end 1999 to fuel a thermoelectric power plant. A 300 MW power plant is currently under consideration to supply power to southern Peru where there is strong growth in electricity demand, driven primarily by demand from energy intensive industries such as the mining sector.

Joint technical studies and environmental impact assessments will be consulted to determine the precise location of the power plant, as well as the routing of a gas pipeline and transmission lines.

> Shell and Mobil have chosen International Generating Company Inc. (InterGen) to join them in developing a thermoelectric power plant fueled with Camisea gas. The equity participants in the venture will include InterGen, Shell International Gas and Mobil Power. The participants have formed a company called EnerPeru to carry out the venture.

Phase 3: DISTRIBUTION

Distribution to Lima-based Consumers

During phase three, Camisea gas will be distributed from the pipelines to Lima-based end users, including industrial consumers, power plants, and residential consumers.

> **Distribution Opportunity**
>
> Shell intends to award a contract to a delivery line constructing company to supply Camisea gas from the pipelines to local customers in and around Lima.

Site

Camisea is located approximately 500 kilometers east of Lima. It lies in the Lower Urubamba Valley, which is situated on the eastern side of the Andes in the Inca Region. The bulk of the natural gas reserves are located in two major fields known as San Martín and Cashiriari, which lie on opposite banks of the Camisea River. A smaller accumulation lies to the northwest of the Camisea River, in a field known as Mipaya.

Nature of Demand

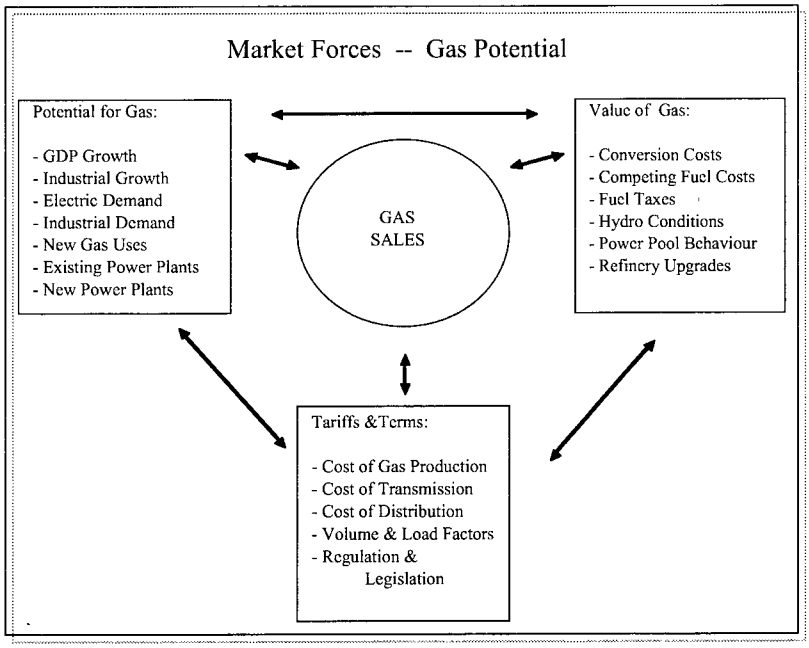
Shell first discovered the Camisea hydrocarbon reserves in the mid-1980s. The reserves, which contain approximately 11 trillion cubic feet of natural gas and 600 million barrels of natural gas liquids, are of great importance to the Peruvian population. These reserves alone are sufficient to fulfill Lima's electricity demand for well over 100 years.

This project has substantial backing within the Peruvian government. In fact, President Fujimori and Minister of the Presidency Daniel Hokama traveled by helicopter to the Cashiriari well site during a highly publicized visit with senior Shell management.

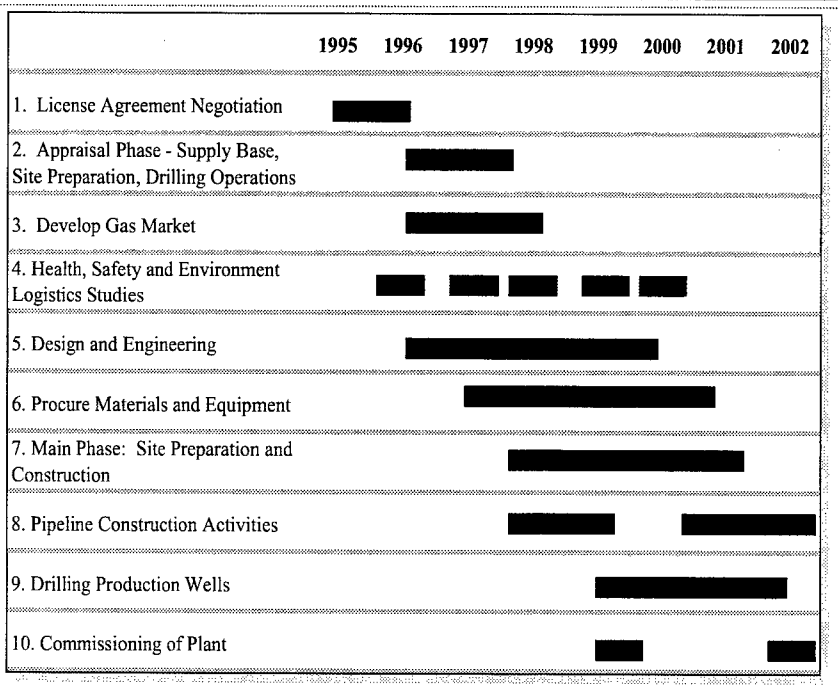
> The Camisea project has the potential of producing US$ 6 billion in tax revenue for the Peruvian government, adding 4-5% to Peru's GDP, employing over 3,000 Peruvian workers and transforming Peru from a net importer into a net exporter of energy. Camisea gas deposits could convert the deficit in Peru's hydrocarbon trade balance into a surplus due to reduced imports of petroleum liquid gas, diesel and gasoline and the export of surplus production.

Potential Markets for Camisea Gas:

- **Energy Market**
  ⇒ Power Plants
  ⇒ Residential Consumers
- **Industrial Market**
  ⇒ Industrial Consumers
- **Condensates**
- **New Business**
  ⇒ Additives (Gas + Iron Carbide)
  ⇒ Ethane extraction (petrochemicals, fertilizers)

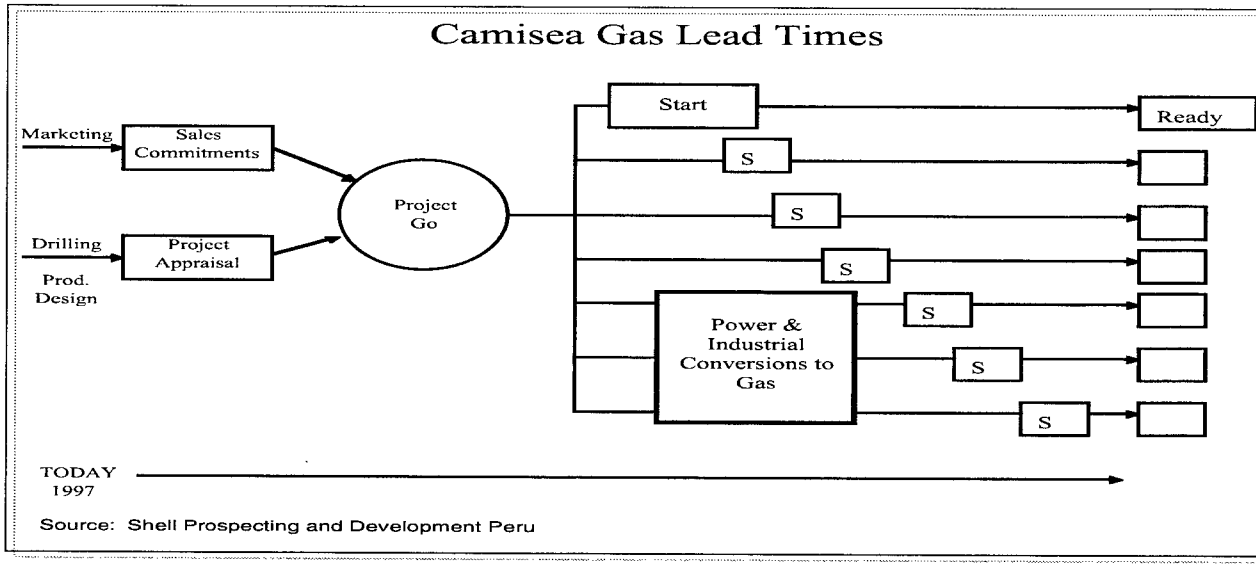


Project Status



Source: Shell Prospecting and Development Peru

The Camisea project is currently in its first phase, which involves appraisal drilling and environmental impact assessments. The BCO Consortium will develop engineering design studies for the gas plant, pipelines to the coast, and coastal processing and export facilities. SPDP will complete appraisal drilling activity and market studies by May 1998. A final investment decision will be made in light of further progress with the development of the domestic gas market, appraisal activity in the Camisea area and information about consumption taxes.



Source: Shell Prospecting and Development Peru

Financing

Shell Prospecting and Development (Peru) B.V. and its minority partner, Mobil Exploration and Producing Peru Inc. are financing this project.

Equipment and Service Procurement

Equipment and services procurement for the Camisea project will total over US$ 1 billion. The project will require compressor stations.

Equipment:

- Coated and sleeve pipe, materials for joints
- Motorized and manual valves
- Field instruments and terminals
- Tubing and connectors for instruments
- Electric drainage equipment
- Power plant and facilities
- Fractionation plant and facilities
- Scrubbers, air pollution equipment

Services:

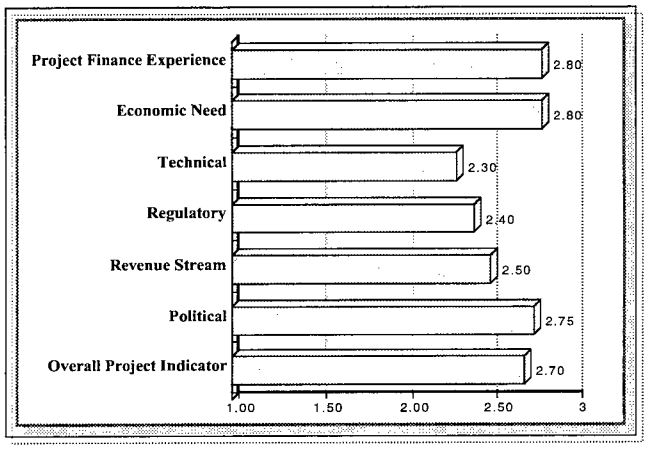
- Specialized engineering, installation
- Design of plant facilities

Equipment Sales Opportunity: ***Transmission Line Mantaro - Socabaya***

Mantaro - Socabaya is a 700 Km transmission line which will extend from the Mantaro Grande Hydroelectric Plant (near Ayacucho) to Socabaya Station (near Arequipa). The Peruvian government is concessioning line construction, which should begin in 1998, to a private contractor.

The transmission line is of key strategic interest to the Peruvian government because it will connect Peru's SICN and SISUR electric grids in Southern Peru. Although several routes are under consideration, the Camisea power plant will utilize the Montaro - Socabaya transmission line to connect to the SICN and SISUR grids.

Critical Project Indicators



Key Decision Makers

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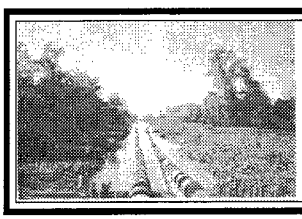


Energy / Regional

Brazil - Bolivia Natural Gas Pipeline

Project Summary

Project No:	**ENE-22**
Subsector:	**Gas Pipeline**
Location:	**Brazil - Bolivia**
Project Cost:	**US$ 2.16 billion**
Export Potential:	**US$ 650 million**
Type:	**Procurement**
Sponsor:	**Petrobrás**

The Federal government of Brazil, through its state run oil company, Petrobrás has attempted for decades to increase the participation of natural gas in the country's energy matrix. (Petrobrás is the world's 15th largest oil and natural gas company.) Idealized in 1938, the project has finally begun, with gas purchase and sales agreements signed between both governments and concessions awarded for piping supply and construction. The Federal government wants to see that the project is concluded on time and on budget, and has included it within its "Brazil in Action" Program which highlights the top 42 infrastructure projects in the country.

Technical Description

The project entails the construction of 3,150 Km gas pipe line, 557 of which is in Bolivia, and 2,593 in Brazilian territory. The project also includes complementary components such as compressor stations and control and monitoring houses.

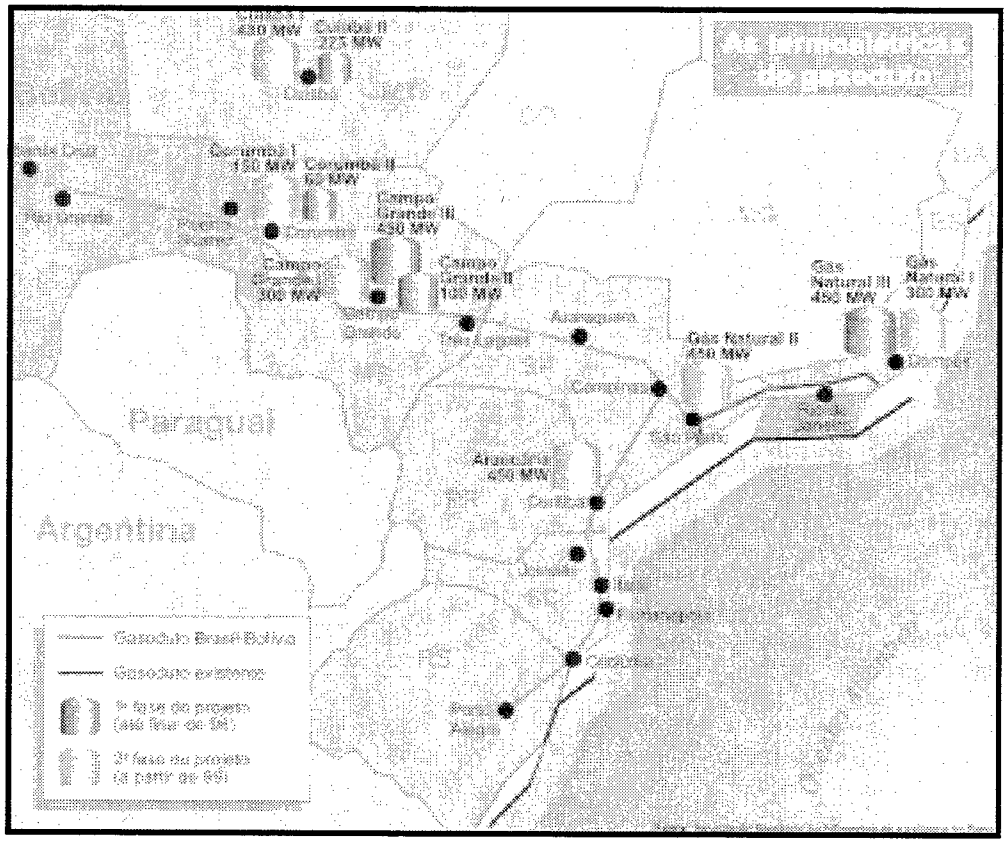
Upon startup, the line will transport 8 million cubic meters of gas per day, and is expected to double by the eighth year of operation. The segment between Rio Grande, Bolivia and Campinas, Brazil however has a diameter of 32 inches, anticipating future demand of 30 million cubic meters per day.

Segment	Diameter (Inches)	Length (Km)
Santa Cruz- Corumbá	32	557
Corumbá- Campinas	32	1,258
Campinas- Guararema	24	155
Campinas- Curitiba	24	469
Curituiba- Florianopólis	20	281
Florianópolis Criciuma	18	178
Criciuma- Canoas	16	252

In order to transport the gas at design pressure, sixteen compression stations will be built along the pipeline; four in Bolivia (Izozog, Chiquitos, Roboré, and Yacuses) and twelve in Brazil (Albuquerque, Guaiacurus, Anastácio, Campo Grande, Mimoso, Rio Verde, Mirandópolis, Penápolis, Ibitinga, São Carlos, Aruacária, and Biguaçu).

Four stations will be set up to measure the Bolivian gas supplied to Brazil: two in Bolivia (Rio Grande and Mutum) and two in Brazil (Corumbá and Paulina). Thirty city gates will also be installed in the states of Mato Grosso do Sul, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul to ensure appropriate measuring of gas delivered to state utilities.

All pipeline operations will be centered in two control houses, one in Santa Cruz de la Sierra, Bolivia, and another in Rio de Janeiro, Brazil. Satellite based monitoring and communication will complement the structures of the two control houses. The pipeline is being built by a consortium headed by Petrobrás (51%), with partners BTB Consortium (British Gas, Tenneco, and Australia's BHP Petroleum - 25%), Bolivia's state oil company YPFB (in conjunction with U.S. partner Enron and Royal Dutch Shell - 20%), and private Brazilian groups (4%).



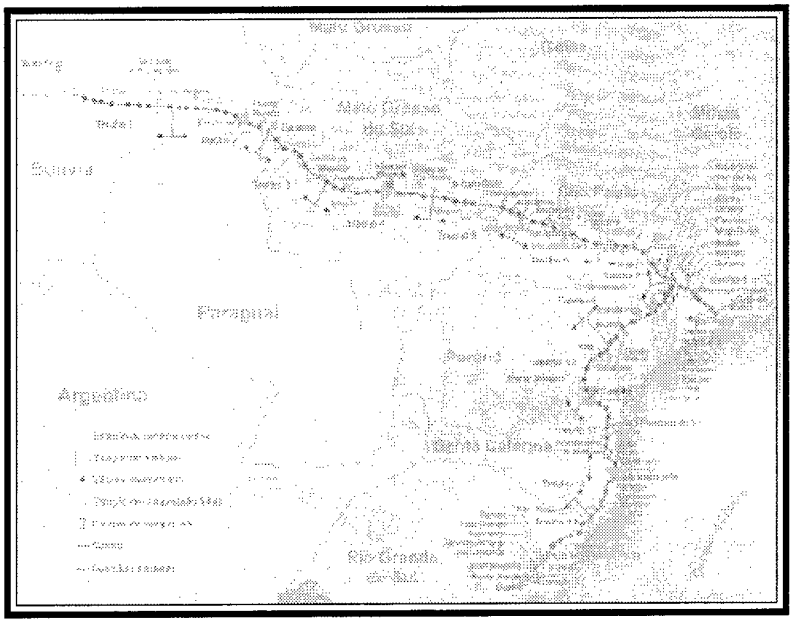
The Brazil- Bolivia Natural Gas Pipeline project will further result in major opportunities in thermal generation, with a projected investment amount on the order of US $12.5 billion over the next five years alone.

Furthermore, state natural gas utilities will also amplify their distribution networks in order to supply the states with natural gas derived from the pipe

line. São Paulo's state utility, Comgas, alone, is projecting an investment of approximately US$ 350 million to construct 1,500 Km of piping within the state.

Site

Complete technical, environmental and economic studies have concluded that the pipeline will run from Rio Grande through Porto Suarez in Bolivia, and then enter Brazil at Corumbá (Mato Grosso do Sul) continuing on to Três Lagoas (Mato Grosso do Sul), Campinas (São Paulo), Curitiba (Paraná), and Florianópolis (Santa Catarina), to end in Canoas (Rio Grande do Sul).



Nature of Demand

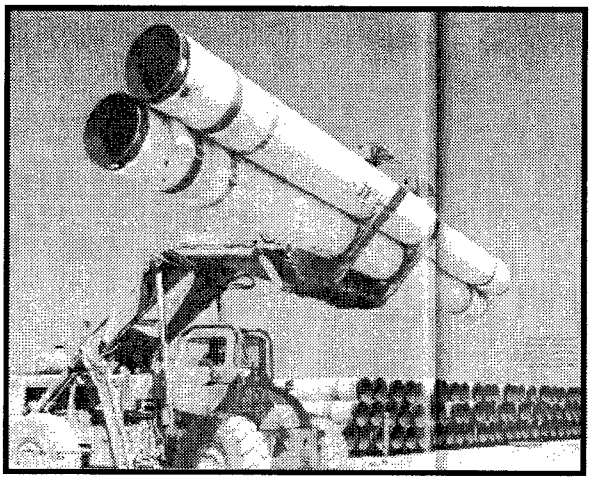
The Brazilian demand for energy has increased much faster than anticipated with the success of the Real Plan, spurred both by household demand as well as by increased industrial activity. Brazil's current installed base is 57.6 Gw, which, under Eletrobrás' direction, (the National Holding Utility) is planned to be expanded to 90.2 Gw by the year 2006. The share of hydroelectric generation will decline form its current 92 percent to 83 percent, with an increase in thermal generation.

According to some estimates, Brazil will need 30,000 megawatts of new generating capacity over the next 10 years, and the country is investing heavily in order to meet this demand.

Natural gas currently accounts for only about 3 percent of Brazil's total primary energy consumption. Petrobrás expects natural gas to account for 10 percent of Brazil's total energy consumption by 2010. Much of the additional supply is expected to be used for electric power generation.

The interior of São Paulo, specifically the Northeast of the state will likely be the area most benefited by the project.

Project Status



On September 4, 1996, President Cardoso and his Bolivian counterpart, President Sanchez de Lozada, signed the final accords. Concessions have been awarded for piping supply and construction.

A contract was signed in March 1997 with the Brazilian tubing company Confab and the Japanese trading company Marubeni for the supply of piping and construction has begun. The construction consortium which has been involved in the first phases of the project is Brazilian construction firm Camargo Correa together with US Brown & Root Murphy.

It is anticipated that the state of São Paulo will receive its first supply of gas in December 1998.

Financing

The project has strong political support at the federal and state government levels. Financing sources for the project are specified below:

Project Financing

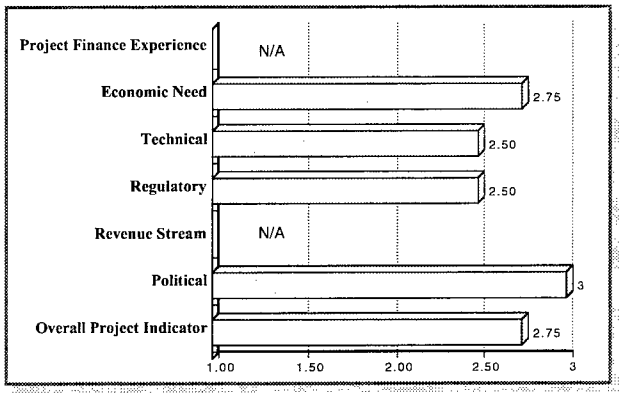
SOURCE	US$ (in millions)
BRAZIL PORTION	
Inter-American Development Bank/World Bank/Corporacion Andina de Fomento	690
Export Credit Agencies	160
Banco Nacional de Desenvolvimento Economico e Social/FINAME	259
Banco Nacional de Desenvolvimento Economico e Social /TCO	302
Equity Capital	310
TOTAL	1721
BOLIVIA PORTION	
International Finance Corporation	730
Export Credit Agencies	150
Banco Nacional de Desenvolvimento Economico e Social/TCO	81
Equity Capital	80
TOTAL	441
COMBINED TOTAL	$2162.00

Equipment and Service Procurement

Equipment and services procurement for piping and construction has been completed. Major opportunities are still available for the compression stations, and for monitoring and control houses.

Substantial equipment and services demand will also stem from derivative projects such as thermal generation plants and transmission networks which will be constructed as the natural gas reaches Southeastern and Eastern Brazil.

Critical Project Indicators



Key Decision Makers

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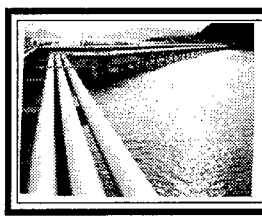


Energy / Regional

NorGas Pipeline

Project Summary

Project No:	**ENE-23**
Subsector:	**Natural Gas**
Location:	**Northwest Argentina - Tocopilla, Chile**
Project Cost:	**US$ 400 million**
Export Potential:	**US$ 23 million**
Type:	**Joint Venture**
Sponsor:	**Southern Energy, Inc.**

The NorGas Pipeline is a 100% private project developed by three partners: Techint Compañía Técnica Internacional SACI (Techint), Electroandina S.A. and Empresa Electrica del Norte Grande S.A. (Edelnor).

Techint, the largest engineering and construction company in Argentina, will be the turn-key contractor and primary developer of the pipeline. Electroandina and Edelnor, respectively the largest and second-largest electric generating companies in Chile's Second Region, will be both pipeline developers and eventual clients of the pipeline gas transmission service.

Technical Description

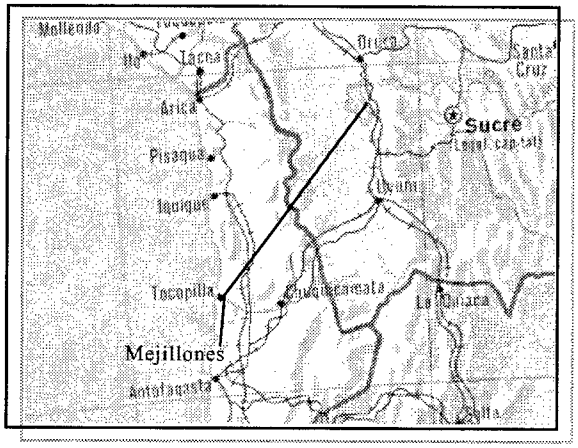
The gas trunk-line for the NorGas Pipeline will be approximately 880 Km long and 20 inches in diameter. Pipeline construction will also entail 180 Km of additional branch-lines of narrower diameter.

The initial volume to be transported will be 2.1 metric millimeters cubed per day, increasing to 4.3 Mmm^3/day in the second year of operation and reaching 7.6 Mmm^3/day by the year 2015. Compression, initially at 13,000 HP, is projected to increase to 23,200 HP by 2014. Initially, the pipeline will have one reception point and four delivery points.

Electroandina and Edelnor plan to commission three new combined cycle natural gas turbine generators with a total installed capacity of nearly 700 MW by the year 2003. Natural gas supply to the new generators will be transported via the NorGas pipeline.

Site

The NorGas Pipeline, a binational project, involves the construction, operation and maintenance of a natural gas pipeline which will extend from the Northwest Basin in Argentina to the Pacific coastal city of Tocopilla in Northern Chile. A branch-line will also extend south from Tocopilla to the city of Mejillones.



Nature of Demand

The demand for natural gas stems from the current and future increase in consumption of electricity in the Sistema Interconectado del Norte Grande (SING), the freestanding electrical transmission system in Chile's Second Region. The higher expected consumption of electricity is a result of increasing copper mining activity in the region.

Although the majority of installed capacity is currently based on coal-fired generators, the substantial cost savings which can be obtained through the use of gas-fired combined cycle generators should elevate future demand for natural gas. In addition, non-electrical industrial consumers represent a smaller yet significant portion of natural gas demand. The NorGas Pipeline project relies on the stability and growth of the worldwide copper market and on non-electrical industrial usage in the region.

Project Status

The NorGas Pipeline has been in development since early 1996. The project developers completed an Open Season for the sale of transmission capacity in April 1997. Construction began in October 1997 and the pipeline is expected to be commissioned in August 1999. No delays are foreseen at this time.

Financing

The estimated total investment for the project is US$ 400 million. The NorGas pipeline will be 100% private-sector financed. Techint, Edelnor, and Electroandina intend to finance at least 50% of the estimated total investment.

Revenues from the project will be drawn from the tariff paid by the electrical generating companies of the SING and from industrial consumers. Both will enter into *take-or-pay* gas transmission contracts with the NorGas Pipeline.

Techint	Edelnor	Electroandina
Techint is part of the Techint Group of Companies, an international organization of over 100 companies involved in steel production, engineering and construction, heavy machine manufacturing, oil and gas, public utilities and other industrial manufacturing activities. The Techint Group of Companies had revenues of US$ 5 billion for 1996.	Edelnor is an electric utility involved in generation and transmission. It operates in Northern Chile. Edelnor is controlled by Southern Company, the largest investor-owned company in the US. The company had revenues of US$ 10.4 billion in 1996.	Electroandina is the third largest generating company in Chile and also the leading generator of the SING. Electroandina is controlled by Tractebel, a Belgium-based organization involved in the areas of electricity, gas, engineering, communications, water, waste management, real estate and industrial services. Tractebel had revenues of US$ 8.8 billion in 1996.

Equipment and Service Procurement

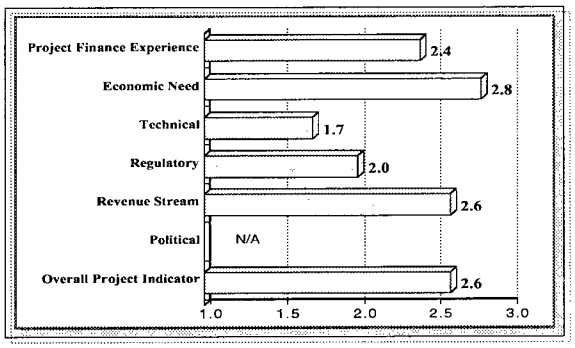
Equipment:

- Steel pipe for the trunk and branch-lines
- Associated pipeline hardware (blocking valves, scraper traps)
- Compression plant
- Metering stations
- SCADA system (data transmission hardware, optic fiber, valve actuators, control room)
- Cathodic Protection
- General Construction & land-moving equipment (back hoes, bulldozers, trucks, trailers, welding machines, generators, compressors, etc.)
- Specialized construction equipment (trenching, boring & padding machines, sidebooms)
- General transportation vehicles, trucks for transporting pipe & construction equipment

Services:

- Pipeline engineering requiring experience in designing & building pipelines in high-altitude mountainous terrain.

Critical Project Indicators



Key Decision Makers

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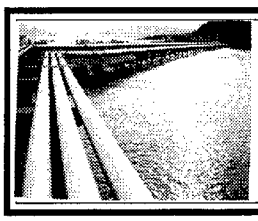


Energy / Regional

Buenos Aires - Montevideo Natural Gas Pipeline

Project Summary

Project No:	**ENE-24**
Subsector:	**Natural Gas**
Location:	**Uruguay - Brazil**
Project Cost:	**US$ 100 million**
Export Potential:	**US$ 40 million**
Type:	**Public Works Concession**
Sponsor:	**Ministerio de Industria, Energía y Minería**

The National Energy Directorate of the Uruguayan Ministry of Industry, Energy and Mining will grant a 15-year Public Works Concession for the construction, operation and maintenance of a natural gas pipeline extending from the Argentine capital of Buenos Aires to Montevideo, Uruguay.

Technical Description

The project entails the construction of a 210 Km buried steel pipeline which will carry natural gas from Buenos Aires to Montevideo. Subsequent distribution and marketing of the gas will form part of a separate concession. The majority of the pipeline will be 16" in diameter, with the exception of the 45 Km segment under the Rio de la Plata, which will have a 20" diameter.

The main pipeline and its branches will service an area of influence which includes over 1.5 million inhabitants, approximately half the total population of Uruguay. The cities to be serviced, and their corresponding populations, are represented in the chart on the right.

The Buenos Aires-Montevideo Pipeline is expected to be sufficient to supply the household and industrial sectors, as well as the non-hydroelectric power plants in the area of influence along its path. Subsequent pipeline expansions will accommodate future demand.

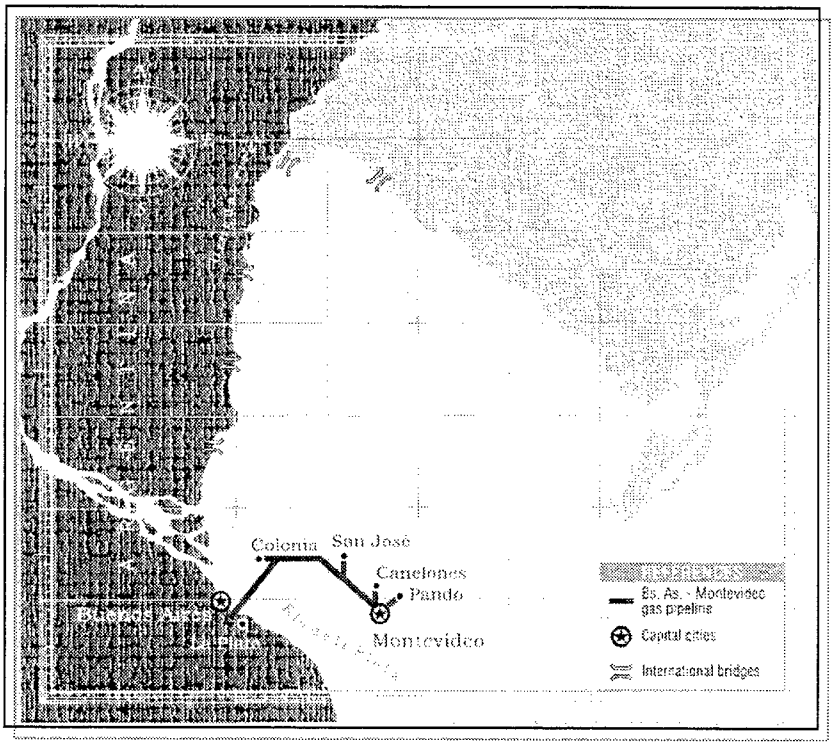
Population Per Town

Montevideo	1,240,503
Colonia	22,142
San José	34,927
Canelones	19,335
La Paz	19,625
Las Piedras	66,095
Ciudad de la Costa	79,349
Pando	24,368
Juan Lacaze	12,966

Source: Ministry of Industry, Energy and Mining

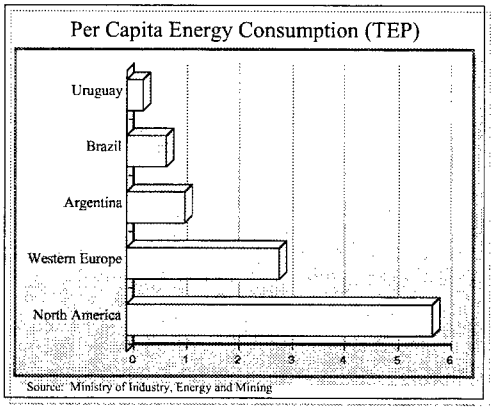
Site

The pipeline will extend from Buenos Aires, Argentina, to Montevideo, Uruguay. It will bring natural gas to the cities of Montevideo, Colonia, San Jose, Canelones, La Paz, Las Piedras, Ciudad de la Costa, Pando, Nueva Helvecia, Colonia Valdense, Rosario and Juan Lacaze.



Nature of Demand

Natural gas is currently unavailable in Uruguay, a factor which helps to explain the country's low per capita consumption level of primary energy. The Buenos Aires-Montevideo Pipeline will supply nearly one-half of the Uruguayan population with a relatively inexpensive, environmentally sensitive energy source.



Existing electric power generation facilities in the city of Montevideo consist of turbo-steam and turbo-gas power plants with a maximum installed output of 555 MW. The units which can feasibly operate with natural gas will add a maximum of 445 MW, distributed as follows: Unite No. 5 Batlle Plant (turbo-steam) 88 MW, Unit No. 6 Batlle Plant (turbo-steam) 125 MW, La Tablada Plant (turbo-gas) 232 MW (2 x 116 MW).

Project Status

A total of 14 companies have responded to the Ministry's call for Letters of Interest and have been pre-qualified for participation in the bidding process. The competitive bidding procedure for the concession award is currently in process, and the bid is expected to be awarded by the 2nd Quarter of 1997. Pipeline construction is expected to begin during the 3rd Quarter of 1998 and should be completed in one year.

The call for bids is being conducted within the context of the agreements entered into for the supply of Argentine natural gas to Uruguay, which were signed by both governments on July 8, 1991 and September 20, 1996. The bidding documents and the standard contract contemplate the factors required to provide access to financing without involving resources of the concessionaire, nor any government guarantee. The criterion to be used in awarding the concession will be the rate required by each bidder.

Financing

The private sector will finance 100% of the project, through public works concession arranged by Uruguay's Ministry of Industry, Energy and Mining. The total investment for the Buenos Aires-Montevideo Pipeline is expected to total US$ 100 million.

The Ministry of Industry, Energy and Mines will be responsible for financially and technically qualifying the company which will construct and operate the pipeline infrastructure. Although the duration of the concession will be precisely defined in the terms of the concession agreement, an initial term of 15 years is expected, plus an extension scheme covering an additional 5 years.

Equipment and Service Procurement

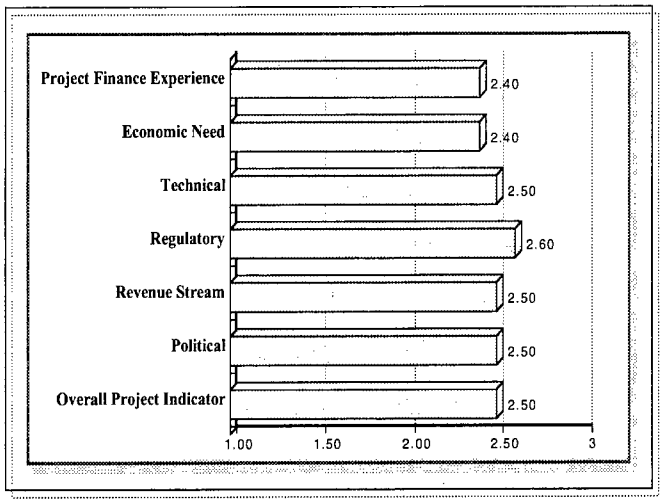
Equipment:

- Steel pipeline
- Associated equipment and connections of complementary size
- Compressing plant
- Equipment for flow station construction
- Pressure control, separation, filtration and flow monitors

Services:

- Buried and underwater pipeline construction
- Installation of Compressing Plant
- Various related services, including pipeline coating, transport, etc.

Critical Project Indicators



Key Decision Makers

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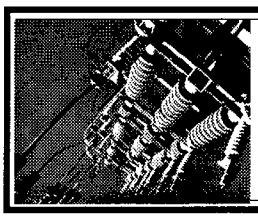


Energy / Regional

Brazil - Argentina Interconnection

Project Summary

Project No:	**ENE-25**
Subsector:	**Transmission**
Location:	**Southern Brazil - Argentina**
Project Cost:	**US$ 350 million**
Export Potential:	**US$ 60 million**
Type:	**Procurement**
Sponsor:	**Electrobrás**

ELECTOBRÁS is a federally-owned holding company responsible for the execution of national energy policies over the entire Brazilian territory. The company operates through generating subsidiaries in which it retains majority control. These companies, in turn, supply concessionaires and certain industrial entities with energy.

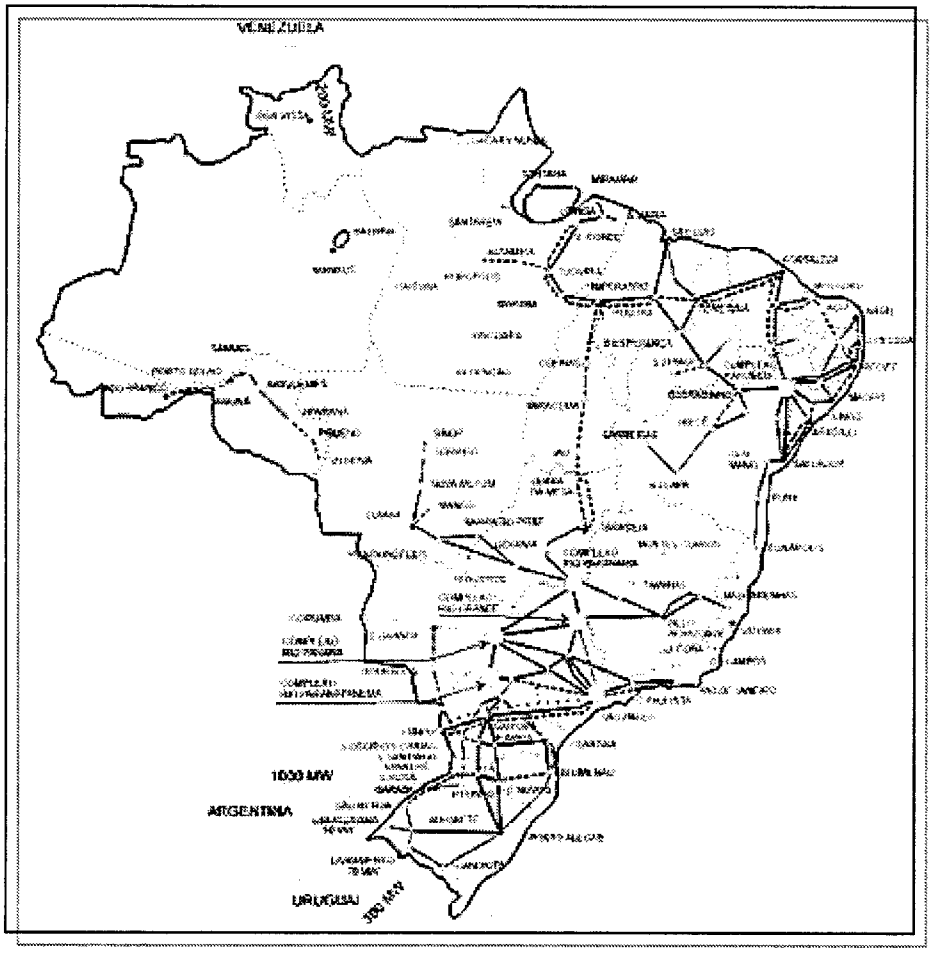
ELECTROBRÁS coordinates and plans the expansion and operation of all electric systems and is responsible for channeling resources to its subsidiaries and concessionaires. ELECTROBRÁS is also responsible for interconnections with other countries.

Technical Description

ELETROBRÁS is granting a US$ 350 million BOT concession for the construction of a 1000 MW transmission line. The 306 Km line will connect Southern Brazil with Argentina. The winner of the bidding process will precisely define the technical characteristics of the project.

Site

The transmission line will be constructed between the Itá Substation in Argentina and HEP Garabi in Brazil. The transmission line will be 306 Km in length running through the border of Argentina and Brazil, through the provinces of Correntes and Missiones in Argentina and the states of Rio Grande do Sul and Santa Catarina in Brazil.



Nature of Demand

Brazil's energy sector is undergoing important changes as the country attempts to meet new demand. The energy sector is anticipated to grow at an average of 5.2 % per year, and increase its network efficiencies.

The Brazil-Argentina transmission line is a vital component needed for increasing the reliability of the energy supply feeding into the Southern, Southeastern and Mid-eastern interconnected system. The transmission line will also serve as a means of secondary energy exchange between Brazil and Argentina, hence increasing network efficiencies.

The growth, both industrial and urban, in Southern Brazil has been exceeding national averages, spurred in part by the strengthening of the Mercosul trade block. The impetus for the project is both strong growth, and hence energy demand growth, as well as integration of the energy grids in order to increase network efficiencies.

Project Status

ELECTROBRÁS' subsidiaries, Eletrosul and Furnas, will sign power purchase agreements with Argentina's Secretary of Energy. Furnas will purchase 70% of the energy and Eletrosul will purchase the remaining 30%. Bids for the supply of energy have been won by Enron on October 1, 1997, and the company will dictate its procurement schedules for equipment and services.

Financing

ELETROBRÁS will purchase energy through its subsidiaries — Furnas and Electrosul — in addition to providing guarantees to concessionaires. The total estimated cost of the transmission line is US$ 350 million. The project will be fully financed by ELECTOBRÁS.

Equipment and Service Procurement

Enron will be responsible for the supply of energy to the Furnas and Eletrosul systems, and will determine specific equipment and service needs.

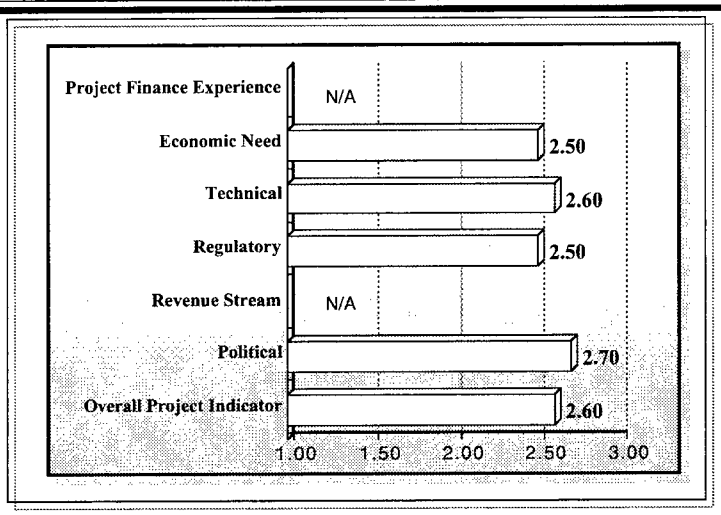
Equipment:

- 306 Km, 1000 MW transmission line
- Substations
- Conductor cables
- Protection command and control equipment
- Breakers, switches & arrestors
- OPGW cables
- Series capacitors

Services:

- Engineering and construction

Critical Project Indicators



Key Decision Makers

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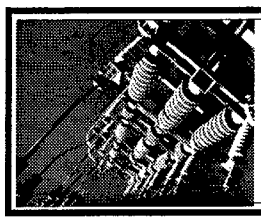


Energy / Regional

Uruguay - Brazil Transmission Project

Project Summary

Project No:	**ENE-26**
Subsector:	**Transmission**
Location:	**Uruguay - Brazil**
Project Cost:	**US$ 285 million**
Export Potential:	**US$ 75 million**
Type:	**Procurement**
Sponsor:	**Ministerio de Industria, Energía y Minería, Uruguay; Electrobrás, Brazil**

The project is being sponsored jointly by Uruguay and Brazil. A bi-national commission has been set up to administer the project and implement its execution. The bi-national commission's principal players are UTE and Eletrobrás.

UTE, Administración Nacional de Usinas y Transmissiones Eléctricas, is the Uruguayan national utility for electricity transmission, which falls under the Ministry of Industry, Mining and Energy. The company is responsible for maintaining, improving and expanding the country's energy grid. UTE is trying to increase efficiency and integrate the Uruguayan electricity system with the Brazilian system, which would link with Eletrosul (Concessionaire of Eletrobrás, Brazil's National Energy Company).

Eletrobrás is a federally-owned holding company responsible for the execution of National energy policies. It coordinates and plans the expansion and operation of all electric systems and is responsible for channeling resources to its subsidiaries and concessionaires, such as Eletrosul, which services states in the South as well as for the state of Mato Grosso do Sul.

Technical Description

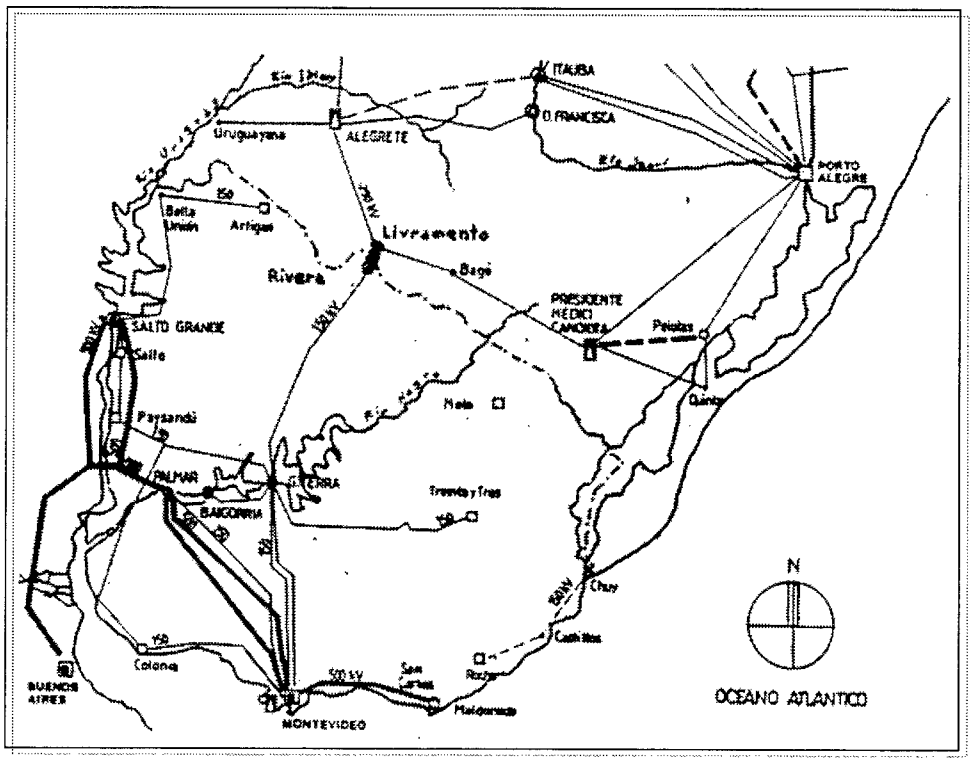
The Uruguay-Brazil Transmission Project is an interconnection of the Uruguayan and Brazilian electricity networks. It will require the construction, operation and maintenance of a 400 Km (250- 500 MW) electrical connection between the two countries.

The Uruguayan National Interconnected system has a high tension transmission cable (500 kV) connecting the hydroelectric power plants with the southern part of the country, which consolidates in excess of 60 % of total energy consumption.

The interconnection shall be established at two sites. The site in question is referred to as the "great power electric connection" and the second site is referred to as the "medium-power electric connection." The latter project has a 70 MW capacity and is being executed by UTE with funding from the Inter-American Development Ban. It will interconnect Rivera in Uruguay with Lavramento in Brazil.

Site

The Uruguay-Brazil Transmission project is located along the border of Uruguay and Brazil.



Nature of Demand

The project's primary objective is to increase efficiencies in electric power service in the context of increasingly broader regional integration created by the Mercosur Trade Agreements.

The project will achieve 5 primary objectives:

- Contribute to the optimal use of energy resources in both Uruguay and Brazil by diversifying the markets and sources of supply
- Modernize current transmission system operating conditions
- Improve efficiencies in energy flows
- Enhance reliability and quality of electric power supplies and reduce technical losses in cities
- Foster further integration of the region, in principal, with the Mercosur trade agreement

Project Status

A bi-national group is currently analyzing the project to determine contractual responsibilities and conditions. The results of the discussions will define the time-frame of the project; nevertheless, it is anticipated that the project will be bid during the first semester of 1998. Once construction begins, the project will take two years to complete. All preliminary studies have been concluded.

Financing

The project will be financed by the federal governments of both countries and will likely count on multilateral support for its execution. The project has strong political support, and is preceded by a smaller transmission line which secured funds from the Inter American Development Bank.

Equipment and Service Procurement

Equipment:

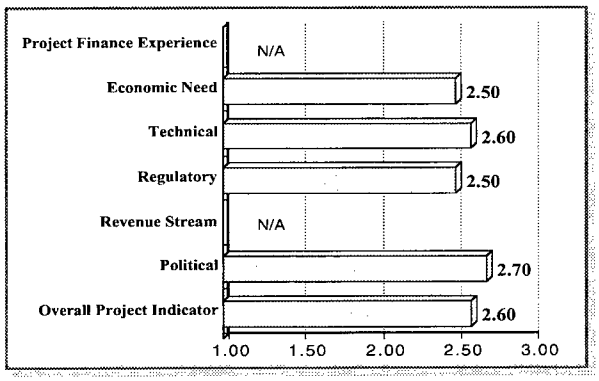
- 400 Km, 500 kV Transmission Line
- Conductor Cables
- Protection Command & Control Equipment
- Breakers, Switches & Arresters
- Series Capacitors
- OPGW Cables
- Energy meters
- Frequency Conversion Stations
- Transformers
- Telecommunications System

Services:

- Engineering and Construction
- Topographic Mapping Services

Best equipment sales prospects for US firms include: Conductor Cables, OPGW Cables, Series Capacitors, Protection Command and Control Equipment, Breakers, Switches and Arresters.

Critical Project Indicators



Key Decision Makers

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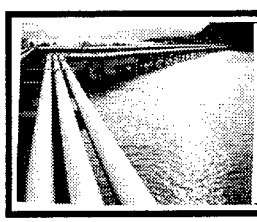


Energy / Uruguay

Natural Gas Distribution for Interior Cities

Project Summary

Project No:	**ENE-27**
Subsector:	**Natural Gas**
Location:	**Interior Cities, Uruguay**
Project Cost:	**US$ 150 million**
Export Potential:	**US$ 25 million**
Type:	**BOT Concession**
Sponsor:	**Ministerio de Industria , Energía y Minería**

Uruguay's Ministry of Industry, Energy and Mining plans to grant a BOT concession for the construction and operation of natural gas distribution networks through pipelines in cities other than the capital, Montevideo.

Technical Description

The concessionaire will be responsible for the construction and operation of natural gas distribution for the cities of Colonia, San José, Canelones, La Paz, Las Piedras, Ciudad de la Costa, Pando, Nueva Helvecia, Colonia Valdense, Rosario and Juan Lacaze. The project will provide for branch pipelines to each of these cities. The branch pipelines will tap into the Buenos Aires-Montevideo gas pipeline and the natural gas pipeline entering Uruguay through the city of Paysandú.

Population per Locality

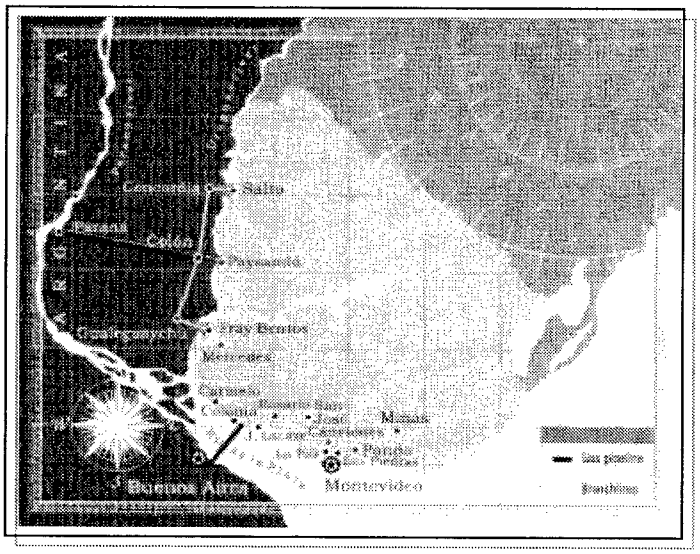
City	Population	City	Population
Salto	93,394	Fray Bentos	21,880
Ciudad de la Costa	79,349	La Paz	19,625
Paysandú	74,171	Canelones	19,335
las Piedras	66,095	Carmelo	16,619
Mercedes	39,139	Dolores	14,764
San José	34,927	Young	14,521
Pando	24,368	Juan Lacaze	12,966
Colonia	22,142		

Source: Ministry of Industry, Energy and Mining

The remaining urban districts of the country will receive liquid petroleum gas, if economically feasible. The cities of Paysandú, Salto, Fray Bentos and Mercedes will source natural gas directly from Argentina. It is likewise feasible that the towns of Guichón, Young, Dolores and Carmelo will also source directly due to their geographical proximity to the aforementioned cities.

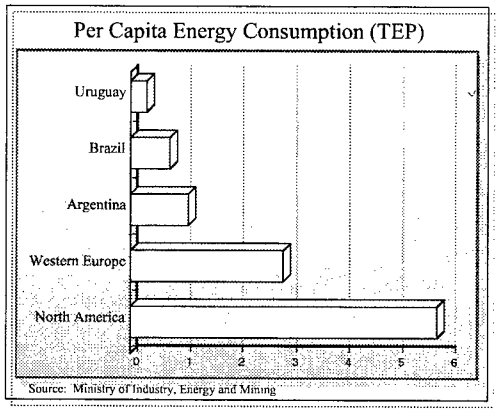
Site

The cities of Colonia, San José, Canelones, La Paz, Las Piedras, Ciudad de la Costa, Pando, Nueva Helvecia, Colonia Valdense, Rosario and Juan Lacaze are located in the Southeastern and Western riverside areas of the country.

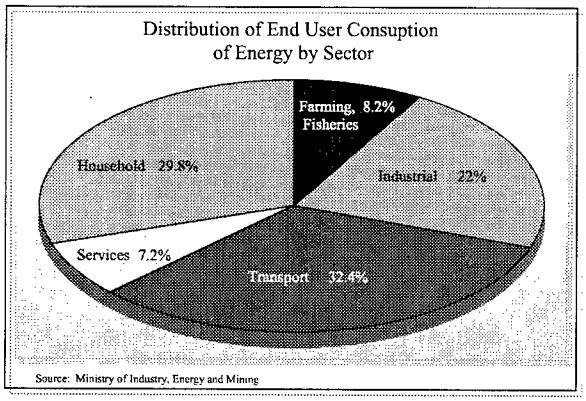


Nature of Demand

Uruguay currently has a low level of per capita energy consumption. In 1995, the end user consumption of energy in the country was 2,240 Ktep, of which the residential sector consumed nearly 30%.



Untapped energy demand in Uruguay is significant. The graphs illustrate current energy distribution in the country by sector and a breakdown of energy consumption distribution within the household sector.



Project Status

Technical rules of procedure were drafted during the first quarter of 1997. The rules outlined the basic safety standards applicable to the construction and operation of the natural gas distribution networks. These standards are currently being considered by the governing councils of the various Departments where services will be provided.

The competitive bidding process is currently underway. Construction and operation of the network will be awarded as a single concession. The concession area covers the entire country, with the exception of Montevideo. Once the bid is awarded, construction will commence in the Western riverside region of Uruguay, which will be the first region to receive the supply of natural gas.

Financing

The total investment is expected to reach approximately US$ 150 million. The investment amount will vary, depending on the number of cities to be supplied with piped gas, their geographical locations, and the specific design of each pipeline. The concession term, as well as the fee, will be defined in the bidding documents.

Equipment and Service Procurement

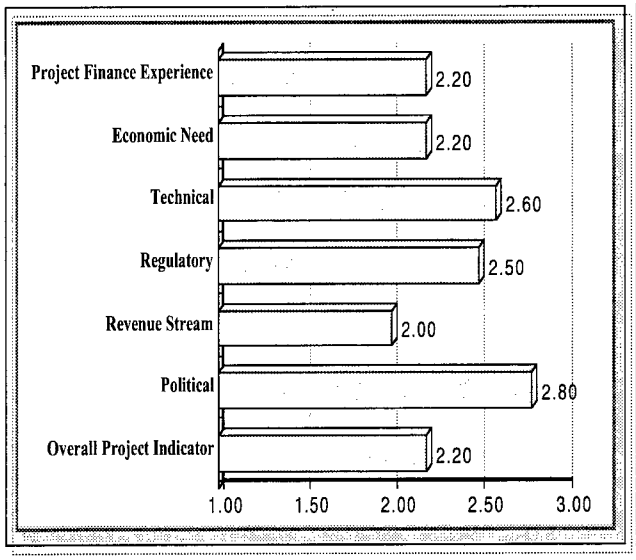
Equipment:

- Coated pipe
- Valves
- Field instruments
- Sleeve pipe
- Materials for joints
- Tubing and connectors for instruments
- Electric drainage equipment
- Compressors

Services:

- Basic and design engineering
- Technical support
- Operational assistance

Critical Project Indicators



Key Decision Makers

Company	Ministerio de Industria, Energía y Minería
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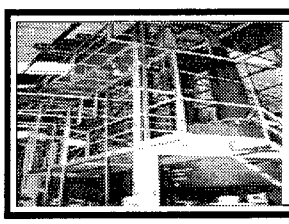


Energy Venezuela

El Sitio Thermoelectric Plant

Project Summary

Project No:	**ENE-28**
Subsector:	**Thermoelectric Generation**
Location:	**Santa Lucía**
Project Cost:	**US$ 1.06 billion**
Export Potential:	**US$ 523 million**
Type:	**Joint Venture**
Sponsor:	**C.A. La Electricidad de Caracas**

Venezuela's Ministry of Energy and Mines (M.E.M.) and Concession Regulator of Electric Energy (C.R.E.E.) have granted C.A. La Electricidad de Caracas a public service concession for the construction and operation of a 1,350 MW thermoelectric plant in the suburbs of Caracas. C.A. La Electricidad de Caracas is seeking potential joint venture partners to participate in the project.

Technical Description

The El Sitio Thermoelectric Plant will consist of 3 generation blocks and auxiliary installations in a 235 hectare area. The plant will have a 1,350 MW installed potential. Each block will hold 2 combustion turbines, 2 vapor generators for heat recovery and a vapor turbine — commonly called a 2 in 1 arrangement.

Combustion Turbines: Industrial combustion turbines of advanced technology with the capacity to operate continuously and at a constant velocity will be utilized. Each turbine will have an installed capacity of 150 MW ISO and will utilize natural gas as a primary and industrial gas as a secondary combustible. The two turbines will be designed with dry heaters to ensure low NOx production.

Vapor Generators for Heat Recovery (VGHR): Each combustion turbine will have its own VGHR, which will operate under 3 pressure levels and without supplementary heat. VGHRs will have reheaters and natural air circulation. Each VGHR will consist of: 3 evaporators, 3 economizers, 3 overheating protectors and 1 reheater.

Vapor Turbine: The vapor turbine will be capable of reheating, with a single axle for a nominal capacity of 150 MW at 3,600 rpm. The turbine will have a control system, an electrohydraulic lubrication system, a vaporized sealing system with slow rotation and an instrumentation monitor. The vapor generators will be directly connected to the turbine.

Surface Condensors and Cooling Towers: A surface condensor and cooling tower system will recirculate latent vapor heat. Circulation pumps will draw water from the turbine into the condensor. The cooling tower will then cool the water as it circulates through the condensor. To replace evaporated water in the cooling tower, water will be supplied from the Río Guaire Treatment Plant.

Mechanical:

- Industrial Water Supplier
- Auxiliary Water Cooler
- Fire Prevention
- Natural Gas System
- Industrial Gas System
- Compressed Air System
- Emergency Power Generation
- Effluent Collection

Electronic & Instrumentation:

- 230 kV Electric Substation
- Terminal Equipment for Generators
- Transmission Lines
- Information and Decentralized Control Systems

Chemical:

- Río Guaire Wastewater Treatment Plant
- Water Demineralization Plant
- Effluent Treatment Plant

Buildings and Roads:

- Administration and Office Buildings
- Control Building
- Multiple Purpose Buildings
- Access Roads

Site

The plant will be situated in a 235 hectare area on the El Sitio estate, which is located in the urban district of the city of Santa Lucía, approximately 40 Km south of Caracas (in the State of Miranda). To the site's northwest lies the 230 kV Santa Teresa-Convento transmission line and to the west is the Santa Lucía-Petare national highway, situated in the Tuy Valley area.

Nature of Demand

The El Sitio Thermoelectric Plant is being constructed to satisfy increasing electricity requirements in the Caracas area. The plant will also minimize overdependence on interconnections with the national energy grid, reducing the risk of a generation deficit throughout Venezuela. El Sitio will serve the market currently covered by Electricidad de Caracas.

Project Status

Feasibility and conceptual engineering studies have been completed. Preliminary studies are currently underway which will serve as a base for the plant's basic engineering. Combustible prices may influence engineering strategies for the plant, particularly with regard to the installation sequence for the vapor turbines.

Phase	Generation	Date of Completion
Phase I	2x150 Mw gas	2001
Phase II	2x150 Mw gas	2003
Phase III	2x150 Mw gas	2005
Phase IV	1x150 Mw steam	2008
Phase V	1x150 Mw steam	2009
Phase VI	1x150 Mw steam	2010

Phase I

Contracting of Basic Engineering	1st Trimester of 1998
Contracting of Specialized Engineering	1st Trimester of 1999
Contracting of Construction:	
Civil Works	3rd Trimester of 1999
Electromechanic Works	3rd Trimester of 2000

Financing

El Sitio Thermoelectric Plant will be constructed and operated under a public service contract which has been granted to C.A. La Electricidad de Caracas. Electricidad de Caracas will be primarily responsible for project financing and is seeking potential joint venture partners to participate in project financing and development. Total project cost is expected to reach approximately **US$ 1.06 billion**.

Equipment & Service Procurement

Equipment (US$ 497 million):

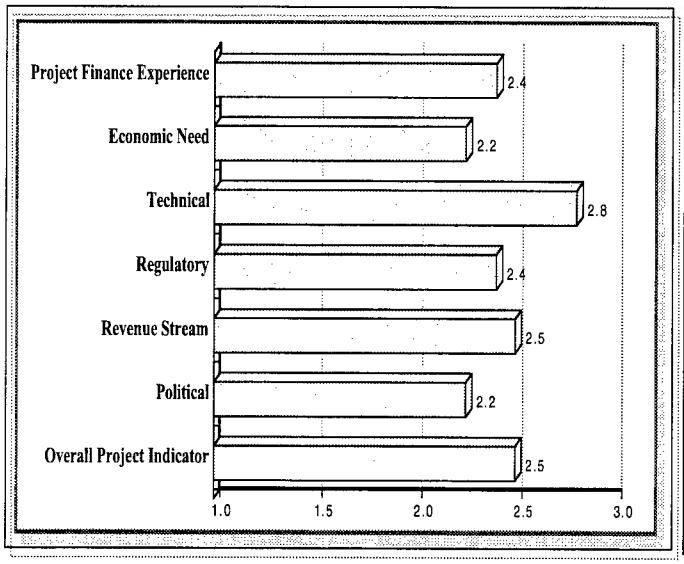
- 2 Combustion turbines (150 MW ISO)
- Vapor generators for heat recovery
- Vapor turbine
- Transformers
- Surface condensors and cooling towers
- Industrial water supplier & auxiliary water cooler
- Fire Prevention & emergency power generation
- Natural & industrial gas systems

- Compressed Air System
- Effluent collection system
- 230 kV Electric Substation
- Terminal Equipment for Generators
- Transmission Lines
- Information & decentralized control systems
- Río Guaire wastewater treatment plant
- Water demineralization plant
- Effluent treatment plant

Services (US$ 26 million):

- Basic and design engineering
- Technical support
- Operational assistance

Critical Project Indicators



Key Decision Makers

Company	**C.A. La Electricidad de Caracas**
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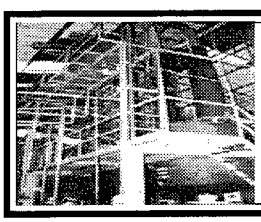
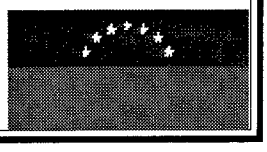


Energy / Venezuela

Nueva Esparta Electric Generation Privatization



Project Summary

Project No:	**ENE-29**
Subsector:	**Electrical Power**
Location:	**Nueva Esparta, Venezuela**
Project Cost:	**US$ 60 million est.**
Export Potential:	**US$ 18 million est.**
Type:	**Privatization**
Sponsor:	**Fondo de Inversiones de Venezuela / CADAFE**

The Fondo de Inversiones de Venezuela is the agency tasked with the privatization and concessioneering of government run utilities and services. Under such jurisdiction, and the recent finalizing of a new regulatory framework for Venezuela, the Nueva Esparta State electrical generation system will be privatized. The system includes the thermal generation plants in the Islands of Margarita and Coche, the power cable from the mainland and the transmission lines.

Technical Description

The supply of energy to Margarita is provided by a 115 kV submarine cable and the thermoelectric plant Luisa Cáceres de Arismendi (PLCA). The cable provides the base supply of energy (69%) while PLCA provides the remaining supply (31%).

The Submarine Cable

The submarine cable is currently owned and operated by CADAFE, one of the four electric companies administering the NIS (National Interconnected System). The cable was manufactured and installed by The Fujikura Cable World, Ltd. (Japan) in 1976 and started operating in 1977. The cable contains an installed capacity of 100 MW which, due to technical and safety reasons, does not transmit above 90 MW.

At a length of 30 miles with 25 miles submerged and 5 miles on Margarita Island, the cable transmits energy at 115 kV. Receiving energy through the NIS, the cable connects through its 115 kV transmission lines to one substation (Chacopata) and to the PLCA. Since construction, the cable has maintained reliable electrical distribution performance.

The transmission system is 97 Km long at 115 kV and approximately 34 Km at 34.5 kV. It consists of 6 substations and a dispatch center.

Transmission Substations in Margarita Island

Substations	Voltage (kV)	Installed Capacity (MVA)
Pampatar	115/13.8	60
Los Millanes	115/13.8	50
Luisa Cáceres	115/13.8	80
La Asunción	115/13.8	16
Los Robles	115/13.8	56
Porlamar	115/13.8	40

Source: CADAFE

Breakdown of Subscribers and Energy Billed
as of December 1995

Units	Manufacturer	Year of Manufacture	Type	Fuel Used	Rated Capacity	Effective Capacity (MW)
No. 1	Fiat	1974	GT	diesel	14.31	0.00
No 2	Fiat	1974	GT	diesel	14.31	8.80
No.3	Aeg kanis	1977	GT	diesel	20.02	17.00
No.4	Aeg Kanis	1978	GT	diesel	20.02	16.23
No.5	Hitachi	1978	GT	diesel	20.38	16.23
No.6	Hitachi	1978	GT	diesel	20.38	16.23
No. 7	Hitachi	1978	GT	diesel	20.38	16.23
No.8	GE	1978	GT	diesel	20.38	16.23
No.9	GE	1974	GT	diesel	20.38	18.23
Total					**170.56**	**121.95**

Source: Eleoriente

Plant Luisa Cáceres de Arismendi

At the present moment, the plant has an installed capacity of 171 MW, with a poor monthly availability factor of 55% (1995 figures), due to forced outages caused by poor maintenance and a lack of spare parts. PLCA contains nine generating units operating on diesel fuel with a capacity for gas also currently not being used.

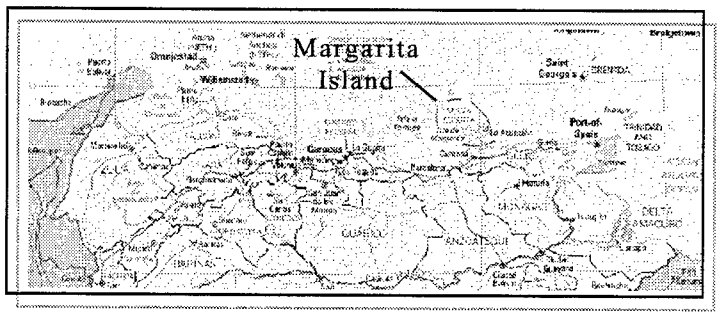
Maximum oil consumption during 1991-1995 has been 22.3 liters per hour, with a total of 149 million liters fired in 1995. Diesel is currently the generator of choice purchased from Corpoven, one of the state oil companies.

Coche Thermoelectric Plant

The Coche plant has an installed capacity of 5.5 MW. Operating at a higher level than the Margarita Plant, the monthly factor has averaged at 82.44%. The plant contains 6 mobile diesel units with capacities ranging from 580 to 2,600 Kw, all operated with diesel fuel (fuel No. 2).

Site

Plant Luisa Cáceres de Arismendi is located on the Margarita Island while the underwater cable extends from Margarita to the Mainland. The transmission lines for the cable are found on the mainland where the dispatch center is located (Barbacoa) and on the islands. The second thermoelectric generation plant is located on Coche Island, south of Margarita.



Nature of Demand

Venezuela has a generating capacity of 19,000 MW, interconnected through transmission lines at 765 kV and 230 kV. Uniting the main generation plants in the country, the system constitutes the National Interconnect (NIS) where the voltage is stepped down to 115 volts and 34.5 volts. Electricity is then supplied to a distribution network of 3,800 cities.

The demand for electricity has continuously risen at an average rate of 8.7%, with even greater growth in the tourist sectors and new development areas of Venezuela. The Nueva Esparta region is not an exception to this growth and, in fact, has experienced even higher growth rates. The Island of Margarita's attraction as a major tourist destination is the cause of such demand. In 1994, the island received 1.4 million tourists. The island has a year-round population of 300,000 inhabitants.

In the wake of economic growth and rapid development, Margarita island has begun to experience power shortages. Demand has increased sharply and is expected to reach to over 200 MW by the year 2000 (based on conservative scenarios derived from past growth projections), exceeding the island's available supply of 150 MW.

Untapped demand is considerable. With numerous requests for connections from new developments, the pressure to add additional energy is mounting. Current requests for additional connections is estimated to be 65 MW over the next five years.

The island experiences high demand for electricity during the summer months of July through September including spurts during the Easter and Christmas holidays. Maximum demand has reached 153 MW. It has continued to increase at an annual compounded growth rate of 5.5% since 1992, and is not expected to subside.

The demand in Coche, although not as great as that of Margarita, is growing continuously. Overall demand in the system has been increasing at a compounded rate of 4.7% annually since 1992.

Project Status

Fondo de Inversiones de Venezuela is finalizing the bidding documents which will define the financial and technical aspects of the privatization. The bidding process is expected to open by December 1997, with a closing date set for the 3rd Quarter of 1998.

Financing

Financing is expected to come from the private sector. The project may be financed through the future services provided to the 83,000 subscribers in the Margarita and Coche Islands. A recent census shows that in 1995, approximately 90% of the subscribers were residential customers consuming approximately 44% of the total energy sold. The industrial customers are mainly large tourism and commercial complexes. Although they represent only 33% of the total subscribers, they account for 27% of the total energy billed and 30% of the total value received.

Energy Losses

Year	Losses (%)
1991	22.06
1992	21.42
1993	13.68
1994	23.14
1995	25.84

Source: Eleoriente

The collection rate is one of the highest in Venezuela, with an average collection period of 27 days. For 1995, the collection rate for all clients, residential, commercial and industrial was 95%. The collection rate drops to 74% when government clients are included.

Breakdown of Subscribers and Energy Billed
as of December 1995

Consumer Group	No. of Subscribers	%	Billed GWh	%	Billed US$*	%
Residential	74,608.00	89.64	284.32	43.60	1,304.82	26.61
Commercial	7,362.00	8.84	124.16	19.04	1,468.60	29.95
Industrial	92.00	0.33	174.24	26.72	1,464.68	29.87
Agriculture	14.00	0.02	0.39	0.06	1.47	0.03
Public Sector	969.00	1.17	68.99	10.58	663.93	13.54
Total	**83,045.00**	**100.00**	**652.10**	**100.00**	**4,903.50**	**100.00**

Source: Eleoriente
* US$ 1= Bs. 473.25, Sept 30. 1996

Tariffs are defined by CREE, a federal regulatory body, by the type of customer. The specific tariffs for the IMPS (Isla Margarita Power System), have been determined and are under consideration by FUNDELE, CREE's technical arm.

Equipment & Service Procurement

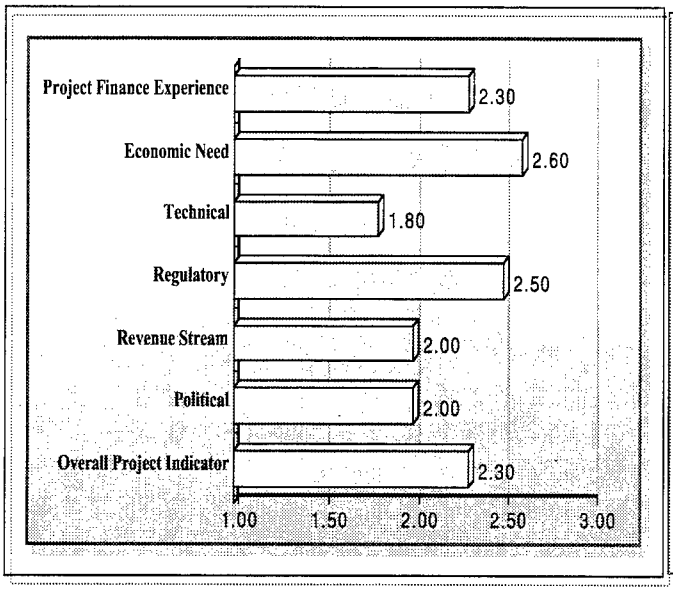
Equipment:

- Spare Parts for Maintenance
- Additional Generators
- Cabling
- Transmission Lines
- Control Panels

Services:

- Management Services
- Financial Analysis
- Banking Services
- Engineering Services (Electrical, Mechanical)

Critical Project Indicators



Key Decision Makers

Company	Venezuelan Investment Fund
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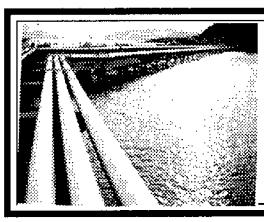
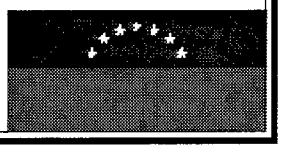


Energy / Venezuela

Yaritagua-Acarigua Natural Gas Pipeline



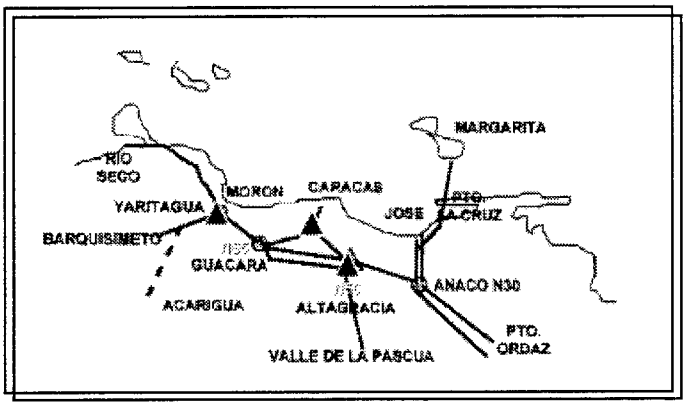
Project Summary

Project No:	**ENE-30**
Subsector:	**Natural Gas**
Location:	**Yaritagua-Acarigua, Venezuela**
Project Cost:	**US$ 39 million**
Export Potential:	**US$ 15 million**
Type:	**Joint Venture**
Sponsor:	**Corpoven**

Corpoven is a vertically integrated corporation of PDVSA (Petróleos de Venezuela S.A.), Venezuela's state-owned oil company. Covering exploration, production, refinement, transportation, and commercialization of oil and gas, Corpoven is the chief operator in the Eastern, Central Western and Southern regions of Venezuela. The company currently operates 3,300 wells, three refineries, one fractionation plant and one cryogenic complex integrated with two liquid natural gas extraction plants. In addition, the company runs three shipping terminals, 4,000 Km of oil pipeline, 5,000 Km of gas pipelines, two distribution systems for combustibles and 762 service stations.

Technical Description

The project involves the construction of a 1.5 MHP compressing plant and a buried steel pipeline, with a longitude of approximately 95 Km and 12, 10, and 18" in diameter. The natural gas pipeline will feed into existing infrastructure, specifically into the Anaco-Barquisimeto system.



Anaco-Barquisimeto is part of Venezuela's Center-East Transmission and Gas Distribution System, which consists of 5,000 Km of pipelines which have the capacity to handle up to 2,000 MMPCD. The system services 1,500 industrial clients and 200,000 domestic/commercial clients. The total investment for the Yaritagua-Acarigua Pipeline is expected to reach US$ 39 million, distributed as illustrated in the chart on the right.

Yaritagua-Acarigua Pipeline Costs
(in millions)

Engineering	US$ 2
Materials	US$ 20
Construction	US$ 16
Permit	US$ 1
Total	US$ 39

Source: Corpoven

Site

The pipeline will run from the city of Yaritagua, located in the state of Yaracuy, to the city of Acarigua in the state of Portuguesa.

Nature of Demand

Natural gas demand in the Yaritagua-Acarigua area should reach approximately 35 MMPCD over the long-term. Clients will include companies involved in the agricultural, metal-mechanic and general manufacturing sectors.

The pipeline is a priority of both the local government and the Chamber of Regional Industrialists. It will provide natural gas service to industrial sectors in the region, in addition to satisfying requirements for clean combustibles at a competitive price and reducing air pollution by replacing combustibles such as diesel oil, fuel oil and sugar cane. Pipeline infrastructure will also stimulate the growth of other industrial, commercial, domestic and automotive transport activities which will support the economic development potential of Acarigua.

Project Status

Corpoven is currently elaborating a feasibility analysis for the Yaritagua-Acarigua Pipeline project. The company has not yet defined prequalification and qualification dates for companies interested in participating in the strategic association, although prequalification should closely follow termination of the feasibility study (2nd Quarter 1998).

The contractual agreement between local consumers and the company assigned to construct and operate the pipeline will define the specific dates for initiating and completing pipeline construction. Once the construction process is initiated, there are no foreseen circumstances which should delay pipeline operation. Macroeconomic conditions are not expected to affect the project's development, since the pipeline's clients are financially sound companies already well-established in the region and the pipeline will have stable markets for its products.

Financing

The private sector will finance 100% of the project, through an operating contract arranged with PDVSA (Venezuela's state-owned petroleum company).

The Ministry of Energy and Mines will be responsible for financially and technically qualifying the company which will construct and operate the pipeline infrastructure. Corpoven will then carry out a selection process to determine, among the qualified companies, which will be the one selected to sign the operating agreement. The company which wins the contract will be required to submit a proposal for the project to the Ministry of Energy and Mines, which will grant a permit for developing the pipeline infrastructure and transporting the natural gas.

The Ministry of Energy and Mines will approve transport tariffs, while taking into consideration the infrastructure required to transport the natural gas to clients and a reasonable return on investment. The Ministry, however, will not provide guarantees which assure a minimum return on investment.

Equipment and Service Procurement

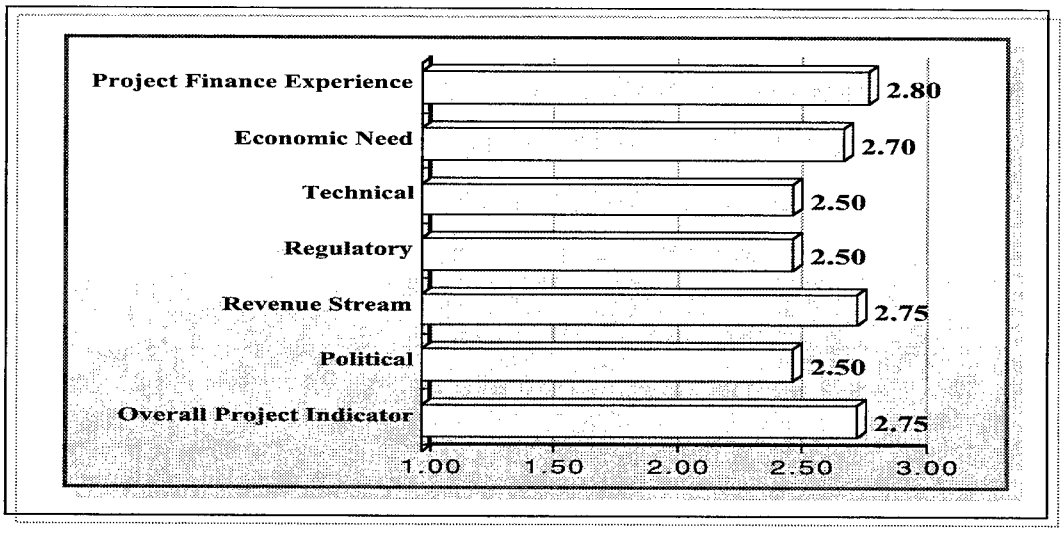
Equipment:

- Carbon steel pipeline (8, 10 and 12" in diameter and 95 Km long)
- Associated equipment and connections of complementary size
- Compressing plant (1.5 MHP)
- Equipment for flow station construction
- Pressure control, separation, filtration and flow monitors

Services:

- Buried pipeline construction
- Installation of compressing plant
- Various related services, including pipeline coating, transport, etc.

Critical Project Indicators



Key Decision Makers

Company	Corpoven
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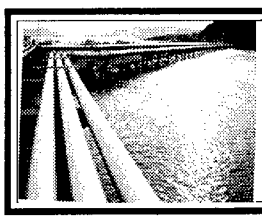


Energy / Venezuela

Barbacoas-Margarita Natural Gas Pipeline

Project Summary

Project No:	**ENE-31**
Subsector:	**Natural Gas**
Location:	**Barbacoas-Margarita, Venezuela**
Project Cost:	**US$ 92 million**
Export Potential:	**US$ 40 million**
Type:	**Operating Contract**
Sponsor:	**Corpoven S.A.**

Corpoven is a vertically integrated corporation of PDVSA (Petróleos de Venezuela S.A.), Venezuela's state-owned oil company. Covering exploration, production, refinement, transportation, and commercialization of oil and gas, Corpoven is the chief operator in the eastern, central western and southern regions of Venezuela. The company currently operates 3,300 wells, three refineries, one fractionation plant and one cryogenic complex integrated with two liquid natural gas extraction plants. In addition, the company runs three shipping terminals, 4,000 Km of oil pipeline, 5,000 Km of gas pipelines, two distribution systems for combustibles and 762 service stations.

Technical Description

The project involves the construction of a 181 Km buried steel pipeline of telescopic design. The natural gas pipeline will feed into the Anaco-Puerto La Cruz System.

Anaco-Puerto La Cruz is part of Venezuela's Center-East Transmission and Gas Distribution System, which consists of 5,000 Km of pipelines whith the capacity to handle up to 2,000 MMPCD. The system service to 1,500 industrial clients and 200,000 domestic/commercial clients.

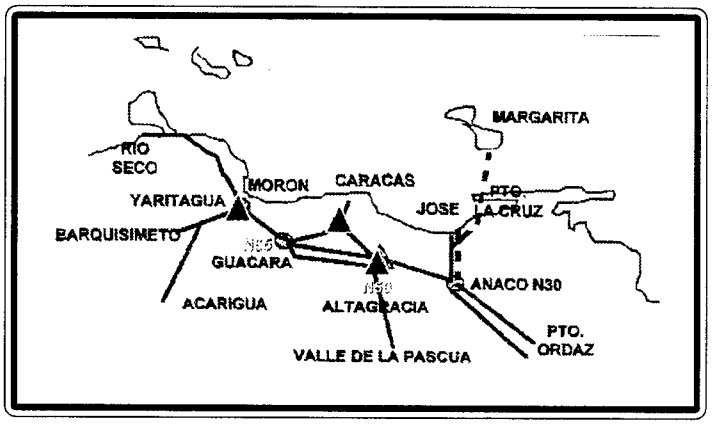
The first segment of the pipeline, in the city of Barbacoas, will have a 20" diameter. The second

segment is designed with a 16" diameter and will run 63 Km to the city of Cumaná. The third segment will be 12" in diameter and continue 77 Km to the Island of Margarita, with 38 Km of underwater pipeline laid at a maximum depth of 50 m. Once on the island, the pipeline's diameter will change to 6" and will run 9 Km until the Luisa Cáceres de Arismendi Thermoelectric Plant in the City of Porlamar.

Additionally, the project will require the installation of a 4.3 MHP compressing plant over the medium-term. The plant will be located on the outskirts of the city of Puerto La Cruz.

Site

The pipeline will run from the city of Barbacoas to the city of Porlamar on the island of Margarita. It will service clients in the cities of Cumaná (State of Sucre) and Margarita (State of Nueva Sparta).



Nature of Demand

The Barbacoas-Margarita Pipeline will service industrial, commercial and domestic clients located in the cities of Cumaná and Margarita, in the states of Sucre and Nueva Sparta, respectively. Corpoven anticipates demand in this area to reach approximately 154 MMPCD over the long-term, given that principal clients of the Luisa Cáceres de Arismendi Thermoelectric Plant consume 82 MMPCD and clients of projects associated with the Puerto La Cruz Refinery consume approximately 55 MMPCD.

The government of the state of Nueva Sparta, the Fund for the Development of Nueva Sparta (FONDENE) and the Puente Libre Chamber of Commerce have been soliciting CORPOVEN to bring natural gas to the Island of Margarita. In addition to satisfying the combustible requirements of the Luisa Cáceres de Arismendi Thermoelectric Plant over the long-term, the pipeline will reduce air pollution levels by substituting diesel-oil (the island's primary combustible) with natural gas. At the same time, the pipeline will develop the necessary infrastructure for stimulating other industrial, commercial, domestic and automotive transport activities, supporting the economic development potential of the cities of Cumaná and Margarita.

Project Status

The Barbacoas-Margarita Pipeline is currently at the feasibility study stage. Corpoven has not yet determined the dates for the prequalification and qualification of companies interested in participating in the operating contract.

Corpoven expects pipeline construction to commence in the year 2000, with the pipeline becoming operational by the year 2002. These dates will depend upon the privatization of the Luis Cáceres de Arismendi Thermoelectric Plant and its subsequent conversion to natural gas. Macroeconomic conditions in Venezuela will determine the feasibility of the plant's privatization. Once pipeline construction has begun, Corpoven foresees no delays for its subsequent operation.

Financing

The private sector will finance 100% of the project, through an operating contract arranged by PDVSA (Venezuela's state-owned petroleum company). The total investment for the Barbacoas-Margarita Pipeline is expected to total US$ 92 million, distributed in the following form:

Barbacoas Pipeline Costs
(in millions)

Engineering	US$ 3
Materials	US$ 41
Construction	US$ 44
Permit	US$ 4
Total	US$ 92

Source: Corpoven

The Ministry of Energy and Mines will be responsible for financially and technically qualifying the company which will construct and operate the pipeline infrastructure. Corpoven will then carry out a selection process to determine, among the qualified companies, which will be the one selected to sign the operating agreement. The company which wins the contract will be required to submit a proposal for the project to the Ministry of Energy and Mines, which will grant a permit for developing the pipeline infrastructure and transporting the natural gas.

The Ministry of Energy and Mines will approve transport tariffs, while taking into consideration the infrastructure required to transport the natural gas to clients and a reasonable return on investment. The Ministry, however, will not provide guarantees which assure a minimum return on investment.

Equipment and Service Procurement

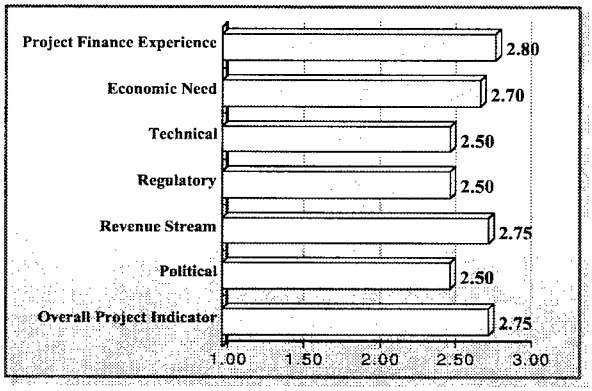
Equipment:

- Carbon steel pipeline (32 Km of 20", 63 Km of 16", 77 Km of 12", 9 Km of 6")
- Associated equipment and connections of complementary size
- Compressing plant with 4300 HP estimated potential
- Equipment for flow station construction
- Pressure control, separation, filtration and flow monitors

Services:

- Buried pipeline construction
- Installation of Compressing Plant
- Various related services, including pipeline coating, transport, etc.

Critical Project Indicators



Key Decision Makers

Company	Corpoven
Name	Iván Orellana
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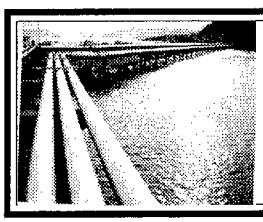
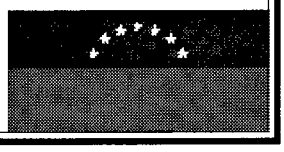


Energy Venezuela

Maraven Gas Recovery System



Project Summary

Project No:	**ENE-32**
Subsector:	**Gas**
Location:	**Maracaibo, Venezuela**
Project Cost:	**US$ 67 million**
Export Potential:	**US$ 32 million**
Type:	**Privatization**
Sponsor:	**Fondo de Inversiones de Venezuela / CADAFE**

Maraven is one of three major holding companies under PDVSA, Venezuela's state-owned oil and gas producing company. The Venezuelan oil industry is undergoing changes that are inducing the international private sector into the upstream and downstream areas of gas and oil. This, together with the restructuring currently underway (extraction, downstream and independent services companies), will allow for an increase in producing capacity and growth from a current production of 3 million barrels to 6 million barrels per day in 2005. Such an increase will require an investment of US$ 60 billion, US$ 25 billion of which will come from foreign sources (60-70% from the US).

The recuperation project working under a concessionary framework is meant to save valuable gas that is being lost daily from onshore and offshore sights in and on lake Maracaibo.

Technical Description

Basic Description

The recuperation project is broken down into two components, off-shore and on-shore operations:

Off-Shore & On-Shore Operations

Maraven's off-shore operations lose an estimated 75 MMPCND of rich gas and hydrocarbon vapor from more than 50 flow station tanks and 3 principal terminals (Bachaquero, Punta de Palmas and Puerto Miranda, *located on-shore.*) Within the on-shore operations of the Costa Bolívar camps (Tía Juana, Langunillas and Bachaquero) Maraven has 5,300 active tanks of low RGP which air an estimated 86 MMPCND of gas through open casings.

In both situations, it is especially important to modulate a production prognosis of gas segmented both by cycles and geography. The entire process must take into account future methods for exploitation based on resources, business plans and a quantification of the project's influence on productive capacity of the wells.

The following is the preliminary technical data for the Maraven Gas Recovery System:

Recuperation of Vapors

Will require the installation of low-pressure electric compressors in the 50 flow stations located in the offshore area and in the 3 principal terminals (on shore). The compressors must be joined within the network distribution and connected to central control units. The gas collected through the operation will then be injected into the system

Recuperation of gas under pressure:

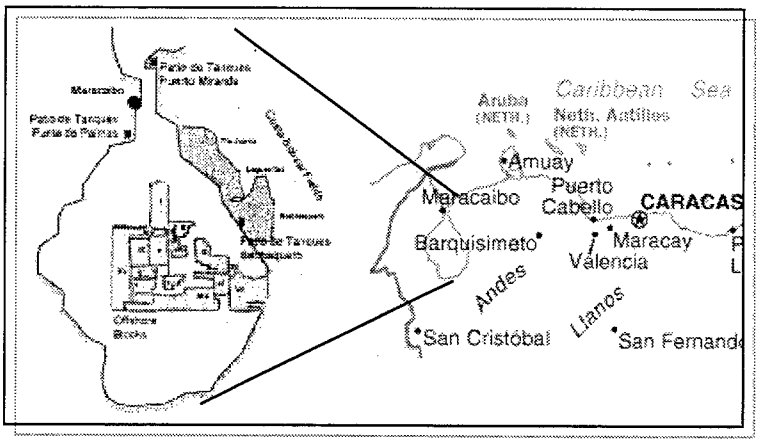
Will entail the installation of centralized low-pressure compressors, with the possibility of providing suction in each valve. Vapor injectors will be installed on each of the 5000 hatches currently losing gas. In the next step, the gas will be deposited in the existing systems of distribution for combustible gas in the Costa Bolívar camps.

Existing Facilities Infrastructure

- The project will be executed using existing infrastructure, which consists of 5000 open vents whose lines make up 150 stations of flow.
- The current infrastructure includes 50 off-shore flow stations of platforms with limited free space. In addition, stabilization tanks with crude oil, gas/ liquid separators and systems of tubing for collection of gas are stationed.
- Three patios for storage of crude with various types of tanks also make up part of the existing infrastructure.

Site

The on-shore recovery project is located in close proximity to the Costa Bolívar Oil fields, while the off-shore Recovery is situated on the floating blocks located in the middle and eastern part of lake Maracaibo.



Nature of Demand

The Maraven Gas Recovery Project is justified by the deficit of natural gas that exists in the western zone of Venezuela. The estimated quantity that is recoverable may be used as an additional fuel in the Paraguaná refinery.

The demand for natural gas is expected to rise in the western zone due to requirements associated with the production of oil and industrial growth occurring downstream in the refining complex of Paraguaná. The reduction in hydroelectric energy in the zone that is utilized for industrial growth is also a factor. In addition, the consumption of natural gas in cars affected by the GNV program will increase demand.

Return on Investment

The project is expected to generate a return of 30%. The Ministry of Energy and Mines has estimated an operating cost of gas between US$ 1.06 and US$ 1.33 per MMBtu. The estimates are based on direct sales to the Maraven distribution system at a minimum of US$ 106,000 per day (38.7 MM$/ year).

Gas Consumption in Costa Bolivar

Item	1997	1998	1999	2000
Steam Generation	52	63.6	70.3	102
Heating	17.5	19.1	21.7	24.9
Well Pumping	13.9	14.5	16.2	18.6
Transport Pumping	4.7	5.1	5.7	6.6
Others	4.7	4.8	5	5.2
Total	**92.8**	**107.1**	**118.9**	**157.3**

Source: Maraven

A market analysis of the expected gas production will provide an additional margin when distributed to downstream energy generation plants, fertilizer factories, industrial factories and secondary recuperation.

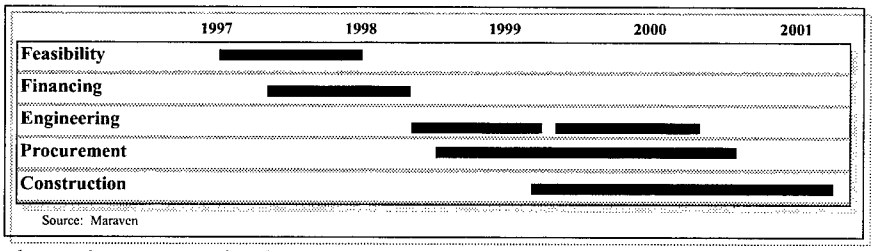
Environmental Regulation

It is estimated that the project will reduce the potential for global warming in Venezuela by 71%. The pressure for such projects continues to be a factor in their eventual implementation. Recent environmental summits in South America and new regulations formulated through trade agreements are focusing an increased emphasis on environmentally sensitive projects such as the Maraven Gas Recovery System.

Project Status

Raytheon Engineers & Constructors, Inc. has been selected to execute a feasibility study for the Maraven Gas Recovery System under a US Trade and Development Agency grant. The study began in October, 1997 and is expected to end in April, 1998.

Prior to the feasibility study, Maraven carried out preliminary testing of both the individualized and centralized recollection processes . The tests demonstrated the technical viability of both schemes. New testing will be conducted to ascertain the possibility of using a screw type compressor.



Source: Maraven

Financing

Maraven S.A. has not determined the financial structure of the project. The project's financing will be reviewed partially in the feasibility study which has yet to be completed.

Maraven is considering a BOO (Build Own Operate), BOT (Build Own Transfer) or BTL (Build - Take or Pay) scenarios with possible financing through PDVSA funds. The type of financing preferred is non-re-course financing using a single-purpose company.

Total Expected Investment

Item	Low Pressure Gas	Hydrocarbon Vapor	TOTAL
Studies	252	223	475
Engineering	1,700	1,600	3,300
Equipment/ Mater.	16,500	14,400	30,900
Installation	14,800	17,600	32,400
TOTAL	33,252	33,823	67,075

Exchange rate utilized Bs 497/1USD
Source: Maraven

Equipment & Service Procurement

Equipment:

- Light tubing - corrosion resistant & heat resistant
- Electric compressors - conventional with low requirements, 80 PSI with the capacity to handle volumes of 0.5 to 2.0 MMPCND - Multifaceted depending on the RGP and suction pressure with a capacity to handle 2,000 to 20,000 BPD of liquids and 0.4 to 3.0 MMPCND.
- Gas cooling units
- Gas purifiers and dehydrators
- Meter for commercial flow measurement
- Explosion proof systems of control
- Control valves
- Hard gas softening machines

Services:

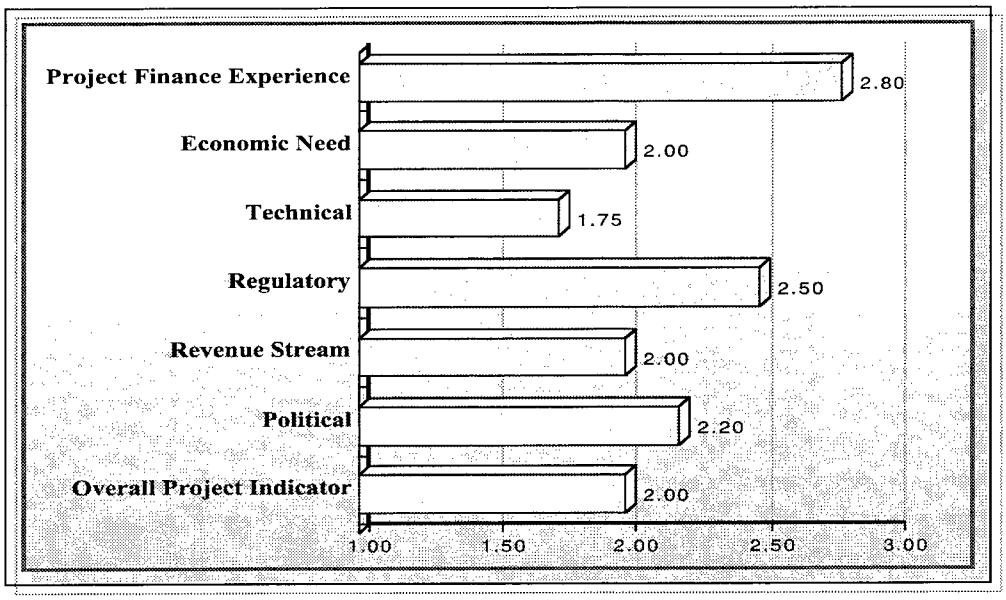
- Specialized engineering
- Installation specialists
- Testing specialists

Proposed Equipment and Services Expenditure

Item	Low Pressure	Gas Hydrocarbon Vapor	TOTAL
Studies	159	141	300
Engineering	425	400	825
Equipment/ Mater.	12,375	12,960	25,335
Installation	2,220	3,520	5,740
TOTAL	15,179	17,021	32,200

Exchange rate utilized Bs 497/1USD
Source: Maraven

Critical Project Indicators



Key Decision Makers

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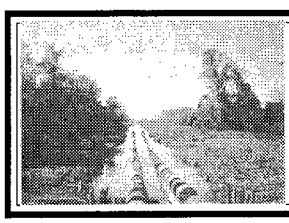
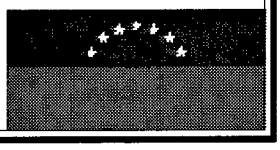


Energy / Venezuela

SINCOR Heavy Crude Upgrading Facility



Project Summary

Project No:	**ENE-33**
Subsector:	**Oil and Refining**
Location:	**Jose, Venezuela**
Project Cost:	**US$ 2.8 million**
Export Potential:	**US$ 1.6 million**
Type:	**Procurement**
Sponsor:	**SINCOR C.A.**

SINCOR C.A. is a strategic association composed of Maraven, S.A. (30%), Norsk Hydro ASA (15%), Statoil Venezuela A.S. (15%) and Total Venezuela (40%). The SINCOR project integrates upstream, refining and downstream operation. Extra heavy crude will be extracted from the Orinico River Belt and transported by pipeline to the coastal refinery, where it will be processed and transported to storage tanks and ocean vessels.

Technical Description

SINCOR Heavy Crude Upgrading Facility is an integrated on-shore oil exploration project which involves the development of an "Extra Heavy" oil field in Venezuela's Orinoco Belt. The extra heavy crude will be blended with a dilutent and transported via pipeline to an upgrader and loading facilities which are to be constructed at an industrial development site in the city of Jose in Anzoategui State.

Size/Capacity

The upgrader will produce 180,000 BPD of syncrude from 203,500 BPD of extra heavy crude, in addition to 6,000 MT/D of coke and 920 MT/D of sulfur.

The surface production facilities of the heavy crude upgrading facility will consist of well clusters and the main station, with several gatherings and a distribution system located between them. The upgrader is designed to convert extra heavy crude (8.5° API) into a synthetic crude of approximately 30° API, low sulfur content.

The crude produced from the Orinoco Field near Zuata will be diluted by means of a wide naphtha cut that comes from the upgrader and is pumped via a separate pipeline to the field in Zuata. The diluted crude will arrive by pipeline from the field, located approximately 220 Km from the upgrader, and will be stored in crude tanks.

The crude and dilutent pipes belong to Petrozuata facilities. The field is expected to start producing diluted crude for export before the upgrader is finished. An initial production facility will also be used during turnarounds at the upgrader.

Pipeline System

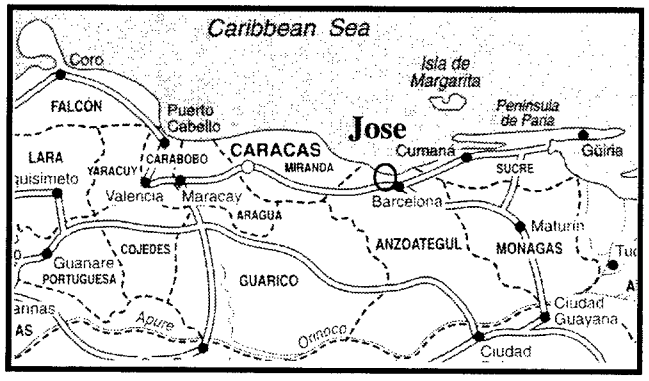
The pipeline system will consist of two 125-mile adjacent and parallel pipelines connecting the oil field production area in the Zuata region with the upgrader at Jose.

Crude loading will be done using the Jose Condominium loading terminal, which also includes all the transfer systems necessary to transport liquid products from storage to ocean-going vessels for export purposes. Solid products (coke and sulfur) will be exported through the Petrozuata solid terminal.

The feed rate to the plant is approximately 275,500 BPSD of 17 API crude. It will include a crude atmospheric and vacuum distillation units, a coker using Foster Wheeler technology and hydrogen and mild hydrocracker units of IFP technology.

Site

The upgrader will be located at an industrial site in the city of Jose, near Puerto Piritu, which is situated approximately 200 Km east of Caracas.



Nature of Demand

The oil industry accounts for 80% of total export revenue in Venezuela. The federal government has had great success in accelerating the privatization program within the oil and gas industry. A number of international operators have won bids to exploit Venezuela's marginal oil fields. Contract agreements with private companies stipulate that investors must assume all risk but will share the profits with the government.

PDVSA, the state-owned petroleum company, has entered into a number of strategic associations with international operators for heavy crude extraction and refining. PDVSA estimates that total investment in the oil sector will top US$ 68 billion over the next decade. A number of additional strategic associations between private operators and various subsidiaries of PDVSA have been congressionally approved or are near approval. These include: Maraven - Conoco (2.2 billion); Corpoven - Atlantic Richfield (3.5 billion); Corpoven - Texaco; Lagoven - Mobile (2.3 billion).

Project Status

The timeline for the heavy crude upgrading facility is 58 months, from Downstream Basic Engineering (BE), which commenced in February 1997, to start-up completion at year-end 2001. Key milestones for the project are listed below.

Project Milestones

Upstream	
Basic engineering starts	May 1997
Basic engineering completion	Jan 1998
Initial production phase (completion)	Aug 2000
EPC contract award	Aug 1998
Downstream	
Basic engineering-start of activities	Feb 1997
Site preparation	Feb 1998
Basic engineering-completion	Jan 1998
EPC contract award	Aug 1998
Site preparation/completion	Mar 1999
Mechanical completion	Aug 2001
Startup completion	Nov 2001

Finance

All project sponsors are large multinational oil companies with solid credit ratings.

Equipment and Service Procurement

Equipment and services procurement contracts will be awarded through an international bidding process, with Venezuelan companies being given preference to the extent that it is economically viable. Due to the complexity of the project, SINCOR estimates that the overall foreign content will reach approximately 55%. Equipment and services procurement will include the following:

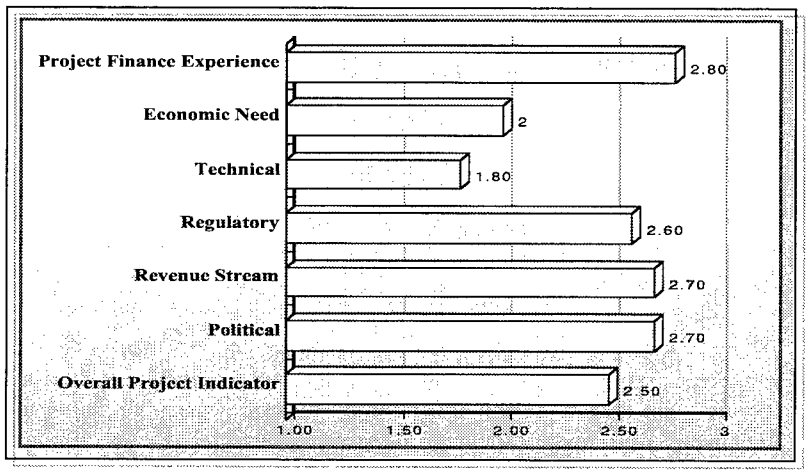
Equipment:

- Piping
- Upgrader
- Loading facilities
- Distribution system
- Well clusters
- Crude tanks
- Vacuum distillation units
- Crude atmospheric units

Services:

- Specialized Engineering
- Design
- Transport

Critical Project Indicators



Key Decision Makers

Company	SINCOR
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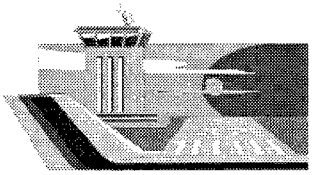
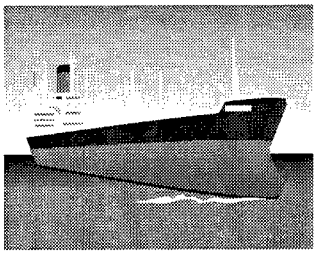
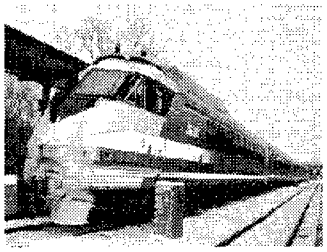
The Transportation Sector in South America







Introduction

Transportation impacts South America's opening to foreign trade and investment more than any other sector. The growth of trade both with the rest of the world and within Latin America has placed a tremendous strain on the region's outmoded and often inefficient transportation links.

South American governments realize that if they want their products to remain competitive in world markets they must reduce the time and cost of shipping those goods. The dominance of transportation projects in this book are a reflection of this fact.

53 Transportation Projects

Total Value	US$ 22.78 Billion
US Export Potential	US$ 5.58 Billion
Urban Mass Transit	10
Ports	16
Airports	4
Highways	5
Bridges	4
Rail	9
Inland Waterway	2
Intermodal	3

Simultaneously, public resources are becoming scarce as governments attempt to bring stability to their economies. With limited public resources, many countries turned to private concessions and other innovative schemes to bring private sector investment into the transportation sector. Throughout South America the transformation has been stunning as private sector entities have begun operating and building ports and new terminals, owning rail lines, building airport terminals and even runways, and constructing and operating roads for profit.

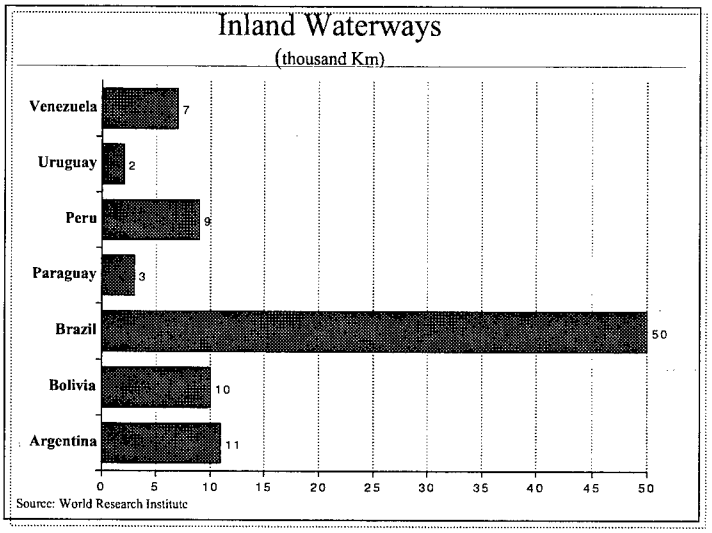
Ports and Waterways

South America's geographic position and growing trade relationships with the US, Asia and Europe have made port investments a priority for the region. Ports have traditionally played an important role in moving goods in and out of South America, but at the same time many government owned ports became synonymous with inefficiency and delays. For example, the major Brazilian ports for São Paulo and Rio de Janeiro have some of the highest cost structures in the world, charging almost US$ 200,000 to unload 300 containers.

To improve efficiencies, most South American governments have implemented concession programs that allow private sector entities to directly own and operate terminals on the basis of long term concession agreements. Opportunities are broad-based with new infrastructure being built in bulk liquids, containerized cargo, bulk solids, and for agricultural items such as fruits and vegetables.

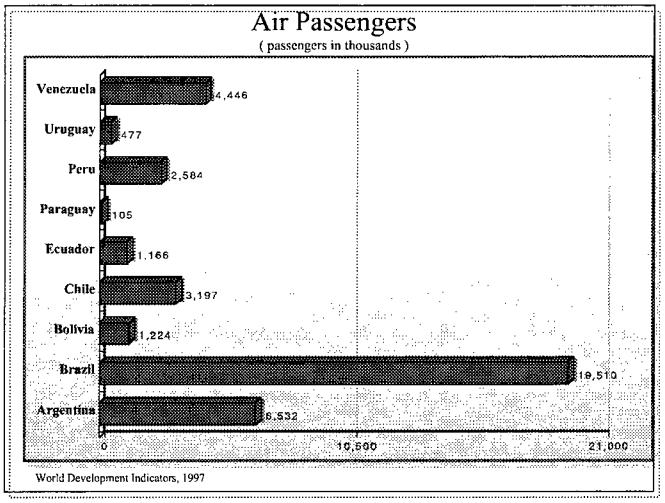
As the private sector wins these concessions, they often need to invest in new equipment, not only heavy cargo moving equipment, but in the computer control systems and telecommunications equipment necessary to manage efficient operations. These concessionaires sometimes lack expertise on certain port operations and require specialized training and advisory services.

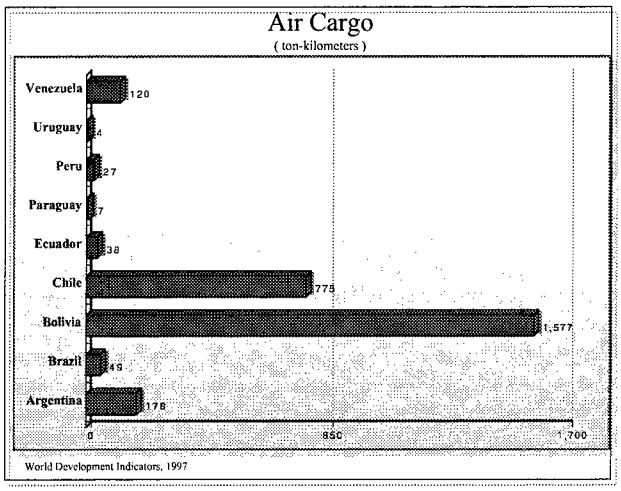
South America also has an extensive network of inland waterways and these networks have important potential in facilitating not only export trade but trade among South American countries. The Southern Cone and Brazil have been aggressive in promoting inland waterways through initiatives involving the Tiete-Parana rivers to tie Brazilian markets with those in Paraguay, Argentina, Uruguay, and Bolivia.



Airports

Airports are being strained as trade booms in the region and they must confront the dual demands of both increased passenger and cargo traffic. In most South American countries there is one major international airport that serves as a hub for the country as a whole and these entities are often the first to hit capacity constraints. Also, as air safety standards tighten around the world, major South American airports need to invest in state-of-the-art air traffic control systems, sophisticated radar and other safety tools.





As free trade and economic growth create new development centers, there is a growing demand for regional airports and regional hubs. These regional airports that have typically operated with low volumes but are now being pushed into becoming first class regional hubs, requiring extensive upgrades of facilities and equipment.

US equipment and service suppliers and investors should expect a large number of airport projects to be undertaken in 1997 and 1998. Major investments are being taken in almost every South American country, with 5 major projects being concessioned in 1997 in Chile alone.

There are even opportunities for investors to take advantage of airport related sub-concessions. Although overall airport operations and air traffic control generally remain the responsibility of federal governments, several governments are implementing schemes to allow private sector participation in sub-concessions. For example, private sector concessions for new terminals and airport parking garages are now commonplace. Colombia has an innovative scheme where a private sector firm was given a concession to build a new runway and will be paid a percentage of future landing fees.

Roads and Bridges

The construction of new roads and bridges was one of the first priorities of South American governments as this infrastructure was often poorly maintained and a major impediment to the circulation of goods and passengers around the country. Even countries that had significant highway networks, found that by the end of the 1980's, the quality of these networks was poor and the cost in terms of lost efficiency high.

For example, Peru alone estimates that it will require an estimated US$ 1.3 billion simply to maintain and upgrade 4,700 Km of existing roadway. Indeed, out of Brazil's extensive road network, 30% is inoperable due to lack of maintenance.

Faced with these daunting investment needs, South American governments turned to the private sector to build and operate these new roads as toll concessions. Problems arose with the structuring of many of these concessions and some projects proved overly ambitious.

The construction of new roads and bridges will be widespread throughout Latin America but several areas will be priorities:

Export Corridors

These project involve the construction and upgrade of roads that connect production and industrial zones with new infrastructure such as ports or railway terminals.

Metropolitan Ring Roads

South American metropolitan areas have continued to grow at high rates, engulfing existing ring roads and clogging them with traffic. New ring roads are much needed to allow the efficient transportation around these urban areas.

Border Crossings/Bridges

Market integration, spurred by initiatives such as the Mercosur trade treaty, is driving the need for more efficient border crossings. Examples of this need abounds in current and planned projects such as the Rosario-Victori Bridge in Argentina, the Santo Tomé - San Borja Bridge between Argentina and Brazil, the Puente de Amistad (Brazil/Paraguay), and the US$ 1 billion Buenos Aires bridge to Colonia in Uruguay.

These projects are providing opportunities not only for US heavy construction equipment but also for US technology products as many of these roads and border crossings involve automatic toll collection, weigh stations, x-ray and other scanning and tracking technology involved for customs clearance.

Railroads

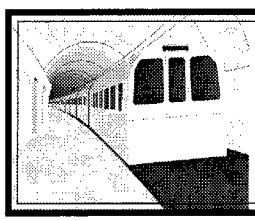
Over the past several years, South American governments have undertaken major privatizations of the region's rail network. The existing infrastructure is for the most part quite poor, and the new owners will need to make substantial investments to improve the efficiency of these systems.
For example, Brazil's federal railway system is almost entirely privatized with investment needs exceeding US$ 4 billion in order for the system to be competitive and efficient over the next 30 years. In Argentina, where the government has now privatized all but one of its rail lines, the private sector has invested up to US$ 2.5 billion in system rehabilitation. Peru is privatizing 3 major cargo lines and Chile has announced the privatization of its passenger rail network. The current federal rail entity estimates the Chilean system will require $350 million in new investment.

Privatization opportunities still exist for investors and US equipment and services companies will find a strong market from the newly concessioned networks. Opportunities will include the rehabilitation of track, environmental remediation, high quality concrete and treated wood ties and rolling stock, signaling, telecommunications and inventory tracking equipment.

Railroads Installed
(kilometers)

Argentina	**34,172**
Bolivia	**3,684**
Brazil	**28,828**
Chile	**7,766**
Paraguay	**970**
Peru	**1,801**
Uruguay	**3,000**
Venezuela	**542**

Source: World Research Institute 1997



Transportation / Argentina

Metrovias Capacity Increase Program

Project Summary

Project No:	**TRAN-01**
Subsector:	**Urban Mass Transit**
Location:	**Buenos Aires**
Project Cost:	**US$ 672 million**
Export Potential:	**US$ 150 million**
Type:	**Procurement**
Sponsor:	**Metrovías S.A.**

Metrovías S.A. is a major player in the Argentine transportation sector. The corporation's controlling shareholder is Roggio S.A., one of the oldest and most important construction companies in Argentina.

In 1993, Metrovías won a 20-year BOT concession to operate the Buenos Aires subway network. The concession also entailed the obligation to fulfill investments stipulated in the Modernization Program of the Argentine government. Total subway infrastructure requirements are expected to reach approximately US$ 672 million.

Technical Description

Subway Network

The Buenos Aires subway network has 5 lines which cover a total of 37 kilometers, with 63 stations and a 7 kilometer line under construction. Various technologies were adopted on each of the lines, resulting in minimal compatibility between them. The subway has been insufficiently maintained and most of its components will need to be replaced and technologically brought up to date.

The project entails infrastructure investments for the modernization of Line A and the construction of Line F. The following provides a brief description of the modernization plan's general characteristics and principal infrastructure investments:

Modernization of Line A

Estimated infrastructure investment required:
US$ 136 million

Modernization of Line A will entail a line extension to the Plaza Flores, and the construction of three new stations: Carabobo, Puan and Plaza Flores.

TRAINS

- 23 trains will be procured. Each train will be 17 meters long, with a 184 passenger capacity.

TUNNEL

- will be extended to 2,420 meters with a total height of 7.7 meters.

CONSTRUCTION OF 3 STATIONS

Carabobo and Puan stations

- Both stations will have a 110 meter lateral platform and an area containing ticket booths, bathrooms, technical support offices, escalators and fire prevention installations.

Plaza Flores Terminal Station

- will have a central platform and train turnaround area, areas for housing electric substation, signaling equipment and personnel/technical support offices. The station will also require bathrooms, ticket booths, escalators and fire prevention installations.

ELECTRIC SUBSTATION

- An electric substation transformer/rectifier and an overhead power cable with remote control sections will be installed. The substation will have an installed potential of 2 x 2500 MW.

SIGNALING AND CONTROL

- A signaling system compatible with the systems already operational in lines C, D and E will be installed. The system will have continuous Automatic Train Protection (ATP) which will allow for a 2 minute interval between trains. The signaling system will be integrated into the Central Operations Post which is currently under construction under 9 de Julio Avenue and Alsina Street.

COMMUNICATIONS SYSTEM

A ground-train communications system will be installed.

VENTILATION SYSTEM

Forced ventilation system which will permit air flow into lobbies and platforms and air out-take below platforms.

Construction of Line F

Estimated infrastructure investment required: **US$ 537 million**

Line F will unite 2 key Buenos Aires stations: Constitution and Plaza Italia. The line will cross Lines A, B, D and E below avenues Entre Ríos, Callao and Las Heras, with a total extension of 7.6 Km and 12 stations.

TRAINS

- 22 trains will be procured. Each train will be 17 m long with 5 cars a 184 passenger capacity.

TUNNEL

- Concrete construction.

STATIONS

Constitución
- Will be transformed into terminal station for Line F. Construction of escalators connecting with F.C. Roca station.

San José
- This existing station will be reconditioned.

Chile
- Currently has a lobby and lateral platform. 4 entrances to the station will be constructed.

Rivadavia
- 6 entrances, a lobby, a central platform and a passageway to Congreso Station on Line A will be constructed.

Corrientes
- Will have 3 entrances, a lateral platform and a transfer passageway to Callao Station on Line B.

Córdoba
- 4 entrances and a combination tunnel with Callao Station on Line D.

Arenales, Recoleta, Gelly y Obes, Billinghurst y Uragteche

- Each will have a lobby, lateral platforms and 4 entrances.

J. Zoológico
- 5 entrances and a communication tunnel with Plaza Italia Station on Line D.

ELECTRIC SUBSTATION

- 3 substations, each with 3 groups of transformer/rectifiers with a 2,500 kW installed potential and an 1500 V overhead power cable.

SIGNALING AND CONTROL

- The system will have continuous Automatic Train Protection (ATP) which will allow for a 2 minute interval between trains. The signaling system will be integrated into the Central Operations Post which is currently under construction under 9 de Julio Avenue and Alsina Street.

COMMUNICATIONS SYSTEM

A ground-train communications system will be installed.

VENTILATION SYSTEM

Forced ventilation system which will permit air flow into lobbies and platforms and air out-take below platforms.

Site

Line A follows Rivadavia Avenue. Line F will unite the Constitution and Plaza Italia metro stations.

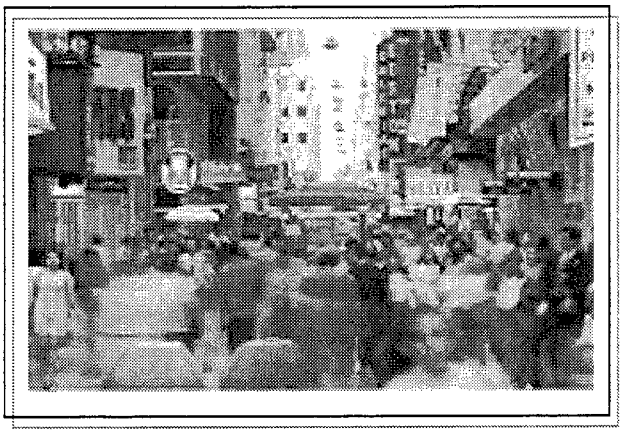
Nature of Demand

The Metropolitan Region of Buenos Aires, with approximately 12 million inhabitants, is one of the world's "megacities." This population generates more than 17 million passenger trips and 500,000 cargo trips per day. The Buenos Aires mass transit system consists of an ample rail network, a relatively small subway system and an extensive network of taxis.

Buenos Aires experiences serious congestion problems which have elevated over the past several years while the city's rail and subway networks have deteriorated. Continued deterioration has increased public reliance on taxis and personal vehicles, a situation which has aggravated road congestion and air pollution problems.

Evolution of Transportation in the Buenos Aires Metropolitan Area

Transport	1970	1991	1995
Rail	8.4	6.2	8.1
Subway	7.0	4.0	5.0
Bus	68.1	62.3	49.1
Private	16.5	27.5	37.8
Total	**100.0**	**100.0**	**100.0**



The Buenos Aires subway is one of the oldest in the world and was the first to be constructed in Latin America. The subway network is rapidly deteriorating and is in dire need of station repair, rolling stock replacement and technological modernization. Trains operating on Line A are the same trains which were purchased when the line was inaugurated in 1913.

Currently, the subway network has 63 stations and only 4 transfer points between lines. The construction of Line F will help to alleviate this problem.

Project Status

Modernization Line A is expected to be completed over a period of 2 1/2 years. Puan Station should be inaugurated in early 1999, Carabobo at year-end 1999 and Plaza Flores during mid-2000. Line F will be completed over a period of 4 years.

Financing

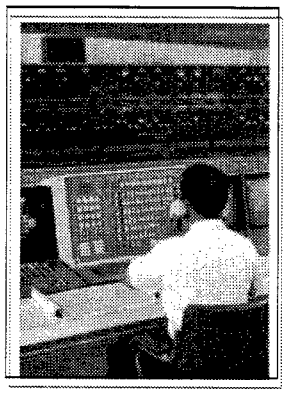
Modernization of Line A will require a total investment of US$ 135 million over 2 and 1/2 years and Line F will entail US$ 536 million over 4 years.

Metrovías intends to finance subway modernization through internal funds, supplier credits (particularly for trains and electromechanical equipment), and assistance from multilateral institutions. A slight tariff increase might also be eventually implemented to cover loan repayment.

Equipment and Service Procurement

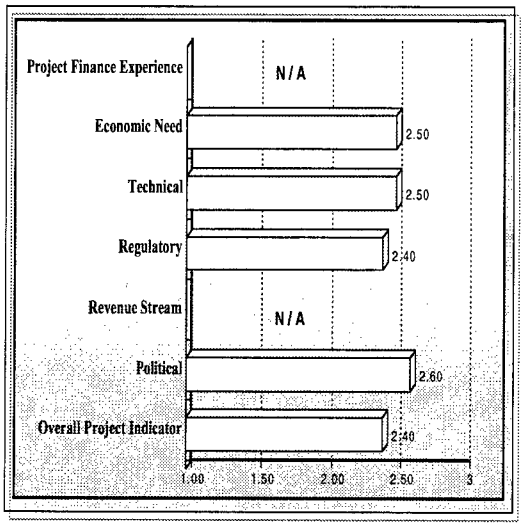
The estimated US export potential for this project is US$ 150 million, including:

- 45 trains (17 m long, 184 passenger capacity)
- ATP Signaling systems
- Fire prevention installations
- Equipment for central operations post
- Ground-train communications systems
- Transformers
- Electric power centers
- Track renovation (rail type UIC54)
- Escalator installation and renovation
- Installations for new maintenance areas
- Electric substation with 2 x 2500 MW installed potential
- 3 substations (2,500 kW installed potential)
- Overhead power cables
- Pumping equipment
- Ventilation systems
- Transfer corridor renovation and construction
- Tunnel construction



Central Operations Post will facilitate supervision and remote control of the network

Critical Project Indicators



Key Decision Makers

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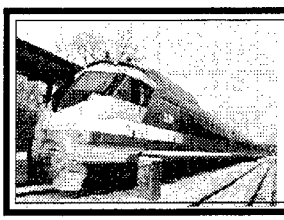


Transportation / Regional

Southern Transandean Railroad

Project Summary

Project No:	**TRA-02**
Subsector:	**Rail**
Location:	**Argentine/Chilean Border**
Project Cost:	**US$ 200 million**
Export Potential:	**US$ 80 million**
Type:	**Concession**
Sponsor:	**Province of Neuquen**

Technical Description

The project will include the construction of the 220 Km Zapala-Lonquimay rail link and the rehabilitation of the Choele Choel-Zapala and Lonquimay-Cautín rail connections. Financing the latter 2 connections will be the responsibility of the Ferrosur Roca railroad in Argentina and the Ferrocarril Sur railroad in Chile.

Plan of Operations

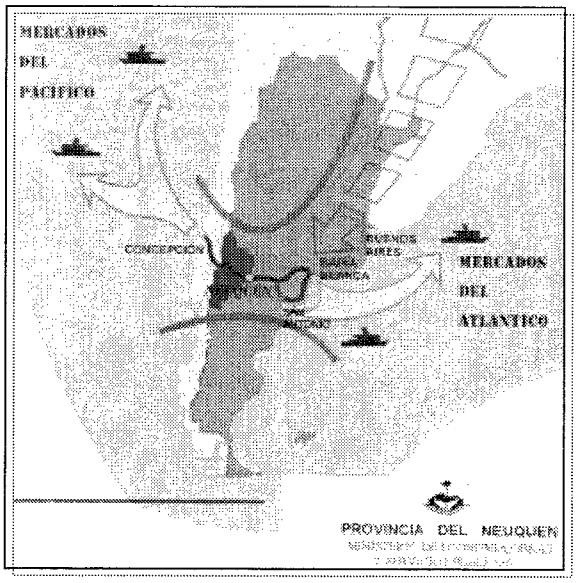
Operation of the Transandean Railroad will be segmented into 4 districts, including:

District 1:	Talcahuano-Lonquimay
District 2:	Lonquimay-Zapala
District 3:	Zapala-Choele Choel
District 4:	Choele Choele-San Antonio Este

On of the principal limitations of train operation is the coupling of rail cars and locomotives, which restricts rail car weight to 30,000 kg. Although new designs permit a weight of up to 38,000 kg., the need to interchange lines impedes their use. As a consequence, rail companies must purchase more trains which weigh less.

Site

The Southern Transandean Railroad will unite Chile's Talcahuano Port on the Pacific Ocean with laterally corresponding Argentine ports on the Atlantic. The Railroad will directly influence the regions of Bio Bio, Araucanía and los Lagos in Chile and the provinces of Neuquén and Río Negro in Argentina.



Nature of Demand

Since the early 1900s, the idea to construct a rail line between the Argentine city of Zapala and the Chilean city of Lonquimay which would complete a bioceanic railroad connection has been in existence. The rail link is considered vital to regional development in the Southern Cone, since uniting the Bahía Blanca and Talcahuano ports will create a commercial corridor between the Atlantic and the Pacific oceans.

Argentina and Chile are associate partners in the MERCOSUR Southern Cone free trade area, which also includes Brazil, Paraguay and Uruguay. Since the MERCOSUR agreement was signed in 1993, regional trade has increased by over 30 %. Completion of the Southern Transandean Railroad link will effectively double annual cargo movement between Argentina and Chile, in addition to providing access to intraregional cargo movements among MERCOSUR countries. The primary Argentine provinces which will utilize to the Transandean link (Buenos Aires, Neuquén, Santa Fe, Río Negro and La Pampa) represent over 63% of the country's total exports.

1996 Cargo movement (tons/yr)	
Argentina to Chile:	1.6 billion
Chile to Argentina:	700 million

Project Status

In 1993, Bechtel completed a prefeasibility study, funded jointly by TDA and the Province of Neuquén, for the construction and operation of the Southern Transandean Railroad. After an in -depth analysis of existing studies, interviews with potential participants and rolling stock, rail line and port site inspec-

tions, Bechtel concluded that under certain conditions, the construction and operation of the new railroad would be sufficiently feasible to justify more detailed studies.

On August 26, 1994, President Carlos Menem of Argentina and Chile's President Eduardo Frei signed an agreement which provided binational support at the federal level for moving forward with the Southern Transandean Railroad project. In October of that same year, the governors of Buenos Aires and Neuquen, Argentina's Secretary of Transport and Minister of External Affairs signed a protocol agreement which initiated the construction of the first 14 Km of the 220 Km which will eventually unite Zapala and Neuquén.

Technical, economic and institutional feasibility studies should commence in early 1998. The bidding process for the concession of the Zapala-Lonquimay rail link is expected to follow completion of the studies.

Financing

Although financial details are not fully defined, preliminary studies indicate that the concessionaire will finance construction of the Zapala-Lonquimay rail link while Ferrosur Roca railroad of Argentina and the Ferrocarril Sur railroad of Chile will be responsible for financing the rehabilitation of the Choele Choel-Zapala and Lonquimay-Cautín rail connections.

Potential financing assistance may become available through multilateral institutions such as the World Bank and the Inter-American Development Bank, export credit institutions such as EXIM Bank, supplier credit, international commercial bank loans and governmental or other institutional funding within Chile and Argentina or in other South American countries.

Equipment & Service Procurement

The estimated US export potential for this project is US$ 180 million, including:

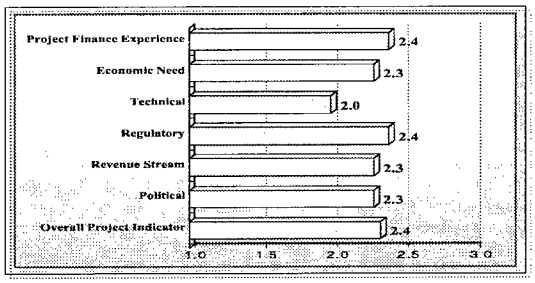
Equipment:

- Rolling stock (US$ 150 million)
- 440 Km of rail and railroad ties
- Supply/repair shops & storehouse equipment

Services:

- Basic and design engineering
- Feasibility/technical studies

Critical Project Indicators



Key Decision Makers

Company	Bolsa de Comercio de Bahía Blanca
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Address	Sarmiento 567, Piso 2, Of. 212 Buenos Aires, Argentina
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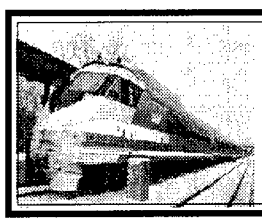
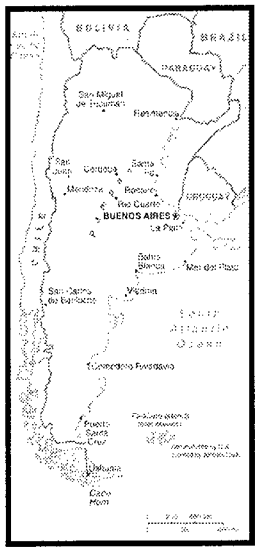


Transportation / Argentina

Modernization of the Belgrano Train System



Project Summary

Project No:	**TRAN-03**
Subsector:	**Rail**
Location:	**Central-Northern Argentina**
Project Cost:	**US$ 405 million**
Export Potential:	**US$ 250 million**
Type:	**BOT/Joint Venture**
Sponsor:	**Ministerio de Economía y Obras y Servicios Públicos de la Nación**

Ferrocarriles Belgrano is a company incorporated under the Ministry of Economy of Public Works and Services in 1993. Since inception the company has invested heavily in rolling stock, information, telecommunications, and civil works amounting to US$ 120 million. US$ 35 million in additional investment was been undertaken by the Ministry in 1997. Commencing with a Total-Quality program, the Belgrano train is poised to become one of the most important in Argentina.

Technical Description

The project restructures the entire train system to create uniform circulation velocity throughout the network compatible with current and future market needs. In addition, the modernization involves revamping current train terminals, warehousing units, and towing areas. Remodulation of the system will include the provision of new locomotives, more advanced switching equipment and controlling devices. Recycled materials will also be included in the form of refurbished parts and replacement rails.

Complementary to the modernization of existing train services, the modernization program will require a US$ 6 million investment in new satellite telecommunications equipment. The communications network will administer operations throughout the rail network, including dispatching and scheduling. The "BELSAT" will generate real time information access through operations and administration.

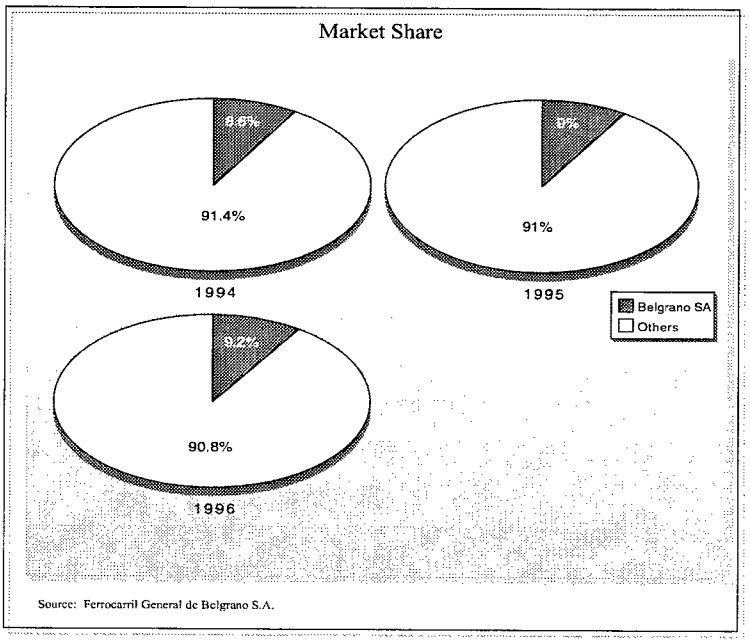
Site

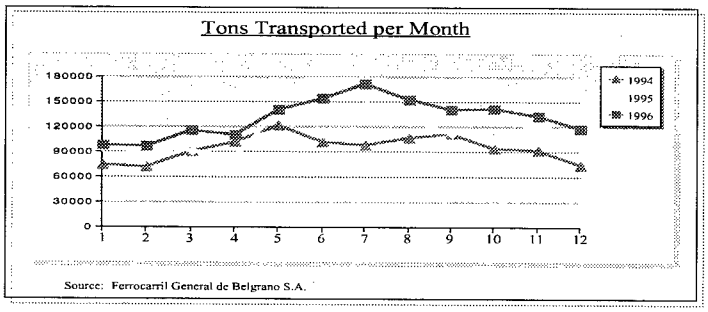
The project includes the entire train network extending through 13 provinces in Argentina located in the central to northern part of the country.

Nature of Demand

The principal strategic definition of the Belgrano train system is to integrate the most important region in Argentina. The project is critical to the countries ability to transport bulk shipments of grains and other products to the Southern Cone Region. Covering 13 Argentine provinces, of which the largest growth sector is mining such as Rioja, Catamarca, and Salta, the Belgrano train also services an increasingly important industrial sector.

In addition to mining products, the train expects to increase the transportation of petroleum and other fuels (liquid or gaseous) as well as agricultural commodities such as rice, corn and soy bean.





As the tables demonstrate, demand in tonnage of transported product has steadily increased through the years, of which the company has gained considerable market share.

Project Status

The project has advanced steadily since inception in 1993. By the end of 1997, government investments of US$ 155 million will have been undertaken, leading the way for private investments of US$ 250 million.

Financing

The project's financial structure is currently undefined. Nevertheless, Ferrocarril General Belgrano is considering either a BOT concession or a joint venture arrangement.

Equipment and Service Procurement

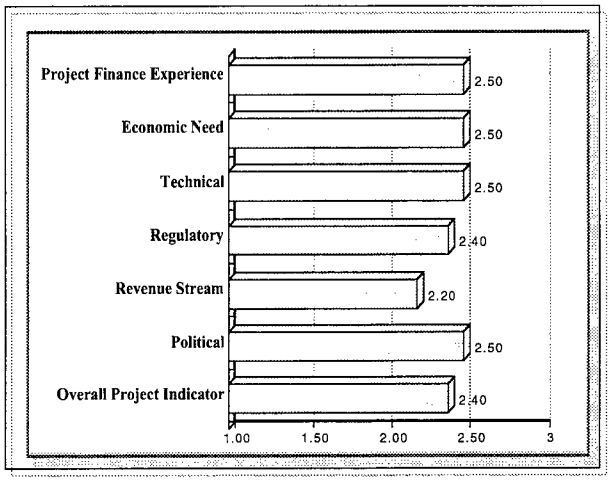
Equipment:

- 10 New Locomotives
- 10 Refurbished Locomotives
- 1000 New Freight Cars
- 1000 Refurbished Freight Cars
- Rehabilitation of Line and Works
- Signaling Equipment
- Control Panels
- Electrical Equipment
- Spare Parts
- Satellite Communications Equipment

Services:

- Engineering Services
- Freight Services
- Technical Services

Critical Project Indicators



Key Decision Makers

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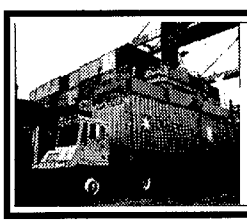


Transportation / Argentina

Puerto Seco Integral Loading Terminal

Project Summary

Project No:	**TRAN-04**
Subsector:	**Ports**
Location:	**Tucumán, Argentina**
Project Cost:	**US$ 10.5 million**
Export Potential:	**US$ 2.5 million**
Type:	**BOT Concession**
Sponsor:	**Puerto Seco y Zona Franca Tucumán - Desarrollo Portuario SA**

Puerto Seco y Zona Franca Tucumán - Desarrollo Portuario S.A. is the entity responsible for concessioning the development of the "Puerto Seco" Integral Loading Terminal to the private sector. Puerto Seco will serve as a dry port and customs terminal in the Province of Tucumán. The company plans to grant a BOT concession for infrastructure development and operation of the integral loading terminal.

Technical Description

The Puerto Seco Integral Loading Terminal will require all infrastructure (access, buildings, etc.) to efficiently conduct the following activities described below:

Foreign Trade:

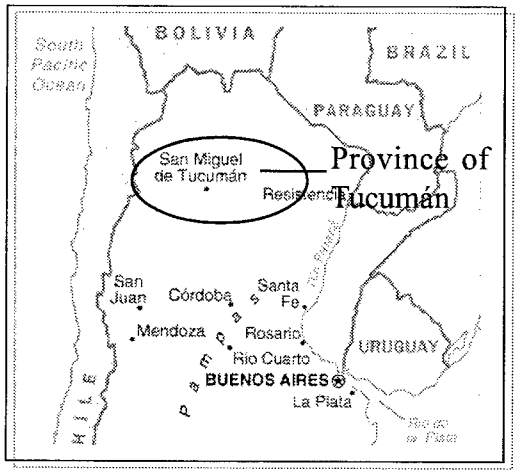
- Custom clearance of imports and exports
- Custom transit
- International transport control
- Zoo and fito-sanitary control
- Other controls

Foreign/Domestic Trade:

- Loading and reloading services
- Temporal containers and other goods storage
- Facilities for cruises: lodging, food, rest-rooms, etc.
- Mechanic facilities
- Other facilities such as banking, post office, insurance, etc.

Site

The project will be executed in province of Tucumán.



Nature of Demand

The Puerto Seco Integral Loading Terminal will substantially reduce cargo transit costs related to the inefficiency of the available transport alternatives in the Province of Tucumán. The charts on the right illustrate current tariffs for the Automotive and Rail Transport Systems in Tucumán. Primary objectives of the terminal include:

Load	Avg. Charge	Rate ($/Ton-Km)	Buenos Aires - Tucumán ($/Ton)	Total
General Load - Complete Truck	24 Ton	0.05	60	1,440
General Charge - Consolidated	16 Ton	0.072	86	1,380
Container 20'	20 Ton	0.056	67	1,340
Air-conditioned Container	19 Ton	0.073	88	1,670

Load	Rate ($/Ton-Km)
General Load	0.025
Container 20'	0.020
Container 40'	0.040
Air-conditioned Container	0.030

- Concentration of supply and demand, reduction of the Vehicle/Distance rate, improved occupation rates, reduced merchandise damage.
- Cost reduction through the optimization of means of transport, infrastructure and handling equipment.
- Coordination between various means of transport, improving regulation and documentation controls, overall simplification of import/export process.

Cargo transported via the Puerto Seco Integral Loading Terminal will satisfy demand in the Province of Tucumán and potentially also in Argentina's Northwest Region (provinces of Salta, Jujuy, Tucumán, Catamarca and Santiago del Estero). The following charts illustrate cargo movement and load demand projections for the terminal, both in Tucumán and in the Northwest Region of Argentina (NOA):

Region	Base Year 1994	Design year 2003
Tucumán	843,100 Ton	1,110,400 Ton
NOA	1,492,000 Ton	1,965,000 Ton

Item	Tucumán	NOA
Vegetable Origin Products	380,100	610,400
Animal Origin Products	10,500	29,100
Mineral Origin Products	50,400	80,900
Wood	1,900	23,100
Pulp Paper	101,000	179,200
Beverages	46,200	84,700
Construction Materials	8,000	83,600
Textile Materials	3,900	6,100
Other Products	101,000	146,700
Total Exports	**703,000**	**1,243,800**
Imports	**140,000**	**248,200**
Totals	**843,000**	**1,492,000**

Project Status

Pre-feasibility studies for the Puerto Seco Integral Loading Terminal have been completed. The project is now undergoing feasibility studies to further define infrastructure and financing requirements. The bidding process for the BOT concession should commence by the 3rd quarter of 1998, with an award by year-end 1998.

Financing

The terminal will be financed through a BOT concession, under an investment totaling between US$ 7 and US$ 10.5 million, depending on the scope of terminal construction chosen. In accordance with the design of load demand (both for Tucumán and for the Northwestern Region of Argentina), the following chart illustrates the capital that should be invested for the terminal's development.

Item	Area		Total Cost	
	Tucumán	NOA	Tucumán	NOA
Field	16	16	192,000	192,000
Stores	12,800	21,800	1,790,000	3,052,000
Containers Field	10,000	17,500	240,000	420,000
Parking & Streets	34,400	57,000	783,000	1,337,000
Buildings	6,800	9,650	2,080,000	2,980,000
Road Access	0.5 Km	0.5 Km	90,000	90,000
Rail Access	0.6 Km	0.6 Km	60,000	60,000
Others			22,000	39,000
Total			**5,257,000**	**8,170,000**

Item	Area		Total Cost	
	Tucumán	NOA	Tucumán	NOA
Cranes	2	3	753,000	792,000
Trucks	3	4	165,000	230,000
Balance	4	6	80,000	120,000
Auto-Elevators	14	24	470,000	810,000
Others			192,000	318,000
Total			**1,660,000**	**2,450,000**

Equipment and Service Procurement

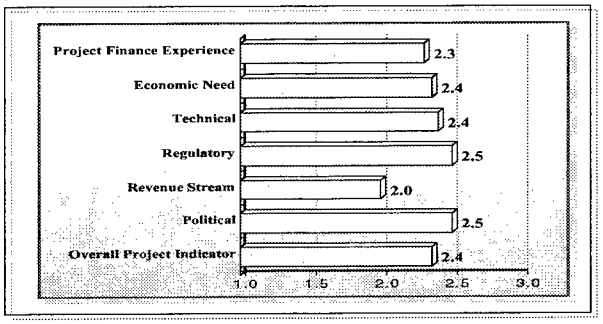
Equipment:

- Cranes
- Trucks
- Auto-elevators
- Rail

Services:

- Basic & Design Engineering
- Installation Services

Critical Project Indicators



Key Decision Makers

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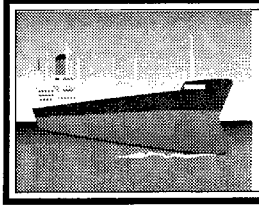
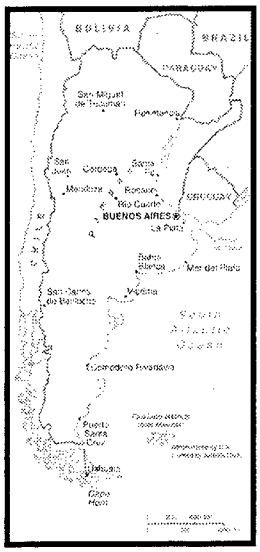


Transportation / Argentina

Port of Santa Fe Expansion



Project Summary

Project No:	**TRAN-05**
Subsector:	**Ports**
Location:	**Sante Fe, Argentina**
Project Cost:	**US$ 200 million**
Export Potential:	**US$ 80 million**
Type:	**Concession**
Sponsor:	**ENTE**

ENTE Administrador Puerto Santa Fe is the local agency given the directive to bring the ex-federal project to a state of efficient functionality and profitability. In doing so, the agency is looking to expand the port to meet the regional demand in agricultural exports in addition to mineral and product shipments. The expansion and efficiency will be achieved at through a concession to the private sector.

Technical Description

Current Infrastructure:

The Port of Santa Fe is expanding its ability to service the Mercosur region. The port is currently equipped with 66,000 ton silos used for storing grains and can load 10,000 tons per day for truck and rail transportation. The main elevator terminal is equipped to handle 1,400 tons per hour, 1,000 tons in one terminal and 400 in the second. Liquid storage tanks are also available with a capacity of 64,000 m^3 for the housing of liquid grains. Storehouses are also available for general cargo, in addition, to containerized terminal handling facilities for dry and cold storage.

Historically, the port has been an inefficient and unprofitable state-run organization. The result of government funded industrialization policies resulted in the problems experienced by the port during

the past 15 years. Today, the government has transferred management of the port to the local planning department of Santa Fe in order to bring it to an acceptable operational level and follow through with privatization.

Needed Works

The project will require dredging from a current depth of 24 m which will to be stabilized at 30 m throughout the year. The project will therefore require dredging of 3.5 million m^3 immediately and 2 million m^3 maintenance throughout the year.

In addition to the work on the river, the facilities will need partial refurbishment and modernization. Refurbishment will include the reconditioning of the silos, cranes and warehousing facilities. Modernization is composed of calibrating equipment, communications peripherals, special weigh stations and new refrigeration units.

Site

The port of Santa Fe is located on a peninsula of the Paraná River, 580 Km from the Atlantic Ocean. The port will soon benefit from the construction of a bridge that crosses the Paraná river, in addition to the joining of the Belgrano Railroad with Bolivia and Chile. Road construction is underway as well to deliver minerals to the port, and join the San Franciso and Santa Fe localities.

Nature of Demand

Agricultural, mineral and automotive exports comprise the nature of demand for the Port of Santa Fe expansion. Agricultural products which the port handles include soy, wheat, sunflowers and lemons. Sugar, a product which Argentina exports to the US, is expected to increase in volume in the near future. An increase from 12 to 40 million in grains produced in Paraguay and Bolivia over the next decade should result in the use of the Port of Santa Fe as an export corridor.

Mineral exports are anticipated to increase from US$ 500 million to US$ 6.5 billion by 2005. In addition, significant growth in the Argentine automotive industry, concentrated in the Department of Cordoba, is expected to increase the number of auto and auto parts exports.

Project Status

Port ownership was transferred to the provincial administrator on the 3rd of November 1997. The Project is set to go to bid on the 18 of December, 1997. The award date is scheduled for June 1998.

Financing

The project will be financed through a concession, either in the form of a BOT or BOO. Concession agreements and arrangements will be conducted in the short-term.

Equipment and Service Procurement

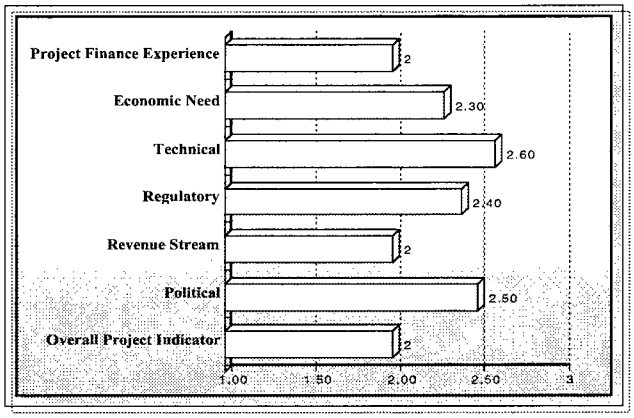
Equipment:

- Cranes
- Spare parts
- Refurbished parts
- Chassis
- Fork lift trucks
- Security equipment
- Computer equipment
- Communications equipment
- Weigh stations
- Containerization terminals

Services:

- Logistic specialists
- Engineering services
- Technology specialists
- Security services

Critical Project Indicators



Key Decision Makers

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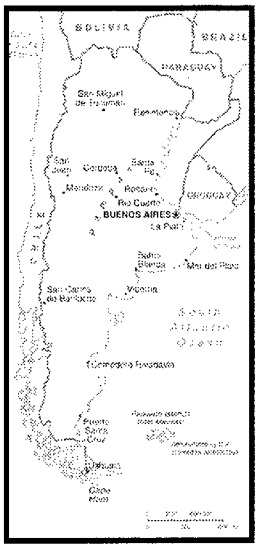
Transportation / Argentina

Expansion Plan - Metro Line H



Project Summary

Project No:	**TRAN-06**
Subsector:	**Urban Mass Transit**
Location:	**Buenos Aires**
Project Cost:	**US$ 320 million**
Export Potential:	**US$ 190 million**
Type:	**BOT Concession**
Sponsor:	**Secretariat of Production and Services of the Government of Buenos Aires**

The Secretariat of Production and Services of the Government of Buenos Aires is tasked with providing for the successful implementation of infrastructure growth in Buenos Aires. Line H will be expanded under a BOT Concession which will provide the government with sufficient funds for its eventual completion.

Technical Description

Line:

The cross-line "H," constructed within the Retiro Station and the Nueva Pompeya Station, is considered a priority in the expansion plan and, when finished, will constitute the longest line in the system. The project will connect the metro network in a North-South direction as it becomes integrated with the suburban trains. In doing so, line H will run directly into the most heavily traveled lines, A(Plaza Once Station), E(San Juan Station), B(Leandro N. Alemfedrico Lacroze Station), D(Catedral-Monroe Station) and C(Retiro-Constitucion Station), allowing for the expansion of a strategic section of the metro system. Line H will also provide further access to the commercial and service centers of the city, in addition to industrial working zones.

Line H will cross through 5 existing stations. A total of 9 additional stations will be constructed.

Repair Shop and Garage

As the longest line in the system, the project will include a repair shop and garage to house the 154-car inventory of rolling stock.

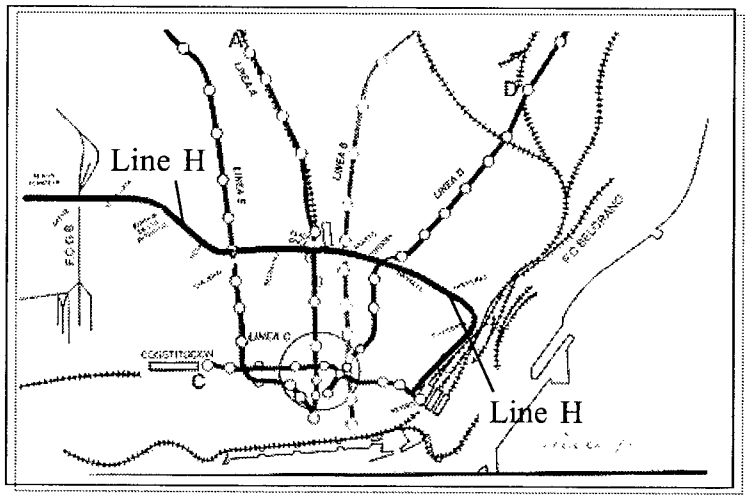
Distance Between Stations

Station	Distance
Retiro - Figueredo Alcorta	To be determined
Figueredo Alcorta - Las Heras	To be determined
Las Heras - Santa Fe	To be determined
Santa Fe - Córdoba	To be determined
Córdoba - Abasto	797 m
Abasto - Plaza Once	505 m
Plaza Once - Belgarano	696 m
Belgrano - San Juan	898 m
San Juan - Inclán	826 m
Inclán Parque de los Patricios	1,219 m
Parque de los Patricios - Uspallata	777 m
Uspallata - Saenz	755 m
Saenz - Nueva Pompeya	745 m

Source: Subterraneos de Buenos Aires

Site

Line H will connect with the subway network of the metropolitan region of Buenos Aires.



Nature of Demand

The metropolitan region of Buenos Aires has 12 million inhabitants. As one of the worlds "megacities," its subway network handles 17 million passenger trips and 500,000 cargo trips per day. Buenos Aires has serious congestion problems which have worsened over the past several years, while the city's public transportation system has deteriorated.

The Buenos Aires subway is the oldest in South America and one of the oldest in the world. With a deteriorating subway network, the demand for rehabilitation and expansion is significant.

Project Status

Pre-qualification and qualification will occur in late 1997 or early 1998.

Implementation Phases

Phase 1	Retiro - Once	30 months
Phase 2	Once - Parque los Patricios	12 months
Phase 3	Parque los Patricios - Nueva Pompeya	12 months

Source: Subterraneos de Buenos Aires

Financing

The project will constitute a 30-year BOT concession, with the government contributing US$ 40 million annually. Government disbursements will begin in July 1999 and will last eight years from that date. The funds are being allocated through the Permanent Fund for Amplification of the Network Law of 1987. The funds, audited and supervised by the government, will be used for civil works, tunnels and stations.

The government's participation will not adversely affect the concession. Respective voting shares will be utilized in the same manner as a joint venture or business arrangement. The government will in no way take responsibility for liabilities incurred by the concessionaire. The concessionaire will be responsible for the administration of services, payment and collection of funds.

Equipment and Service Procurement

Rolling Stock

- Rolling Stock of 134 Coaches (each with capacity of 40 seated passengers and 14 ft long)
- Substation transformers of 13.2 Kv at 1,500 Vcd voltage. The trains may be either driven manually of automatically

Track

- The running track will be laid directly on reinforced concrete slabs. The standard gage of the track will be 1.435 mm.

Signaling Systems

- System will be type CTC (Central Traffic Control)

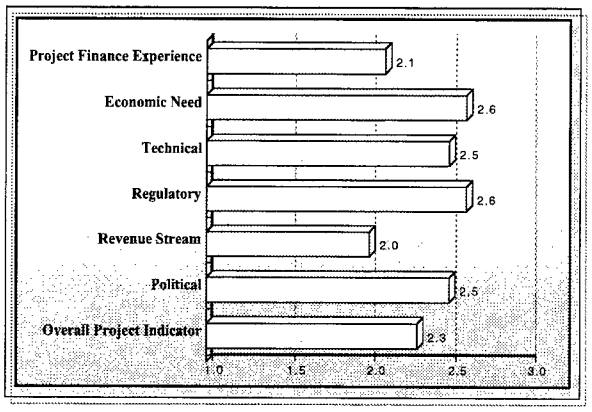
Telecommunications System

- Closed circuit television
- Internal communications
- Radio communication
- Sounding Equipment
- Recording Equipment

Auxiliary Systems

- Elevators, pumps, lighting
- Emergency booths
- Main Ventilation Duct
- Ventilation of technical rooms
- Escalators
- Fire detection system
- Ticket collection gates

Critical Project Indicators



Key Decision Makers

Company	Subte de Buenos Aires
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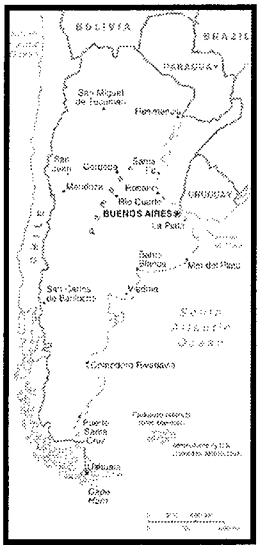
Transportation / Argentina

Córdoba Public Transportation System



Project Summary

Project No:	**TRAN-07**
Subsector:	**Urban Mass Transit**
Location:	**Córdoba, Argentina**
Project Cost:	**US$ 12 million**
Export Potential:	**US$ 10 million**
Type:	**Procurement / Concession**
Sponsor:	**Secretariat of Public Services, Municipality of Córdoba**

The Secretariat of Public Services of the Municipality of Córdoba is set on improving the public transportation system in Córdoba. To do so, the municipality will improve response times, schedules and the current tracking systems through an informatics/telecommunications concession. The tracking system will provide value-added information to the eight companies currently servicing the Córdoba metropolitan region.

Technical Description

The project involves the development of a fully-integrated system for passenger transportation throughout Córdoba. The municipality intends to improve pickup and drop off times for buses, as well as to provide real time information to dispatchers and travelers.

The traffic system is currently designed across 9 radio-centric corridors. All of the lines that make up the 9 corridors flow from downtown Córdoba toward the outskirts of the city. In total, 51 lines are organized in 9 radio-centric corridors, in addition to 4 lines that circle the city. Each bus company operates independently , instead of following a demand-supply traffic flow model.

The Córdoba bus system is expected to control 1,000 vehicles with the possibility of increasing to 5,000. To meet this objective, the Cordoba Public Transportation System will include a central control

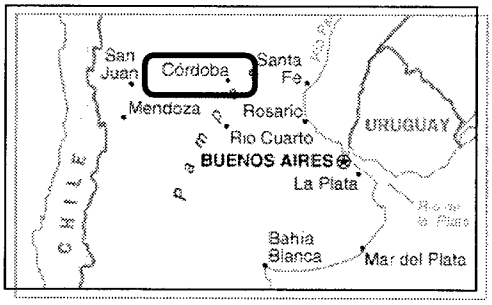
terminal to house the 8 companies that currently operate services. Central dispatch will provide statistical data for the future redesign of the system. In addition, the system will provide passengers with real-time data on the arrival times between bus stops included in an interactive computer set up at various locations throughout the city. The system may then be effectively managed for efficient bus frequency and regularity.

System Needs Synopsis:

- Communications equipment between vehicles and communications between the central control station and the 8 service companies, as well as from the 8 companies to their respective buses, all at real time (data sharing every 20 seconds).
- Tracking systems for all vehicles.
- Real time information for 300 stops throughout the system.
- Interactive computer terminals in strategic locations.

Site

Córdoba is located 710 Km northwest of Buenos Aires. It is the capital city of the Province of Córdoba.



Nature of Demand

Córdoba is increasingly becoming congested. Currently, there are 354,000 vehicles registered in the city. The need for efficient mass transportation is becoming more and more important to the development of the city's infrastructure. In an attempt to curtail the growth of vehicular traffic, the municipality is attempting to improve the system's ability to provide public transportation. Optimizing the service will provide clients with a reasonable alternative to driving into and throughout the city.

Project Status

Feasibility studies are currently underway for the development of a concession to install relevant equipment to meet project objectives. Qualification and pre-qualification will take place in November 1997.

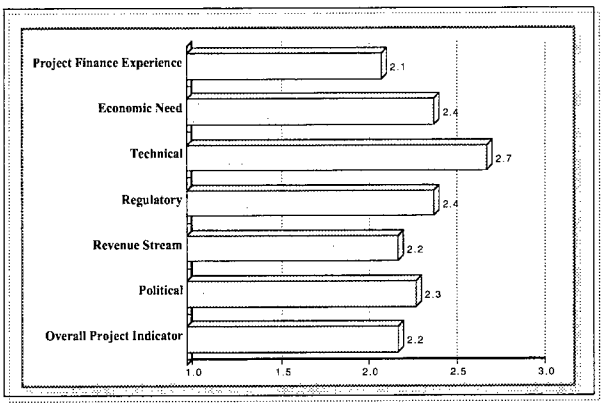
Financing

The municipality is looking for private financing through a BOOT or BOT concession. Thetype and length of the concession has not yet been determined. The IDB may participate in project financing, although no concrete decisions have been made on their part.

Equipment and Service Procurement

- Vehicular detection equipment for 1000 Buses
- Central Controller Station with digitized mapping of the city to provide real time data on all buses traveling within the system.
- Communications terminals for continuous data and information sharing between the 8 service companies and the Central Controller Station.
- Approximately 300 panels connected to the Central Controller Station to provide real time arrival and departure times for the public.
- 6 Interactive Panels providing information to users in strategic high traffic areas.

Critical Project Indicators



Key Decision Makers

Company	Municipality of Córdoba
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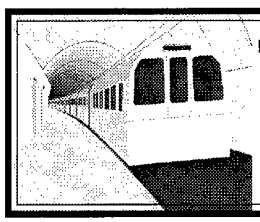


Transportation / Argentina

Urquiza Electric Train Renovation

Project Summary

Project No:	**TRAN-08**
Subsector:	**Urban Mass Transit**
Location:	**Buenos Aires**
Project Cost:	**US$ 36 million**
Export Potential:	**US$ 10 million**
Type:	**Procurement**
Sponsor:	**Metrovías S.A.**

Metrovías S.A. is a major player in the Argentine transportation sector. The corporation's controlling shareholder is Roggio S.A., one of the oldest and most important construction companies in Argentina.

In 1993, Metrovías won a 20-year BOT concession to operate the Buenos Aires subways and Urquiza electric train. The terms of the concession obligate Metrovías to upgrade the safety and efficiency of the system. The program has the full on-going support of the Argentine government. Total infrastructure requirements are expected to reach US$ 36 million.

Technical Description

Urquiza Electric Train

The Urquiza Electric Train is the newest addition to the Buenos Aires mass transit system. It covers 25 Km of track with 23 stations and links Subway Terminal B to the suburbs of Buenos Aires. Urquiza has standard gauge and receives electric power by third rail. The electric train's infrastructure and rolling stock, which was purchased in 1973, is relatively modern.

Site

The Urquiza Electric Train extends from Subway Terminal B to the suburbs of northeastern Buenos Aires.

Nature of Demand

The Metropolitan Region of Buenos Aires, with approximately 11 million inhabitants, is one of the world's "megacities." This population generates more than 17 million passenger trips and 500,000 cargo trips per day. The Buenos Aires mass transit system consists of an ample rail network, a relatively small subway system and an extensive network of taxis.

Congestion problems in Buenos Aires have grown over the past several years while the city's rail and subway networks have deteriorated. Continued deterioration has increased public reliance on taxis and personal vehicles, a situation which has aggravated road congestion and air pollution problems.

In 1995, Metrovías transported 187.2 million passengers.

Evolution of Transportation in the Buenos Aires Metropolitan Area

Transport	1970	1991	1995
Rail	8.4 %	6.2 %	8.1 %
Subway	7 %	4 %	5 %
Bus	68.1 %	62.3 %	49.1 %
Private	16.5 %	27.5 %	37.8 %
Total	**100 %**	**100 %**	**100 %**

Project Status

Metrovias is currently modernizing the Urquiza electric train, as part of its concessionary arrangement, by replacing obsolete equipment, tracks and signals. Increased demands placed on the train have made these renovations a higher priority.

Financing

Metrovías intends to finance the Urquiza Electric Train modernization mainly through internal funds and supplier credits (particularly for trains and electromechanical equipment). A slight tariff increase might also be eventually implemented to cover loan repayment.

Equipment and Service Procurement

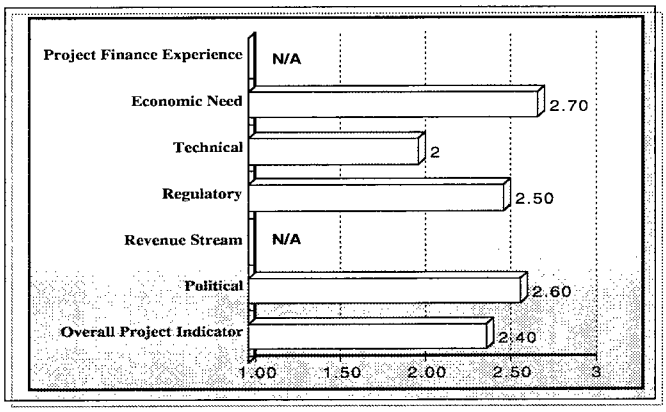
Equipment:

- Track renovation equipment
- Repair shop equipment
- Communications system
- Renovation of track #3 (2,000 meters)
- Cables (medium tension)
- Automatic signaling system
- Centralized Train Control (CTC) system

Services:

- Construction of vehicular crossings
- Laying cables
- Track renovation

Critical Project Indicators



Key Decision Makers

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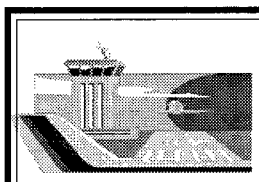
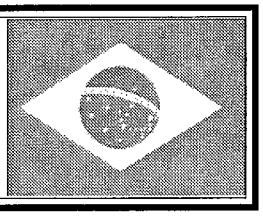


Transportation / Brazil

Riberao Preto Airport Expansion



Project Summary

Project No:	**TRAN-09**
Subsector:	**Airport**
Location:	**São Paulo, Brazil**
Project Cost:	**US $35 million**
Export Potential:	**US $14.25 million**
Type:	**BOT Concession**
Sponsor:	**Departamento Aeroviario do Estado de São Paulo (DAESP)**

Departamento Aeroviario do Estado de São Paulo (DAESP) is the State executive authority holding the concession for managing 31 airports within the State of São Paulo, including Ribeirao Preto. DAESP plans to transfer its concession for the Ribeirao Preto Airport to private hands through a BOT concession, and has requested Federal and State government approval for this transfer.

Technical Description

DAESP is promoting the Ribeirao Preto Airport as a regional "gateway to Mercosur," and plans to grant a 15-20 year BOT concession to ensure private sector participation.

Under the DAESP master plan, the Ribeirao Preto Airport Complex will eventually include a new passenger terminal, a cargo terminal and facilities, a multi-modal terminal (rail, air, highway), a maintenance facility, a 100-room hotel, a shopping center, a convention center and exhibit hall, a world trade center, and a duty-free commercial zone.

Existing infrastructure at Ribeirao Preto, which is classified as a regional airport, includes one 18-36 (2100 x 35 meter) non-precision runway. DAESP plans to extend this runway to 2,600 x 36 meters and eventually to 3,200 x 36 meters. The runway's asphalt pavement is capable of accommodating a Boeing 737.

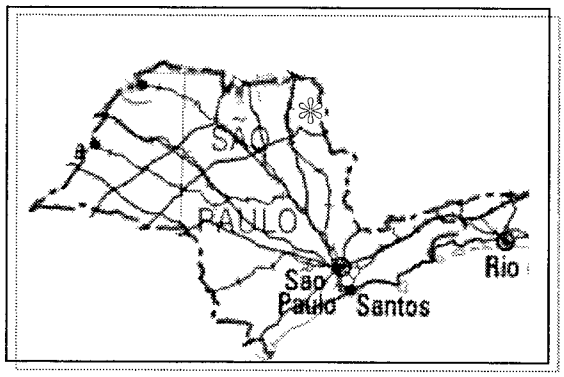
Airport infrastructure also includes an air passenger terminal and adjacent rail facilities. TAM, the largest regional airline which serves Ribeirao Preto, has entered into discussions with DAESP regarding the need to construct an additional air terminal to fulfill increasing domestic and international passenger traffic demands. The size of terminals and other intermodal facilities will ultimately depend on forecasted demand. The local municipality of Ribeirao Preto will be responsible for acquiring land for airport expansion and for ensuring that the airport is conveniently accessible.

General Characteristics of Riberao Preto Airport

Dimension of Runway	2100x35m (paved)
Capacity	Fokker F-100 Boeing 737
Latitude	21°08'09" S
Longitud	47°46'34" W
Altitude	549 meters
Reference temperature	30.2 °C
Passenger Terminal Area	1,145 m2
Parking Capacity	100 vehicles
Cargo Terminal Area	410 m2
Light System	Rotating light, runway lights, heading lights, taxing lights, obstacle lights
Hangars	8
Services	Post office, restaurants, paid phones, taxis, hotel reservations, car rentals, emergency vehicles
Air Traffic in 1995	27,787 planes
Increase over 1994	46%.
Passengers in 1995	345,376
Principal Users	Tam, Interbrasil, Rio Sul, Passaredo, Aeroclube, Avição Executiva e Geral da Região

Source: DAESP

Site

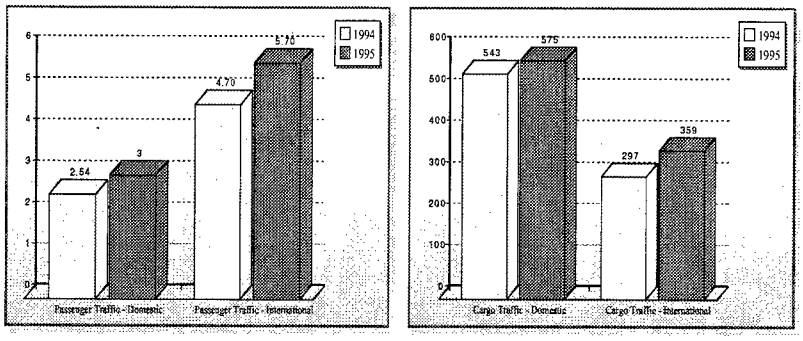


The Ribeirao Preto Airport is located in the northeastern portion of the State of São Paulo. It is the largest of DAESP's São Paulo-based regional airports.

Nature of Demand

The MERCOSUR trade agreement has propelled air traffic demand for both passengers and cargo in Brazil, particularly within the State of São Paulo. The trend of increasing intra-regional travel will also be a key demand driver at Brazil's regional airports, including Ribeirao Preto.

Recent Growth in Brazil's Aviation Market (millions)



Source: INFRAERO and Brazilian Institute of Tourism

INFRAERO (Empresa Brasileira de Infra-Estrutura Aeroportuaria), the state-owned agency responsible for operating 62 airports which handle 95% of national air traffic, is planning investments in upgrades and modifications of terminals, lighting systems and navigational aids for regional airports to meet future passenger and cargo traffic demands.

Annual Demand Projections

Total Passengers				Total Airplane Transit			
Year	Pessimistic	Mean	Optimistic	Year	Pessimistic	Mean	Optimistic
2000	420000	453000	506000	2000	30240	32570	36270
2005	510000	592000	738000	2005	34620	40220	50280
2015	751000	1014000	1577000	2015	46340	62670	97470
Cargo Movement				**Mail Traffic**			
Year	Pessimistic	Mean	Optimistic	Year	Pessimistic	Mean	Optimistic
2000	3404000	3722000	4244000	2000	1278400	1416900	1568800
2005	4289000	5130000	6680000	2005	1894400	2387700	3002600
2015	6813000	9743000	16460000	2015	2990900	4728100	7670200

Source: OPUSfrom Master Plan

Only two airports within the State of São Paulo are currently used for air freight — Campinas and Viracopos. DAESP plans to transform the Ribeirao Preto regional airport into an air cargo airport capable of providing full intermodal service with air, rail and vehicular access.

In 1996, the Ribeirao Preto Airport handled 43% of passenger and 70% of cargo traffic within the DAESP system. The Ribeirao Preto Airport will have a competitive advantage over Campinas, Viracopos and the State of Parana for air cargo traffic due to its close proximity and convenient access to interstate vehicular and rail transportation.

The above chart illustrates estimated passenger and cargo demand for the years 2000, 2005 and 2015.

Project Status

A TDA-sponsored Definitional Mission for the Ribeirao Preto Airport Project was completed by Montgomery Consulting Group, Inc. in March 1997. TDA has since funded a feasibility study for the development of the Ribeirao Preto Airport into a multi-modal transportation facility is being conducted by Woolpert.

The feasibility study will provide an in-depth assessment of the planned infrastructure investments, a forecast of passenger and cargo demand, schematic layouts, estimated projects costs and a determination of the economic and financial viability of private sector participation in the project. The BOT concession for phase one is expected to be awarded in early 1998.

Due to the extensive scope of the Ribeirao Preto Investment Program, DAESP plans a multi-phased approach to development. The chart on the right outlines phase one.

Riberao Preto Investment Program
Phase One

Runway expansion from 2,100 to 3,200 meters	US$ 15 million
Taxiway & Apron expansion	US$ 10 million
Navigational installations (Precision Approach Landing System)	US$ 4 million
Cargo Terminal & Equipment	US$ 10 million
New Passenger Terminal & Equipment	US$ 10 million
Maintenance Facility and Equipment	US$ 1.5 million
Professional Services	US$ 2.5 million
Airfield Improvements	US$ 1 million
Total Investment	**US$ 54 million**

Ribeirao Preto Investment Program - Phase Two

Phase two will include the development of supporting facilities for the intermodal facility, including a 100-room hotel, a shopping center, a convention center and exhibition hall, a world trade center and a duty-free commercial zone. Cost estimates for these facilities have not yet been determined.

Financing

Airport expansion will be funded primarily through the private sector under a 15-20 year BOT concession agreement. Although DAESP would prefer to grant one concession for the entire Ribeirao Preto Investment Program, it may prove to be more economically and financially feasible to award multiple phases to various concessionaires. DAESP may provide funding for some equipment, including runway extensions, lighting, navigational aids, and other basic airfield infrastructure.

Equipment and Service Procurement

An estimated US$ 14.25 million in equipment and services will be imported for this project, including:

Equipment:

- Fixed bridges
- Air bridges
- Belt conveyors
- Circular luggage sorters
- Air conditioning system
- Luggage inspection X-ray systems
- Communications systems
- Emergency energy system
- Fire equipment
- Emergency medical vehicles

Services:

- Specialized engineering
- Operations-related consulting
- Financial services

U.S. firms have historically been successful in exporting equipment into this market. The use of a Brazilian agent has been a key ingredient in this success. Typical U.S. exports to the Brazilian aviation market include emergency fire equipment, aircraft tires, air conditioning systems, air bridges and power stations.

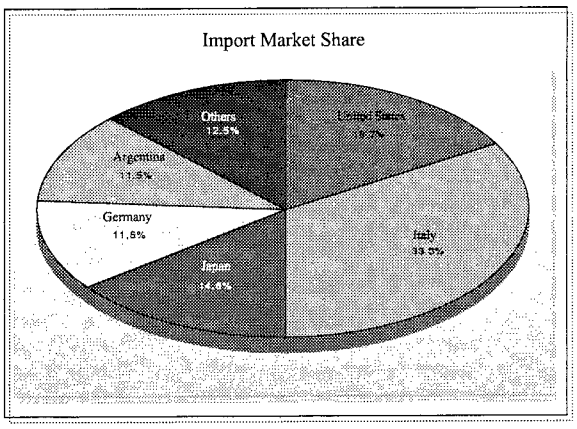
Historical Composition of Airport and Ground Support Equipment for Brazil
US$ millions

	1993	1994	1995	Est. growth for next 3 yares
Import market	889	1535	2846	25%.
Local Production	930	810	760	
Exports	640	580	52	
Total Market	1179	1765	3404	15%.
Imports from US	139	238	345	20%.

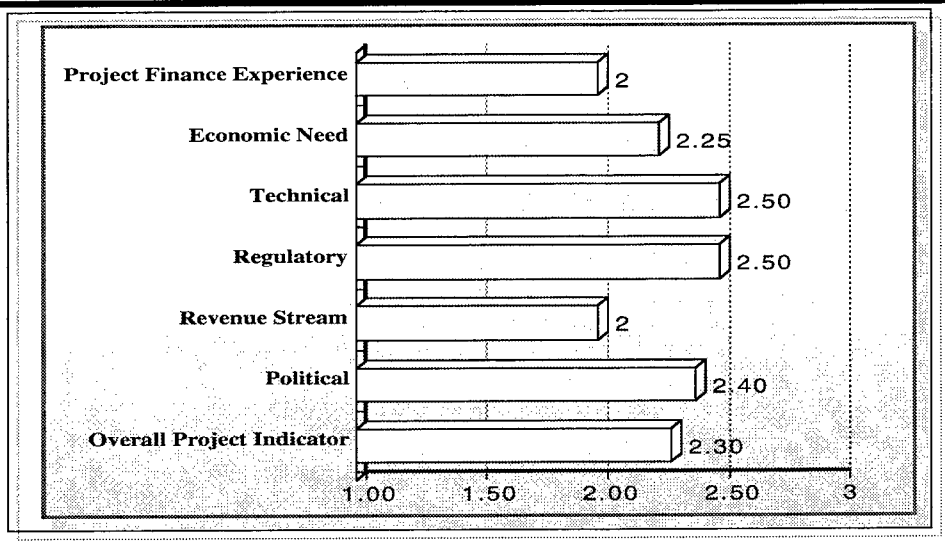
Source: IT Market Report Renata D'Almeida - US Embassy, April 1996

U.S. equipment and services suppliers in the Brazilian aviation market face competition primarily from Germany, Argentina, Japan, United Kingdom and Italy.

Barriers to entry for U.S. services are substantial in the Brazilian aviation market due to the in-house planning and engineering capabilities of INFRAERO. DAESP's tendency to retain external consultants for planning and engineering services, however, should open the door for U.S. consulting firms in this project.



Critical Project Indicators



Key Decision Makers

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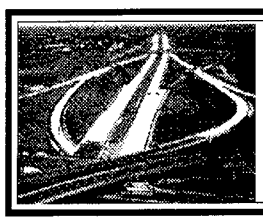


Transportation / Brazil

The Metropolitan Beltway of São Paulo

Project Summary

Project No:	**TRAN-10**
Subsector:	**Highway**
Location:	**City of São Paulo, Brazil**
Project Cost:	**US$ 2.7 billion**
Export Potential:	**US$ 80 million**
Type:	**Concession**
Sponsor:	**State Government of São Paulo**

The state government of São Paulo through the administration of DERSA (São Paulo State Highway Company) is planning to concession the construction of a beltway for the city of São Paulo. The project was first conceived under the administration of Mário Covas and has now been revitalized to meet the transportation demands of the city.

Technical Description

The "Rodoanel" will provide an important alternative for freight traffic contributing to efficient product intermodality and regional integration. The project is also designed to minimize the impacts on rural and urban environment. To guarantee environmental coherence, the project although executed in various stages will be planned as one whole system.

Section 1: Perus - Regis Bettencourt Highway

Section 1 incorporates the western part of the beltway with a total of 39.6 Km interconnecting five truck-highways and one railroad axle. The section will compensate the present deficiency of road interconnections between the north and southwest. Running in the valley of the Carapicuíbe Creek, the project can take advantage of currently un-utilized lands. In the Northeast region, the project will also utilize large quantities of empty space, but with weak soil in some areas.

Section 1 will cross eight municipalities:
Caieiras, Itapecerica da Serra, São Paulo (totally or partially in the Headwaters Protection Areas).
Barueri, Cajamar, Carapicuíba, Cotia, Osasco, Santana do Parnaíba (outside the protections area of Headwaters).

Section 2: Regis Bettencourt Highway - Presidente Dutra

The second section is 93.1 Km long, intercepting four truck highways and three railroad axles: Imigrantes, Anchieta, Ayrton Senna da Silva, Dutra Highways, and the Railroads São Paulo-Semaritá, Santos-Jundiaí and São Paulo-Rio de Janeiro. In addition, the project crosses the lowlands of Tieté which has important structural roads.

In the Southwest, beginning in the municipality of Embu, the project enters into protected land that is under the Law of Headwaters Protection. In order to comply with the directive, the project will intersect with current truck highways. In addition, the project crosses the Guaió River lowlands, an area of great potential for exploration of future projects.

Section 2 crosses the following municipalities:
Embú, Itapecerica de Serra, Mauá, Ribeirão Pires, Santo André, São Bernardo do Campo, Sãp Paulo (Mostly within the Headwater Protection Areas).
Ferraz de Vasconcelos, Guarulhos, Itaquaquecuba, Poá and Suzano (Outside the Headwater Protection Areas).

Section 3 - North: Presidente Dutra Highway - Perus

At a total length of 46.2 Km, section 3 intercepts three truck highways and one truck-railroad. The highways include Fernão Dias, Presidente Dutra and Bandeirantes Highways while the railroad is the Santos-Jundiaí. The portion also crosses 31Km of Headwater Protection areas established to preserve the Cantareira Mountain Range and the Paiva Castro Reservoir responsible for supplying water to metropolitan São Paulo. Due to the delicate nature of the region and its importance to São Paulo, the project will undergo specific technical studies on impact prevention and mitigation. The third alignment will provide full access to the Airport and for freight and passengers.

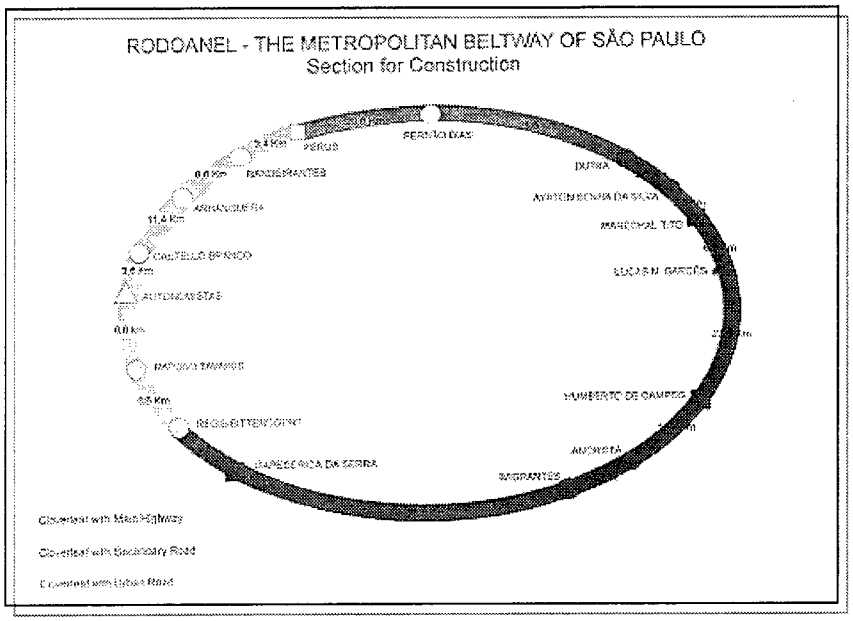
Section 3 will pass through the following municipalitics:
Caieiras and Mairiporã (Mostly within the Headwater Protection Areas)
Guarulhos and São Paulo (outside Headwater Protection Areas)

Technical Characteristics

Designed speed		100 Km/h
Total stopping visibility distance		210m
Minimum radius of horizontal curve		375m
Maximum superelevation		8%.
Maximum ramp		4%.
Minimal ramp	Cut	0.5%
	Filling	0.35%
Vertical Gauges:		
Highways		5.50m
Electrified railroads		7.50m
Navigation		7.50m
Width of traffic lane		3.60m
Width of shoulder		3.00m
Width of refuge		1.00m
Control range:		
Minimum		80m
Maximum		130m

Source: Government of the State of São Paulo

Site



The project is located in the outskirts of São Paulo. It circumnavigates the entire city at a total length of 178.9 Km passing through 21 municipalities.

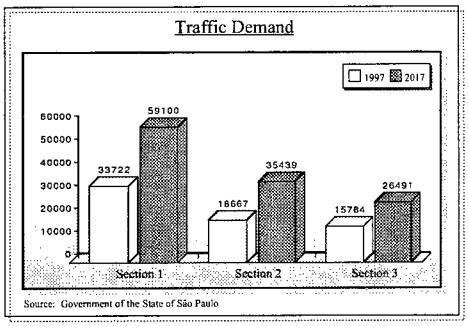
Nature of Demand

São Paulo has developed into one of the most populated cities in the world. The gigantic urban concentration known as the Metropolitan Region of São Paulo is home to 16 million inhabitants generating a GDP of US$103 billion. Without a doubt, the city is the heart of Brazil in terms of size and financial strength.

Today the MRSP (metropolitan region of São Paulo) is in need of a system to alleviate traffic flow and increase transportation efficiency. Ten truck highways, 5 railroad lines and 9 large urban axles converge on MRSP producing an outflow of vehicles nearing 1 million daily. Trucks account for 35% of the traffic.

With traffic growth at a steady 4% annually, and expected to reach 50% over the next 10 years, the need for increased traffic access and flow is critical to the city. The MRSP has over 4.5 million vehicles, increasing at a rate of 600,000 per year. Of these, 3 million cars circulate in the city daily.

Major traffic jams continue to plague the city. The avenues of Tietê and Pinheiros Rivers experience a 70% rate of traffic jams during peak hours. Road collisions and rain cause the entire traffic system to collapse, leading to major repercussions for the entire urban road network. In addition, traffic in the city maintains a velocity of only 19 Km/h, a number which continues to decline annually. Such speeds have detrimental affects on the economy and life within MRSP.



Project Status

The newly reformalized project will require a reconceptualization of metropolitan policies in an urban and environmental context. They will include: urban development studies, transportation management studies, and an environmental study.

Financing

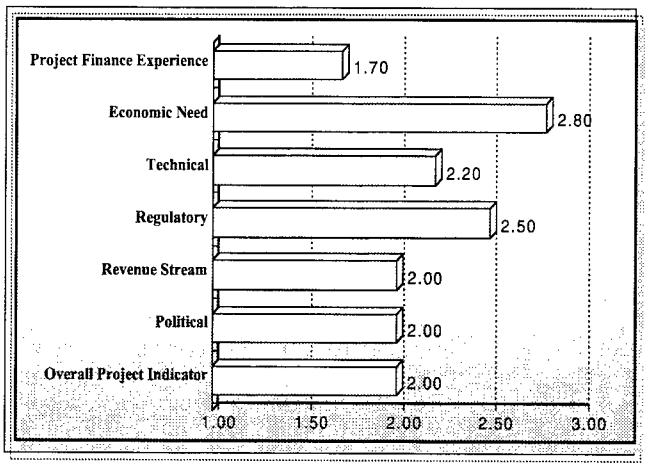
The project will be financed through toll receipts, the concessionaire's investment and government funds. Toll tariffs have been evaluated and will run in the range of US$1.00 per axle for private vehicles, and US$ 2.00 for commercial vehicles. Section 1 will be constructed by the government at a cost of US$ 593 million. Section 2 and 3 will look for private investment at a range of US$ 1 billion and US$ 433 million, respectively.

Equipment and Service Procurement

Equipment:

- Toll road collection systems
- Communications systems
- Lighting
- Bidirectional barriers
- Cargo transfer centers
- Traffic signaling equipment
- Weigh stations

Critical Project Indicators



Key Decision Makers

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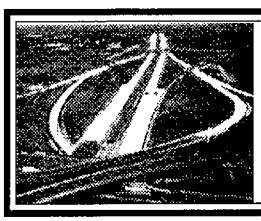


Transportation / Brazil

Mercosur Highway

Project Summary

Project No:	**TRAN-11**
Subsector:	**Highway**
Location:	**Brazil - Argentina**
Project Cost:	**US$ 1.5 billion**
Export Potential:	**US$ 75 million**
Type:	**Procurement**
Sponsor:	**Ministry of Transportation**

The Brazilian Ministry of Transportation has prioritized transportation projects as it attempts to reduce the high internal transportation component of the "Custo Brasil." Regional integration with partners to the South through the Mercosur trade block has induced Brazil's Federal Government to include the Mercosur highway project within the 14 priority projects in the Federal "Brazil in Action" Plan. The highway is integral to facilitation of trade within Brazil and between Brazil and Mercosur.

Technical Description

The project involves lane doubling, existing infrastructure rehabilitation, security improvements and modernization of the following highway corridors: São Paulo - Curitiba - Florianópolis. The project also includes contracting environmental impact studies, feasibility studies and specialized engineering and design services.

Once concluded, the project will be concessioned to the private sector for operation and maintenance. Specific concession terms of are to be determined; nevertheless, it is known that two concessions will be awarded upon conclusion of phase I of the project. One concession will be awarded for the section between São Paulo and Curitiba and another will be awarded for the section between Curitiba and Florianopolis.

The project has been broken down into phases to reflect financing ability and timing. Phase I of the project encompasses works on the following existing highways:

- BR 116 (known as Regis Bittencourt), linking São Paulo with Curitiba
- Contorno Leste Highway in Curitiba
- BR 376-PR, which links Curitiba to the division of the states of Paraná and Santa Catarina
- BR 101-SC, which links the division of the states of Paraná and Santa Catarina with Florianopolis.

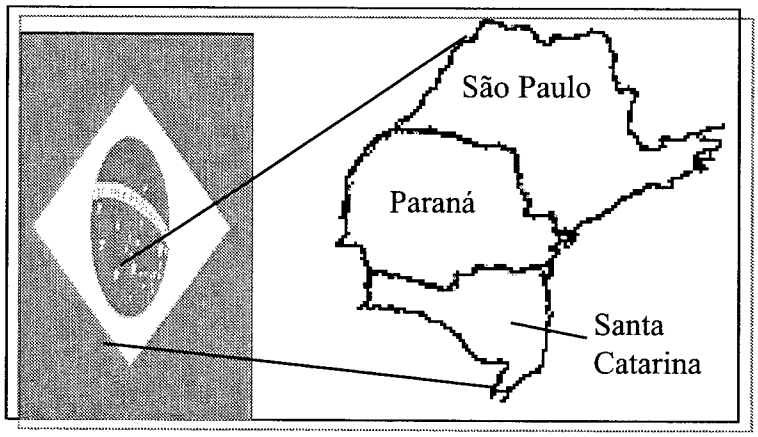
The most important objectives to be met during the first phase of the project include upgrading the level of service of the highway to ease congestion, reducing transportation costs and instituting a financially self-sustaining concession modality for private sector participation.

Principal Works

Description of Works	Sao Paulo	Paraná	Santa Catarina	Total
Doubling of Lanes	202.4 Km	43.4 Km	215.4 Km	461.2 Km
Reconstruction of all-weather surfaces	317.6 Km	171.2 Km	215.4 Km	704.2 Km
Construction of Double Lane Highway		43.2 Km		86.4 Km
Installation of Tollo Collection Units	4 Units	2 Units	3 Units	9 Units
Construction of Tunnels	1,459 m		1,041 m	2,500 m
Construction of Bridges	20 Units	11 Units	41 Units	72 Units
Construction of Elevated Portions	20 units	11 Units	31 Units	62 Units

Site

The first phase of the Mercosur highway encompasses the states of São Paulo, Paraná and Santa Catarina.



Nature of Demand

The existing portions of the aforementioned highways face severe degradation problems due to underinvestment in maintenance and expansion by the Federal Government. This has resulted in serious problems for cargo and passenger transport due to security and infrastructure quality.

The route in question already faces high demand which results in congestion and above national average accident ratios. The advent of Mercosur in 1991 and the increase in trade generated between the South and South East of Brazil and the other Mercosur partners (namely Argentina, Uruguay, and Paraguay) has resulted in an increase in demand for a safe and reliable form of on-ground transportation between the regions.

The project will facilitate the integration of the Mercosur economies, reduce costs in trading commodities in the region and foster economic development in the axis the project encompasses.

Project Status

Works for the first phase are on-going, and it is forecast that approximately 80 % of the works will be concluded by the second semester of 1998.

The second phase of the project is to be bid separately after financing is secured. The Federal government estimates that all works will be concluded by June 2000. The concessioning of the highway to the private sector for operation and maintenance is being determined.

Financing

The project is being financed by the Federal Government, and has the support of both state governments involved as well the Mercosur economies, which are contributing to the project by investing in highway infrastructure within their borders. The Inter-American Development Bank has also lent US$ 200 million for phase I of the project.

Equipment and Service Procurement

The principal procurement component is civil works, which will be executed by Brazilian construction firms. Nevertheless, the project will entail the use and purchase of the following equipment:

- *Earthmoving Equipment*: Graders, Front-end loaders, Tandem & Pneumatic rollers, Backhoes, Bulldozers, Mobile sweepers.
- *Vehicles*: Dump trucks, pick-ups, tractors, utility vans, flatbed trucks, Water tankers w/ pumps, tractor trailers w/flatbed.
- *Other Equipment:* Mobile cranes, field office trailers, hydraulic drills, asphalt spreader, mobile generators, compressors, computers, welding equipment, vibratory plate compactors.

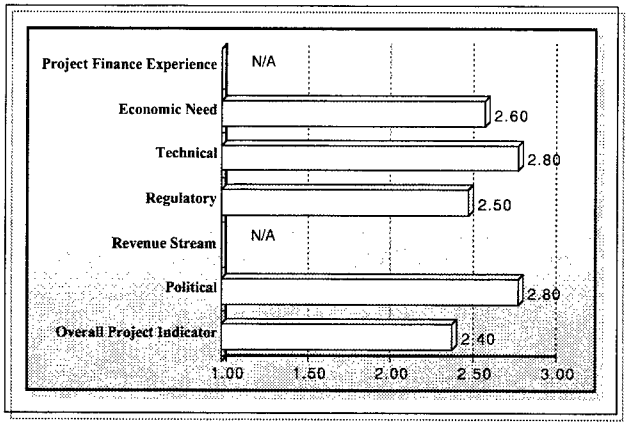
Furthermore, the following components will be bid within the scope of the project:

- Toll Collection Systems
- Traffic Signaling Equipment
- Weigh Stations
- Communication Systems and Radar Equipment

The project will also require substantial environmental impact assessments which will be procured through international public bids. Other services integral to the project are:

- Installation of drainage and engineered superelevations
- Construction engineering supervision
- Civil works: upgrading and reconstruction of all-weather surfaces, demolition, tunneling, excavation, cuts and fills, etc.

Critical Project Indicators



Key Decision Makers

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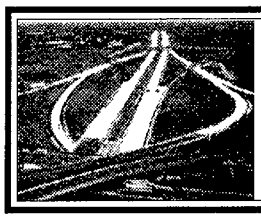


Transportation / Brazil

Fernão Dias Highway Doubling

Project Summary

Project No:	**TRAN-12**
Subsector:	**Highway**
Location:	**States of São Paulo and Minas Gerais**
Project Cost:	**US$ 1.3 billion**
Export Potential:	**US$ 15 million**
Type:	**Procurement**
Sponsor:	**Ministry of Transportation**

The Fernão Dias highway is among the country's most important transportation links, and its modernization and doubling of lanes has been included within the 14 priority projects in the Federal "Brazil in Action" Plan. The highway is integral to the continued development of the economy established in the São Paulo- Belo Horizonte axis.

Technical Description

The project includes the doubling of lanes, existing infrastructure rehabilitation, security improvements, and modernization of the Fernão Dias Highway, also known as BR 381. The project aims at upgrading the level of service of the highway infrastructure to ease congestion, and to instituting a financially self-sustaining concession modality for private sector participation.

The project is divided into two phases:

Phase I

Lane doubling and the recuperation of 270.7 Km of highway, 217 Km of which is located in the state of Minas Gerais, between the cities of Contagem and Nepomuceno. The remaining 53.7 Km is in the state of São Paulo, between the cities of São Paulo and Atibaia.

Specific works include:

- Construction of 270 Km of guardrails
- Reinforcement of bridges and drainage systems
- Construction of two tunnels
- Installation of signaling equipment
- Construction of three sets of toll collection stations
- Construction and implementation of one weighing station for trucks
- Construction of 6 police security check points with full signaling and radar equipment

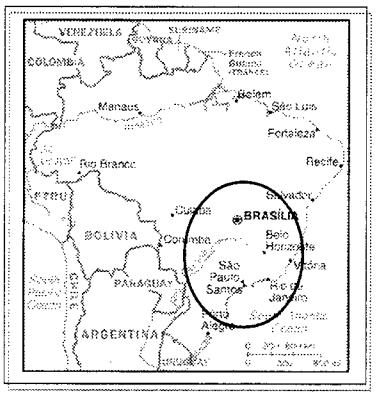
Phase II

The second phase will recuperate and double the remaining 292.5 Km of the BR 381, of which 256.2 Km is located in the state of Minas Gerais, between the city of Nepomuceno and the state line. The remaining 36.3 Km are in the state of São Paulo, between the city of Atibaia and the state line.

Specific elements of the second phase are still being studied.

Site

The Fernão Dias highway is located in Southeastern of Brazil, linking the states of São Paulo and Minas Gerais.



Nature of Demand

The objectives of the project are threefold:

1. To meet existing and growing demand for highway transportation between the metropolitan areas of São Paulo and Belo Horizonte, two of the three largest and most important urban centers in the country. The cities of São Paulo and Belo Horizonte have been growing steadily, as has highway traffic demand between the two cities. The project aims primarily at meeting traffic demand and improving service and safety levels, thereby reducing transportation costs between the two regions.

2. Create a supplementary, alternative route to the North-South corridor along Brazil's Atlantic coast.

3. Contribute to the development of the axis along the highway, in the states of São Paulo and Belo Horizonte. The urbanization of both cities has resulted in an outflow of industries to the metropolitan outskirts. This trend is expected to continue.

The present highway is currently very poorly maintained and dangerous, due to security and poor design. Accidents and robberies are very common. The project will address both of these factors.

Project Status

Planning the first phase is on-going, with completion forecasted for the second half of 1998. The second phase of the project is to be bid separately in the fall of 1997. Solicitation for the São Paulo section are already under bid, while the Minas Gerais section is still being studied.

Financing

The project is being financed by the Federal Government, and is backed by the state governments of both São Paulo and Minas Gerais. The Inter-American Development Bank has also lent US $267 million for Phase I of the project, and US $275 million for Phase II.

Equipment and Service Procurement

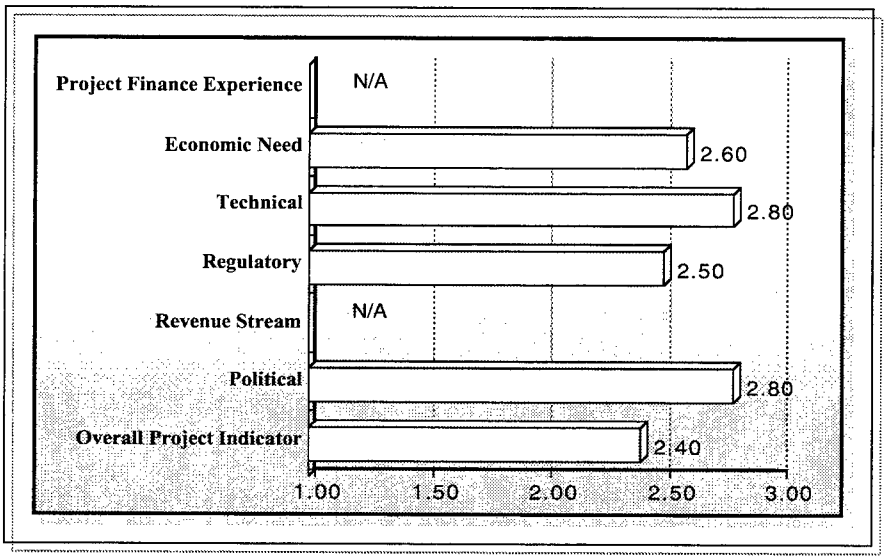
Equipment:

- *Earthmoving Equipment*: Graders, Front-end loaders, Tandem & Pneumatic rollers, Backhoes, Bulldozers, Mobile sweepers.
- *Vehicles*: Dump trucks, pickups, tractors, utility vans, flatbed trucks, Water tankers w/pumps, tractor trailers w/flatbed.
- *Other Equipment*: Mobile cranes, field office trailers, hydraulic drills, asphalt spreader, mobile generators, compressors, computers, welding equipment, vibratory plate compactors.
- Toll Collection Systems
- Traffic Signaling Equipment
- Weigh Stations
- Communication Systems and Radar Equipment
- Materials: Steel reebar

Services:

- Installation of drainage and engineered superelevations
- Construction engineering supervision
- Civil works: upgrading and reconstruction of all-weather surfaces, demolition, tunneling, excavation, cuts and fills, etc.

Critical Project Indicators



Key Decision Makers

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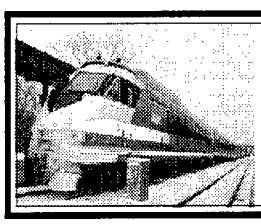


Transportation / Brazil

Unaí - Pirapora Center-East Rail Line

Project Summary

Project No:	**TRAN-13**
Subsector:	**Rail**
Location:	**Minas Gerais State**
Project Cost:	**US$ 500 million**
Export Potential:	**US$ 50 million**
Type:	**Procurement**
Sponsor:	**Companhia Vale do Rio Doce (CVRD)**

The Companhia Vale do Rio Doce (CVRD) is Brazil's largest mining conglomerate, with 1996 revenues of US $2.87 billion. The company has recently been privatized, and is hence undergoing structural and operational changes in order to improve efficiencies.

The project has also been included within the 42 priority projects outlined by the Federal Government in its "Brazil in Action" Program, as it increases competitiveness of Brazilian exports.

Technical Description

The Unaí - Pirapora Center-East Rail Line is the first segment in the Brazilian Center–East Transportation Corridor. It consists of a 285 Km rail line between Unaí and Pirapora in the state of Minas Gerais and will focus primarily on the transportation of agricultural products. The railway will connect to an existing line which extends through Belo Horizonte (the state capital) and further on to the port of Tubarão (privately-owned and operated by CVRD) in the state of Espirito Santo. It also will connect with the river transportation system of the São Francisco River in Pirapora.

CVRD has conducted an economic pre-feasibility study which compares transportation costs using the Unaí–Pirapora Line to reach the port of Tubarão or the FEPASA line to Santos. The study concluded that shipping to Tubarão is cheaper than any other alternative, irrespective of the combination of grain and cereals transported. In addition, other cities in the Central–East region will be connected to this corridor through improvements on the Pirapora–Capitão Eduardo Line.

Site

The Unaí - Pirapora Center-East Rail Line will be located in the northwestern area of the state of Minas Gerais. It will connect Unaí, which is southeast of Brasilia, with Pirapora, which is north of Belo Horizonte. The railway continues to the port of Tubarão outside Vitoria, the capital of Espirito Santo.

Nature of Demand

The new line will transport an estimated 15 million tons annually. This prediction is based on the assumption that 20% of the annual agricultural production in the area will be shipped by railway. CVRD owns 10 million hectares for grain production in the region encompassed by this project.

Apart from agricultural production in Minas Gerais, demand for transportation is expected to come from agricultural production in the state of Goiás and from industrial production in Minas Gerais for Brasilia. The integration of the Center–West region with the river transport system of São Francisco is also expected to generate additional demand for rail transportation.

Project Status

An economic pre-feasibility study has been conducted by CVRD. The implementation should begin during the first quarter of 1998.

Financing

The railway line will be privately financed by CVRD and has the financial support of the state of Minas Gerais. New company direction (post-privatization) has prioritized the project, and it should move forward. Bids for equipment and services will be issued by CVRD and will follow international public bidding guidelines.

Equipment and Service Procurement

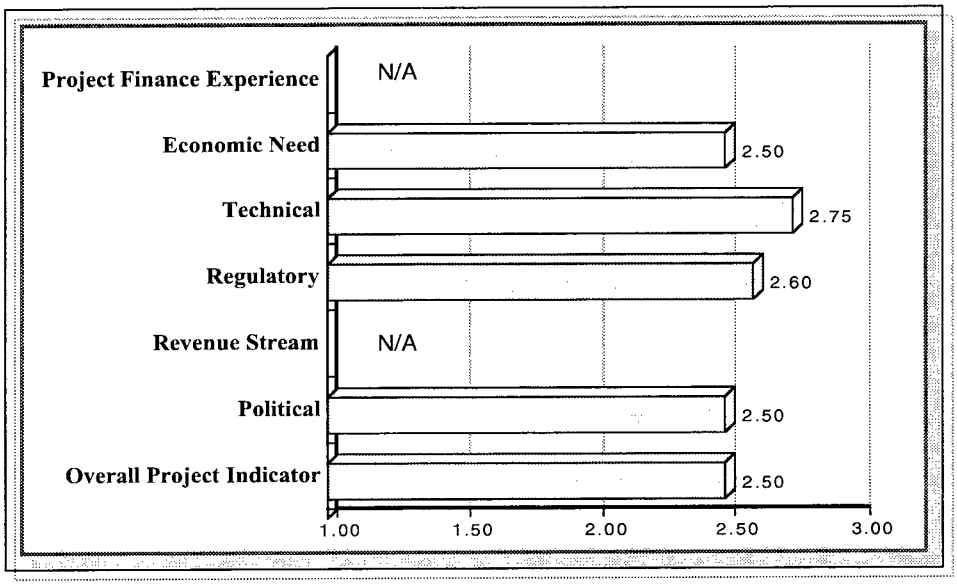
Equipment:

- Telecommunications
- Rolling Stock
- Signaling Equipment

Services:

- Design and construction management
- Operations

Critical Project Indicators



Key Decision Makers

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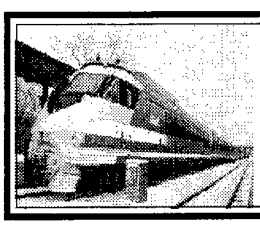


Transportation / Brazil

Ferroeste Section 2

Project Summary

Project No:	**TRAN-14**
Subsector:	**Railroad**
Location:	**State of Paraná**
Project Cost:	**US$ 176 million**
Export Potential:	**US$ 30 million**
Type:	**BOT Concession**
Sponsor:	**Ferroeste Transportation Secretary of the State of Paraná**

The state of Paraná has successfully extended the existing 350 Km rail Ferroeste cargo rail line by another 170 Km, creating a link with the Port of Paranaguá, the state capital and the western part of the state of Paraná. The state has employed its own resources to implement the project in order to maximize efficiency gains for grain exports. The state government is also expanding and modernizing the Port of Paranaguá in an integrated effort to boost agricultural exports.

Technical Description

The Cascavel- Foz Iguaçu rail link for the Ferroeste Line is an extension of the existing railroad network in the state of Paraná, connecting the agricultural regions of western Brazil and eastern Paraguay with the Atlantic coast and the Port of Paranaguá.

The project calls for a concession for the construction and operation of the 179 Km rail extension linking Cascavel to Foz Iguaçu. The project will also include purchasing additional rolling stock for operation on the extended line. The cost of the rolling stock has not been factored into the overall project cost.

Technical Details of the Project

Minimum radius:	312 m
Maximum Ramp:	Imp 1.8% Exp. 1.5%
Land Leveling	18 million m³
2 Tunnels	30 m
9 Over passes	350 m
2 Bridges	130 m

Site

The project links Foz Iguaçu on the border of Paraguay and Argentina with the western regions of Paraná with the Atlantic Coast and the Port of Paranaguá.

Nature of Demand

The integration of the Mercosur economies and the need for a inexpensive and efficient means to transport grain agricultural products are the impetus for the extension of the existing Ferroeste rail line. The project is expected to add 4 million tons of cargo to the existing system.

Project Status

Feasibility studies for the project were concluded by Brazilian, Vega Engenharia e Consulonio Ltd. in August 1997. Bidding documents are being prepared, and the project should go out to bid during the 1st Quarter of 1998.

Financing

The state government of Paraná has financed the first section of the Ferroeste cargo rail line, after having tried concessioning the construction and operations to the private sector unsuccessfully. The rail line linking Guarapuava with Cascavel and Guaira cost the state in excess of US $500 million. The existing Ferroeste Line also links to a pre-existing 350 Km rail line which connects Paranaguá, Curitiba and Guarapuava. The government has prioritized this project and the last section should move forward.

The government's ability to successfully concession the remaining line should be facilitated by the existing infrastructure already in place and the growth in demand spurred by the increasing trade within the Mercosur trade block.

Equipment and Service Procurement

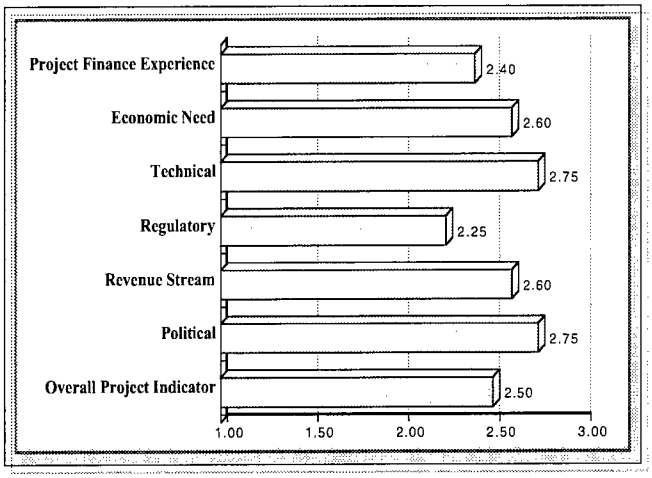
Equipment:

- Tracks: TR-45, eelded bars, deenik
- 1,540 m^3 of concrete per Km
- Cross ties
- Ballast
- Signaling equipment
- Communications equipment
- Rolling stock

Services:

- Construction management
- Operations

Critical Project Indicators



Key Decision Makers

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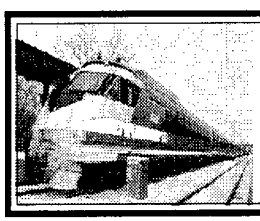


Transportation / Brazil

Ferronorte Railroad

Project Summary

Project No:	**TRAN-15**
Subsector:	**Railroad**
Location:	**Brazil**
Project Cost:	**US$ 1.1 billion**
Export Potential:	**US$ 250 million**
Type:	**Procurement**
Sponsor:	**Itamarati Group**
	Bradesco Bank

Part of the Itamarati holding group, Ferronorte has the exclusive construction and exploration rights for rail projects in the center-west and northern regions of the country. The concession was granted by the federal government for a 90-year period in 1988, with the objective of ensuring a cost-efficient method of transporting the region's agricultural produce to the consumer centers in the Southeast and to the principal ports for export.

Technical Description

During the project's first stage, the railway will run on a 1,728 Km route connecting Cuiabá (capital of the state of Mato Grosso) with northwestern São Paulo and the Triângulo Mineiro region in the west of the state of Minas Gerais. During the project's second stage the railway will link Cuiabá in the Amazon basin with Porto Velho (state of Rondônia) on the Madeira River waterways, covering nearly 1,500 Km, and Cuiabá - Santarem (state of Pará) on the Tapajós river, covering approximately 2,000 Km.

Based on preliminary studies, an investment of US$ 1.1 billion is contemplated for the project's first stage. Stage one will cover an initial extension of 400 Km, in addition to the rolling stock necessary to operate 1,300 Km, 900 Km of which will be in the existing line (Fepasa) in the state of São Paulo, which is being privatized.

Trains of 50 cars each will be hauled by diesel-electric locomotives. Each train will be 1,000 m long with a capacity of 6,000 metric tons/load and 30 metric tons/axle. The capacity during the second stage of the project is anticipated to be 100 wagons at 12,000 metric tons/load.

Site

The project is located over a 400 Km stretch covering states in the center-west and north of Brazil.

Nature of Demand

The region is a major agricultural area. Principal merchandise to be transported include:

- agricultural grains in pallets (comprising two thirds of the total cargo)
- lumber
- fertilizers
- general cargo
- fuel

The need for an efficient system to transport the region's agricultural produce is evident. Currently, shipping is done via trucks, at high costs, with transportation and taxes combined comprising up to 40% of a product's selling price.

Reducing transportation costs means that producers will command higher prices for their soy. Hence, companies in the region are supporting the Ferronorte concession. Companies established in the region include: Sadia, Ceval, Sanbra, Comercial Quintella, Cargill, Intercontinental, Esteve Irmãos, Perdigão, Copasa, Transroll, Sealand, Ultrafertil and Ipiranga.

Project Status

Construction of the first phase began in August 1992. However, it was halted for 18 months due to the poor financial standing of the Itamarati Group. The project was re-inaugurated in August 1997 and is expected to have its first phase concluded by the second semester of 1998. Bids for equipment supply and services are on-going.

Financing

Banco Bradesco, Brazil's largest private bank, coordinated the financing for the project while Bndespar (arm of the BNDES, National Development Bank) did the underwriting. The project's financial structure has been secured through an issuance of US$ 280 million in Ferronorte's capital and US$ 100 millon in debentures. This project counts on strong political support as it will impact positively on Brazil trade balances.

Equipment and Service Procurement

Ferronorte has built a factory to supply the basic track structure, nevertheless, the following equipment will need to be purchased:

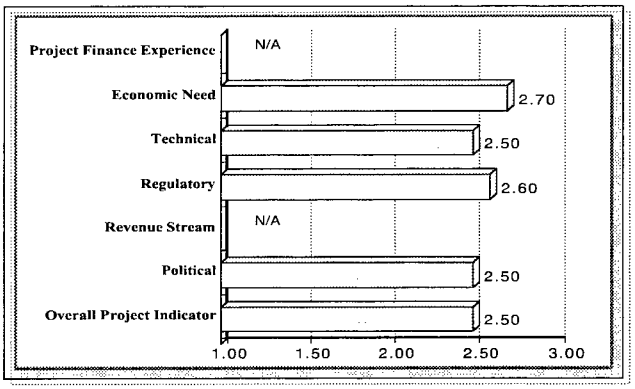
Equipment:

- signaling equipment
- telecommunications equipment
- internal process control and scheduling information systems
- auxiliary systems
- rolling stock (Diesel-electric locomotives)

Services:

- Construction Management
- Operations
- Design and engineering for the second phase.

Critical Project Indicators



Key Decision Makers

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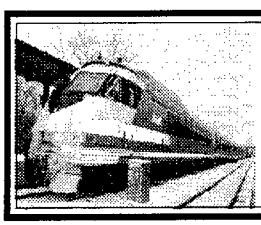
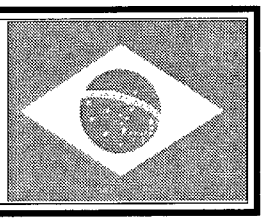


Transportation / Brazil

North South Rail Line



Project Summary

Project No:	**TRAN-16**
Subsector:	**Rail**
Location:	**Goiás, Tocantis, Maranhao and Pará**
Project Cost:	**US$ 2.2 billion**
Export Potential:	**US$ 250 million**
Type:	**BOT Concession**
Sponsor:	**Valec Engenharia Construção e Ferrovías**

The "Brazil in Action" Plan (42 Priority Projects of the federal government) includes the first phase of the North South Rail Line. The second phase complements the project linking the city of Belém in the North of Brazil to Fepasa, the rail network in the state of São Paulo.

VALEC is a public Brazilian company, responsible for the construction and operation of rail projects.

Technical Description

The North South Rail line has been structured in two phases. The first phase is ongoing, with works being executed by the Federal Government under its "Brazil in Action" program. It involves a multi-modal transportation corridor following the Araguaia and Tocantins rivers. The initial phase is purely a public sector project with specific procurement opportunities to construct the 120 Km rail line included within the project between Imperatriz and Estreito in the state of Maranhão. (Please refer to Araguaia – Tocantins Project Profile).

The second phase is instrumental toward achieving rail network connectivity between states, and concludes the North South Rail Line. The project is structured as a BOT concession for the construction and operation of the rail networks connecting Estreito to Goiania, the capital of the state of Goiás, and linking Açailândia with Belém, the capital city of the state of Pará. This results in a rail connection

which runs from North to South of the country, as it connects with the Carajás Rail Line, with the Center-Atlantic line and ultimately with *Fepasa* (the rail network of the state of São Paulo, in the South East of the country.

The total rail network length will be 2,187 Km. The extension for the first section, between Açailândia and Belém, is 550 Km in length and between Açailândia and Goiania is another 1,637 Km. Of the latter section, only 106 Km are in operation (since 1993) and another 120 Km are part of the "Brazil in Action" program. (first phase of the project).

Site

The project is located in the North of Brazil, linking the states of Maranhão with Pará and extending the rail network South to the state of São Paulo.

Nature of Demand

According National Research Institute statistics, the operational costs of inter-state transport by highway surpass US$ 15 billion per year, further generating costs for up-keep of the networks, as well as environmental costs. In light of this, and in order to increase the competitiveness of Brazilian exports, the Federal government is re-designing the existing infrastructure of internal Brazilian transportation, and in doing so, placing increasing responsibility on rail transportation. The government is disbursing its own funds in order to attract new private sector participation in new agricultural and industrial production units in less-developed regions of the country, in particular in the Northern states.

The project will reduce the costs of inter-state cargo transportation. Estimates indicate that the average price for transporting general cargo within the country is US$ 38 per 1,000 tons/Km. Rail transportation would reduce this to US$ 15. It is estimated that the cargo volume during the first years for the project is 15 million tons per year, and is expected to increase by 4% per year.

Internal transportation demand in Brazil is very high given the existing infrastructure. The project will facilitate the transportation of agricultural products from the North to the South and Southeast of Brazil, and will facilitate transportation of industrialized products in the converse direction.

Project Status

The project's initial technical designs are concluded and bidding documents are being prepared. Documents should be ready by July 1998, with appropriate Federal guarantees in place. VALEC anticipates that a concession will be awarded by June 1999, and initial operations will begin in August 2002. (Construction of the rail line will take 3 years.)

Financing

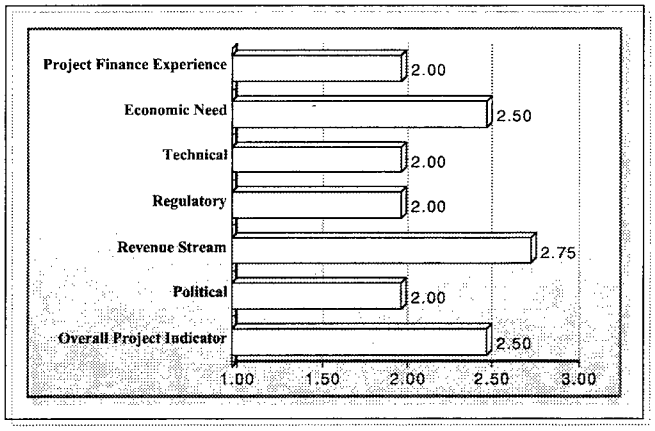
The project has strong political backing. The Federal government will invest 30% of the project's cost and provide guarantees in order to facilitate multilateral investment. The project will likely utilize IFC, IDB and BNDES support.

Private capital will be structured in the form of a BOT concession, the terms of which are being determined. Estimates indicate that the rail average operational costs are US$ 15 per 1000 t/Km, and the rail average freight rate is US$ 22 per 1000 t/Km. The average cost per Km of the rail line infrastructure is estimated at US$ 909,000.

Equipment and Service Procurement

The project will entail the purchase of rolling stock, signaling and telecommunications equipment, and engineering services. Specific equipment and service needs will be determined upon conclusion of the bidding documents.

Critical Project Indicators



Key Decision Makers

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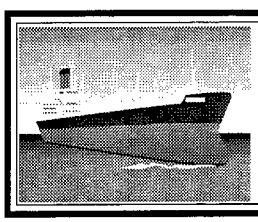


Transportation / Brazil

Rio de Janeiro Cargo Terminal and Highway Connection

Project Summary

Project No:	**TRAN-17**
Subsector:	**Intermodal**
Location:	**Rio de Janeiro, Brazil**
Project Cost:	**US$ 142 million**
Export Potential:	**US$ 35 million**
Type:	**Concession**
Sponsor:	**State of Rio de Janeiro**

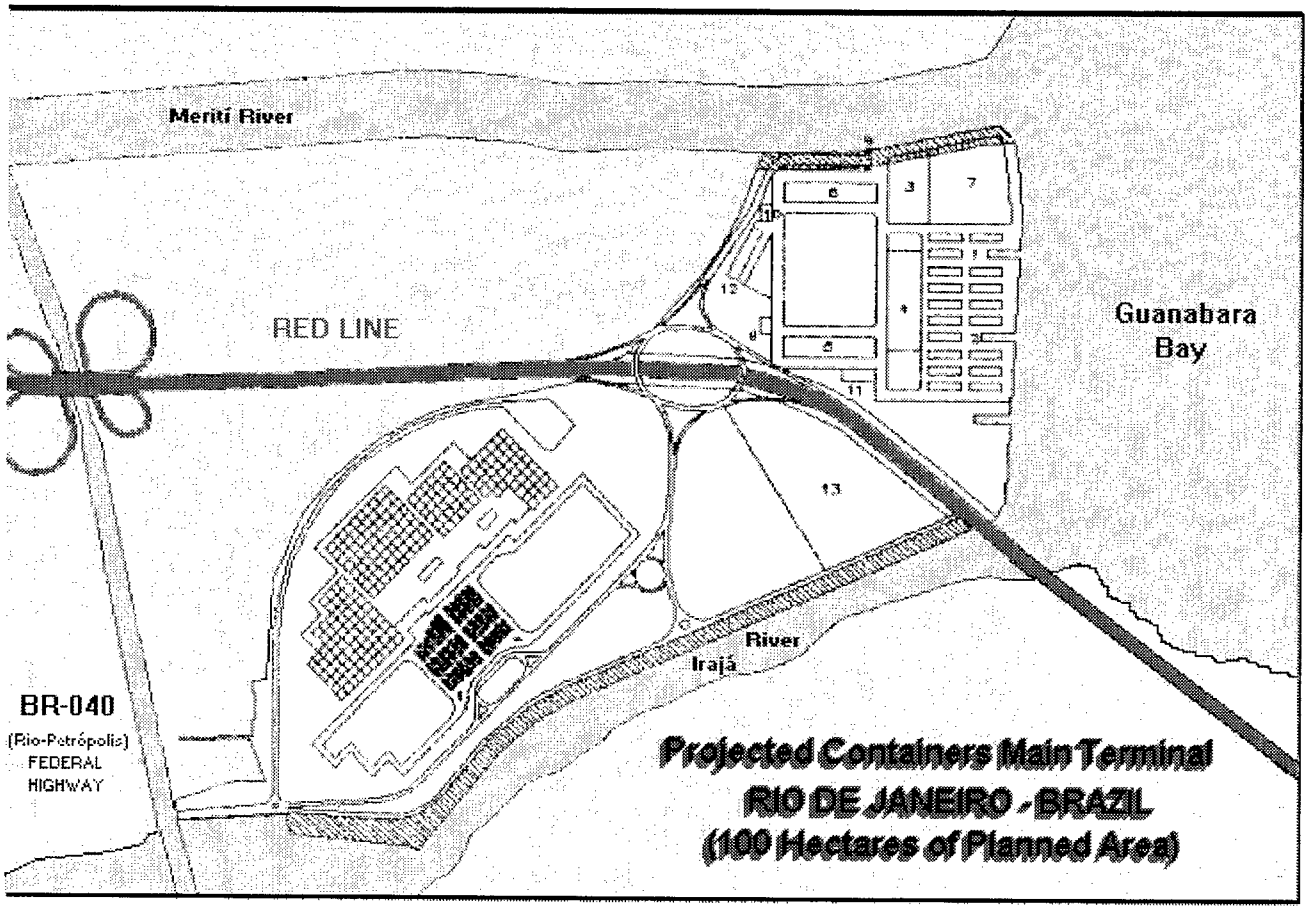
The state of Rio de Janeiro has been privatizing several state owned companies, attempting to gain competitiveness as the states in Brazil compete for new investments. Rio de Janeiro has faced financial difficulties and has hence fostered private sector infrastructure creation and maintenance, and has led this trend in Brazil.

Technical Description

The project is an integration of two of Rio de Janeiro's priority projects:

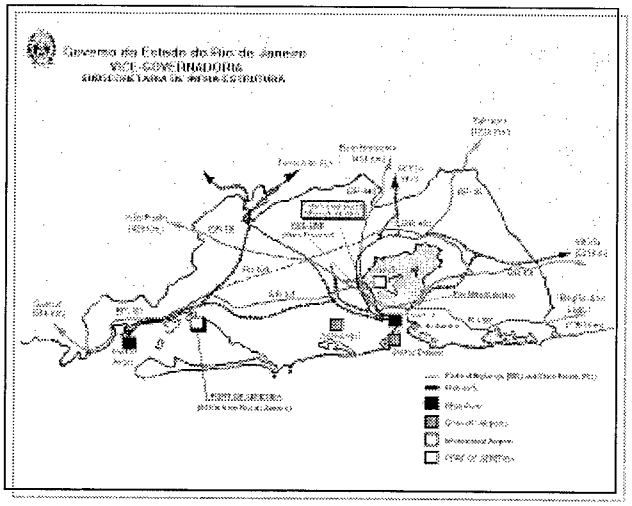
The first project is the concessioning of the red line which passes through Rio de Janeiro's center, connecting it to the airport. This includes revamping and amplifying the existing highway and constructing ramps and tunnels to ease the existing traffic congestion.

The second project is the construction of a container cargo terminal in the Rio de Janeiro Port. This terminal will be used as a transfer terminal for containers destined to the Southeast and will be used as a transshipment point between the Sepetiba port in the state of Rio de Janeiro, and the port of Santos in São Paulo.



The projects will be bid separately, however these are part of the state of Rio de Janeiro's integrated plan for the transport sector.

Site



The red line project is located in the city of Rio de Janeiro, adjacent to the International airport and ports.

The container terminal project is located in Rio de Janeiro's port, 61 Km away from the port of Sepetiba.

Nature of Demand

The red line connects the Rio de Janeiro port terminals and airport with the port of Sepetiba and to the federal highway network.

The integrated project will facilitate the transport of containers within Brazil complementing to the Sepetiba and Santos hub ports. There are currently one million containers transported between Rio de Janeiro and São Paulo, and thirty five million tons transported to each city by highway and another 120,000 tons transported by rail.

Project Status

The projects are being developed by the secretary of infrastructure of the state of Rio de Janeiro. Bidding documents will be prepared during the first semester of 1998, and a concession for the red line will be bid during the third quarter of 1998. The container terminal will be bid separately, and bidding documents will be ready by the last quarter of 1998.

Financing

The estimated investment amounts for the port container terminal is US $30 million, and investment for the red line is US $112 Million.

The state of Rio de Janeiro is the awarding entity, and has successfully completed the sales of its port terminal operations in Sepetiba, as well as privatizing its state bank and energy utility. The state is highly indebted, and has among the country's highest pay-role servicing, which is promoting the involvement of the private-sector in infrastructure creation. The economic need for the project is clear, and is condusive to user-fee based structuring without governmental subsidies.

The federal government is studying participation in the container terminal project. Nevertheless, it remains unclear whether the federal government would fund the project, or provide guarantees to back the Rio de Janeiro State government.

Equipment and Service Procurement

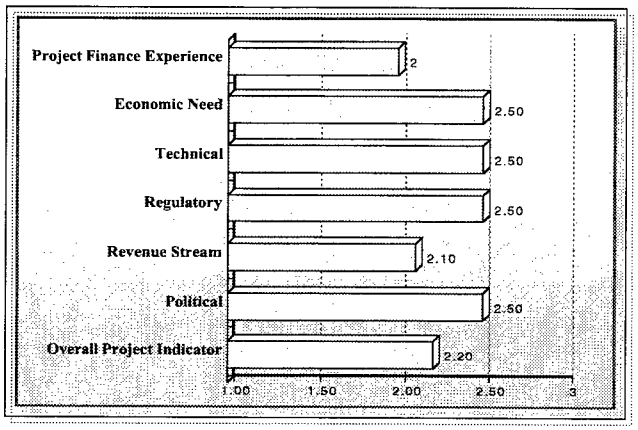
Equipment:

Container handling equipment
Transfer gantry cranes
High capacity ship un-loaders
Ship loaders
Lighting equipment
Communications systems
Mobile cranes
Toll collection systems
Radar equipment

Services:

Engineering and design
Dredging
Construction management
Port operations and management

Critical Project Indicators



Key Decision Makers

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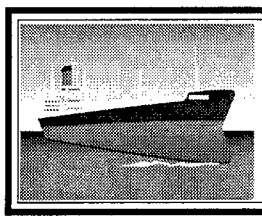


Transportation / Brazil

TEVECOM Concession in Port of Paranaguá

Project Summary

Project No:	**TRAN-18**
Subsector:	**Port**
Location:	**Paranaguá, Brazil**
Project Cost:	**US$ 115 million**
Export Potential:	**US$ 25 million**
Type:	**Concession**
Sponsor:	**Secretaria de Estado dos Transportes & Administraçao dos Portos de Paranaguá e Antonina**

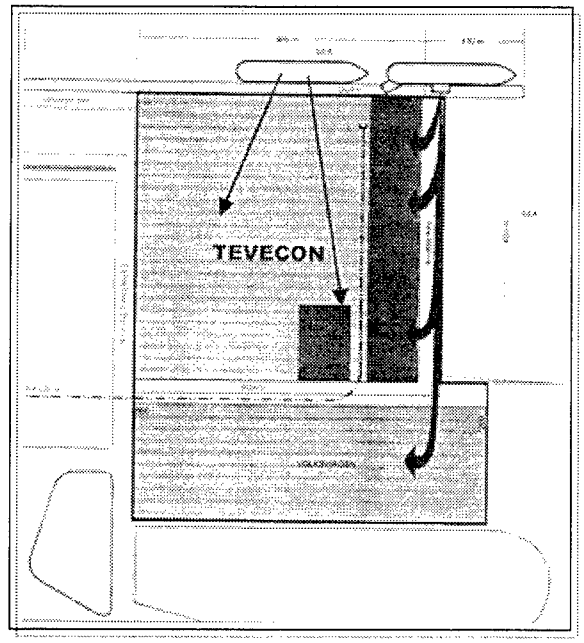
The Paranaguá and Antonina Port Administration (APPA) has initiated a Port Modernization Program which will encourage additional private sector participation in port operations through the leasing of warehouses, port installations and surrounding land. Under the port modernization program, APPA is granting a 25-year concession to operate a vehicle and container terminal in the multimodal Port of Paranaguá. The terminal is expected to consolidate the strategic position of the Port of Paranaguá in the context of the Southern Cone's Common Market (Mercosur).

Technical Description

Vehicle and Container Terminal - TEVECON

The Vehicle and Container Terminal (TEVECON) of Paranaguá will be a specialized terminal for the movement and storage of vehicles and containers. The terminal will have of 600,000 m^2 yard and will be situated behind Berths 215 and 216. The Paranaguá Port Administration will construct the terminal and the concessionaire will be responsible for supplying terminal equipment and for terminals operations under a 25-year concession agreement.

Additional Investment and Procurement Opportunities



Additional projects to be included in the APPA Port Modernization Program are the following:

- **Districenter:**
  Installation of modern, specialized cells of distribution and logistics, which offer storage, processing, reprocessing, mounting and commercialization of goods.

- **Export Corridor Modernization:**
  Projects to increase the static capacity, as well as to increase cargo movement capacity of the Paranaguá Export Corridor.

- **Bagged and Boxed Terminal:**
  Construction of a specialized terminal for the movement of bagged & boxed goods. The terminal will require the installation of equipment such as SPIRAL VEYOR, which is used to transport goods such as sugar and polypropylene in bags and boxes. It will have a capacity to move up to 4,800 tons/day in ships' holds of 40,000 DWT. Rocha S.A. has been awarded the terminal concession, and the terminal is currently under construction

- **Terminal for Imported Solid Bulk Products:**
  Concession for installation of a terminal specialized in the movement of imported solid bulk with chemical properties.

- **Increasing Port Draft:**
  The APPA has begun the tender for dredging to increase the depth of the access channel and the maneuvering bay, to reach a draft of 12.4 m from the present 11.8 m.

- **Dock Extension:**
  Construction of a 325 m pier, permitting docking at internal and external berths, destined for the movement of solid bulk, both for export and import.

Existing Infrastructure

The Port of Paranaguá has 3 distinct mooring points, including a Commercial Dock, an Inflammables Pier and the Catalini Private Pier.

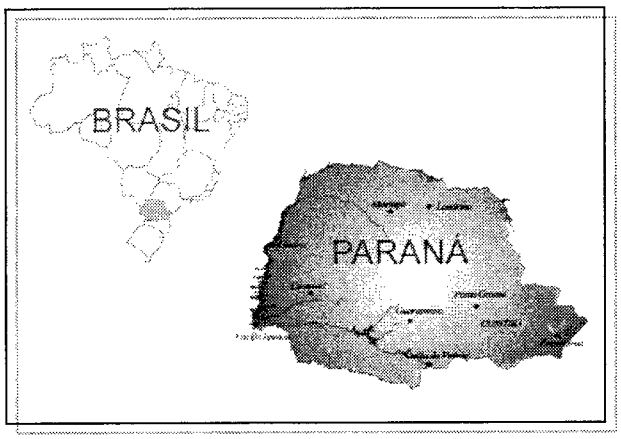
The Commercial Dock has a berthing length of 2,616 m, reaching depths from 8-13 m. The dock permits the simultaneous berthing of 12-14 vessels, from small cabotage vessels up to super-solid-bulk vessels of OAL 270 m. The biggest loading operations have already reached 78,000 tons per vessel with grain and meal at the Grain Complex of the Export Corridor.

The Inflammables Pier comprises 2 piers, one of 143 m and the other of 184 m. The 184 m pier can berth 2 vessels simultaneously. The pier is specialized to accommodate the movement of liquid bulk products, such as petro-products, which are linked to the pier through pipelines connected to an inflammables park operated by PETROBRAS. The pier is also linked by pipeline to the vegetable oil terminal company *Dibal* and the fertilizer company *Becker*, which imports chemical products for processing fertilizer phosphates.

The Catalini Private Terminal is utilized to move liquid bulk cargo (vegetable oils, etc.). Its pier has 2 berths and is linked to a network of shore tanks with a capacity of 65,266 tons.

Site

The Port of Paranaguá is situated on the Paraná coast, in the city of Paranaguá. Its jurisdiction extends from the northern coast of the state of São Paulo near the mouth of the Saí Guaçu River to the border of the state of Santa Catarina.



The port and terminals of the Paraná coast are the most protected in Brazil. To arrive at the berthing points, vessels must pass through the Galheta Channel, with a maximum official draft of 12.4 m, and a sandy bottom which allows for the safe navigation of vessels of up to 120,000 tons DWT.

Nature of Demand

The Port of Paranaguá is the number one Brazilian grain port and number two in general cargo. The port handles cargo for an area encompassing more than 800,000 Km^2, extending from the State of Paraná to the states of Santa Catarina, Mato Grosso, Mato Grosso do Sul, Rio Grande do Sul and São Paulo. Bolivian, Argentine and Paraguayan cargo is also handled at the port.

In 1996, the port handled over 18 million tons of cargo. Projected infrastructure investments should enable the Port of Paranaguá to become a feeder port, or possibly the Brazilian hub port for the Atlantic Coast of Mercosur.

Project Status

The bidding process is currently underway for the TEVECON concession and is expected to be completed by year-end 1997. The terminal should be operational by 1999.

The chart on the right outlines the status of additional projects to be included in the APPA Port Modernization Program:

Project	Biding Period	Period to Start Operation	Status
Districenter	80 days	120 days	Awaiting Government Approval
Export Corridor Modernization	80 days	540-720 days	Awaiting Project Definition
Bagged & Boxed Terminal	N/A	540-720 days	Rocha S.A. Awarded Bid
Terminal for Imported Solid Bulk Products	80 days	540 days	Awaiting Government Approval
Increasing Port Draft	80 days	540-720 days	Awaiting Government Approval
Dock Extension	80 days	540-720 days	Awaiting Project Definition

Financing

The TEVECOM Vehicle and Container Terminal will be financed under a 25-year concession agreement. Under the terms of the concession, the Paranaguá Port Administration will finance terminal construction and the concessionaire will be responsible for supplying terminal equipment and for terminal operation.

Equipment and Service Procurement

Equipment:

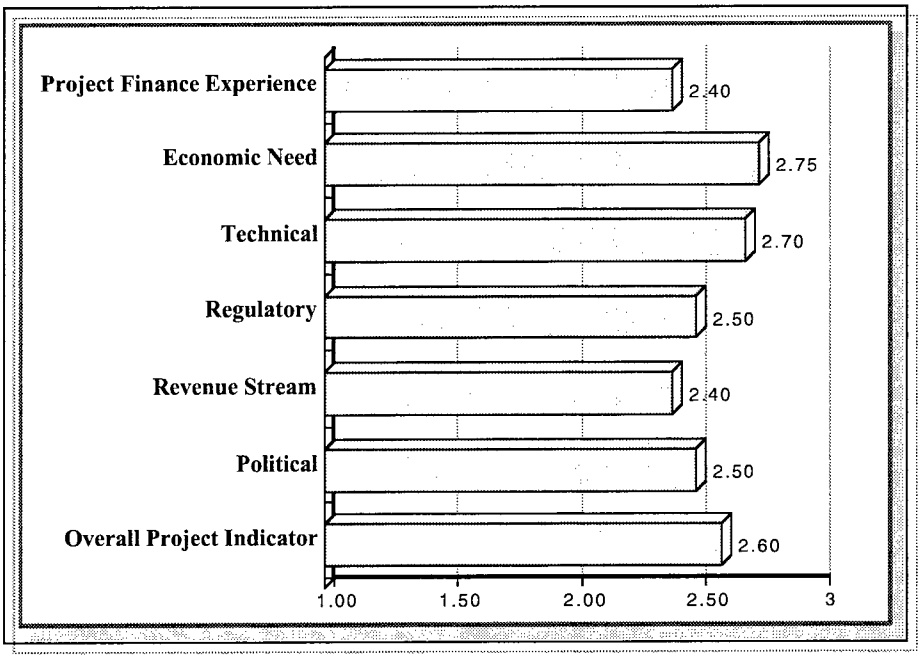
- Ship loaders/unloaders
- Conveyor belts
- Receiving and loading lines
- Receiving hoppers
- SPIRAL VEYOR equipment
- Warehousing silos
- Computer systems
- Communications technology
- Pumping systems
- Gantry cranes

Services:

- Port operation
- Channel dredging
- Specialized engineering

Total investment in equipment and services is estimated at US$ 25 million.

Critical Project Indicators



Key Decision Makers

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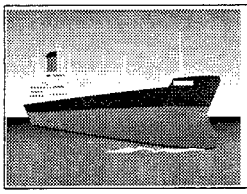
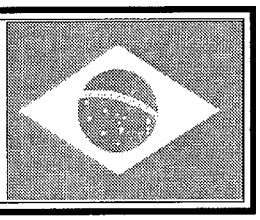


Transportation / Brazil

Port of Pecém



Project Summary

Project No:	**TRAN-19**
Subsector:	**Port**
Location:	**Ponta do Pecém, State of Ceará**
Project Cost:	**US$ 172 million**
Export Potential:	**US$ 48 million**
Type:	**Joint Venture**
Sponsor:	**Cearáportos**

This is a priority project of the state and federal governments being executed as part of the "Brazil-in-Action" Program. It is designed to create a multi-modal port and industrial complex in Northeast Brazil in Ponta do Pecém, 50 Km south of the major city of Fortaleza. Petrobrás and Companhia Siderúrgica do Ceará (CSC) -- a major steel conglomerate -- are financing the project's initial phases.

The project also involves related works to bring rail and highway links to the newly created port as well as water and electricity. In total, the State Government estimates that US$ 400 million will be required to complete the project and corresponding infrastructure.

Overall port operations will be run by Cearáportos, which is a publicly-owned corporation established in 1995 for the purpose of building, reforming, upgrading, leasing, and developing port facilities and supporting inter-modal transportation and infrastructure projects in the State of Ceará. In the medium-term, it is expected that the company's stock will be sold to private investors, leaving port operations in private hands.

Technical Description

The core of the project is the construction of an efficient and modern port facility to handle petrochemical, petroleum, steel, mineral ore and steel related manufactured products. The port is expected to handle 5 million tons/year by the year 2000.

The first phase of the project envisions the following, with the goal of increasing capacity as new demands are created particularly due to the growth of the industrial complex:

1. *Offshore Bridge*: This will be a 2-lane 2,120 m offshore bridge to mitigate the impact on the coastline with conveyor belt support for ore and other bulk materials.

2. *Pier*: Total pier will be 1,700 m in length. Tidal protection will be provided through an L-shaped construction. Pier One will be used mainly to move steel and steel related products initially for CSC and later for general cargo. The pier will be 350 m long with a width of 45 m and two berths.

Pier Two will have two berths and be reserved for liquid bulk cargo, mainly petroleum-related.

3. *Warehouses*: Construction of warehouses of 16,600 m each.

The second phase of the project envisions a third pier, as well as full scale development of the industrial complex. To support the development of the port and industrial complex, several complementary works are underway or are being planned that will be of interest to US equipment and services suppliers. These will require over US$ 200 million and include:

1. A new 20.1 Km road from the port to Brazil's Route 222, which connects to the North and Northwest of the country; and connects to BR 116 and BR 020 which connects to the South and Southeast. This is under construction.

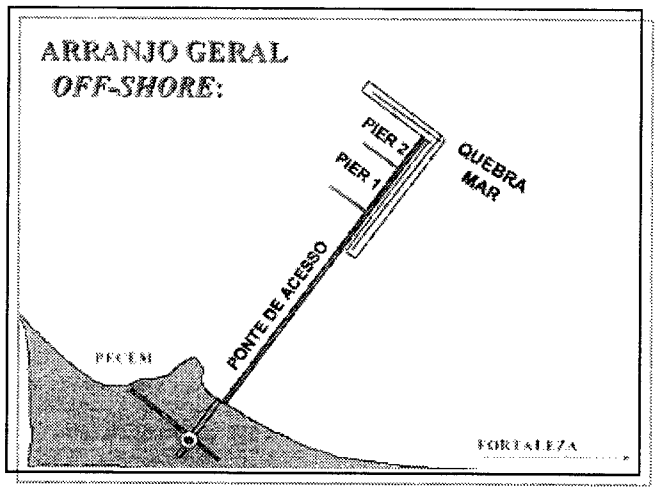
2. A 15.6 Km rail line to be built off the current northern line of the National Railroad network, RFFSA.

3. A gas pipeline extension from the current pipeline that services Fortaleza. The pipeline is currently under development and will be completed by 1998, at an estimated cost of US$ 65 million.

4. The construction of water transportation and distribution from the São Gonçalo river.

Site

The project is located on the northern coastline of Brazil at the Ponta de Pecém, located 50 Km south of Fortaleza. The specific site was chosen because natural water depths from 15 to 18 meters are found within 2 Km of the coastline.



Nature of Demand

Petrobrás and CSC's need for efficient and modern port facilities in northeastern Brazil is generating immediate demand for the port. During its first year of operation, Petrobrás is expected to move 900,000 tons through the port. CSC will handle another 1 million tons. Short-term expectations predict CSC's demand to double to 2 million tons/year.

Total demand is predicted to reach a rate of 5 tons/year by the year 2000 due to growing demand from the region and through the specific development of the related industrial complex. The region has a growing demand for port capacity as the northeast region of Brazil continues to grow. Northeastern Brazil has a lack of deep water port capacity (supporting over 15 meter drafts) located outside of congested urban areas.

Economic growth in Brazil is increasingly outside of the traditional growth zones of Rio and São Paulo with new manufacturing increasingly being located in the southern and northern regions of Brazil. For example, the State of Ceará, host to this project, has had the highest rate of economic growth in all of Brazil over the past 10 years.

The State government of Ceará is supporting the development of the industrial complex not only through the construction of the port and the related transportation, energy and water infrastructure but also through a program of tax incentives. These incentives include exemption from state income taxes and rebates on the ICMS tax (Tax on Circulation of Goods and Services), as well as supporting efforts to receive long-term and working capital credits through official sources.

Project Status

The bidding process began in August 1997. The Secretary of Transportation, Energy, Communications and Public Works for the State of Ceará (SETECO) is continuing to accept bids. The money for the project has been allocated, the vast majority coming from the Federal government with a smaller portion from the State.

Work has already commenced on portions of the supporting infrastructure such as the access highway and preliminary work has begun on the port itself. The port is projected to initiate operations in December 1998.

Financing

On December 22, 1995, the federal government, through the Ministry of Transportation, signed an agreement with the State of Ceará for financing the first phase of the port development (transportation access, offshore access bridge, piers #1 and #2, warehousing). The agreement provided US$ 200 million in federal funds with US$ 20 million provided by the State. The money is to be disbursed over a 4-year period from the date of agreement.

The commitment of the federal government to the first phase of this project along with the demand from Petrobrás and CSC makes this a strong project from a financial perspective that will certainly move forward.

The second phase of the project is less certain and depends on the industrial complex successfully attracting major new clients that will generate a need for new infrastructure and new port capacity. This is highly dependent on the overall success of the Brazilian economy and on business conditions in the state necessary to continue attracting national and international investment.

Equipment and Service Procurement

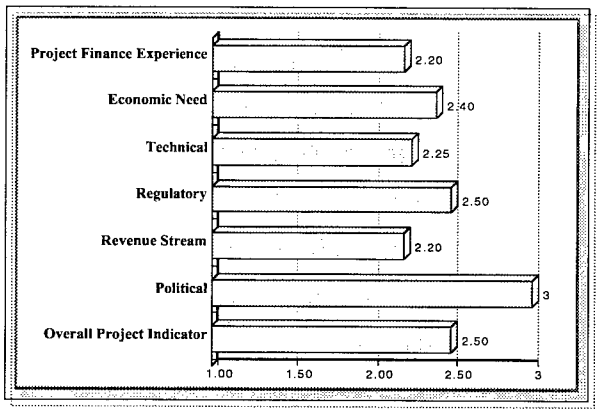
Equipment:

- Rail-mounted unloaders for vessels up to 65,000 TDW with an operating capacity of 1,250 tons/hr, 40 operating cycles per hour and maximum unloading reach of 277 m
- Rail mounted crane for Pier 1
- Conveyor system fed by unloader capable of unloading 1,250 tons/hour, total extension of 6.25 Km
- Liquid bulk operating pier with carbon steel supports of 12", 10" and 8" diameters, and automatic hydraulic controls
- Mobile multi-purpose Dock crane
- Four lane pipeline of 26", 20", 18", and 16" diameters with a length of 9.6 Km
- Computerized control systems

Services:

- Port engineering and construction management services

Critical Project Indicators



Key Decision Makers

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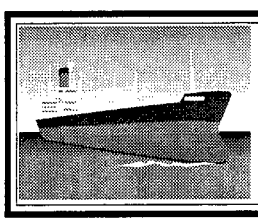
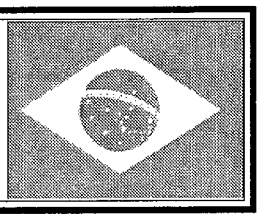


Transportation / Brazil

Industrial Port Complex of Suape



Project Summary

Project No:	**TRAN-20**
Subsector:	**Port**
Location:	**Ipoyuca, State of Pernambuco**
Project Cost:	**US$ 172 million**
Export Potential:	**US$ 48 million**
Type:	**Joint Venture**
Sponsor:	**SUAPE Industrial Port Complex**

The Suape Industrial Port Complex is one of the top 14 priority infrastructure projects being executed as part of the "Brazil in Action" Program. The project is designed to greatly increase the capacity of the existing Port of SUAPE and turn it into the major hub port for Northeastern Brazil.

Technical Description

Existing Infrastructure:

The project involves development of the internal port to complement the growing operations of the External Port of SUAPE. The government has decided that the growth of the External Port justifies the development of additional facilities. The external port handled 20,000 TEUs and 3.0 million tons of bulk liquids in 1996. The project has three major components — construction of the Internal Port itself, development and construction of a series of major terminals, and development of construction of related industrial projects.

The external port of SUAPE began operation in 1984 for bulk liquids and then for general container traffic in 1991. The external port is formed by an L-shaped jetty of 2,950 meters that protects two piers in the basin. The access channel to these piers is 15.1 to 16.5 meters deep and will be further dredged to maintain a uniform depth of 16.5 meters.

The specifications of the existing external port is as follows:

1. *Bulk Liquids Terminal*: This terminal is 84 meters long and 25 meters wide at the operations platform and services ships up to 50,000 TPB with a depth of 14 meters at both its Eastern and Western cradles. Existing equipment includes 10 mechanical arms for loading and unloading bulk liquids (5 in each cradle) with a capacity of 1,000 m^3/h. A new floating 40,000 ton liquefied natural gas tank was installed in 1994.

2. *Multiple Use Quay*: The quay is 343 meters long and 39 meters wide with a depth of 15.5 meters at the east cradle and 10 meters in the first 180 meters of the west cradle. The superstructure is capable of handling ships of up to 80,000 TPB and 25,000 TPB respectively. At the east cradle there is a ramp 20 meters in length destined for roll on/roll off operations.

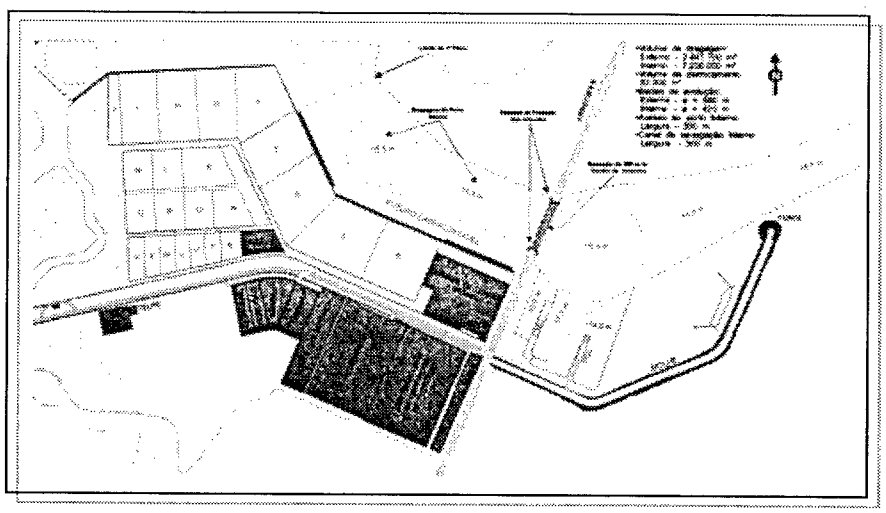
The eastern cradle has a docking extension of 323 meters and already services full container ships of 2,600 TEU with a capacity to service 4,000 TEU ships.

The western cradle has a docking extension of 180 meters (10 meters deep) and another of 160 meters (7 meters deep). The depth is being brought to a uniform 10 meters along its entire length.

The pier is connected to a container farm via a 200 meter paved roadway. The container farm is paved with concrete plates and has an area of 19,000 m^2 and a standing capacity of 2,070 TEU, at a height of 5 meters, having 72 outlets available for refrigeration of containers.

Construction of the internal port involves the following elements:

1. Physical Construction of the Internal Port



- Opening of 300 meters of reef line and construction of protection walls at the entrance of the internal port (already underway).
- Dredging to a depth of 15.5 meters and embankment of the sides of the internal navigation channel (already underway).
- Dredging of the external port to a depth of 15.5 meters in the basin, and 16.5 meters in the access channel until the tip of the jetty (almost completed)
- Construction of 2 quay segments each 300 meters in length.

2. Development and Construction of Terminal Infrastructure:

- TECON-1 container terminal: structure of 200,000 m^2 with a 15.5 deep quay. invest ment estimated at approximately US$ 30 million
- Bulk grain terminal: Development of this facility is in the feasibility phase
- Roll-on/Roll-off Terminal: Currently nearing completion
- Fruits Terminal: In feasibility study phase
- Liquefied natural gas terminal: In feasibility study phase
- Cargo distribution center: Consulting studies being completed
- Customs warehouse: Bids about to be issued by the Brazilian Treasury Department
- Alcohol terminals: Construction underway

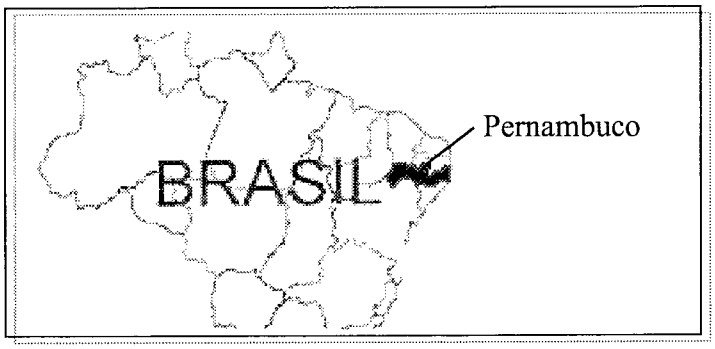
3. Development and Construction of Related Industrial Projects

All these projects are in the formulation or study phase:

- Thermoelectric plant
- Beverage industry complex
- Steel Foundry and rolling mill
- Vehicle assembly
- Distribution for alcohol and petrochemicals

Site

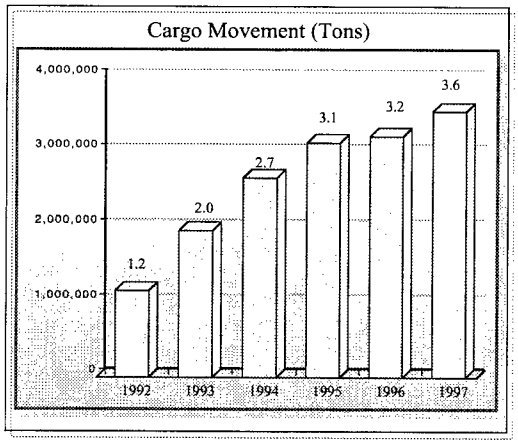
The site is located at the existing Port of SUAPE, which is 40 kilometers south of Recife in the city of Ipoyuca in the state of Pernambuco, the easternmost tip of Brazil.



Nature of Demand

The Port of SUAPE is poised for growth for a number of reasons. First, it is an existing port with investments in existing infrastructure in excess of US $200 million. This infrastructure, combined with excellent natural conditions, allows the port to service ships at a depth of 15.5 meters. Second, the Port of SUAPE is strategically located at the easternmost tip of South America. Third, a number of improvements have recently been made or are about to be made to the existing infrastructure through state and federal funds, setting the stage for private sector investment in specific terminal facilities.

The Brazilian Federal and state governments are developing the Port of SUAPE as a major hub port. Movement through the port has increased dramatically in the 1990's, more than doubling the number of tons of traffic through the port from 1.1 million in 1991 to 3.6 million in 1997. Container traffic increased during the same period from 6.4 thousand to an estimated 36 thousand units. Total bulk liquids increased from 1.2 tons in 1991 to over 3 million tons in 1996.



Project Status

The infrastructure works for the construction of the internal port are well underway. The major remaining progress are focused on the construction of the terminals and related industrial infrastructure. Bids for the major container terminal opened in October, 1997. Bids for the remaining items will be issued as feasibility studies are completed.

Financing

The Port of SUAPE operates under the model of a "landlord port," where in the public sector provides the infrastructure and acts as the port authority while the private sector invests in and operates individual facilities under lease agreements. As this is a top priority project of both the state and federal government, funding has been forthcoming for the construction of the port infrastructure.

Equipment and Service Procurement

Equipment:

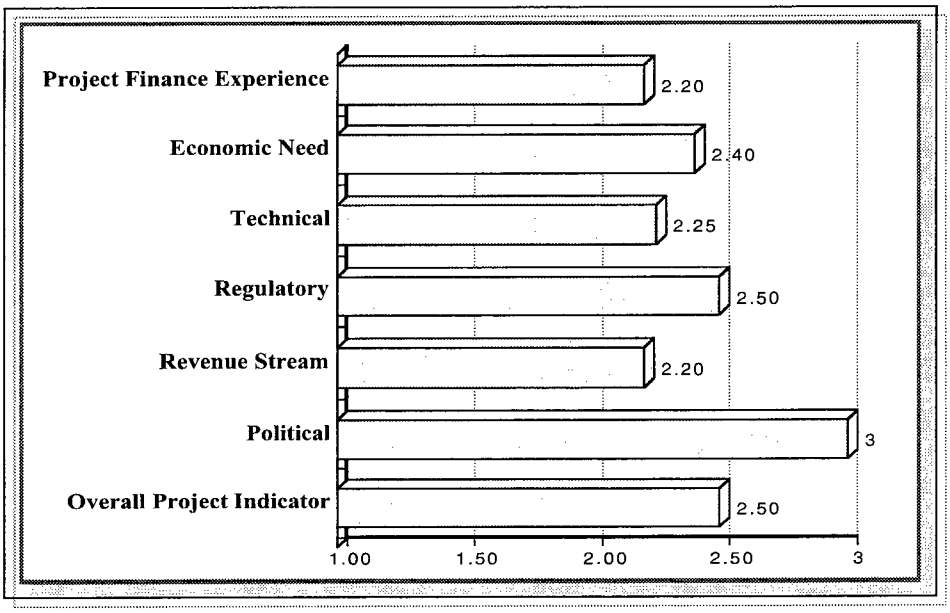
- Equipment for loading and unloading container
- Control systems and security systems.

Service:

- Detailed port engineering and layout services
- Marine environmental consulting services
- Cargo demand and feasibility studies

Procurement will be accomplished both through the Port Authority and through the private sector winners of the terminal leases.

Critical Project Indicators



Key Decision Makers

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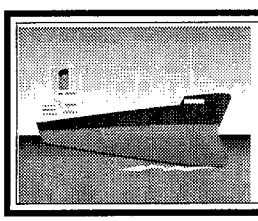


Transportation / Brazil

Port of Santos Modernization and Expansion

Project Summary

Project No:	**TRAN-21**
Subsector:	**Port**
Location:	**Santos, Brazil**
Project Cost:	**US$ 1 billion**
Export Potential:	**US$ 150 million**
Type:	**Concession**
Sponsor:	**Ministry of Transportation & CODESP**

The Port of Santos is managed by Companhia Docas do Estado de São Paulo (CODESP), a conglomerate whose major shareholder is the Federal Government. In October1995, CODESP initiated a privatization program to transfer port operation and infrastructure investment into private hands. The privatization program is intended to serve as a mechanism for the expansion and modernization of port facilities.

Technical Description

Fourteen contracts have been signed with private concessionaires since 1995, covering an area of 487,000 m^2 within the port complex and having a total value of US$ 241 million. CODESP intends to award 17 additional concession contracts for port expansion and operation in the next year. The contracts will cover an area of 1.1 million m^2, with a total value of US$ 415 million.

In addition, CODESP will utilize a US$ 250 million loan from OECF-Japan to expand and modernize the port facilities. The project involves the expansion and modernization of 3 specialized terminals: *Container Terminal* - TECON, *Fertilizer Terminal* - TEFER and *Grain Terminal* - EXPORT CORRIDOR.

Expansion of the Container Terminal - TECON

The container terminal, which was inaugurated in August 1991, covers approximately 300,000 m^2 and has already exceeded its designed handling capacity. Currently, the container terminal handles over 270,000 TEU's per year. CODESP estimates that the Port of Santos will reach 500,000 TEU's by the year 2000.

The terminal will be expanded by 310 m of quay and by 185,000 m^2 of backyard. When expansion is completed, the container terminal will be able to simultaneous berth of up to 4 vessels, with 13.5 m of draft. The project will include the installation of 1 quay crane, with a hoisting capacity of 50 tons and 8 rubber tire mounted transfer gantry cranes.

Modernization of the Fertilizer Terminal - TEFER

The fertilizer terminal, which has a 567 m length, currently handles approximately 2 million tons per year. Fertilizer terminal facilities will be modernized to handle 3 million tons per year. The present pier will be widened and reinforced, allowing the installation of 4 gantry- type ship unloaders with large capacity. New accesses to the pier will be constructed and a new system of conveyor belts, compatible with the unloaders, will be installed to link the quay with existing warehouses.

Expansion of the Grain Terminal - EXPORT CORRIDOR

Handling capacity of the grain terminal, which is utilized for handling bulk vegetable cargo, is completely saturated. Expanding the terminal's facilities is not a feasible alternative, due to space constraints. Thus, the project will include construction of a new terminal, as well as the supply and installation of new equipment such as ship loaders, receiving lines and loading lines for the existing Grain Terminal.

The new terminal will be constructed in an area of the port complex north of the existing grain terminal. It will provide fixed facilities for exporting grain, including a berth, access bridge, landfill, dredging, warehousing silos, receiving hoppers, train and truck access and other complementary work. Expansion will increase present static capacity from 150,000 tons to a total of 300,000 tons. Shipping capacity will also increase from 3,000 tons/hour to 6,000 tons/hour, allowing for an annual handling of approximately 6 million tons, with the possibility of future expansion.

Auxiliary Services

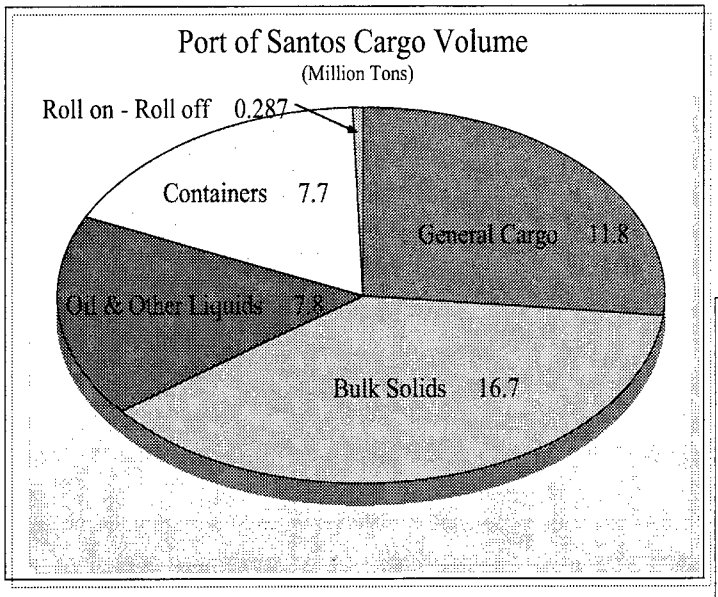
Modernization of the Port of Santos will also involve the implementation of auxiliary services to maximize terminal operation. Services will include automated systems for control and drive and an upgrade of primary electrical facilities.

Site

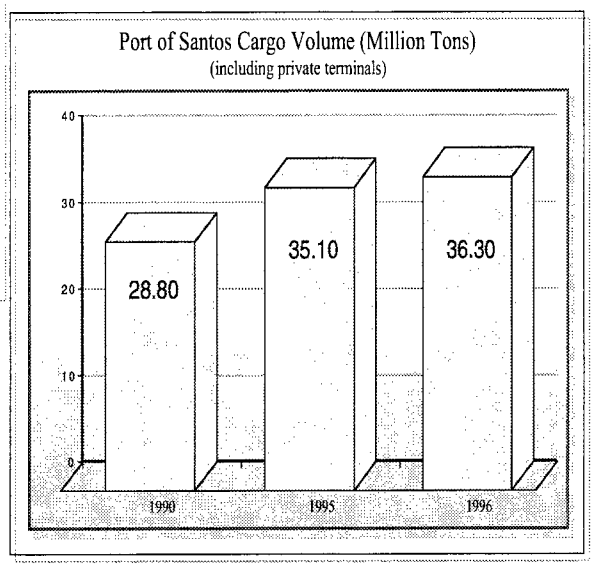
The Port of Santos is located in the State of São Paulo, on the southeastern coast of Brazil approximately 50 Km east of the State capital of São Paulo.

Nature of Demand

The Port of Santos is currently the highest volume port in South America and is being stretched to capacity. Shipping volume in 1996 was 36 million tons, and is expected to reach 50 million tons by the year 2000. Santos handles the largest variety of cargo in Brazil, including general cargo, solid and liquid bulks.



The objective of the Port of Santos Expansion and Modernization Project is to reduce tariffs by 10% every 6 months and to achieve an overall reduction of tariffs of 46% by the end of 1998.



Thus far, the Port of Santos concession program has enabled private contractors to handle an additional volume of 7.9 million tons. The goal of the next stage of port expansion and modernization is to reach 16.7 million additional tons.

Project Status

The Port of Santos privatization program has been ongoing since October 1995. A total of 14 concession contracts have been signed to date, and CODESP intends to sign another 17 contracts with private operators by the year 2000. Bidding documents are available through CODESP.

The expansion and modernization of the 3 container terminals is also currently underway. The chart on the right outlines the investment breakdown of the project.

Investment Breakdown

US$

INVESTMENT WITH OWN, PUBLIC AND EXTERNAL RESOURCES	Realized			Forecast			
	1995	1996	1997*	1998	1999	2000	2001
Container Terminal Expansion	41,758	59,175	65,970	109,620	43,307	39,851	11,036
Port Development Project (OECF-Loan Agreement)	**541**	**1,336**	**3,676**	**88,890**	**107,310**	**85,470**	**4,200**
Consulting Services	541	1,336	3,676	2,990	2,830	2,520	
Container Terminal - Civil Work and Equipment				21,000	10,500		
Export Corridor (Grain Terminal) TEGRAN				26,000	62,480	60,900	4,200
Fertilizer Terminal - TEFER				38,900	31,500	22,050	
Basic Infrastructure Projects (World Bank Loan)				**60,300**	**64,622**	**58,172**	
Channel Dredging and Rock Breaking				22,000	21,672	21,672	
Ditching of Electric Power Line				3,300	4,950		
Resettling of Soil Occupations				10,000	10,500	11,000	
Extension of Ave. Portuaria				12,000	14,500	14,500	
Left Bank Railway Recovery				2,000	2,000		
Right Bank Railway Relocation				8,000	8,000	8,000	
Recovery of Alamoa Site				3,000	3,000	3,000	
Improvement of Santos Port Facilities	**705**	**943**	**9,427**	**14,510**			
Recovery / Replacement of Santos Equipment	**10,155**	**5,223**	**11,275**	**16,059**			
Industrial and Commercial Santos Port Project			**189**	**750**			
Master Plan of the Port of Santos			**955**	**600**			
Equipment Purchase for Port Modernization	**5,416**	**4,718**					
TOTAL	**58,575**	**71,395**	**91,492**	**290,729**	**215,239**	**183,493**	**15,236**
Private Sector Investment (Proaps)		**6,600**	**91,000**	**33,986**	**119,300**		

Source: Compahia Docas do Estado de São Paulo *estimated through end of 1997

Financing

Overall investments to expand and modernize the Port of Santos will total approximately US$ 1 billion through the year 2000. Of this amount, a US$ 250 million loan is being provided through the Overseas Economic Cooperation Fund of Japan (OECF) to finance the expansion and modernization of the container, fertilizer and grain terminals.

Another US$ 183 million will be provided through a World Bank loan from 1998-2000. The loan will cover channel dredging and rock breaking, ditching of electric power transmission linse, road extension and railway recovery/relocation.

Additional expansion and modernization projects will be undertaken both through internal CODESP funds and through the investments of private sector concessionaires (including the 17 contracts expected to be awarded).

Equipment and Service Procurement

Equipment:

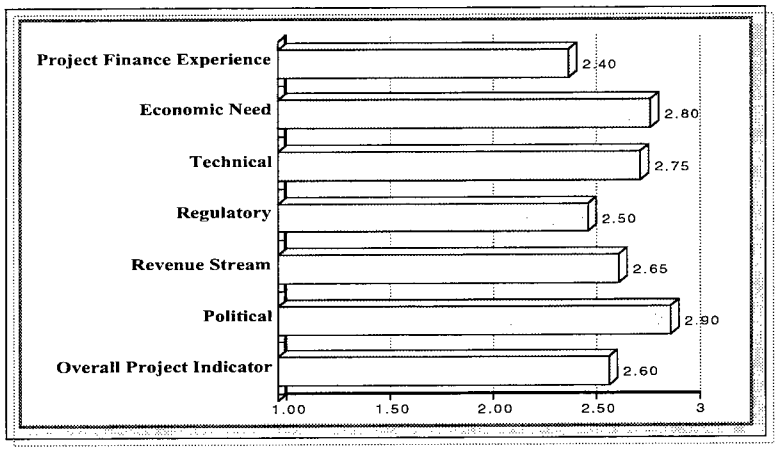
- Quay Crane (50 ton hoisting capacity)
- 8 Transfer Gantry Cranes (rubber tire mounted)
- 4 Gantry-type Ship Unloaders (large capacity)
- Conveyor Belts
- Ship Loaders
- Receiving & Loading lines
- Receiving Hoppers
- Warehousing Silos
- Computer Systems
- Communications Technology
- Pumping Systems
- Electrical Facilities & Transmission Line
- Rail & Switching Equipment

Services:

- Port Operation
- Channel Dredging
- Rail Construction
- Specialized Engineering

Total investment in equipment and services is estimated at US$ 150 million.

Critical Project Indicators



Key Decision Makers

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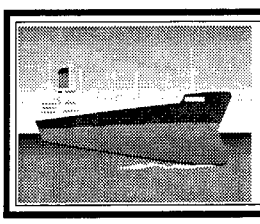
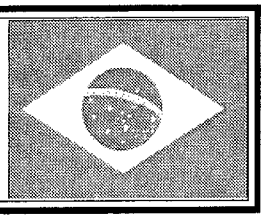


Transportation / Brazil

Modernization of the Port of Sepetiba



Project Summary

Project No:	**TRAN-22**
Subsector:	**Port**
Location:	**State of Rio de Janeiro**
Project Cost:	**US$ 380 million**
Export Potential:	**US$ 50 million**
Type:	**Procurement/ Privatization**
Sponsor:	**Ministry of Transportation Cia Docas do Rio de Janeiro**

The Port of Sepetiba was established in 1982 to meet trading needs for coal imports and aluminum exports. The port has an untapped potential to complement capacity from Rio de Janeiro's port. In addition, the government wishes to establish an industrial complex in the port's retro-area.

The Sepetiba Port Project has been included in the federal government's 14 priority project list within the Brazil in Action Program, and is integral to the development of a new economic axis in the country.

Technical Description

The Sepetiba port project is composed of two phases. The first will be financed by the Ministry of Transportation, through the National Development Bank (BNDES). The second phase, will be financed and executed by the private sector.

Phase I

The first phase involves the following basic infrastructure works:

22 Km of Dredging for the access canal
Dredging will be 18.5 Km deep, allowing for the operation of vessels with 150,000 tons of capacity. Current access channel depth is 16 Km.

Implementation of the basic infrastructure for a general cargo terminal
The terminal will be able to handle both containerized cargo as well as mineral cargo and has capacity to handle 1 million TEUS annually.
Implementation of the basic infrastructure for a grain handling terminal
The terminal has capacity to handle 4 million tons per year.
Construction of rail links to the National grid
Energy Generation and water and waste water infrastructure

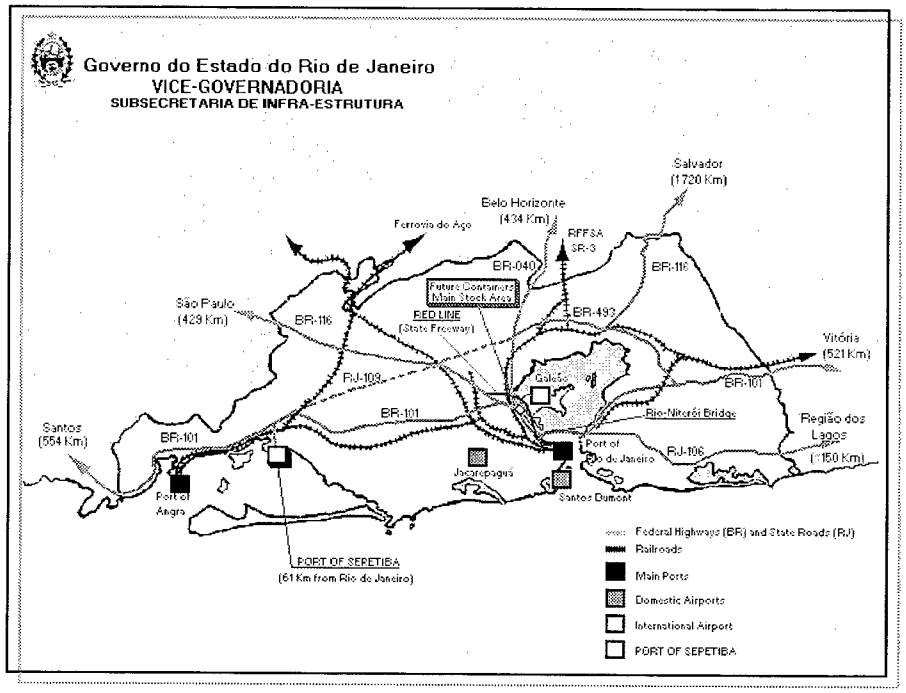
Phase II

The second phase involves the concession of the general cargo and grain terminals. The private concessionaires will be responsible for the completion of the terminals. The second phase maps out the concession of the existing mineral ore terminal, with capacity to transport 15 million tons per year. The concession agreement for the terminal was signed with the Compania Portuaria de Sepetiba (FERTECO) in December 1996. The company is currently studying various means in which to improve and expand the terminal structure.

Site

Located 100 Km south of Rio de Janeiro and 320 Km from São Paulo, the Port of Sepetiba is situated in Brazil's prime industrial region.

The port has a retro area of 10 million square meters, in which the government wants to stimulate the creation of an industrial complex. The port's depth in the approach channels and docks is 18.5 Km, sufficient to handle containerized vessels with capacity of 4,000 TEU's and vessels with the ability to handle 150,000 TPB of granulated cargo.



Nature of Demand

Southeastern Brazil is responsible for approximately 65% of the country's GDP. The region 500 Km around the port area contains 32 % of the population and generates approximately 60% of the industrial and agricultural output of the country.

The two existing ports, Santos and the Port of Rio, are unable to meet current demand. This is the primary impetus for the Port of Sepetiba project.

The Sepetiba project also calls for the development of an industrial park in the port vicinity which will require port infrastructure. The project has strong political support and has been included among the priority 42 projects of the "Brazil in Action" plan.

The port region's Master Plan designates the Port of Sepetiba as a hub port, primarily transporting containerized cargo between the São Paulo and Rio de Janeiro states. Currently, approximately 1 million containers are transported between these two metropolitan regions per year by truck, which adds an estimated 15 % increase to the final cost of products. The Port of Sepetiba will be used as a hub port in order to transport containerized cargo to the Port of Santos, which is also being privatized.

Project Status

The Master Plan for the project and industrial park has been completed. The engineering designs for the executive project on privatizing the terminals have been contracted by Compania Docas do Rio de Janeiro, (CDRJ).

Phase one of the project is on-going, financed through Federal funds and channeled through the National Development Bank (BNDES). The procurement for works are on-going.

The mineral ore terminal was concessioned to the Compania Portuaria Ba'a de Sepetiba (FERTECO) in December 1996. FERTECO is responsible for the development of this terminal and for ensuring that investments are made to ensure that the terminal is fully operative.

The concessioning of terminals is scheduled for the first quarter of 1998.

Financing

Phase I of the project will be financed through federal and state funds, channeled through the National Development Bank (BNDES).

Phase II of the project will be financed through the private sector.

It is estimated that aggregate revenues from terminal concessions of the terminals will reach US $100 million, and that total investments in the port will reach US $280 million.

Equipment and Service Procurement

The overall port modernization and expansion presents excellent opportunities for US equipment suppliers and port terminal operators. Dredging services will also be an important procurement opportunity for US companies. Most engineering and design services have been bid and executed.

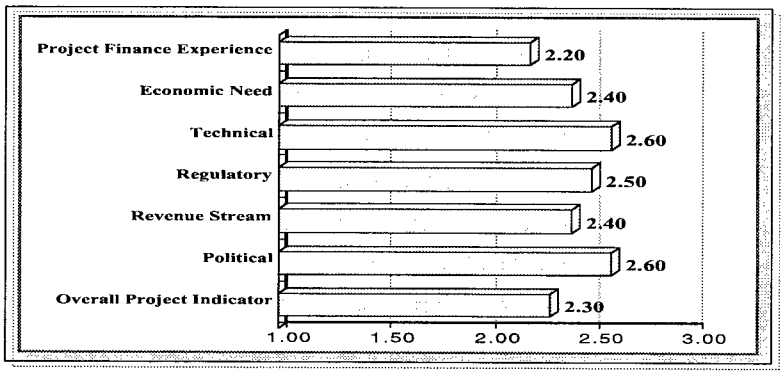
Equipment:

- Container handling equipment
- Transfer gantry cranes
- High capacity ship unloaders
- Conveyor belts
- Ship loaders
- Receiving & loading lines
- Receiving hoppers
- Mobile hoppers
- Dynamic weigh bridges
- Trucks/ wagons
- Suction systems
- Bucket reclaimers
- Warehousing silos
- Computer systems
- Communications technology
- Pumping systems
- Electrical facilities and transmission line
- Rail and switching equipment.
- Water / waste water infrastructure

Services:

- Port operation
- Channel dredging
- Rail construction

Critical Project Indicators



Key Decision Makers

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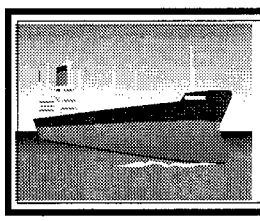
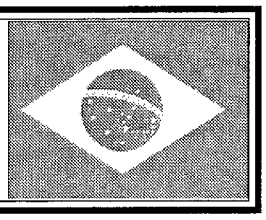


Transportation / Brazil

Teaçu I Sugar Terminal Concession



Project Summary

Project No:	**TRAN-23**
Subsector:	**Port**
Location:	**Santos, Brazil**
Project Cost:	**US$ 30 million**
Export Potential:	**US$ 20 million**
Type:	**Procurement, JV**
Sponsor:	**Logos Engenharia,SA**

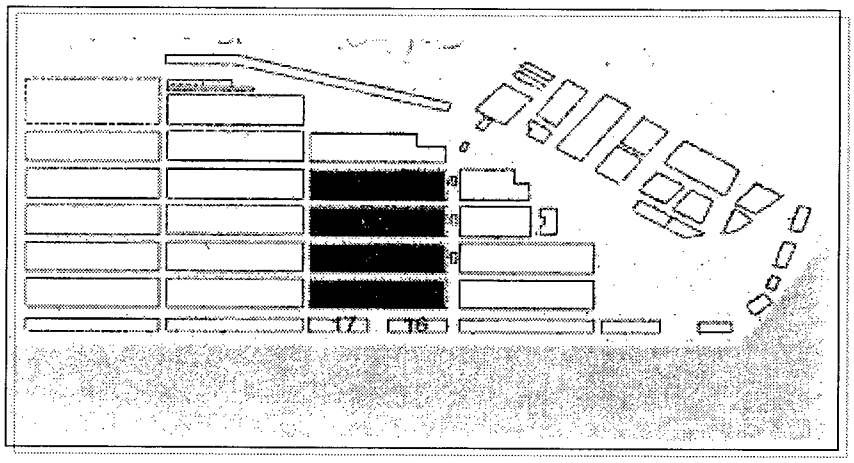
In April 1996, Logos Engenharia, S.A. a Brazilian engineering firm, based in São Paulo signed a 20-year concession contract with the Santos Port Authority (Companhia Docas do Estado de São Paulo — CODESP) for construction of the Teaçu I Sugar Terminal in the Port of Santos. The Teaçu I project is illustrative of future port concessions that will be awarded over the coming years in Brazil's aggressive effort to modernize its transportation infrastructure and particularly vital port links. Traditionally, Brazilian ports have operated at low efficiencies and high costs, and the government has now turned to the private sector to reduce shipping costs and to increase the country's export competitiveness.

As the private construction and operation of port facilities is new to Brazil, companies winning these concessions can benefit from the expertise of US companies with services and equipment to make these new facilities efficient. As the new private concessionaires must compete amongst themselves for business, they must seek out and invest in the best and most efficient equipment as well as expertise on efficient operations.

Technical Description

The Teaçu Sugar Terminal will utilize 4 existing warehouses that front a straight wharf in the Port of Santos. The terminal will primarily handle sugar but the owners are evaluating the potential for also handling other agricultural products. Each of the 4 warehouses is 230 m by 40 m and is currently used for the storage of bulk and bagged agricultural products. None of the existing warehouses have equipment to handle the movement of bulk or bagged products.

The project will modify existing infrastructure to receive 3,000 bags/hr per warehouse and to ship 6,000 bags/hr or 300 tons/hr. The concessionaires are evaluating several technology solutions to achieve maximum efficiency with the leading alternative having the following components:



- Installation of a new lighting, electrical supply and distribution system in each warehouse.

- Improvement of the wharf foundation.

- Construction in each warehouse of two similar and independent systems to handle bags using a continuous conveyance system. Each system would have a capacity to receive or ship 1,500 bags per hour. These systems would consist of truck and wagon unloaders, conveyor belts through the entire length of the warehouse and teleloaders to store and reclaim the bags.

- Construction outside of the warehouses of two parallel conveyor belts lodged in a bridge galley each to be fed from the warehouses at a rate of 3,000 bags/hour. The conveyor belts will first run perpendicular to the wharf and then afterwards parallel to it until they reach the spiral ship loaders near the waterfront. Two spiral ship loaders will receive the bags and load them into the holds of the ships at a rate of 3,000 bags/hour. These ship loaders will also be able to operate with bulk materials at a rate of 400 tons/hour.

- Installation of an integrated automation system with electronic devices to synchronize the flow of bags or bulk materials. The system will include an electronic road scale capable of receiving trucks of up to 50 tons. Overall system control will be provided by an operational control center including a second logic system to coordinate the quantity of products stocked and the arrival of ships by means of simulations. The two logic systems will operate in tandem and enable the transfer of data between the terminal and users via telephone.

- There is also an alternative plan under consideration that would alter the system installed in the warehouse closest to the wharf. This alteration would involve the installation of a completely automated bulk handling system, without the use of internal payloaders but using a rake reclaimer that would send the bulk materials to the holds of the ships through the conveyor belts and spiral ship loaders.

Site

The terminal is located in the Port of Santos, in São Paulo State. The Port of Santos is the located in the south eastern part of Brazil, and is the principal via used for exports and imports of agricultural and industrial goods in the country.

Nature of Demand

Brazil is major producer and exporter of sugar. It produced approximately 12.5 million metric tons of sugar in 1996 and exported between 5 to 6 million metric tons. Brazilian sugar exports have been growing steadily since 1989 although government regulations prevented shipments through Southeast Brazilian ports. When these restrictions were removed, sugar exports began growing rapidly through the port of Santos. This trend is expected to continue.

Inefficiencies in port operations and equipment add important costs to the price of exported sugar. Current port shipping costs are estimated at about $53/ton. The Port of Teaçu estimates that it will be able to make a profit at a price of $30/ton thus making it very competitive in the market.

Project Status

The 20-year concession to operate the terminal was awarded to Logos Engenharia in April 1996. Logos has completed detailed technical and feasibility analysis for the port including having evaluated a number of technical alternatives. The company continues to negotiate with potential service and equipment suppliers as well as potential partners and/or third party capital sources.

Financing

The project is structured as a concession with the market risk falling on the concessionaire. The viability of the project is closely tied to its ability to compete effectively in the market by providing a competitive shipping price. The Port Authority has granted several other concessions for similar terminals, including one recently granted to Cargill. Thus, there is strong competition in the Port of Santos market. The concessionaires expect that the overall demand for shipping services, combined with their ability to operate efficiently, will allow them to finance the project on budget and to operate at a profit thereafter.

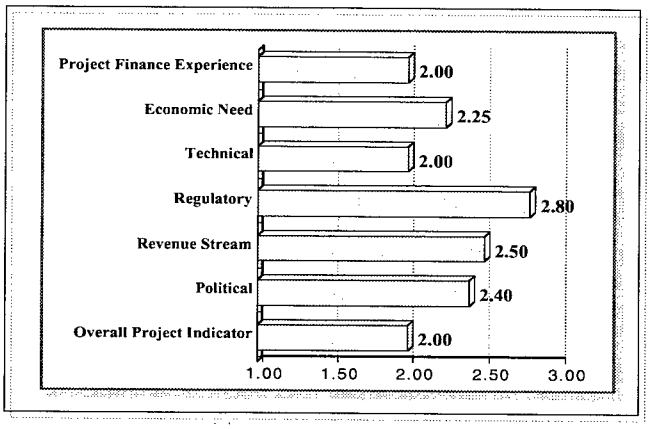
Lowos is in the process of securing financing for the project, and is very interested in working with US companies with particular interest in leasing equipment for the long term. There are substantial risks in this project aside from market and competitive risks. There is some risk from devaluation although port shipping prices are generally tied to if not denominated in US. dollars. Second, there is agricultural and price risk tied to Brazil's sugar crop and worldwide prices for sugar. Sugar tends to be a volatile market and the political environment impacts world export sugar prices.

Equipment and Service Procurement

The project requires major investments in port loading and unloading equipment for bulk and bagged materials and accompanying automation systems. Current technical specifications require:

- Lighting and electrical distribution equipment
- Bag and bulk conveyance systems — conveyor belts and teleloaders
- Spiral ship loaders
- Operational control systems including simulation software
- Telecommunications equipment
- Port engineering and construction management services

Critical Project Indicators



Key Decision Makers

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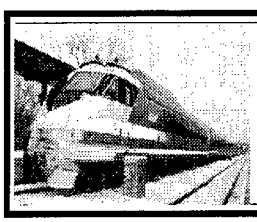


Transportation / Brazil

São Paulo - Light Rail VLP Project

Project Summary

Project No:	**TRAN-24**
Subsector:	**Urban Mass Transit**
Location:	**City of São Paulo, Brazil**
Project Cost:	**US$ 1.5 billion**
Export Potential:	**US$ 100 million**
Type:	**BOT Concession**
Sponsor:	**São Paulo Transporte, S.A. (SPTrans)**

The Veículo Leve Sobre Pnevs (VLP) Project is a plan proposed by São Paulo Transporte, S.A. (SPTrans) to provide São Paulo with a new and efficient transport system, to reduce traffic congestion and pollution. This system will integrate with existing modes of public transportation (bus, subway, and city trains), and consist of electric trolley-bus vehicles on exclusive lanes, separate from local traffic. SPTrans plans to transfer its concession for the VLP System to private hands through a 15-year BOT concession.

Technical Description

The VLP system is expected to cover 104 Km, which will include direct and circular (orbiting) routes. The goal is to provide a transportation system that could serve a range of demands of 13,000 to 35,000 passengers per hour, in each direction. São Paulo Transporte is promoting the VLP Project as a 15-year BOT concession.

Each trolley-bus will combine bus/metro type equipment, and will be guided on lateral rails which function on electricity. The vehicles will have wheel brakes, as well as antilock braking systems. Two electric motors of 120 KW each will be required for the single-link trolley, while 2 motors of 180 KW each will be needed for the trolley with two links. The maximum extension of each trolley will be two links. The maximum speed of travel will be 80 Km/h, with the average speed being 35 Km/h.

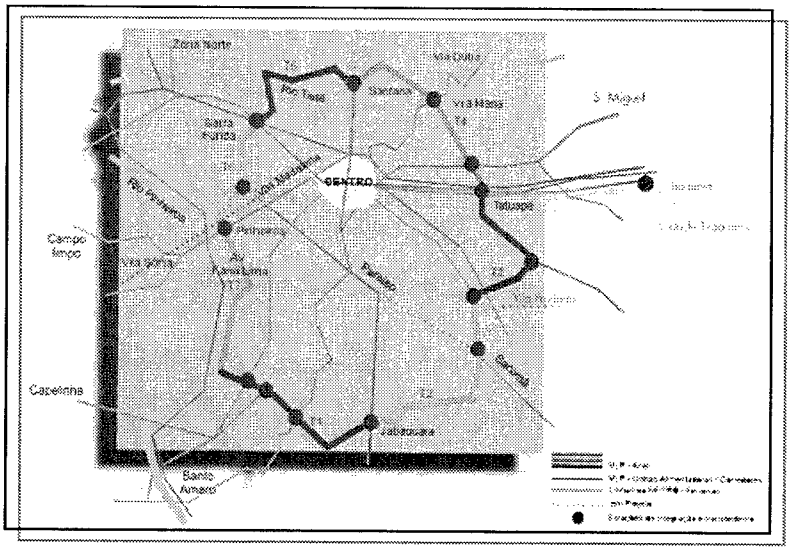
The vehicles will travel in lanes specifically separated from auto traffic, linked together to reach a length of nearly three city buses. This capability will increase passenger capacity to 221 people per vehicle. Current city buses carry only 80-140 passengers.

Sales and purchases of tickets will be done in the VLP stations, in order to eliminate the delay caused by the exchange of money while boarding city buses. Passengers will embark and disembark from a raised platform at the same level as the vehicle floor, allowing for more efficient entries and exits. Exiting will be permitted from anywhere on the trolley, which will also improve the commuter flow. It is planned for a new vehicle to pass through each station every 75 seconds. The graph on the right shows the length of the routes.

Route	Length of Route(Km)
Sacomã – Pq. D. Pedro II	10.64
São Mateus – Pq. D. Pedro II	27.80
Sacomã – Brooklin – Pinheiros	21.10
Cidade Dutra – Pç. da Bandeira	22.40
Radial Leste e Pq. Novo Mundo	21.10

Site

The transport system will be implemented in the São Paulo municipal area and integrated with other modes of transportation. The map on the right shows where VLP lines would be located.



Nature of Demand

São Paulo is the largest and most populated city in Brazil. The entire metropolitan area encompasses 15 million inhabitants. The metropolitan bus transportation system currently serves close to 700 million passengers per year. This immense demand is served via 43 Km of lines and 41 stations. To put this into perspective, one can compare São Paulo with London, which has 394 Km of lines and 270 stations, serving 720 million passengers each year.

The trolley-bus system is projected to provide a transportation system that could serve a range of

demands of 13,000 to 35,000 passengers per hour, in each direction. Currently, São Paulo's public system serves 11.1 million trips/day.

Route	Number of Vehicles	Projected Demand
Sacomã – Pq. D. Pedro II	31	138,940
São Mateus – Pq. D. Pedro II	161	403,966
Sacomã – Brooklin – Pinheiros	65	287,401
Cidade Dutra – Pç. da Bandeira	55	197,686
Radial Leste e Pq. Novo Mundo	40	172,002

Besides passenger demand, the air pollution factor is also driving the need for a nonpolluting above- ground urban mass transit system. Since the trolley-bus is run on electricity and not gasoline, it would reduce dangerous levels of pollutants. According to a study done by SPTrans, every vehicle substituted by a trolley-bus would decrease emissions of carbon monoxide by 1.5 metric tons. When fully implemented, VLP will operate a fleet of 287 vehicles and absorb 1.5 million trips/ day. Therefore, the common bus fleet will be reduced from 11,500 to 9,500 vehicles.

Financing

SPTrans estimates the cost of implementing the VLP system in São Paulo would be US$ 12 million per Km (including vehicles and equipment). The proposed system stretches a total of 104 Km, thus bringing the size of the investment to approximately US$ 1.5 billion. The financial structure of the project is a 15-year BOT concession. The above chart outlines financial projections for the project.

Type of Investment
in US$

Type of Investment	Total System	Part 1	Part 2	Part 3	Part 4	Part 5
1.1 Infrastructure	**1,234,756**	**172,658**	**360,892**	**225,698**	**261,592**	**213,914**
Route	582,845	59,265	172,670	105,830	128,110	116,970
Stations	213,000	23,430	46,860	44,730	53,250	44,730
Terminals	305,652	76,413	101,884	50,942	50,942	25,471
Raised Route	133,259	13,550	39,479	24,197	29,291	26,744
1.2 Operation of System	**389,348**	**37,488**	**117,540**	**77,640**	**86,040**	**70,640**
Vehicles	274,400	21,700	87,500	56,000	61,600	47,600
Control System	52,320	5,320	15,500	9,500	11,500	10,500
Communication Sys.	20,928	2,128	6,200	3,800	4,600	4,200
Garage/Office (including land)	37,800	7,560	7,560	7,560	7,560	7,560
Auxiliary Vehicles	3,900	780	780	780	780	780
1.3 Plans & Pre-Operation	**81,205**	**10,507**	**23,922**	**15,167**	**17,832**	**14,228**
TOTAL	**1,705,309**	**220,653**	**502,354**	**318,505**	**365,014**	**298,782**

Indicator	Stage1	Stage 2	Stage 3	Stage 4	Stage 5
Efective Demand (passengers/day)	138,940	403,966	287,401	197,686	172,002
IRR (15%)	20.4%	22.7%	24.0%	14.7%	17.6%
Years to Break-Even	3.5	3.5	2.4	7.7	5.6
Average Tariff (R$/Passenger)	0.90	0.90	0.90	0.90	0.90
Average Cost (R$/Passenger)	0.64	0.56	0.52	8.81	0.72

The project will be completed with financing from the city of São Paulo and the private sector. In Part 1, the public sector will invest in the routes and the private sector concessionaire will invest in the vehicles, control systems, installations and garage equipment.

Origin of Capital:

Participation of Public Sector (financial and contractual): Funds will be drawn from SPTrans budget and development bank financing. The public sector will execute the land acquisition, development and creation of Master Plan with some participation in installation of infrastructure.

Participation of Private Sector: Funds will be channeled via national and international funds. Minimum participation will be 15% of the total investment amount.

Investment Rules, Tariff Policy: The concession will be executed by a public bidding process. Tariffs will be set and regulated by the Public Sector.

Participation of Bilateral and Multilateral Institutions: The project expects bilateral and multilateral institutions to participate in the international bidding.

Project Status

The rail corridors are already being constructed for the first line (Sacomã - Parque Dom Pedro II) with 26% of the civil works having been concluded.

PHASES OF VLP PROJECT		Applicable Dates
Phase 1: SACOMÃ / PARQUE DOM PEDRO II (including Vila Prudente line)		1/97 - 9/98
1.1	Planning and Development of Project	1/97 - 9/97
1.2	Acquisition of vehicle, infrastructure, and execution of civil works	9/97 - 9/98
1.3	Initiation of Operation	9/1/98
1.4	Initiation of Operation of Vila Prudent line	9/1/98
Phase 2: S. MATEUS / PARQUE DOM PEDRO II (NOVA SAPOPEMBA) (Including Anhaia Melo/ Penha line)		6/97 - 1/00
2.1	Planning and Development of Project	6/97 - 12/97
2.2	Acquisition of vehicle, infrastructure, and execution of civil works	1/98 - 8/98
2.3	Initiation of Operation	9/1/99
2.4	Initiation of Operation of Anhaia Melo and Penha lines	1/1/00
Phase 3: SACOMÃ / BROOKLIN / PINHEIROS (Orbital Route)		1/98 - 9/00
3.1	Planning and Development of Project	1/98 - 9/98
3.2	Acquisition of vehicle, infrastructure, and execution of civil works	9/98 - 9/00
3.3	Initiation of Operation of Sacomã / Brooklin / Pinheiros lines	9/1/00
Phase 4: CIDADE DUTRA / PRAÇA DA BANDERA (WASHINGTON LUIZ)		9/98 - 1/01
4.1	Planning and Development of Project	9/98 - 7/99
4.2	Acquisition of vehicle, infrastructure, and execution of civil works	7/99 - 1/01
4.3	Initiation of Operation	1/1/01
Phase 5: EAST RADIAL AND PARQUE NOVO MUNDO		7/99 - 12/31/01
5.1	Planning and Development of Project	7/99 - 7/00
5.2	Acquisition of vehicle, infrastructure, and execution of civil works	7/00 - 12/31/01
5.3	Initiation of Operation: East Radial	1/1/02
5.4	Initiation of Operation: Parque Novo Mundo	1/1/02

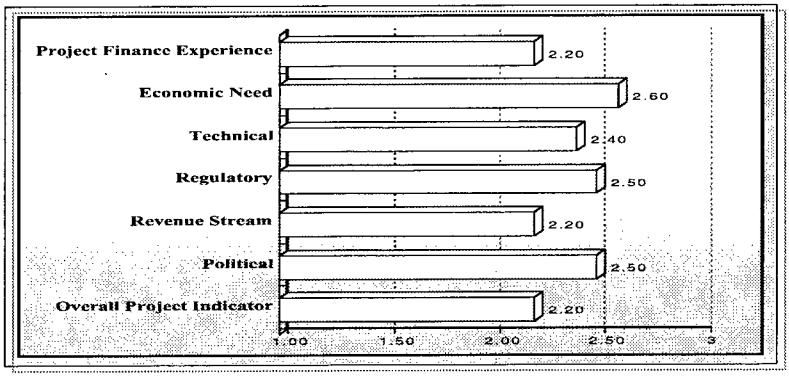
Source: SPTrans

Equipment and Service Procurement

The principal equipment and systems needed for the VLP project include:

- Communication system- radio, closed Circuit television
- Traffic signal system and signs
- Electrical systems
- Operational control system
- Rolling stock (trolley-bus vehicles)
- Engineering services for civil works
- Electronic ticketing systems
- Electronic crediting system
- Maintenance equipment

Critical Project Indicators



Key Decision Makers

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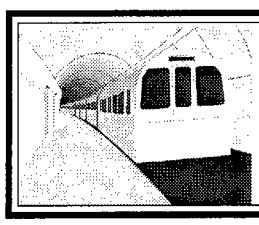


Transportation / Brazil

São Paulo Metro Line 4

Project Summary

Project No:	**TRAN-25**
Subsector:	**Urban Mass Transit**
Location:	**City of São Paulo, Brazil**
Project Cost:	**US$ 2 billion**
Export Potential:	**US$ 800 million**
Type:	**BOT Concession**
Sponsor:	**Cia. do Metropolitano de São Paulo (Metro)**

Companhia do Metropolitano de São Paulo (Metrô), mandated by state charter and under state supervision anticipates two expansion projects, of which only one is open for bid and concession. Metrô plans to expand service by: extending two current lines by 12 Km, and adding two new lines. The first of these new metro lines, #4 will be constructed under a BOT concession, while the second will be implemented by Metropolitan Commuter Railways (CPTM) and the Inter-American Development Bank (IDB).

Operating in one of the most populated cities in the world, Metrô has used TQM to consistently rank as one of the most safe and efficient, second only to Hong Kong. The metro system currently services 700 million passengers annually on three lines; again ranked high amongst the most traveled metros in the world behind Hong Kong and Vancouver.

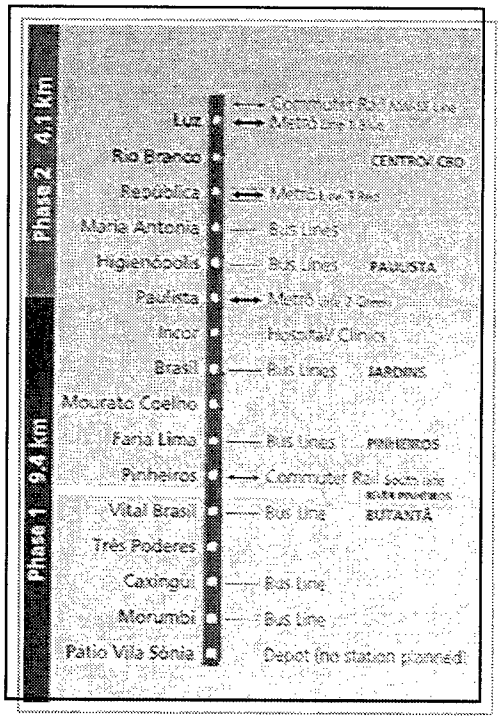
Comparison of Passengers per Route-Kilometer

System	Passengers (millions)	Length (km)	Ratio (millions)
Hong Kong	779.00	43.20	18.00
São Paulo	694.00	43.60	16.00
Tokyo	2,738.00	230.30	11.90
Seoul	1,354.00	120.70	11.20
Moscow	2,581.00	241.60	10.70
Mexico City	1,422.00	158.00	9.00
Paris	1,201.00	201.40	6.00
Rome	190.00	33.50	5.70
Madrid	413.00	112.60	3.70
Singapore	204.00	67.00	3.00
New York	1,057.00	443.00	2.40
London	728.00	394.00	1.80

Source: Secretaria de Transportes Metropolitanos - Brazil

Technical Description

The technical makeup of the system will include two phases. The first will be 9.5 Km of tunnel and track involving the construction of 10 Stations linking Paulista and the São Paulo business district with Vila Sônia. The track will connect with Line 2 at the Paulista Station. Phase II will include a 4.1 Km connection from Paulista to Luz Station.



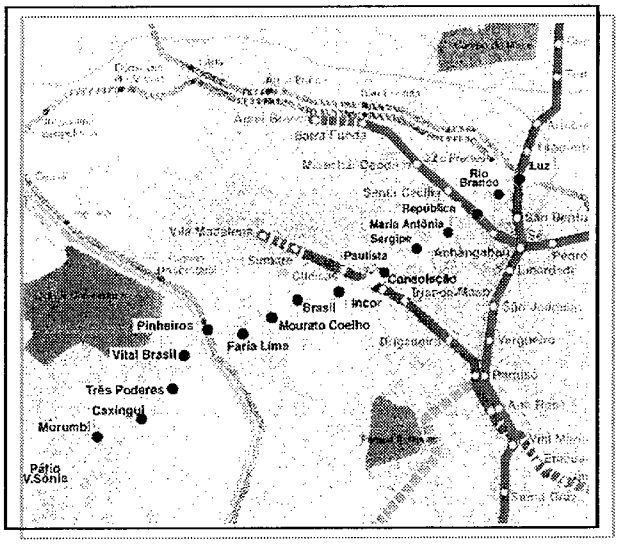
When completed, the network will evolve from a radial system to a grid system, alleviating congestion in the central business district. The congestion will subside by connecting to Line 3 at Republican Station and Line 1 at Luz Station to the new Line 4.

The self-contained project will include rolling stock, systems, maintenance and staffing. The project is expected to be entirely independent of the remaining networks of different voltages. Under the concession contract, the project will entail both privately and publicly-supplied assets. The concessionaire will be expected to provide the rolling stock, electrical systems, and working capital, while the public supplier will furnish the civil works requirements.

Directives for Bidding on Concession Contract

- Candidates may include a sole company or a group of companies formed by a consortia.
- The length of the concession term will be 25 years, which may be extended according to conditions negotiated upon three years prior to the termination of the contact.
- Any subconcessions of services are not permitted by the concessionaire.
- Travel fares will be determined by the State Government according to financial balance and contractual accordance.
- Candidates are required to agree contractually to render services according to performance requirements as stipulated by the State Government.
- Revenues may be used as loan guarantees in compliance with Articles 29 and 30 of the State Law No. 7835, of May 8, 1992
- Concessionaire may contact third parties for the execution of works.
- For the bidder to win, its core business must be in the operation of said services as will be specified in the concession contract.
- Bidding will be split into two basic phases: The Prequalification Phase requiring documentation, statements and proof of competency and the Formal Proposal Phase requiring technical and commercial proposals for assessment.

Site



The project will be located in São Paulo, one of the most populated cities in the world with a total population of 17 million people; 10% of the Brazil's population. Specifically, the location of Line 4 will be in the East/ South East area of the downtown center of São Paulo.

Nature of Demand

The service region for the project is made up of 3.1 million inhabitants representing 18.7% of the Greater São Paulo Metropolitan Area. The region currently serviced generates approximately 3.2 million trips per day. According to Transmark models, daily ridership for Phase I is expected at 460,000 and Phase II at 590,000, compiling an overall total of 1.05 million, greater than the average ridership of either lines 1, 2, or 3.

The proposed site for development contains well-developed arterial roads providing the majority of the intermodal demand west of the Pinheriso station. Additional traffic magnets include the Hospital, the Incor Station and the University lands at Vital Brazil. Also, bus concession development and extension work on existing lines will greater increase demand flows.

Developmental priority of infrastructure projects has been granted to all transportation as a matter of precedence to other infrastructure targets. This position was voiced by public officials at both the state and federal levels emphasizing the development of projects in partnership with the private sector. Particular to project, dealing with rail transportation, Line 4 and improvements are of high priority.

Project Status

TDA funded a US$ 362,600 grant for PBI to conduct a Technical Assistance study for the IFC in 1996. Metrô is currently reviewing the performance criteria that the eventual Concessionaire would have to comply. In order to continue to maintain high international performance standards, the performance criteria is expected to be quite detailed and stringent.

When the concession is granted, it will abide by and follow through with Brazil's 1995 Concession Law. The 25-year concession will be granted to the company that provides the highest NPV of the concessional revenue stream to the state.

The concession will be going to bid during the months of November and December 1997, soon after the IFC has conducted its financing participation studies.

Design work has already been conducted on Phase I, while designs for Phase II will begin in the short term.

Environmental permits will be conducted in a three distinct phases. The first phase, the concept phase, provides licenses for the concept. During the second phase, civil works are approved, while the last phase provides for the operating licenses. Once the project has passed the first phase, the second and third are normally considered procedural in nature.

On March 13, 1997, the Technical Group for Transportation Systems of the Environmental Council Board for the State of São Paulo (the Consema) unanimously approved the application of the permit for the first phase of the evaluative process.

Financing

The financing strategy should include developmental financing and limited recourse financing in order to fully comply with publicly sourced needs, as well as privately needed assets of the 2 billion, more than one third is scheduled to be financed through public instruments.

As the principal advisor, the IFC is currently studying the financing strategy for public funds. Government will invest R$802.90 million provided by IRDB and BNDES financing. The private financing should contain but is not limited to long-term loans, revolver facilities for working capital, long-term notes issues, cross-border tax-oriented leasing primarily for rolling stock, export credit financing and domestic equity placement. Political risk insurance is recommended by export agencies, multilateral development agencies and other government bodies.

Since hard currency will be used to invest and the Brazilian Real will be earned as revenue, investors should consider foreign exchange coverage. Revenues generated in the project will come only from fares charged to the riding public, which may be utilized to fulfill responsibility for all cost derived from operation and service of the train system.

Concession Model :
an adopted BOT (Build-Operate-Transfer) Scheme

The concessionaire will be responsible for all construction works which will be undertaken at its own risk and expense. Contributing funding to the project, the state government will disburse installments

during project implementation. Installments will be provided as the concessionaire meets the following requirements:
- Minimum scheduled interval
- Significant demonstration of effective improvements in the implementation works

The bid will provide the specifics of what constitutes significant demonstration and the minimum scheduled interval.

Equipment and Service Procurement

A substantial amount of equipment and services is expected to be imported for the project. The needed procurements will include such items as:

Equipment

Rolling Stock - Fleet of 17 Vehicles

- Each with the Following Dimensions:
- Maximum Length: 133 Meters
- Maximum Width: 2,800 mm
- Vehicle Height: 3,150 mm
- Floor Elevation (from railhead): 900 mm
- Gauge and Track: 1,435 mm

• Power will be supplied through a pantograph with 1,500 Vdc voltage. Trains may be either driven automatically or manually.

Track

• Length of track will total 9,000 m, with an additional 400 m long track at the Vila Sônia depot, sidings included.
• The running track will be laid directly on reinforced concrete slabs. Must meet all regulations in compliance with environmental standards, building preservation laws, and noise and vibration requirements.

- Gauge: 1,435 mm
- Rail Section: UIC-60, continuous welding
- Elastic bearings rail attachment
- Distance between top railhead and tunnel concrete slab bottom: Approximately .75 mm
- Directly attached 31 devices for track reversal with mobile frogs instead of wood sleepers.
- 5 "x" crossing directly laid with mobile frogs.

Depot Track

Must comply to standards set forward in the Track. The depot track specifications are similar to the track, except for:

- 26 TSM (Track Shifting Machine) on concrete slabs.
- Buffer and Rail Lubricants on running track and depot

- 2 Crossings on concrete slabs.
- Train stabling and cleaning platforms
- Level-crossings (Highways)
- Maintenance equipment for rail mounted and road rail vehicles
- Tools normally used on maintenance routines
- Special tools used on the running track

Power Supply

Includes systems involved in supplying power to trains and station, depot and stabling equipment.

- Primary Substation: 138-88 kV/22kV
- Medium Voltage Network: 22kV
- Rectifier Substations: 22kV/1,500 Vdc
- Auxiliary Substations: 22kV/480V
- Emergency Power Supply
- Grounding
- Contact link of 1,500 Vdc: rigid catenary in the tunnel and flexible catenary in the depot.

Signaling and Control Systems

System will utilize moving block technology
All main control equipment will be stationed at the Paulista Station

Auxiliary Systems

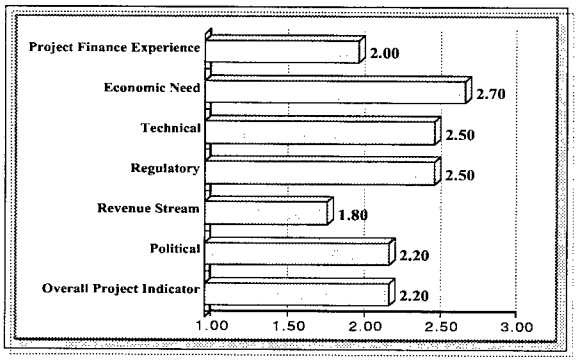
Equipment will be installed in the track, stations, depot and Operations Control Center.

Equipment:
- Main ventilation duct
- Ventilation of technical rooms
- Escalators
- Elevators
- Pumps
- Lighting
- Emergency booths
- Fire detection system
- Ticket collecting gates

Services:
- Insurance
- Financial Services
- Technical Advisors
- Construction Engineering

Asset Group	Phase I (US$ million)	Phase II (US$ million)
Planning	58.8	27.6
Land	70.7	7.3
Civil Works	473.0	302.2
Trackworks	35.8	19.3
Systems	338.0	124.0
Rolling Stock	215.9	180.0
Management Assistance	54.2	28.5
Total	**1246.4**	**688.9**

Critical Project Indicators



Key Decision Makers

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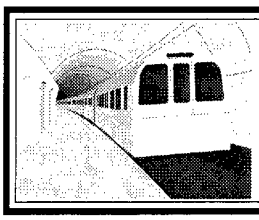
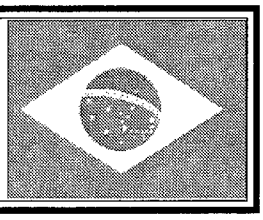


Transportation / Brazil

São Paulo Metro Line 5



Project Summary

Project No:	**TRAN-26**
Subsector:	**Urban Mass Transit**
Location:	**City of São Paulo, Brazil**
Project Cost:	**US$ 550 million**
Export Potential:	**US$ 170 million**
Type:	**BOT Concession and Procurement**
Sponsor:	**Cia. do Metropolitano de São Paulo (Metro)**

As an integral component of the State of São Paulo's Urban Mass Transit System Program (PITU), the Line 5 of the SP Metro is a priority project which will connect existing commuter systems and ease traffic in the metropolitan region of São Paulo.

The Companhia do Metropolitano de São Paulo (Metrô) is mandated by state charter and is responsible for the construction of Line 5, which will be implemented through the Metropolitan Commuter Railways (CPTM) and the Inter-American Development Bank (IADB).

Technical Description

The proposed Line 5 (referred to also as the "lilac" line) is a non- radial underground line which links with lines 1, 2 and 4 of the Metro, as well as with the São Mateus Jabaquara metropolitan bus corridor and the Metropolitan Rail Line. The project will successfully integrate the Santo Amaro region with important commercial and residential poles in the regions of Butantã, Pinheiros, Av. Paulista, Vila Mariana, Moema and Brooklin.

The Line has been divided into two distinct projects, divided at the Largo 13 de Maio in the center of the Santo Amaro region. The line will have a total extensions of 19.8 Km and 17 stations.

The first phase of the project is the construction of the 9.3 Km section of Metro Line 5 and revamping of the Commuter rail, CPTM, that links to the line. This portion represents approximately one third of

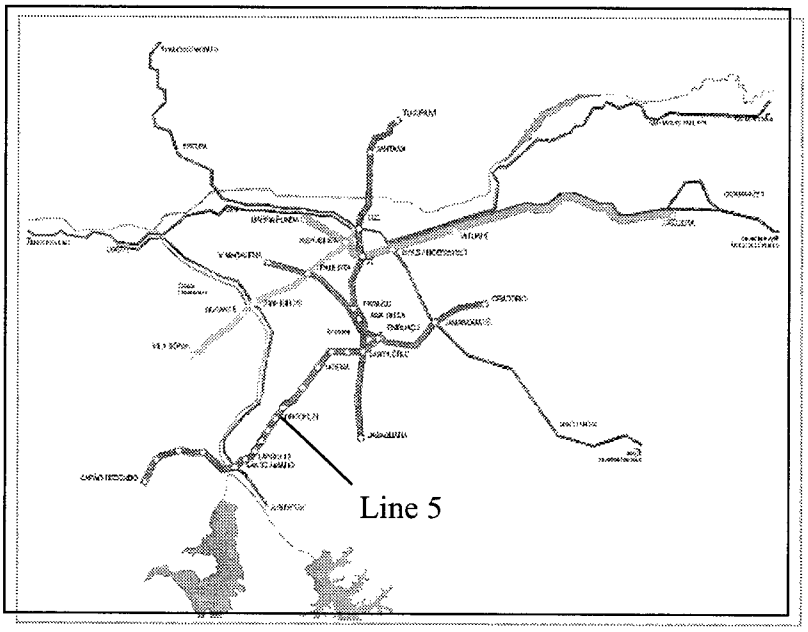
the total project cost, and has secured financing from the Inter American Development Bank.

The second portion of the project links Santo Amaro to Embauaçu, and will be awarded as a BOT concession. The technical specifications will be determined upon conclusion of a feasibility study.

Site

The project will be located in the city of São Paulo, in Southeastern Brazil. São Paulo is responsible for approximately 40% of the country's GDP, and is South America's largest business city, with almost 17 million people in the metropolitan region.

Line 5 will be in the South and Southwestern regions of downtown São Paulo.



Nature of Demand

The primary objective of Line 5 is to integrate different mass transit systems in the South and Southwestern regions of São Paulo city. This will primarily facilitate the commute of middle and low income populations and improve traffic flow in the city, which faces chronic traffic problems due to continued growth. The city has a precarious urban mass transit system which results in traffic congestion and a loss in overall economic productivity.

The direct and indirect areas of influence of the project encompass a population of 2.4 million people, which result in 3.9 million motorized trips per day.

Passenger Demand (Projected to the year 2000)

Station	Daily Trips	Station	Daily Trips
Capão Redondo	106,800	Brooklin	49,000
Campo Limpo	53,400	Campo Belo	15,000
Vila das Belezas	25,000	Ibirapuera	15,000
Giovani Gronchi	33,000	Moema	20,000
Santo Amaro	57,000	Servidor	31,000
Largo 13	92,000	Vila Clementino	38,000
Paulo Eiró	25,000	Santa Cruz	130,000
Granja Julieta	20,000	Embuaçu	90,000
Borba Gato	15,000		

Project Status

The executive project has been concluded for Line 5, and financing has been secured for phase I from the Inter American Development Bank. Procurement for the first phase is on-going and bids are being prepared by the CPTM and Metrô, following IDB guidelines.

Phase II of the project requires a feasibility study to determine the best manner in which to secure private sector participation.

Financing

The overall cost for phase I of the project is US$ 550 million, which is to be financed in the following manner:

Inter American Development Bank:	US$ 350 million
State Government:	US$ 200 million (Using Financing for Equipment Component of Project)

The remaining section will be financed through a concession, which is to be determined after the completion of a feasibility study.

Equipment and Service Procurement

A substantial amount of equipment and services is expected to be imported for the project. Equipment procurements include:

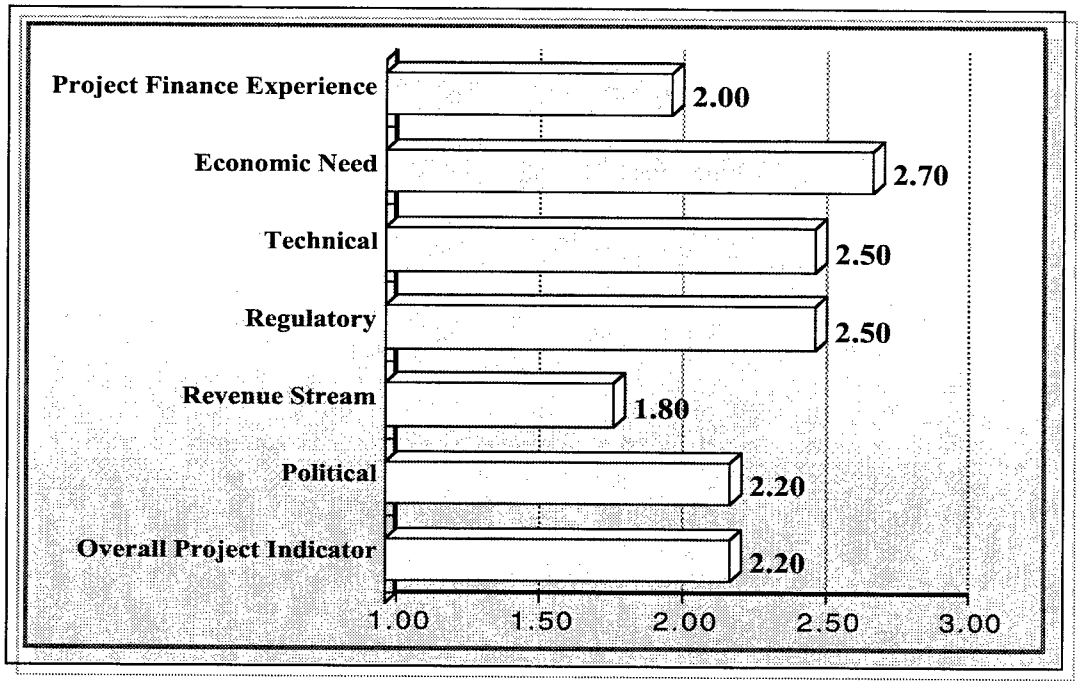
Equipment:

- Rolling Stock including 20 motor cars and 20 trailers
- Railroad Tracks
- Train Control Systems
- Communications Equipment
- Closed Circuit Television equipment
- Auxiliary station equipment - turnstiles and ticket vending machines
- Excavators
- Accessories
- Signaling systems
- Ventilation systems
- Security Systems
- Electromechanical systems for the stations (elevators, escalators)
- Electrical systems including primary supply and auxiliary substations
- Transmission lines
- Tunnel boring equipment

Services:

- Installation of electric power supply systems
- Track Construction
- Technical Advisors
- Construction Engineering

Critical Project Indicators



Key Decision Makers

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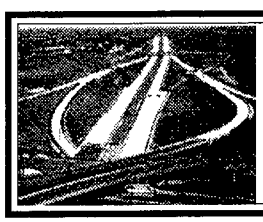


Transportation / Brazil

São Paulo - Automatic Bus Fare Collection

Project Summary

Project No:	**TRAN-27**
Subsector:	**Urban Mass Transit**
Location:	**City of São Paulo, Brazil**
Project Cost:	**US$ 60 million**
Export Potential:	**US$ 20 million**
Type:	**BOT concession**
Sponsor:	**São Paulo Transporte (Transurb)**

São Paulo Transporte S.A./A is contracted by the municipality of São Paulo to exclusively manage the Automatic Bus Fare Collection project, in addition to its current responsibility of managing the public bus transportation system. Local government support is built into this project.

Technical Description

The Automatic Bus Fare Collection project will develop an electronic ticketing system. This system is composed of electronic card validators, data transmission equipment, software, hardware and electronic cards. The project is representative of several which will occur in São Paulo State, and elsewhere in Brazil.

Site

The ticketing system will be implemented in the São Paulo municipal area, which has a population of 10 million people.

Nature of Demand

São Paulo is not only the largest and most populated city in Brazil, but also in all of South America. São Paulo has a population of 10 million, which will be directly affected by the project. Additionally, the surrounding area is formed by 39 other towns, whose populations are partly, and daily, in transit to São Paulo, and will also benefit from project implementation.

The market for the project consists of the users of public bus transportation in São Paulo, who make 5.5 million trips per day.

Current fare collection costs are approximately 26% to 28% of revenue. This new ticketing system will lower costs to 7% of revenue, resulting in a savings of US$ 240 million annually. The infrastructure project will also allow for more flexibility in integrating with other forms of transport. For example, the proposed Veículo Leve Sobre Pnevs (VLP) project, providing São Paulo with a new and efficient transit system, will have electronic ticketing, thus adding potential compatibility between systems. Overall, the automatic bus fare collection system will offer a higher level of security in transactions, thus providing for greater system control and a higher quality of public service.

Project Status

A pilot test, involving 1,000 volunteers, started on September 15, 1997, and will last for approximately 2 months.

Milestone	Date
Feasibility Studies	January - May 1997
Pre-Qualification Bids	June - September 1997
Pre-Selection	November 1997
Final Bids	December 1997
Project Award	January 1997
Financial Closing	January 1997
Operating Terms	February 1998

Financing

The project will be 100% financed by the private sector under a BOT concession. Although the tariff policy is set by the Public Sector, this will not interfere with the contracted companies in the service providing agreement.

Equipment and Service Procurement

The principal equipment and systems needed for the project include:

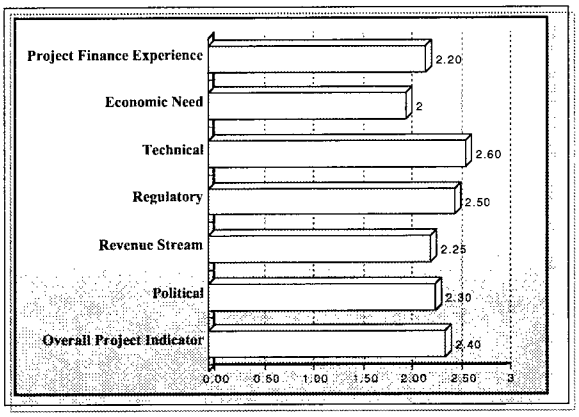
- electronic equipment (including validators, data transmission equipment)
- software
- electronic cards
- magnetic tickets

Equipment:	US$ 20 million
Engineering Services:	US$ 7 million
Services:	US$ 3 million

Investment Stages:

1) Purchase of cards: US$ 10 million in six installments between December 1997 and May 1998.
2) Investments in hardware and software: US$ 5 million in twelve installments between October 1997 and September 1998.
3) Investments in validators and data transmission equipment: US$ 45 million between March 1998 and March 2003.

Critical Project Indicators



Key Decision Makers

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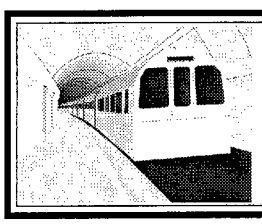
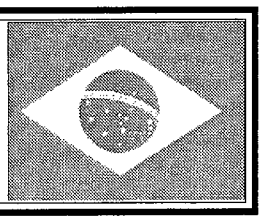


Transportation / Brazil

Fortaleza Metro Line 2



Project Summary

Project No:	**TRAN-28**
Subsector:	**Urban Mass Transit**
Location:	**Fortaleza**
Project Cost:	**US$ 110 million**
Export Potential:	**US$ 50 million**
Type:	**Procurement**
Sponsor:	**SETECO & METROFOR**

SETECO, the Transportation, Energy, Communications and Public Works Secretariat of the Ceara State Government, is the entity responsible for operating the Ceara northern and southern railway freight lines, as well as several diesel passenger lines. The railway lines were formerly under federal control.

SETECO has created a state-owned company called Companhia Cearense de Transportes Metropolitanos (METROFOR) to carry out the construction of the Fortaleza Subway. Line 1 exists and Line 2 will make use of the already existing infrastructure of the northern and southern railway freight lines. METROFOR will also be responsible for the initial operation of the Metro lines.

Technical Description

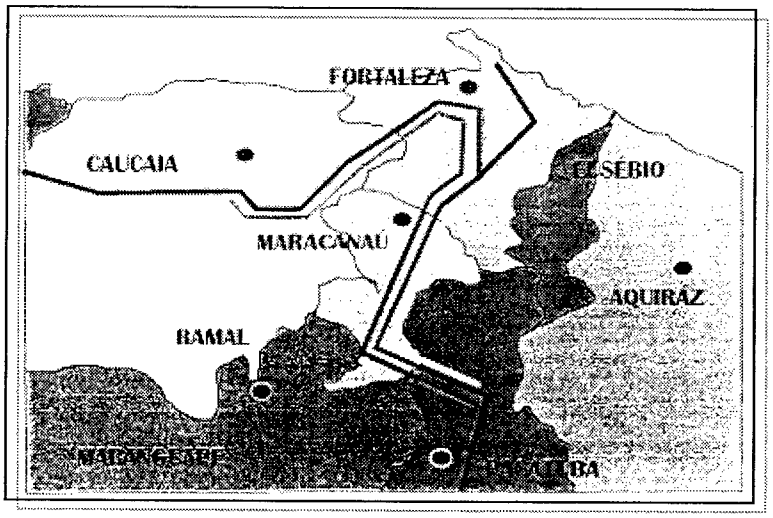
Stage One

The first stage of the project will involve the construction of stations for the first section of Line 2, which will pass through downtown Fortaleza. Line 2 will use existing railway lines, which will minimize civil works to the construction of 2 ground stations, 5 special works (bridges or viaducts) and a superstructure.

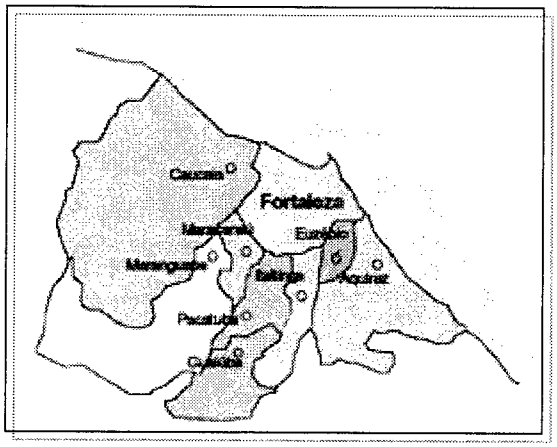
Stage one will also include the electrification of Line 1 (the southern line), and the complete segregation of freight and passenger lines.

Stage Two

The second stage will involve the electrification of Line 2 (northern line), and the connection of Line 2 to Line 1 at João Felipe Station. This stage also involves the construction of a second track for Line 2, as well as the construction of additional stations. Line 2 will ultimately service the cities of Fortaleza and Caucaia, and will utilize the existing right of way of the freight railway track. It will cover a total of 20 Km, with 15 stations.



Site



Fortaleza is the capital of Ceará State, which is situated in the northern portion of the Atlantic plateau, in northeastern Brazil. Fortaleza and 8 other municipalities form the Fortaleza Metropolitan Region, which contains 54% of the state of Ceará's population.

Line 1 will pass through the cities of Fortaleza and Maracanaú, and Line 2 will service Fortaleza and Caucaia.

Nature of Demand

The Fortaleza Metropolitan Region (FMR) has a population of 2.5 million. The total number of trips within Fortaleza, verified in Brazil's 1996 Origin/Destination Survey, is approximately 3.1 million per day. Fortaleza city stands out among the municipalities within FMR as Ceará State's center of economic activity. More than 60% of the state's employment is concentrated in Fortaleza, primarily along the city's coastline.

Fortaleza has a radio-concentric road network with 9 primary traffic corridors, 6 of which connect with bordering municipalities. One of the most important of these corridors is Corridor A, which is served by Metro Line 2. Line 2 covers the northwest region of Fortaleza City, and all of Caucaia County. The line's primary axle is the connection of the Bezerra de Menezes and Mistur Hal Avenues and the BR-222 and BR-020 roadways.

Demand for Line 2 is estimated at 10,821 passengers in one direction at rush hour. Demand for Lines 1 and 2 is approximately 290,000 passengers per day. METROFOR expects to procure additional equipment (primarily rolling stock) following the implementation of Line 2, due to the high density of customers served and the possibility of integrating line metro and bus service. The daily demand forecast with full metro/bus integration is 485,000 passengers per day for both lines.

Project Status

METROFOR is currently in the process of constructing Line 1 and plans to begin construction of Line 2 in early 1999. Line 2 should be operational by the 3rd quarter of 1999. The bidding process for line and station construction candidates is expected to begin by year-end 1998.

Feasibility studies and the basic metro line design are already completed by METROFOR. These schematics will be reviewed to ensure compatibility with existing technologies and with the implementation of Line 1.

Financing

The federal government is responsible for assuming costs associated with the implementation of Lines 1 and 2. The government is financing Line 1 in coordination with the Export-Import Bank of Japan (JEXIMBANK), and has requested a World Bank loan to cover a portion of the total cost for implementing Line 2. The total cost of Line 2 is expected to reach US$ 110 million. The federal government may obtain additional financing from the National Bank of Economic and Social Development (BNDES).

Equipment and Service Procurement

Procurement is expected to be competitively bid, with no restrictions against foreign suppliers of equipment or services.

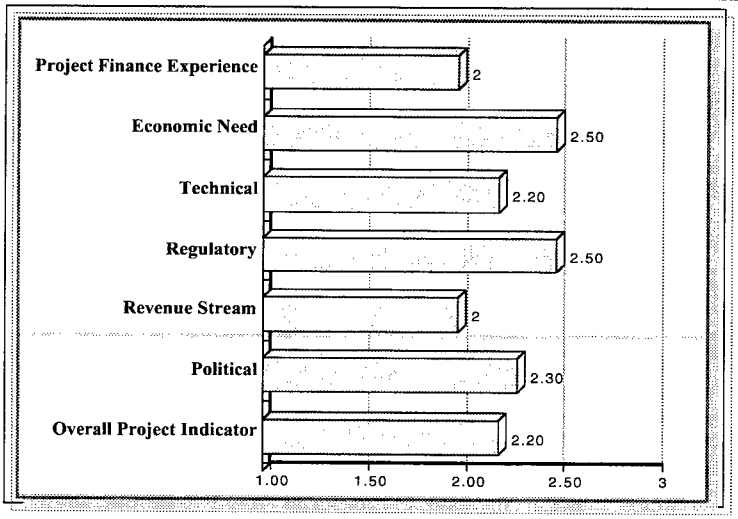
Equipment:

- Rolling stock: 8 electrical multiple units (EMU), composed of 4 cars
- Power supply: 2 rectifier substations with input of 69 kVac and output of 3 kVdc, composed of 2 rectifier groups of 3 MW
- Signaling: Entire line
- Communications: telephony, radio, recording and transmission systems

Services:

- Technical Assistance: management and supervision of implementation

Critical Project Indicators



Key Decision Makers

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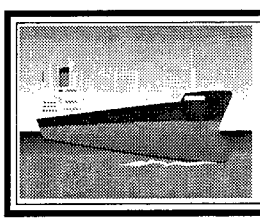


Transportation / Brazil

Araguaia Tocantis Multi-modal Transportation

Project Summary

Project No:	**TRAN-29**
Subsector:	**Multi-modal**
Location:	**Centerwest and North Brazil**
Project Cost:	**US$ 225 million**
Export Potential:	**US$ 85 million**
Type:	**Procurement**
Sponsor:	**Ministry of Transportation**

The Federal Government has prioritized the Araguaia – Tocantins multi-modal project as a means to reducing high internal transportation costs, primarily for moving grain, to the nearest ports. The project has been included within the 42 priority projects of the Federal Government's "Brazil in Action" Program.

Technical Description

The project involves a multi-modal development axis along the Tocantins, and Araguaia rivers, connecting the highlands of the center-east region of Brazil with ports in the São Marcos basin in the state of Maranhão and the Pará river in the state of Pará.

Waterway

The waterway extends for 1,230 Km between Aruanã in the state of Goiás, and Xamboiá in the state of Pará; and a further 551 Km between Nova Xavantina in the state of Mato Grosso, and Araguaia also in the state of Mato Grosso. The waterway additionally encompasses 420 Km on the Tocantins river between Miracemado Norte in the state of Tocantins, and Estreito in the state of Maranhão.

Project Component's Cost

Component	Cost (US$ Millions)
Waterway	40
Highway	68
Rail Line	115
Total	**225**

The waterway component of the project requires dredging and signaling, in order to make the waterway navigable.

Highway

The highway component of the project consists of paving the existing highway BR 153 between São Geraldo do Araguaia and Marabá in the state of Pará, with an aggregate extension of 155 Km.

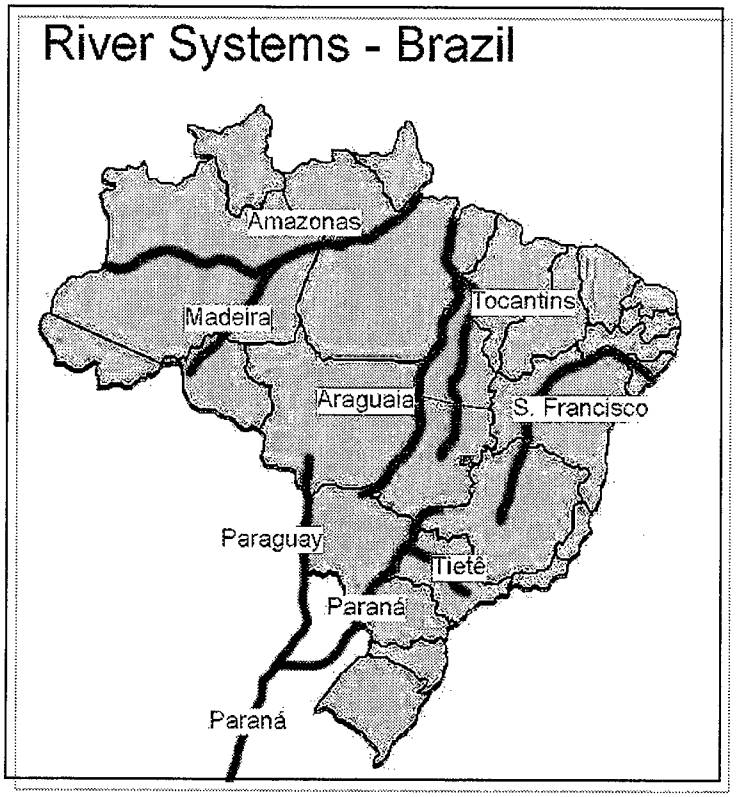
Rail Line

The rail component of the project involves the construction of a section of the North South Rail Line (Ferrovia Norte Sul), connecting the cities of Imperatriz and Estreito in the state of Maranhão. The remaining length of the construction is approximately 120 Km.

The project will also have a power transmission component, however this is not defined, and not included within the cost structure of this integrated project.

Site

The project is located along the Araguaia to Tocantins rivers in the Center East to the North of Brazil. The extension of the project is approximately 1,800 Km north-south and 1,000 Km east-west.



Nature of Demand

"Custo Brasil", or the "Brazil Cost" refers to the high costs of doing business in Brazil. Specifically, it refers to factors which impact on Brazilian businesses, hindering their productivity, and hence cost

competitiveness. Though the "Custo Brazil" includes diverse factors such as high real interest rates, social security burdens, bureaucracy and fiscal burdens, the most important component of the cost for manufacturing and exporting companies is the cost of transportation.

The Federal Government has prioritized the transportation sector in Brazil, and is seeking to increase the existing infrastructure, in all regions of the country, in order to lower internal transport costs. The Araguaia Tocantins multi modal project is integral to this effort, in order to facilitate the transport of agricultural products, particularly soy beans, destined for exports.

Bulk products such as soy have up to 40% of their value eroded with high transportation cost within the country, which is the impetus for this project. A further impetus for the project is the development of the north and central region of the country, and meet growing demand for transportation systems, with the increase in grain production and exports from that region.

Project Status

The project is approximately 17% complete, but has been delayed due to environmental impacts assessments and permitting. Environmental permits were to be awarded by October 1997, when the project was re-initiated. Bids for equipment and services are on-going and the Ministry of Transportation anticipates the following completion dates:

Component	Completion Date
Waterway	October 1999
Highway	December 1999
Rail Line	December 1998

Financing

The project is being financed by the Federal Government, and has strong political backing. Funds are being channeled through three independent public entities:

Waterway : AHITAR (Administração das Hidrovias Tocantins e Araguaia)
Rail Line : VALEC (Engenharia, Construções e Ferrovias S.A.)
Highway: SETRAN (Secretaria de Estado dos Transportes do Pará)

The major consideration remains if the environmental permits will be obtained in order to continue the project's waterway component. US Companies should follow bidding schedules published in the "Diário Oficial" by the ministry of transport for remaining procurement opportunities. Financing for Phase II is pending successful environmental licensing.

Equipment and Service Procurement

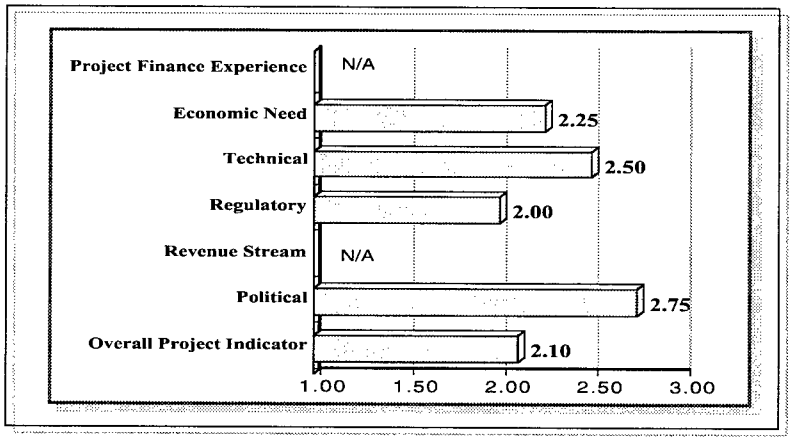
The project will need the following equipment:

- Signaling Equipment
- Rolling stock
- Communications Systems
- Monitoring Systems
- Mobile cranes
- Field office trailers
- Hydraulic drills
- Asphalt spreader
- Radar Equipment
- Bulldozers
- Mobile sweepers
- Weigh Stations

The principal services to be procured are:

- Construction engineering supervision
- Dredging
- Environmental Impact Studies
- Tunneling

Critical Project Indicators



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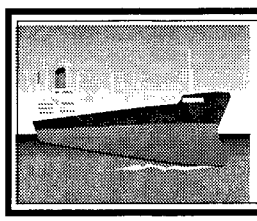
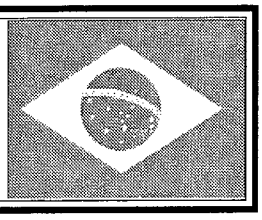


Transportation / Brazil

Brazil Water Locks Project



Project Summary

Project No:	**TRAN-30**
Subsector:	**Waterways**
Location:	**Central and South Brazil**
Project Cost:	**US$ 1.2 billion**
Export Potential:	**US$ 200 million**
Type:	**Concession**
Sponsor:	**ADTP**

The primary entity promoting the development of the water locks project is the Tietê-Paraná Development Agency (ADTP), the entity which designed the Master Plan for integrated infrastructure development in the Valley of the Tietê and Paraná Rivers.

Construction of locks and waterway operations are coordinated by the São Paulo Energy Company (CESP), the largest power generating utility in the State of São Paulo. CESP has developed hydroelectric facilities throughout the state.

Technical Description

Expansion of the Tietê-Paraná system will be achieved through two ways:

- Interconnection with other major waterway systems
- Expansion of feeder routes.

Connection to the Amazon systems is a long-term project and is not being actively considered at this time. The only immediate system interconnection that makes economic sense evaluating today is between the Tietê-Paraná and the Paraná-Paraguay, probably at the Itaipú Dam.

The Paraná-Paraguay system is navigable from the ocean, at Montevideo and Buenos Aires, to as far as Carceres in Mato Grosso. However, for environmental considerations, navigation is being considered only as far as Corumbá, in Mato Grosso do Sul. The Paraná is in theory navigable up to Itaipú, but

seasonal limitations will be corrected only with the construction of Corpus Dam, down-river from Itaipú. The 115-meter high Itaipú Dam does not have locks and represents a major challenge.

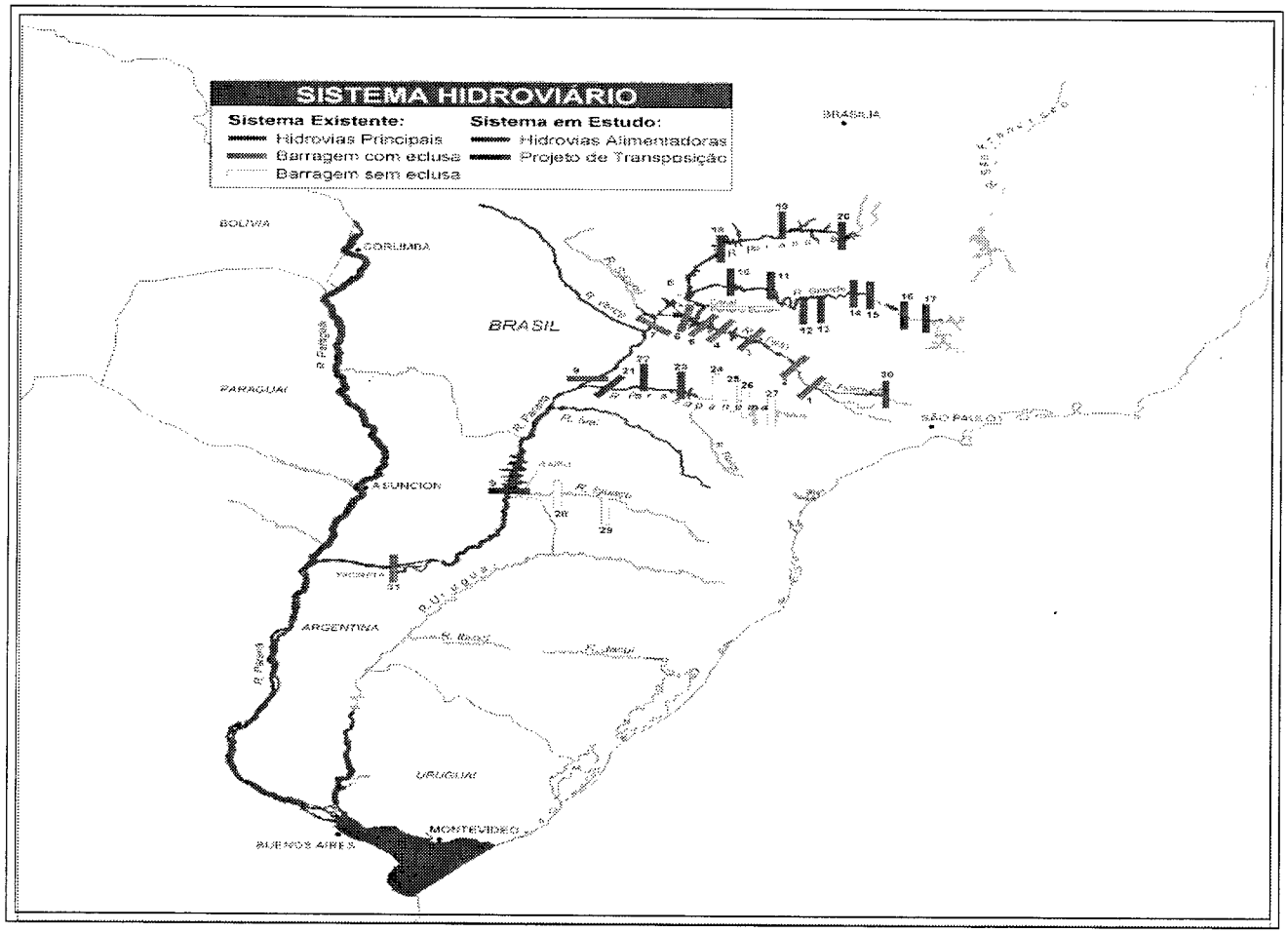
There is immense potential for expansion of the Tietê-Paraná waterway traffic by carrying barge traffic up tributaries into vast existing and new agricultural areas, forming a network of secondary waterways.

In some cases the expansion of feeder routes will require the construction of dams to provide or enhance navigability, but in others - for example on the Paranapanema River in São Paulo State - the dams have already been built for other purposes, normally hydroelectric generation. In these cases, all that is required is the addition of some form of cargo transshipment. This may be done by construction of conventional locks, construction of lock alternatives such as a barge lift or ramp hoist, or short road/ rail transshipment facilities between up-river and down-river terminals either side of the dam.

In each case, the solution depends on the physical obstacles to overcome and the type and volume of current and future cargo.

Lock and dam projects are publicly-funded projects developed by CESP, which contracts the design and construction, as well as the procurement of all materials.

Site



The Tietê-Paraná Waterway is Brazil's first man-made waterway, as opposed to a river that is simply used where it is navigable (e.g., the Amazon and São Francisco). Since the 1950s, São Paulo State has been building hydroelectricity dams on the Tietê River, and visionary state legislation required construction of locks at each dam, despite the fact that until the system was complete, there was very little traffic.

The Tietê became fully navigable in 1994 with the opening of locks at Três Irmãos, the lowest dam before the convergence with the Paraná. Locks at Jupiá on the Paraná are nearing completion and will make the system navigable all the way down to Itaipú on the Paraguay/Argentina border and up to São Simão in Goiás state.

CESP, the São Paulo Energy Company, calculates it has spent over US$1.6 billion on locks, channels and ancillary systems, over and above the basic cost of the hydroelectric dams. However, this is now being written off and the waterway requires very little further capital spending.

Freight capacity on the Tietê stretch is limited by lock size, bends and draft to around 20 million tons a year, while the Paraná stretch should be able to carry 200 million tons.

Modern intermodal terminals are in operation at São Simão and Pederneiras, and others are planned or building. The surrounding intermodal transport system is fast incorporating the waterway and, as this grows, it encourages further use.

Nature of Demand

Waterway transport is gaining popularity in Brazil. This comes after a long history of favoring other transport modes. The São Francisco River in the Northeast has long been used as a regional thoroughfare but is not navigable down to the sea. The Amazon was important during the rubber boom and still carries substantial traffic up to Manaus. The developed, South/Southeast rivers have been less important. With most major Brazilian cities lying on or fairly near the 5,000-mile South Atlantic coast, cabotage would appear to be an obvious and natural transport mode. However, it has fallen into relative disuse through inefficient services and expensive ports.

Also, given the dimensions of the country, rail transport is a logical option for heavy goods. This mode was important through the latter part of the 19th Century and the first decades of the 20th Century, prior to nationalization, but decades of under-investment by state companies led to very inefficient services. Today, rail is little used except for fuels, minerals and some grains. Optimistically this will change following the on going federal rail privatization.

The development of the Tietê-Paraná and Paraná-Paraguay systems, has made waterway transport possible which is starting to benefit important grain and mineral regions. Five major waterway systems can be identified as national priorities. They are Tietê-Paraná and Paraná-Paraguay in the South; Madeira-Amazonas and Araguaia-Tocantins in the Southern Amazon; and São Francisco in the Northeast.

Economic Importance of Waterways:

The renewed interest in waterways is a reflection of three factors:

• The continuing spread westward of Brazilian agriculture places producers further and further from major consuming centers and from Atlantic ports. Producers in the Chapada dos Parecis in Mato Grosso are currently trucking soy more than 2,000 Km over bad highways to Santos. Cheaper freight will make Brazil's new agricultural frontiers much more competitive and lead to further expansion of planted areas.

• Increased competition through globalization does not directly affect commodities in the way it has affected various industrial and consumer goods sectors in Brazil. However, the increased contribution of foreign trade to GDP places renewed focus on Brazil's potential as a major global food source. This has increased public and private- sector interest in improving the required infrastructure.

• The waterways now receiving priority require relatively little capital, compared with the enormous cost of laying thousands of miles of railroads to reach the new agricultural regions.

Project Status

The waterway's existing locks and channels have been built over the course of the last 30 years. Only recently, however, has long-distance barge traffic become a reality.

As a first step, a detailed study is required, including:

• Existing dams without locks, to determine engineering options
• Current and potential cargo flows
• Current and potential transport alternatives
• Basic cost and revenue projections
• Other economic, social and engineering factors relevant to an assessment of the general feasibility of feeder route expansion

A study should begin during the first semester of 1998, after which the project will be structured and procurement and investment schedules developed.

Financing

Waterway transportation has a distinct cost advantage over the rail or highway alternatives. The transportation costs of a ton of grain from Asunción, Paraguay to San Lorenzo, Argentina, near the mouth of the Paraná are approximately US$ 2 - US$ 3 for waterway, as opposed to US$18 for railway, and US$ 20-US$ 22 for highway.

Financing for the project is undetermined, and will require a feasibility study to evaluate the options. It is clear that the remaining water locks will be financed by the private sector, for which tolls are collected.

Equipment and Service Procurement

The project offers significant opportunities for US companies that specialize in waterway and transport projects, engineering, operations, systems and equipment.

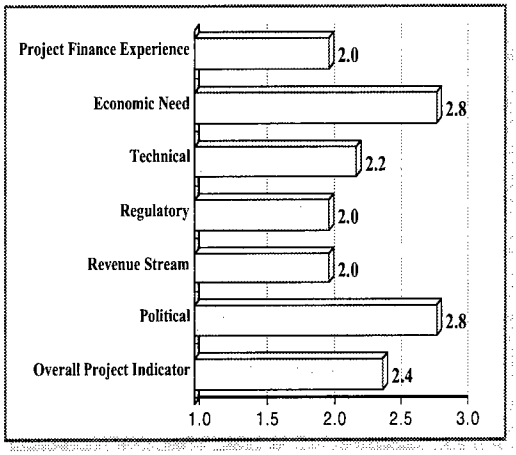
Equipment:

- Lock and dam construction
- Intermodal port equipment
- Equipment for tri-modal and road-waterway terminals
- Barge fleet
- Signaling equipment
- Communications systems
- Monitoring systems
- Mobile generators
- Radar equipment
- Bulldozers

Services:

- Dredging services
- Environmental impact studies

Critical Project Indicators



Key Decision Makers

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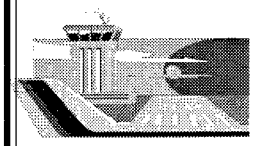


Transportation / Chile

CNS/ATM Air Traffic Control Plan

Project Summary

Project No:	**TRAN-31**
Subsector:	**Air**
Location:	**Santiago, Chile**
Project Cost:	**US $104 million**
Export Potential:	**US $61 million**
Type:	**Procurement**
Sponsor:	**Dirección General de Aeronaútica Civil**

Dirección General de Aeronaútica Civil (DGAC), Chile's air navigation services agency, is currently evaluating its investment requirements for the year 2000 and the long-term. DGAC intends to emphasize the satellite-based Global Positioning System (GPS) to serve its future investment needs and has signed an agreement with the Federal Aviation Administration (FAA) to coordinate and share information on GPS and satellite-based navigation issues.

Through the GPS, DGAC plans to replace existing ground-based navaids, respond to capacity increases at major airports and possibly introduce nonradar/satellite surveillance using Automatic Dependent Surveillance (ADS). Other areas of interest beyond the year 2000 include establishing an in-country Aeronautical Telecommunications Network (ATN), an Aeronautical Mobile Satellite System (AMSS) and a Controller Pilot Data Link Communications (CPDLC).

Technical Description

The equipment DGAC consists of advanced aeronautical communications, a new radar system and a ground-based navigation infrastructure (in need of improvement). In addition, DGAC owns a modern ATC automation system capable of accommodating future airspace management requirements. The agency's sophisticated technological resources form a solid base for making the change to advanced space-based navigation and surveillance equipment. The three basic areas in which the company is looking to expand its capabilities are: Communications, Navigation, Surveillance and Air Traffic Management.

Communications:

DGAC currently uses HF Radio for air-ground operations over oceanic and polar routes. Although Chile is 95% digitized, a lack of comparable systems across borders impedes the use of cutting-edge technology. DGAC is currently evaluating a higher quality digital high-fi system of satellite communications that would have the capability to serve both polar and oceanic routes.

Navigation:

GPS would provide Chile with the most advanced space-based navigation technology available. Such technology would be perfectly compatible with that of the digital telecommunication system currently in place in the country. The new network would consist of Wide Area Reference Stations and a communications interface to the Wide Area Augmented System(WAAS) master station in the United States. In addition, Chile would require Local Area Differential GPS (LADGPS) that would ensure the safe and precise landings required in Instrument Flight Rules (IFR).

Surveillance

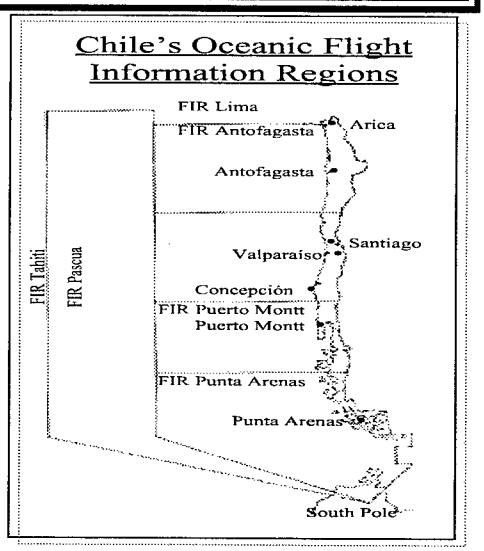
The need for surveillance equipment will become apparent in the near term. Chile currently has reliable en route radar coverage over land, but lacks systems for oceanic, polar and mountainous terrain approaches. Automatic Dependent Surveillance (ADS) equipment would provide the airport with more efficient use of airspace, almost doubling arrival and departure capacity. In addition, ground surveillance equipment would be useful for safety during foggy conditions.

Air Traffic Management

DGAC has already procured a new Thomson ATC system. The system will increase Chilean airports efficiency by reducing space between aircraft. The system will be capable of handling ADS input information.

Site

The Republic of Chile currently has seven international airports and 113 smaller domestic travel airports. Sight and surveillance equipment would be stationed throughout the country for products that require peripheral stationary units while centrally located equipment will be placed in the Santiago International Airport.



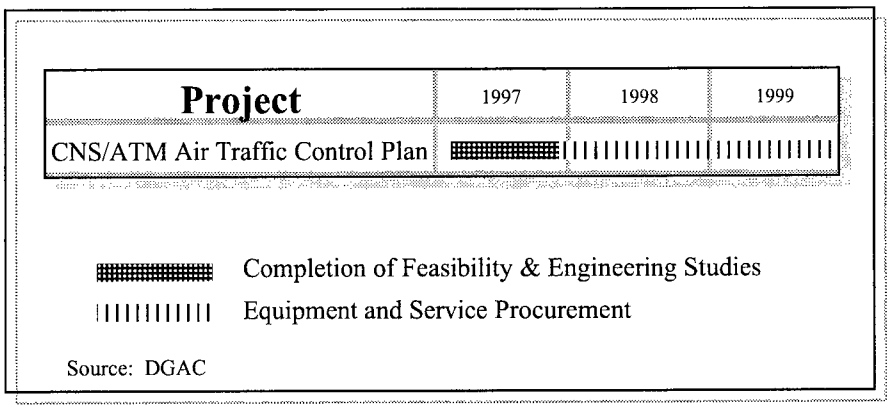
Nature of Demand

A fast-growing economy and the government's open-skies policy have resulted in double-digit increases in air transportation over the past several years. The Mercosur free trade agreement with neighboring countries and Chile's anticipated inclusion in the North American Free Trade Agreement (NAFTA) are also expected to significantly increase air commerce.

Chile's consistent GNP increase of 6% has jettisoned air traffic growth to 20% annually; 4-5 times that of its South American neighbors. Such growth can only lead to further expansion in technology and efficiency for the entire Chilean air transportation infrastructure.

Project Status

A definitional mission was completed by US based MGA and a final report submitted to the U.S. Trade and Development Agency in April 1997. A U.S. TDA-funded feasibility study which will identify Chilean airspace communications, navigation and surveillance needs to determine specific CNS/ATM technology requirements and the most cost-effective path for adoption of these new technologies is expected to be completed by December 1997. Equipment and services procurement for the project is scheduled to begin in 1998.



Financing

Total capital requirements for CNS/ATM will entail approximately US$ 105 million in both equipment and services, with no major construction required. Although financing is possible directly through DGAC, alternative resources may also be used.

As the DGAC is an organization funded through airport usage and airline fees, the financing will not be problematic. The funds that DGAC receives allows it to cover expenses associated with operating and maintaining Chile's aviation infrastructure. In addition, the funds also allow for upgrading and improving the system.

Equipment and Service Procurement

DGAC will procure a variety of CNS/ATM equipment and services, including:

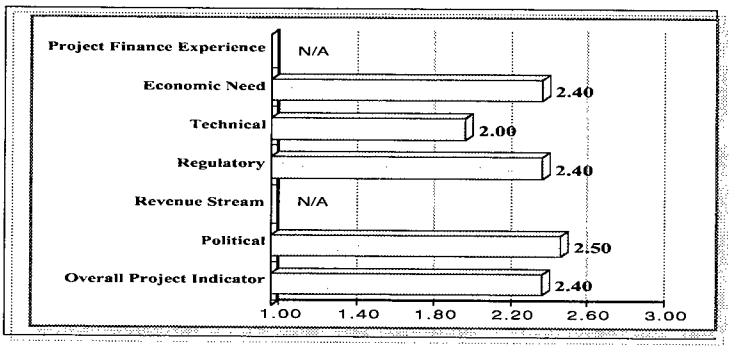
- WADGPS
- ADS
- ASDE
- LADGPS
- PRM
- Runway Lighting Systems

Additionally, Chilean air carriers may be required to upgrade their fleet through the installation of integrated avionics with GPS/WADGPS/LADGPS, satcom, ADS and data link capability. CNS/ATM equipment cannot be sourced domestically. Thus, DGAC will import all CNS/ATM equipment. The system will also require engineering and systems integration expertise. Total equipment and services imports for this project are estimated at **US$ 67 million dollars**.

"Although US firms will face competition in this market, primarily from European Union and Japanese companies, MGA believes that US companies are well positioned to export CNS/ATM equipment and services to Chile." MGA representative, Definitional Mission Report April 1997

US firms will face competition primarily from European Union and Japanese equipment and service providers. However, US technology in this market will ensure that US firms are well positioned to take on a leading role.

Critical Project Indicators



Key Decision Makers

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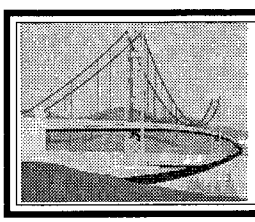


Transportation / Chile

"Canal de Chacao" Bridge Concession

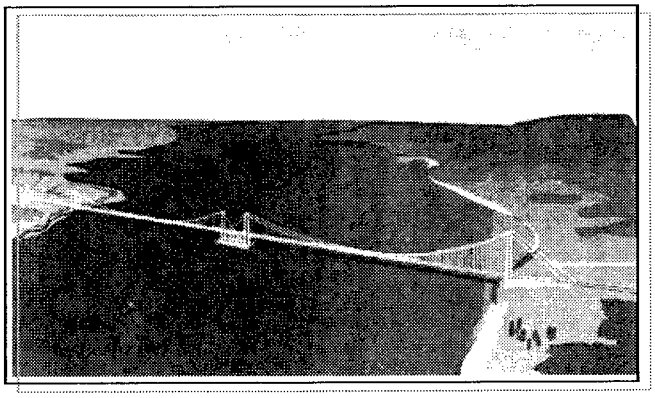
Project Summary

Project No:	**TRAN-32**
Subsector:	**Bridges**
Location:	**Southern Chile**
Project Cost:	**US$ 300 million**
Export Potential:	**US$ 60 million**
Type:	**Concession**
Sponsor:	**Ministerio de Obras Públicas**

The Ministry of Public Works (MOP) is the entity responsible for concessioning infrastructure development in the transportation sector. MOP has initiated a 4-year investment program which will address Chile's most pressing infrastructure bottlenecks. The program includes construction of the Canal de Chacao Bridge, which will unite Chiloe Island with the Chilean mainland.

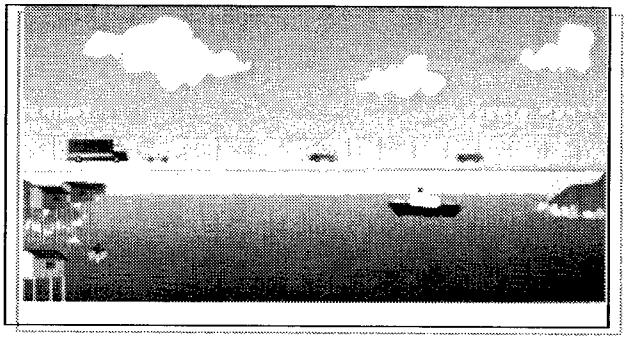
Technical Description

The length of the bridge will be 2,500 m, plus an additional 20 Km of access roads. Preliminary designs suggest a four-lane highway. Definitive engineering designs will determine the precise construction technology and bridge configuration required.



Site

The bridge will connect Chiloe Island with the city of Puerto Montt on the Chilean mainland. The bridge will extend over the Chacao Canal. The island of Chiloe is located in Southern Chile, in the 10th Region.



Nature of Demand

The Canal de Chacao Bridge project will provide a vital link between the cities of Chiloe and Puerto Montt in Southern Chile. Current transportation access is by way of ferry, which produces extensive travel delays and hinders access to and from Chiloe. The bridge will substantially reduce travel time between Chiloe and the mainland, resulting in lower transport costs between the two cities and increasing the accessibility of the island, which is a popular vacation destination for both domestic and international travelers.

The project has been included in the Ministry of Public Works' General Concessions Program, which will entail US$ 610 million in urban roads concessions (e.g., Américo Vespucio Bypass), US$ 500 million in inter-urban roads (e.g., Highway 5), and an additional US$ 400 million in multi-sectoral projects (e.g., Chacao Bridge).

Project Status

Prior to awarding the concession, the MOP will award several contracts for a series of engineering studies which will precisely define technical characteristics of the bridge. Pre-qualification is currently underway and qualification is expected to begin by year-end 1997.

The MOP is inviting interested companies to submit expressions of interest for studies regarding geophysical, topographic, geoseismic, geological and geotechnical characteristics, winds, bridge engineering, access road engineering, etc. Each consortium must include at least one domestic consulting firm, in addition to one or more foreign consulting firms. Candidates are be required to present Technical and Economic Offers to MOP by December 19, 1997.

The bidding process for the bridge concession will closely follow completion of the engineering studies, slated for early 1999.

Financing

Total investment for the Canal de Chacao bridge is estimated to reach US$ 300 million, which will be private-sector financed through a BOT concession. The specific terms of the concession are not yet defined.

Equipment and Service Procurement

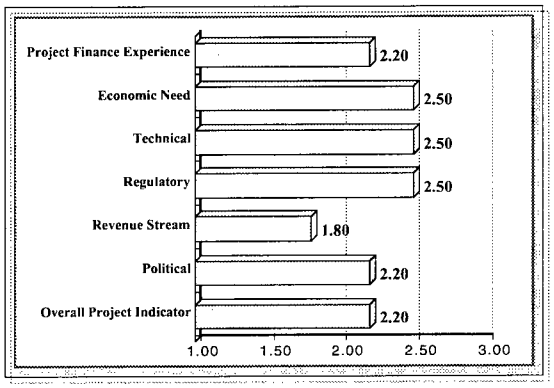
Equipment:

- Construction equipment, dredges, etc.
- Control systems
- Toll collection equipment
- Lighting

Services:

- Construction management
- Bridge engineering and design
- Geophysical, topographic, geoseismic, geological and geotechnical studies

Critical Project Indicators



Key Decision Makers

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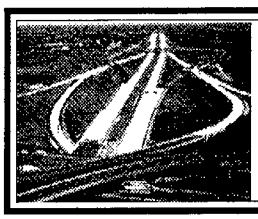


Transportation / Chile

Américo Vespucio Bypass

Project Summary

Project No:	**TRAN-33**
Subsector:	**Toll Roads**
Location:	**Santiago, Chile**
Project Cost:	**US$ 160 million**
Export Potential:	**US$ 50 million**
Type:	**BOT Concession**
Sponsor:	**Ministerio de Obras Públicas (MOP)**

The Ministry of Public Works (MOP) is the entity responsible for concessioning infrastructure development in the transportation sector. MOP has initiated a 4-year investment program which will address Chile's most pressing infrastructure bottlenecks. The program includes concessioning the construction of the Américo Vespucio Bypass, which will serve as the backbone of the Greater Santiago Urban Transport System.

Technical Description

The project involves the construction of a 45 Km bypass which will circle the city of Santiago. The bypass will incorporate toll roads with controlled access and will connect with local roads throughout Santiago. The Américo Vespucio Bypass will be constructed in 7 segments, including the following:

Segment 1: Centenario Bridge - El Salto (3 Km)

- Overpass at El Salto

Segment 2: El Salto - San Martín (11 Km)

- Connection with local streets
- Over/underpasses in Recoleta, El Guanaco, Pedro Fontova, Independencia and San Martín

Segment 3: San Martín - San Pablo (10 Km)

Segment 4: San Pablo - Pajaritos (5.5 Km)

- Construction of 2-lane highway
- Connection with local streets
- Over/underpasses at San Pablo, Av. Los Mares and Santa Elena

Segment 5: Pajaritos - Pedro Aguirre Cerda (3.5 Km)

- Connection with local streets
- Over/underpasses at Segunda Transversal and Los Tilos

Segment 6: Pedro Aguirre Cerda - Grecia (20 Km)

- Construction of 2-lane highway between Pedro Aguirre Cerda and Vicuña Mackenna
- Construction of 2 express lanes between La Granja and Santa Rosa
- Construction of 3 express lanes per direction between Vicuña Mackenna and Grecia
- Construction of a Public Transport Corredor, to facilitate continuous public transit service under an accordion-style bus system
- Connection with local streets
- Construction of covered drainage channels between Pedro Aguirre Cerda and Lonquén, Vicuña Mackenna and Floilán Roa and Departamental and La Florida
- Over/underpasses at Av. Central, Las Industrias, Gran Avenida, La Granja, Santa Rosa, Tacora, La Serena, Coronel, San Luis, Santa Julia, Jerónimo de Alderete, El Parque, Las Torres, Quilín and Grecia

Segment 7: Grecia - Centenario Bridge (11 Km)

<u>Subsegment Grecia - Bilbao</u>

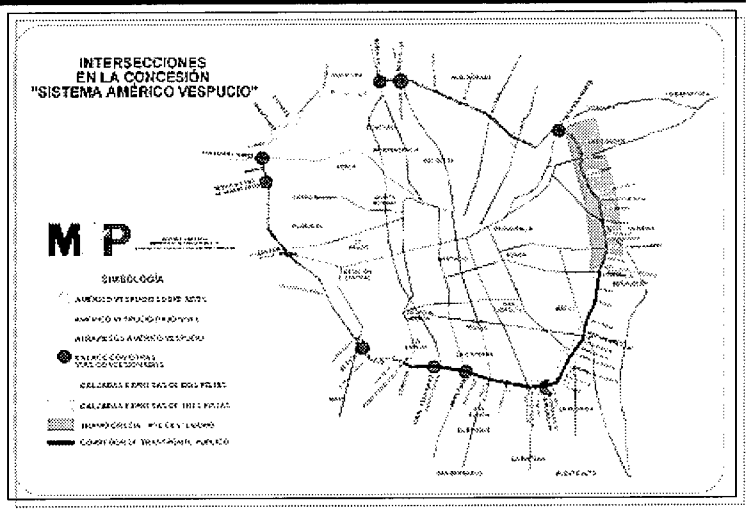
- Covered drainage channel
- Construction of 3-lane highway
- 2 tunnels (1 for each direction of traffic), 20 m. wide
- Overpass

<u>Subsegment Bilbao - Centenario Bridge</u>

- Covered drainage channel
- 2 tunnels (1 for each direction of traffic), 20 m wide
- Construction of 3 lane highway

Site

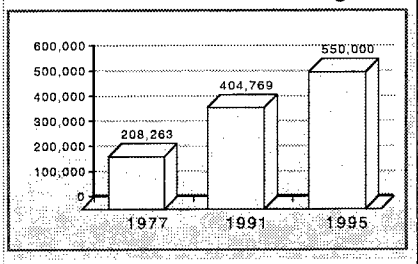
The Bypass will circle the capital city of Santiago.



Nature of Demand

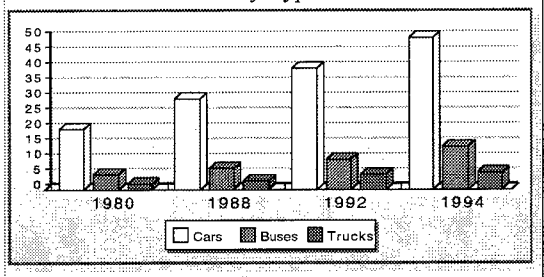
During the 1980s, MOP estimates that the Chilean government invested only 30% of what was needed to maintain the country's road network in good condition. Lack of investment in the Santiago urban road network has become a glaring problem, accentuated by a significant increase in traffic. The total number of vehicles on Santiago streets increased from over 200,000 in 1980 to 550,000 in 1995. By the year 2000, this figure is expected to surpass 700,000.

Number of Vehicles in Santiago



Source: Ministerio de Obras Públicas - Chile

Distribution by Type of Vehicle



Source: Ministerio de Obras Públicas - Chile

According to the MOP, traffic congestion problems in Santiago are responsible for a competitivity loss of approximately US$ 433 million per year, due to transportation lag time, increased vehicular wear and tear and reduced productivity. Traffic congestion is also creating serious health problems among the Chilean population due to elevated levels of air pollutants in the atmosphere.

Santiago
Mean Velocity

Year	Average Speed
1977	37.4 Km/h
1991	24.6 Km/h
1995	20.0 Km/h

Source: Ministerio de Obras Públicas - Chile

Santiago
Vehicles per Capita

Year	Vehicles/ Hab.
1977	1/17
1991	1/11
1995	1/9

Source: Ministerio de Obras Públicas - Chile

From 1997-2000, MOP will concession over US$ 600 million urban roads, including: the North-South and East-West systems, the Northeast Radial, Pie Andino and Isabel Riquelme Avenues, the Las Industrias - La Serena Axis and the Américo Vespuccio Bypass. The Américo Vespuccio Bypass is expected to substantially alleviate traffic congestion in Santiago and will serve as the backbone of the Greater Santiago Urban Transport System.

Project Status

Prequalification of bidding candidates is expected to take place by year-end 1997. Bidding for the concession is expected to open during the first quarter of 1997, with construction slated to begin by year-end 1998.

Financing

The bypass will be 100% private sector financed, under a BOT concession agreement through Chile's Ministry of Public Works. Return on investment will be obtained through controlled access tolls on the 45 Km beltway.

Equipment and Service Procurement

Equipment and service imports for the Américo Vespuccio Bypass could total as much as US$ 50 million, made up of the following equipment and services.

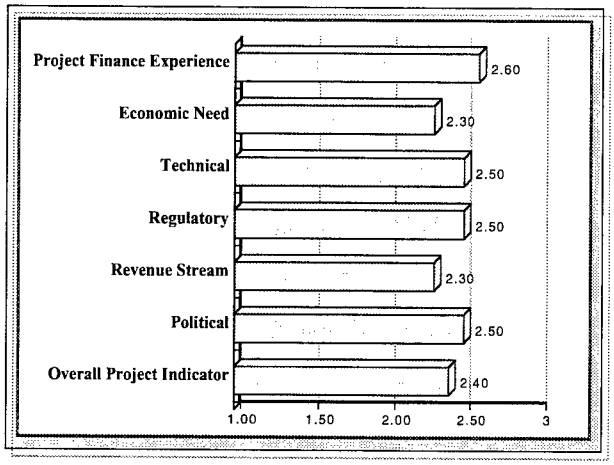
Equipment:

- Toll road collection systems
- Communications systems
- Construction equipment
- Accordion-style buses
- Covered drainage channels

Services:

- Basic engineering and design
- Tunnel construction

Critical Project Indicators



Key Decision Makers

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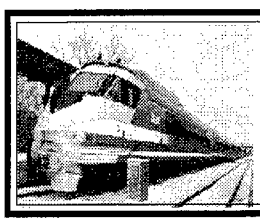


Transportation / Chile

Santiago - Puerto Montt Passenger Rail Concession

Project Summary

Project No:	**TRA-34**
Subsector:	**Rail**
Location:	**Santaigo, Puerto Montt**
Project Cost:	**US$ 160-210 million**
Export Potential:	**US$ 35 million**
Type:	**Concession**
Sponsor:	**Empresa de los Ferrocarriles del Estado (EFE)**

Empresa de los Ferrocarriles del Estado (EFE) is Chile's state-owned rail company, which operates 1,600 Kms of rail extending from Santiago to Valparaíso on the coast and to Puerto Montt in southern Chile. EFE plans to concession infrastructure investment and inter-urban passenger rail service for its Santiago-Puerto Montt line to the private sector.

Technical Description

EFE will concession infrastructure-related investments and passenger rail service for its Santiago-Puerto Montt rail line for a minimum period of 25 years. The concession will be renewable every five years up to a maximum of 35 or 45 years (maximum period not yet defined). The concession will transfer the following assets:

- EFE's Santiago-Puerto Montt rail line and corresponding infrastructure, including branch lines to Concepción and Valdivia (1,320 Km total).
- All train stations located between Rancagua and Puerto Montt
- All rolling stock, equipment and installations.

* The Santiago-Rancagua branch will also be used for suburban train service operated jointly by a Metro and EFE. This should not effect passenger service of the concessionaire, since this branch has dual track.

The following basic guidelines will apply to infrastructure investment under the concession:

1. Investments can be made in rail infrastructure, rolling stock, stations, installations and maintenance equipment.

2. EFE (with government funding) will finance up to US$ 150 million for investments in infrastructure and rolling stock, following the concessionaire's requirements.

3. All infrastructure and stations financed by EFE or with government funds will become EFE assets.

4. All rolling stock, installations and maintenance equipment financed by the concessionaire will become property of the concessionaire.

Candidates may propose any investment project which complies with the specifications and conditions established in the bidding forms, which include:

- Safety and technical guidelines (similar to those of the FRA of the United States)
- Minimal passenger services which must be provided. (The concessionaire is free to provide any additional service beyond the minimal requirements)
- Required infrastructure-related investments
  - Fundamentally to install between 350,000 and 600,000 concrete rail ties (to be provided by EFE) and to repair pre-determined portions of track.

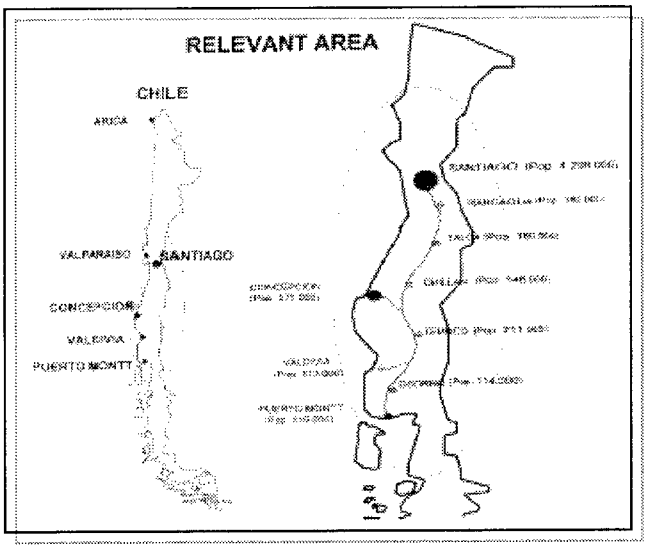
A bidding prospectus (in English) is available through the project sponsor upon request. An evaluation committee will qualify projects for candidacy and verify that each project complies with bidding document guidelines. The concessionaire must execute the project as outlined in the original bid to obtain federal government funding. Failure to complete elements of the proposed project could result in fines or, contract termination.

Activities which a proposed project could include:

- Repair of the Santiago-Puerto Montt rail line, equivalent to 1,320 Km of track and 100 Km of rail yards and switches.
- Repair of 12 large bridges (those with more than 150 m) and river defenses, including approximately 60 small bridges.
- Construction and repair of gates and railroad crossings.
- Repair and/or amplification of signaling, electrification and communications systems.
- Procurement and repair of passenger rolling stock (locomotives, coaches and diesel trains).
- Repair and equipment procurement for repair/maintenance shops.

Site

The rail line to be concessioned extends from Santiago to the city of Puerto Montt in southern Chile. Seventy percent of the Chilean population is concentrated in this region.



Nature of Demand

This project will fulfill two national economic priorities:

Rail Infrastructure

The construction, maintenance and operation of rail infrastructure between Santiago and Puerto Montt, providing train dispatching and traffic administration servicies. The key demand drivers for rail infrastructure are FEPASA cargo transport and passenger service.

> FEPASA transported approximately 900 million tons/Km of cargo in 1996 and is expected to increase cargo transfer at a rate of 4-8 % per year.

Interurban Passenger Services

The construction and maintenance of train stations and rolling stock, as well as rail service operations between Santiago and Puerto Montt. A 6% annual growth rate is expected to result in a 1.5 million increase in inter-urban passengers by the year 2000.

This project will receive financial backing from the federal government. The regional governments also support this project, although they have not yet committed to providing financial resources.

Project Status

Companies Listed
CB Transporte SA (Cruz Blanca SA)
COMSA de Chile
ENGIL SCCSA (Consultora Saper Ltda)
Ferrostaal Chile SAC
Ferrovial Chile - AGROMAN Chile
Ferrovias SAC
Fluor Daniel Chile SA
Gines Navarro Construcciones SA (Spain)
Herzog Contracting Corp.
INECO - TIFSA
Infraestructura 2000 SA
INGELSAC SA (Siemens AG)
Ing. Augusto Spinazzola y Otros
Ready Mix SA
SCI Transoceanica Ltda.
TRIBASA Cono Sur SA

A total of sixteen companies participated in a public bidding process for the Santiago-Puerto Montt passenger rail concession which closed in July, 1996.

The concession was originally expected to be awarded in December 1996. However, the Chilean government decided to postpone the award to allow for a revision of EFE's rail objectives and the concession guidelines. Public bidding has re-opened and EFE intends to award the concession by the first quarter of 1998.

EFE estimates that the entire investment project can be completed over a period of 4-6 years. The concession contract will dictate a six-year maximum completion time. The Santiago-Chillán branch (320 Km) could be become operational and provide minimal service at an earlier date.

Financing

Based on preliminary studies, estimated infrastructure investment will include the following:

Rail infrastructure	US$ 140-170 million
Rolling stock	US$ 15-30 million
Stations	US$ 3-6 million
Repair shops and Maintenance equipment	US$ 2-4 million
Total	**US$ 160-210 million**

EFE, with federal government funds, will finance up to of US$ 150 million for investments in infrastructure and rolling stock. The concessionaire will finance the remainder of the investment. Some regional government financial support may also become available to the concessionaire.

Additional funding is available to the concessionaire through real estate investments in rail stations, such as fast food restaurants, convenience stores, bus terminals, etc. The concessionaire will also be able to charge toll fees to FEPASA, a cargo service owned by a private company (FEPASA was privatized in 1995) which uses the same rail line. The toll charged will be based on tons per Km rate.

Total return on investment for the project based on these considerations is expected to reach at least 12 % per year.

Equipment and Service Procurement

An estimated US$ 35 million in equipment and services will be imported for this project, including:

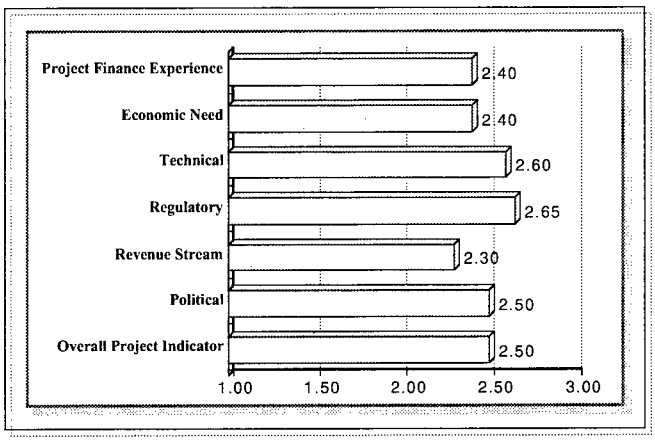
Equipment:

- Rails, switches and other rail apparatus
- Transformers and other electric components
- Rail construction and maintenance equipment
- Reconditioned rolling stock: diesel locomotives and trains, passenger cars of various types
- Signaling and communications systems
- Railroad crossing systems
- Equipment and installations for repair/maintenance shops
- Information systems: traffic control, reservations, passenger ticket sales, etc.

Services:

- Specialized engineering, primarily in the areas of track installation, signaling, communications, traffic control, electricity, stations, passenger service operations and information systems.

Critical Project Indicators



Key Decision Makers

Company	Empresa de los Ferrocarriles del Estado (EFE)
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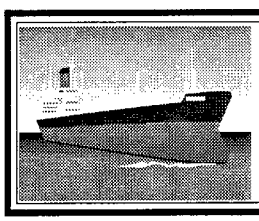
Fax	562-776-2053



Transportation / Chile

Port of Valparaíso Modernization and Operation Concession

Project Summary

Project No:	**TRAN-35**
Subsector:	**Port**
Location:	**Valparaíso, Chile**
Project Cost:	**US$ 428 million**
Export Potential:	**US$ 300 million**
Type:	**Concession**
Sponsor:	**EMPORCHI**

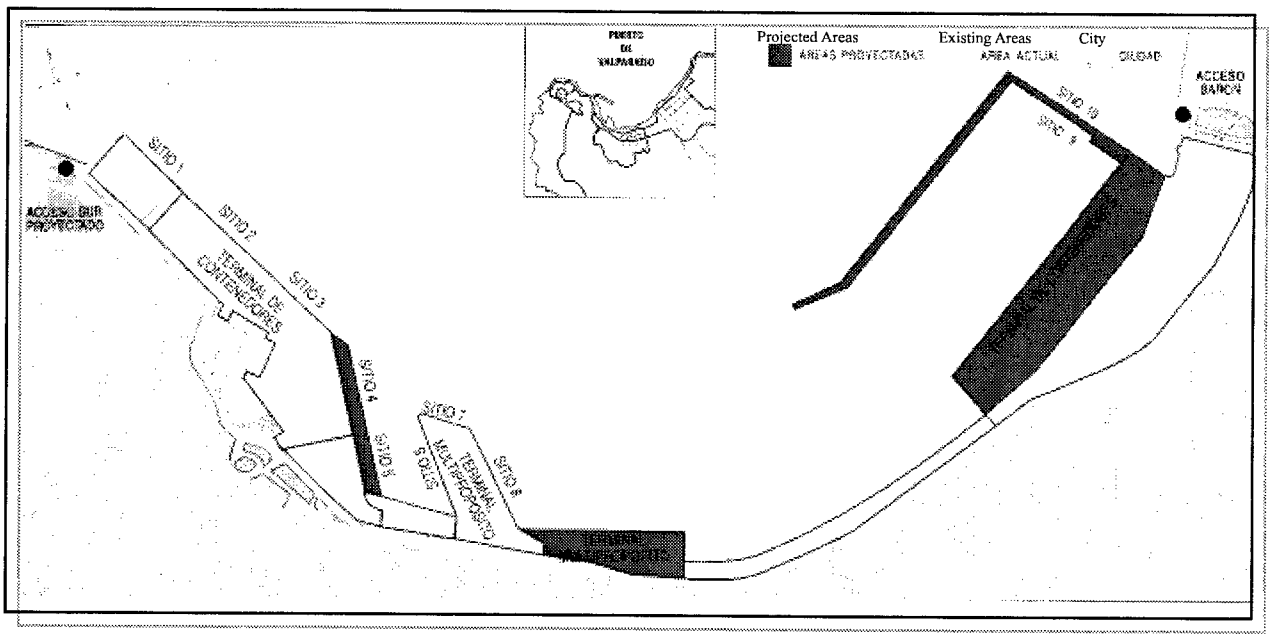
EMPORCHI (Empresa Portuaria de Chile), Chile's state-owned port company, is responsible for operating eleven ports (14 terminals) which handle 50 % (21.3 million metric tons/yr) of the country's ocean freight.

Technical Description

The EMPORCHI Modernization Law, under consideration in the Chilean Congress and expected to pass by the end of the year, will divide EMPORCHI into autonomous operating units and allow the company to grant concessions to private investors for the operation and facilitation of investment in Chile's state-owned ports, including the Port of Valparaíso. The EMPORCHI law, once passed, will define the specific terms of the concession contract.

Existing Port Infrastructure

The Port of Valparaíso is 2005 meters long, with 10 docks and approximately 50 hectares of sheltered waters. Authorized draft is 9.49 meters, and the total port area is 114.595 m^2 covered and 85.263 m^2 open. Port construction consists of concrete walls, reinforced concrete wallboards on concrete piles and reinforced concrete boards over steel piles.



Economic Transfer Capacity (in millions of metric tons):
Current (multipurpose sites): 5.5
With Investment (specialized sites): Multipurpose = 4.5
Containers = 12.3

Main Cargo:
Imports: chemicals, mining & industrial products, vehicles, pulp & paper.
Exports: fruit, food, agricultural & industrial products.

Nearby port facilities include a 5.2 hectare outer harbor and an off-port warehouse. The Port of Valparaíso is connected to Chile's FF.CC. Rail Network, which provides connections to northern and southern Chile. In addition, the port has highway access to the Panamerican Highway, which runs north-south and to the Los Libertadores highway (Highway 60) which links Chile to Argentina.

Road access in the immediate vicinity of the port, however, is inadequate and the loading process is often hampered by traffic back-ups. To address this problem EMPORCHI began construction of a tunnel in March of this year which will connect the port entrance to Highway 68, which links with Santiago. The access tunnel is expected to be completed in 3-4 years.

Related Infrastructure Projects Under Construction:
Improvement of Southern access of Highway 68 (Santiago-Valparaíso), which will link the outer harbor and the port facilities without crossing through the city.
Status: Under Construction *Type*: Private Concession.

Southern section of La Dormida Highway, linking Highway 68 to the northern section of the Panamerican Highway (Highway 5).

Port Modernization

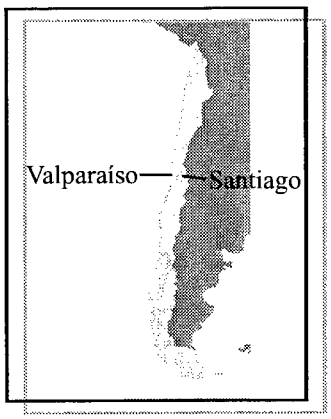
Modernization of the Port of Valparaíso will include five projects:

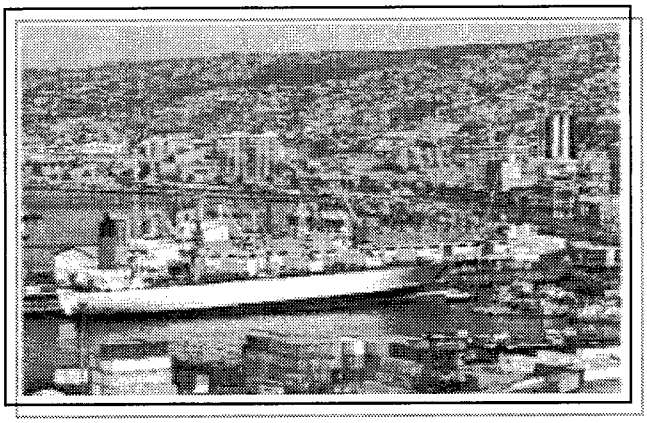
1. *Container Terminal #1*: Installation of 4 Gantry Cranes for handling container berths 2 and 3, which were remodeled. The berths have a total length of 620 meters and a depth of 12 - 12.5 meters. **Estimated Cost: US$ 26 million.**
2. *Container Terminal #2*: Construction of 2 berths in Costanera Barón area, Backfill and Dredging (depth 15.5 m, length 650 m, yard 71,800 m^2. Installation of 5 Gantry Cranes for handling containers. Construction of Breakwater (length 900 m, average water depth 33 m). **Estimated Cost: US$ 317 million.**
3. *Multipurpose Terminal #1*: Modernization of berths 4 and 5. Seismic Reinforcement, Dredging (depth 10 - 12 m, length 370 m., yard 12,500 m^2. Installation of 2 Gantry Cranes for handling containers. **Estimated Cost: US$ 36 million.**
4. *Multipurpose Terminal #2*: Reinforcement and sealing of Gravitational Walls in Berths 6, 7 and 8 (Pier Dam), construction of concrete beams for cranes. Improved Backfill and Repaving of 20,000 m^2. Installation of 2 Gantry Cranes. **Estimated Cost: US$ 14 million.**
5. *Multipurpose Terminal #3:* Construction of 2 berths in Costanera Barón area, refilling and dredging (depth 12 m, length 450 m., yard 16,700 m^2. Basic installation of 2 Gantry Cranes. **Estimated Cost: US$ 35 million**.

Complementary Investments: Repairs and Maintenance, Access, Parking, Extensions, Lighting, Paving, Enclosures, Closed-circuit Surveillance, Computer System, Generating Set.
Estimated Cost: US$ 12 million.

Site

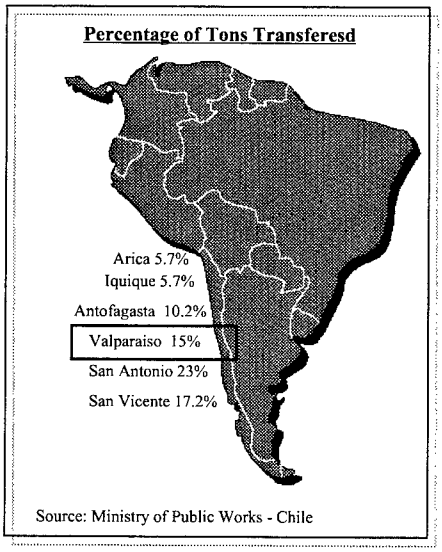
The Port of Valparaíso is located in the city of Valparaíso (Region V), 117 Km to the west of Santiago. Valparaíso is Chile's second-largest city, with a population of over 1.436 million inhabitants. It is also the country's main port center and the seat of the national Congress, which comprises a 46-member Senate and a 120-member Chamber of Deputies.





Nature of Demand

Port infrastructure is a crucial component of Chile's export-based economic growth. In fact, 95 % of Chilean exports are shipped through the country's ports. Thirty percent of Chile's general cargo and 11 % of bulk passed through state-owned ports in 1995. During that same year, private ports in Chile handled 51 % of the country's grain exports and 8 % of bulk. Private ports have invested over US$ 53 million in modernization projects and plans to invest an additional US$ 32 million over the next several years are under consideration.



The Chilean government is aware that substantial investments in port infrastructure are an absolute necessity if Chile intends to achieve its goal of becoming a gateway for multilateral commerce involving both Asia and the Americas. Chilean ports will require technological advancements, improved rail and road networks, terminal construction and general port amplification to accommodate future port traffic flows.

The sheer size and close proximity to Santiago of the Port of Valparaíso ensures that its modernization is a high government priority. The Port of Valparaíso currently handles 15 % of Chile's total metric tons transferred. EMPORCHI expects this percentage to increase substantially, given the efficiency gains which port modernization will bring and the expected tremendous increase in cargo transfer demand over the next 18 years. According to EMPORCHI projections, annual cargo transfer demand for the Port of Valparaíso will soar from its current level of 4.5 million metric tons to 29.4 metric tons in 2015. Another factor which will influence the nature of demand for this project is the impact which the port modernization will have on the city of Valparaíso.

Potential Cargo Transfer Demand
millions of metric tons

Type of Cargo	1996	2005	2015
General	1.9	5.2	5.6
Containers	2.6	10.2	23.8

Source: EMPORCHI

Valparaíso has historically served as Chile's primary seaport, melding the economy of Valparaíso tightly into complementary port activities. The Chilean government views modernization of the Port of Valparaíso as a key part of its plans to in revitalize the city's economy.

Project Status

Investment in port infrastructure will take place over an 18-year timeline(1997-2015). Procurement is expected to commence by the second quarter of 1998.

Financing

The project will be 100 % financed by the private sector, through concessions to private investors for the operation and facilitation of investment in port infrastructure.

Equipment and Service Procurement

Equipment procurement will include the following:

- 14 Gantry Cranes
- Modernization of Berths 4 & 5
- Lighting
- Computer / Communications systems
- Close-circuit surveillance
- Generating set

The majority of equipment required is expected to be imported. The US is already the largest supplier, covering over 50 % of Chile's total port equipment market for the past 3 years.

Port Equipment Market in Chile
millions of dollars

Total Market Size	1996	1997	1998
Total Local Production	512.8	571.3	643.9
Total Exports	1.9	2.2	2.8
Total Imports	4.7	9.3	12.5
Imports from the U.S.	261.2	305.0	350.0

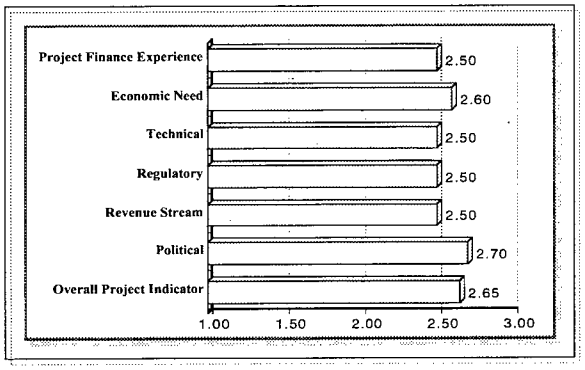
Source: National Trade Data Base

Services:

- Site deepening
- Filling
- Dredging
- Seismic reinforcement
- Port construction & expansion
- Specialized engineering services

Sales Opportunity:
US exporters can supply used port equipment without paying the tax normally imposed on used equipment and products brought into Chile, which is 50 % of the country's 11 % import duty.

Critical Project Indicators



Key Decision Makers

Company	EMPORCHI
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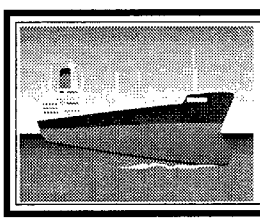
Fax	56-32-256-189



Transportation / Chile

Port of San Antonio Modernization and Operation Concession

Project Summary

Project No:	**TRAN-36**
Subsector:	**Port**
Location:	**San Antonio, Chile**
Project Cost:	**US$ 312 million**
Export Potential:	**US$ 200 million**
Type:	**Concession**
Sponsor:	**EMPORCHI**

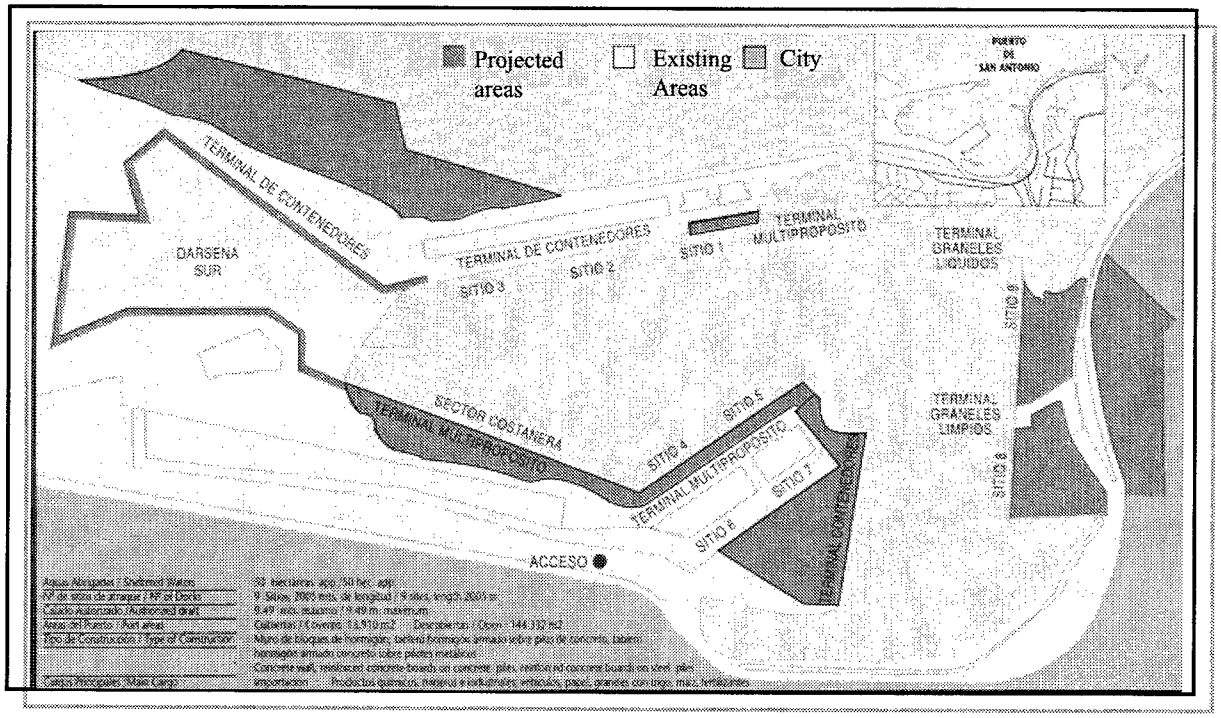
EMPORCHI (Empresa Portuaria de Chile), Chile's state-owned port company, is responsible for operating eleven ports (14 terminals) which handle 50 % (21.3 million metric tons/yr) of the country's ocean freight.

Technical Description

The EMPORCHI Modernization Law, under consideration in the Chilean Congress, is expected to pass by year end 1997, The law, once passed, will divide EMPORCHI into autonomous operating units and allow the company to grant concessions to private investors for the operation of Chile's state-owned ports — including the Port of San Antonio. The EMPORCHI law will define the specific terms of the concession contract.

Existing Port Infrastructure

The Port of San Antonio is 2005 m long, with 9 docking sites and approximately 50 hectares of sheltered waters. Authorized draft is at a 9.49 m maximum, and the total port area is 13.910 m^2 covered and 144.332 m^2 open. Port construction consists of a concrete wall, reinforced concrete boards on concrete piles and reinforced concrete boards on steel piles.



Economic Transfer Capacity (in millions of metric tons)

Current (multipurpose sites): 8.1
With Investment (specialized sites):
Multipurpose = 5.2
Containers = 12
Bulk = 3.2

Main Cargo

Imports: chemicals, mining & industrial products, vehicles, paper, bulkwheat, corn, fertilizers.
Exports: fruit, food, agricultural & industrial products.

Nearby port facilities include a private off-port warehouse in a 35 hectare area and 6 hectares of private parking. The Port of San Antonio is connected to Chile's FF.CC Rail network, which provides connections to northern and southern Chile. In addition, the port has highway access to the Panamerican Highway, which also runs north-south, to Highway 68, which connects with Santiago and to the Los Libertadores Highway (Highway 60), which links Chile to Argentina.

Related Infrastructure Projects Under Construction

Transversal Corridor to Argentina, "Los Libertadores Mountain Pass"
Status: Planning Phase *Type*: Private Concession.

120 hectares reserved south of the Port of San Antonio for future expansion of port premises.

Paving of Santiago - San Antonio Highway (two-lane) through private concession.

Port Modernization

Modernization of the Port of San Antonio will include eight projects:

1. *Multipurpose Terminal #1*: Modernization of Site 1 (Multipurpose/Bulk Terminal), including equipment provision. **Estimated Cost: US$ 10 million**

2. *Multipurpose Terminal #2*: Construction of 3 berths in waterfront area. Backfill and dredging (depth 12.5 m., length 720 m.) Basic installation for 3 gantry cranes (yard 80,000 m^2). **Estimated Cost: US$ 67.3 million**.

3. *Multipurpose Terminal #3*: Modernization of Berths 4 and 5 (length 340 m., depth 10 m.). Installation of 2 gantry cranes (yard 30,000 m^2). **Estimated Cost: US$ 13 million.**

4. *Container Terminal #1*: Extension of Site 3 (65 m.). Installation of 2 gantry cranes for containers (length 500 m., depth 12 m.). **Estimated Cost: US$ 15.1 million.**

5. *Container Terminal #2*: Construction of 2 Container Berths in inner harbor (length 470 m., depth 12.5 - 14m.). Installation of 4 gantry cranes for container handling (yard 175,000 m^2).
Estimated Cost: US$ 91.4 million.

6. *Container Terminal #3*: Modernization of Berths 6 and 7 (length 320 m., depth 14 m.). Installation of 2 Gantry Cranes for container handling (76,000 m^2). **Estimated Cost: US$ 41.6 million.**

7. *South Inner Harbor*: Construction of new inner harbor in a 230,000 m^2 area. Dredging, excavation and breakwater with private financing.
Estimated Cost: US$ 31.5 million.

8. *Clean Bulk Terminal*: Modernization of warehouses and areas in Site 8 (length 400 m., depth 14 m.). Installation of 2 Dock Cranes for bulk cargo (yard, 48,000 m^2).
Estimated Cost: US$ 39 million.

9. *Complementary Investments*: Port access roads, plus an urban and internal road system.
Estimated Cost: US$ 3.9 million.

* The Port of San Antonio will require specialized cranes capable of container handling at high velocities (40 containers/hr). This will surpass current handling capabilities of Chilean ports (8 - 10 containers/hr).

Site

The Port of San Antonio is located in the city of San Antonio, in Region V. Region V has a population of 1.436 million inhabitants. San Antonio lies between the cities of Valparaiso and San Vicente, approximately 117 Km to the southwest of Santiago.

Nature of Demand

Port infrastructure is a crucial component of Chile's export-based economic growth. In fact, 95% of Chilean exports are shipped through the country's ports. Around 30% of Chile's general cargo and 11% of bulk passed through state-owned ports in 1995. During that same year, private ports in Chile handled 51% of the country's grain exports and 8% of bulk. Private ports have invested over US$ 53 million in modernization projects and plan to invest an additional US$ 32 million over the next several years.

The Chilean government is aware that substantial investments in port infrastructure are an absolute necessity if Chile intends to achieve its goal of becoming a gateway for multilateral commerce involving Asia and the Americas. Chilean ports will require technological advancements, improved rail and road networks, terminal construction and general port amplification to accommodate future port traffic flows.

The Port of San Antonio and the Port of Valparaiso are the two most important ports in Chile. Together, they move 40% of Chilean exports and 30% of imports. The Port of San Antonio currently handles 23% of Chile's total metric tons transferred. EMPORCHI expects percentages to increase substantially, given the efficiency gains which port modernization will bring and the tremendous increase in cargo transfer demand expected over the next 18 years. According to EMPORCHI projections, annual cargo transfer demand for the Port of San Antonio will soar from its current level of 6.4 million metric tons to 35.6 metric tons in 2015.

Potential Cargo Transfer Demand
(millions of metric tons)

Type of Cargo	1996	2005	2015
General	1.2	5.2	5.6
Containers	3.1	10.2	23.8
Bulk Cargo	2.1	4.5	6.2
Total	6.4	19.9	35.6

Source: EMPORCHI

Project Status

Investment in port infrastructure will take place over an 18-year timeline. (1997-2015)

Financing

The expansion project will be 100% financed by the private sector, through concessions to private investors for the operation of and to facilitate investment in port infrastructure.

Equipment & Service Procurement

Equipment procurement will include the following:

- 15 Gantry Cranes
- Lighting
- Computer / Communications systems
- Equipment Provision for Sites 1, 3-8.

The majority of equipment required is expected to be imported. The U.S. is already the largest supplier, covering over 50 % of Chile's total port equipment market for the past 3 years.

Port Equipment Market in Chile
(millions of dollars)

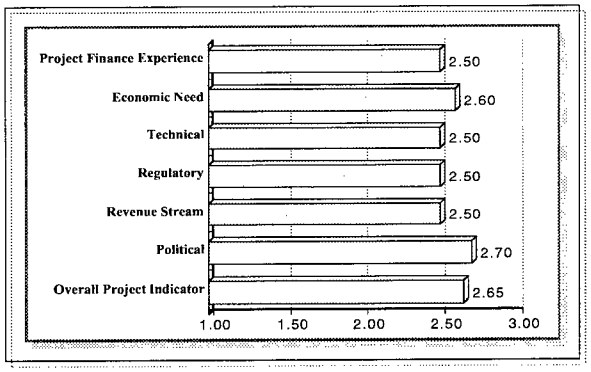
Total Market Size	1996	1997	1998
Total Local Production	512.8	571.3	643.9
Total Exports	1.9	2.2	2.8
Total Imports	4.7	9.3	12.5
Imports from the U.S.	261.2	305.0	350.0

Source: National Trade Data Bank

Services:

- Site deepening
- Filling
- Dredging
- Seismic reinforcement
- Port construction & expansion

Critical Project Indicators



Key Decision Makers

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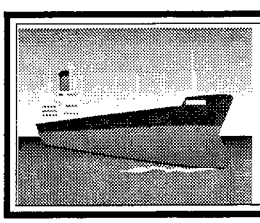


Transportation / Chile

Mejillones Port Complex

Project Summary

Project No:	**TRAN-37**
Subsector:	**Port**
Location:	**Mejillones, Chile**
Project Cost:	**US$ 400 million**
Export Potential:	**US$ 180 million**
Type:	**Concession**
Sponsor:	**Complejo Portuario de Mejillones S.A.**

Complejo Portuario de Mejillones (CPM) S.A. is a subsidiary of CODELCO, Chile's state-owned copper company. The Chilean Government has appointed CPM's Board of Directors to facilitate transfer the of Port of Mejillones into private hands.

Complejo Portuario de Mejillones (CPM) S.A. is seeking a concessionaire who will transform the Port of Mejillones into a mega-port complex. The concession, whose time period has not yet been defined, will include port operation.

Technical Description

The project involves the multi-phase construction of a deep container mega-port complex which will ultimately be capable of handling cargo transfer for "Post Panamax" ships of approximately 300 meters in length and 18 meters draft.

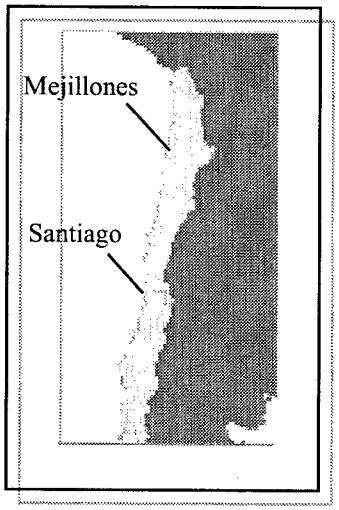
Phase one involves the construction of a general cargo terminal with a minimum capacity of 2.5 million tons per year. Preliminary designs involve construction of a 30 hectare pre-embarking platform and an extended pier which will reach a water depth of 21 meters. A docking pier running parallel to the coast will also be built at a 21 meter depth. The docking pier will be capable of receiving ships from both sides.

Several docks will also be constructed perpendicular to the extended dock to receive ships at a shallower depth. Definitive port designs may also include a deep trough in the ocean bed that will act as a dike.

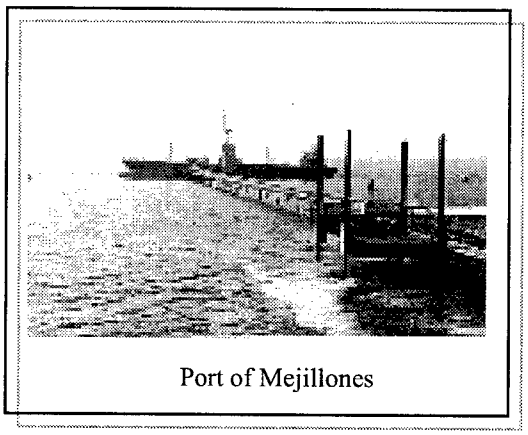
The Mejillones Port Complex will ultimately be capable of transferring at least 30 containers per hour by crane with ample docking sites to ensure minimal waiting time.

Site

The Mejillones Port Complex will be constructed within a 450 hectare zone in the city of Mejillones, which is located 1150 Km north of Santiago, in the region of Antofagasta. Mejillones has a population of 6,000 and the region of Antofagasta has more than 388,000 inhabitants, primarily dedicated to mining-related activities. The region of Antofagasta currently has highway connections to the cities of Salta and Jujuy in Argentina, and rail connections to both Bolivia and Argentina.



Construction of the port complex will take place in the Southern Bay of Mejillones, whose geographic location provides a natural shelter, ideal for a deep container port. The natural conditions of Mejillones Bay allow for the construction of docking sites in open sea without breakwaters or sea walls.


Port of Mejillones

Existing Port Infrastructure

The current port of Mejillones consists of a terminal and dock with a conveyor belt designed exclusively for the transfer of coal. Mejillones Bay has a sand floor with a uniform slope of 2.5%. The land area surrounding the port includes over 20,000 hectares, with a 3% slope which is free of rocks and naturally favors the installation of complementary port infrastructure such as warehouses, dry ports, and a large industrial zone. Within the port zone are paved roads, a railroad terminal and several electric plants.

Infrastructure of the nearby Port of Antofagasta includes a container terminal, several multimodal terminals and a grain terminal. Eight docking sites 1,572 meters in length accommodate ships with a maximum draft of 11.25 meters and have a 4.83 ton/hr capacity.

Primary cargo includes industrial and chemical products, Bolivian wheat and minerals, concentrated and metallic copper and fish meal.

The Port of Antofagasta is currently undergoing a rehabilitation process due to a recent earthquake. This port lacks the infrastructure to handle current demand. Its basic capacity is oriented toward the transfer of metallic cargo. Its primary limitation is the port's rail access to the city of Antafogasta. The rail line leading to the Port of Antafogasta carries cargo directly through downtown Antafogasta, a situation which is creating tremendous traffic congestion.

Tons Moved per Hour

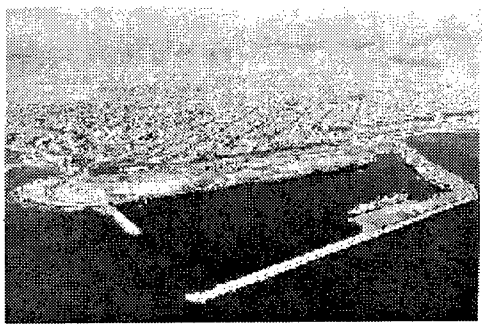
PORT	1993	1994	1995
Arica	2.4	3.07	3.13
Iquique	3.1	3.77	4.21
Antofagasta	3.25	3.6	4.83
Valparaíso	2.56	2.62	2.82
San Antonio	5.67	6.29	8.29
Talcahuano	7.02	8.08	10.22
TOTAL	**24**	**27.43**	**33.5**

Source: Ingenieros

Nature of Demand

Due to its strategic significance as a potential hub for future international trade through the Bioceanic Corridor, the Mejillones Port Complex has substantial federal government support. This port could play an important role in the regional integration of Latin American economies of the southern cone as it will serve to connect these markets with the Pacific Rim.

The Chilean Government also considers the Mejillones project to have strategic importance to CODELCO, the word's leading copper producer. In fact, the Chilean Government has appointed CODELCO's Executive President to head the Board of Directors of CPM. Minerals, which account for 49% of total exports, continue to play a vital role in the Chilean economy. From 1997-2001 Chile is expected to export an estimated 2.5 million tons of copper.



Port of Antofagasta

Additionally, the project's ability to fuel the regional economy of Antofogasta through the development of complementary port sector activities is securing regional and local government backing. The regional governor of Antofagasta also envisions that the Mejillones Port Complex will alleviate the current traffic congestion problems caused by the Port of Antofogasta, which already lacks sufficient port infrastructure to meet future demand. Decisions made by the Chilean Government over the next several years regarding the future of the Port of Antofagasta will determine the overall scope of the Mejillones Port Complex. Mejillones could eventually be connected to a coast-to-coast transamerican roadway currently in the preliminary planning phases which will link Chile's Port of Antofagasta with Brazil's Port of Santos. Mejillones could also benefit from plans to open two new land corridors from Argentina to the Pacific coast.

Project Status

Phase One: Preliminary Studies

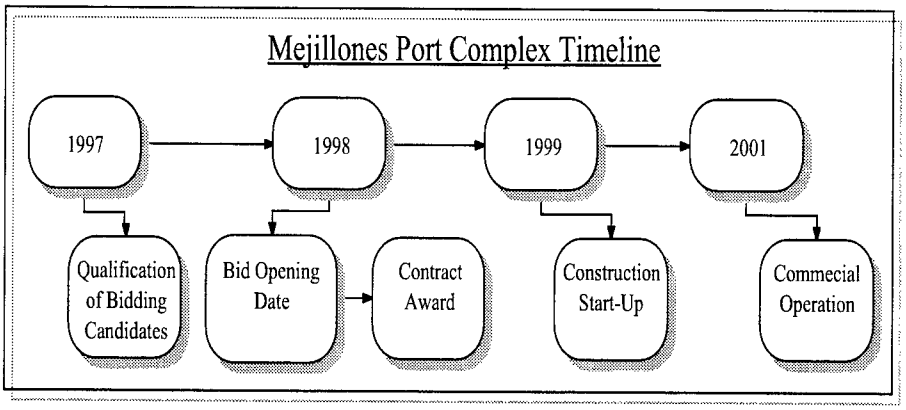
Preliminary studies are currently underway to address the following issues:

- Optimal site for port construction.
- Territorial zoning for the Southern Bay of Mejillones.
- Methodology for the privatization process, including duration of concession.

CPM S.A. is also in the process of contracting an investment bank to handle the financial aspects of the privatization process. Pre-qualification and qualification of bidding candidates will be completed by the end of 1997. Bids will be called during the first six months of 1998 and the contract will be awarded during the final six months of 1998.

Phase Two: Port Construction

Port construction is scheduled to begin at year-end 1999, with the objective of having the first phase of port infrastructure in place by the beginning of 2001.



Financing

The project will be 100% financed by the private sector, with an initial investment of US $200 million.

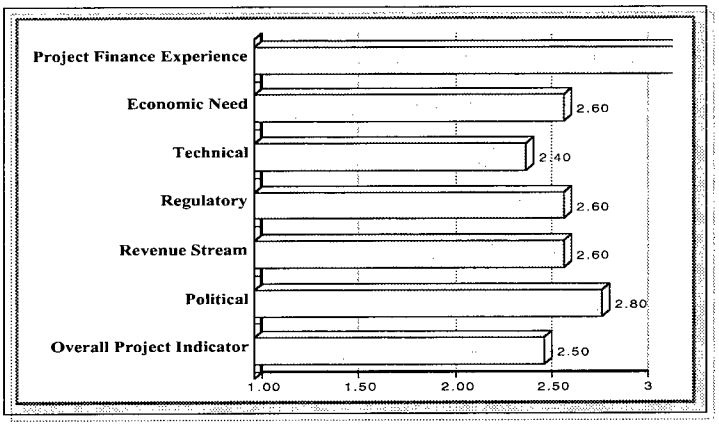
Equipment and Service Procurement

The project seeks equipment and service procurement of all types, including:

- multimodal, container, & grain terminals
- storage facilities
- transport systems
- cranes
- weighing equipment
- piping
- warehousing and storage facilities
- liquid cargo tanks
- grain silos
- computer systems
- communications technology
- conveyor belts
- pumping systems
- conceptual and specialized port design engineering services

Total investment in equipment and services is estimated at **US $45 million dollars.**

Critical Project Indicators



Key Decision Makers

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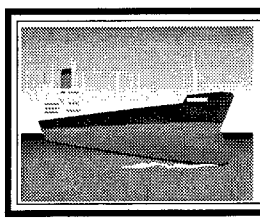


Transportation / Chile

Lota Multimodal Port

Project Summary

Project No:	**TRAN-38**
Subsector:	**Port**
Location:	**Lota, Chile**
Project Cost:	**US$ 18-54 million**
Export Potential:	**US$ 10-30 million**
Type:	**Concession**
Sponsor:	**CORFO**

The Corporación de Fomento de la Producción (CORFO), created in 1939, is a public entity responsible for economic development and industrial promotion throughout Chile's 13 regions. CORFO is currently the majority stockholder in the country's 13 state-owned water utilities, in addition to electricity, transportation and mining companies.

CORFO made the decision to close the ENACAR coal mine, located in the city of Lota, in 1996. Shortly thereafter, CORFO initiated a development plan to facilitate the growth of non-mining related industry in Lota. The Port of Lota will serve as a catalyst for fishing and forestry industry exports in Lota and throughout Chile's 8th Region.

Technical Description

CORFO will grant a concession for the construction and operation of a multimodal port in the city of Lota. Preliminary designs suggest that the Port of Lota should be developed in 2 phases.

Phase 1
During the first phase, the concessionaire will construct 2 docking sites, with rail and road access. The port will require 2 access roads, in addition to corresponding connections with north-south highways. The southern access road will principally carry forestry cargo, including cellulose and paper from the city of Arauco. The northern route will carry cargo originating from Santa Juana. The port currently has rail access, which will require reinstallation, replacement and maintenance.

Phase 2:

The second phase will involve the incorporation of additional docking sites based on the following 4 alternatives:

Alternative A

Transform the first 180 m of the existing pier into an 180 m by 9 m access bridge and construct a 200 m by 26 m reef, using 138 m of existing infrastructure. The new pier, under this alternative, will be 380 m long with a 4.5 m NRS work platform capable of handling ships of 40,000 DWT.

Alternative A would utilize existing overland access routes, which include Carlos and Loreto Cousiño streets for northern destinations / originations and rail connections through Lota Station for southern destinations / originations.

Principal Characteristics

New Pier	200 x 26 m
Depth	12 m
Access Bridge	180 x 9 m
Retro Area	10 Hectares
Sites	2
Cost Per Site	US$ 9 million
Total Cost	US$ 18 million

Source: CORFO

Principal Characteristics

Breakwater	500 m
Pier	300 + 700 m
Artificial Platforms	14.5 Ha
Retro Area (land)	5.5 Ha
Total Retro Area	20 Ha
Sites	4
Depth	14 m
Cost Per Site	US$ 14 million
Total Cost	US$ 54 million

Source: CORFO

Alternative B

Construct a 14.5 hectare artificial platform with 4 docking sites capable of handling a minimum of 2.4 million tons/year.

This alternative will require the construction of additional road and rail access, undertaken as a separate concession through the Ministry of Public Works, once port demand necessitates additional complementary infrastructure.

Alternative C

Construct a 10.9 hectare artificial platform with 2 docking sites capable of handling ships carrying general cargo both in containers or granule. This alternative could be implemented as an intermediate stage before completing Alternative B, since it will contain 2 of the 4 docking sites and 10.9 of the 14.5 hectares which Alternative B requires.

This alternative will also require additional road and rail access, developed as a separate concession through the Ministry of Public Works.

Principal Characteristics

Breakwater	500 m
Pier	450 m
Artificial Platform	10 Ha
Sites	2
Depth	12 m
Cost Per Site	US$ 17 million
Total Cost	US$ 33 million

Source: CORFO

Principal Characteristics	
Pier	360 x 26 m
Depth	12 m
Access Bridge	100 x 9 m
Artificial Platform	3.20 Ha
Retro Area (land)	11.80 Ha
Total Retro Area	15 Ha
Sites	3
Cost Per Site	US$ 17 million
Total Cost	US$ 33 million

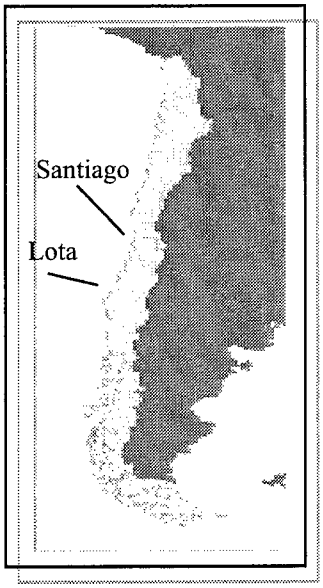
Source: CORFO

Alternative D takes advantage of the maximum potential of the Bay of Lota. This alternative could be undertaken as a final stage after completing Alternative B. It involves the construction of a pier with a 360 m by 26 m reef which will allow for 3 docking sites. The reef will connect with land via a 100 by 9 m access bridge. The port will also have a 3.2 hectare artificial platform.

This alternative will require a northern access road which connects the port to Lota's industrial sector, as well as a southern access road. Both roads will be constructed as separate concessions granted under the Ministry of Public Works.

Site

The Port is located on the coast of the city of Lota, approximately 450 Km southwest of Santiago. Lota has a population of 50,256. Lota is situated in Region 8, which is a major industrial region of the country. The city's rail and road access are ideal for the development of an intermodal port facility.



Nature of Demand

Demand for port services in the 8th Region has experienced a substantial increase over the past 20 years, primarily due to growth in the forestry and fishing industries. In fact, this region holds the highest concentration of shipping and fishing operations in Chile. Companies in Region 8 process approximately 20 million tons of primary forestry material and produce 5 million tons of derivatives (cellulose and cut wood) from this material, 50% of which is exported. In addition, fishmeal exports and fertilizer imports constitute cargo which surpasses 1 million tons.

By the year 2000, Chile is expected to attain a sustainable forestry production of 60 million hectares, at a primary material production level of approximately 30 million tons per year. The forestry industry is anticipated to achieve a production level of nearly 8 million tons/year, with corresponding value-added exports (cellulose, paper, cut wood and furniture) of 3.5 million tons. By the year 2015, production of manufactured forestry materials is expected to reach nearly 20 million tons, half of which will be exported.

Region 8 will require 11 docking sites for general cargo by the year 2000. A total of 10 sites are currently in operation. By 2015, the region is expected to require 20 docking sites. The expansion of current port capacity will enable the construction of 3 additional sites, leaving a deficit of 7 sites. The Port of Lota is expected to fulfill this deficit.

Project Status

Under the Lota Development Plan, CORFO contracted the Arze, Reciné y Asociados consulting firm to conduct a study which would determine alternative uses for the existing port installations formerly used in ENACAR's operations. The study concluded that the Bay of Lota constitutes the best option for developing a port in the center-south of Chile.

CORFO is currently reviewing the recently-completed feasibility study and should have bidding documents ready by the 1st Quarter of 1998. The concession is expected to be awarded by year-end 1998.

Financing

The estimated investment for the Port of Lota is expected to range between US$ 18 and US$ 54 million, depending upon the alternative chosen for port development. This amount will be 100% private sector financed, through a concession agreement. The duration of the concession will be established in the terms of reference.

Equipment and Service Procurement

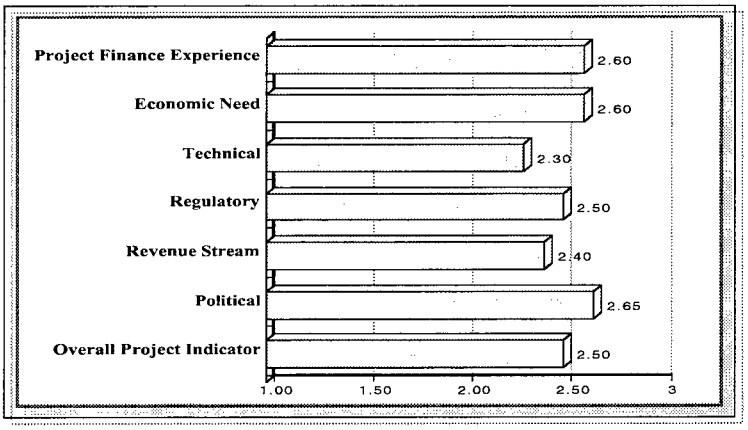
Equipment:

- Terminals for woodchips, logs, fish, grain
- Elevators and conveyor belts
- Transfer gantry cranes & unloaders
- Ship loaders and receiving hoppers
- Receiving and loading lines, silos
- Communications and computer systems
- Pumping systems
- Electrical facilities and transmission line
- Rail Infrastructure

Services:

- Geotechnical engineering
- Maritime hydraulic engineering
- Port design
- Environmental impact studies
- Structural engineering
- Potable water/sewage-related services
- Electric and mechanical services
- Road surveying and design

Critical Project Indicators



Key Decision Makers

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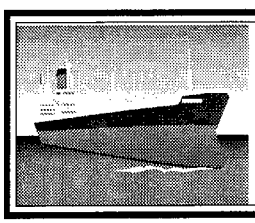


Transportation / Ecuador

Expansion of the Port of Manta

Project Summary

Project No:	**TRAN-39**
Subsector:	**Port**
Location:	**Manta, Ecuador**
Project Cost:	**US $100 million**
Export Potential:	**US $35 million**
Type:	**Concession**
Sponsor:	**Port Authority of Manta**

The General Directorate of the Merchant Marine and Coastal Seaboard of Guayaquil, has approved the expansion of the Port of Manta converting it into the country's first international maritime port. In its expansion, the Port Authority of Manta will initiate a aggressive plan of action to convert the port into a world class operation. The authority will concession out the project to modernize existing terminal structures and organizational mechanisms, thereby reducing costs, improving efficiency and increasing profitability.

Technical Description

Dredging and Maintenance

Since its inception in 1966, the Port of Manta has undergone no dredging. The situation has become critical for the port. Dredging will increase depth from an average of 2m to 24m, enabling large vessels to access the port. The process will also bring the port up to international port specifications for the servicing of 20 and 40 ft. containers.

Enlargement of Wave Breakers

To augment the port's activity and make it more attractive to international transport companies, the port

will enlarge current wave breakers. Such breakers will provide the customer with the maximum guarantee of timely dispatching year round. Imperative to the securing of services during improvements, the wave breakers should be installed first.

Demolition of Existing Warehousing, Rebuilding and Enlargement of New Warehousing

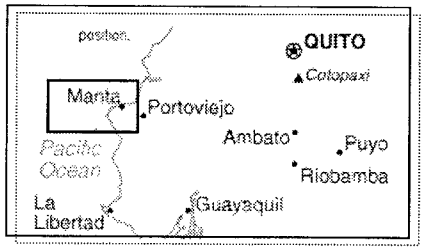
The highly competitive environment in international shipping necessitates increasing the space and capability of the port. In order to meet international demands and compete successfully, the Manta Port must open an operational area in dock #1 and in closely surrounding areas for container loading. Specifically, the project expects to provide services for two containerized ships simultaneously.

The warehouse #1 will be demolished to enable the construction of patios which will facilitate container flow through the port.

The project's current scheme will fulfill Ecuador's shipping requirements till the year 2006 whereupon an analysis of new requirements will be undertaken. The program is set to continue through the year 2010.

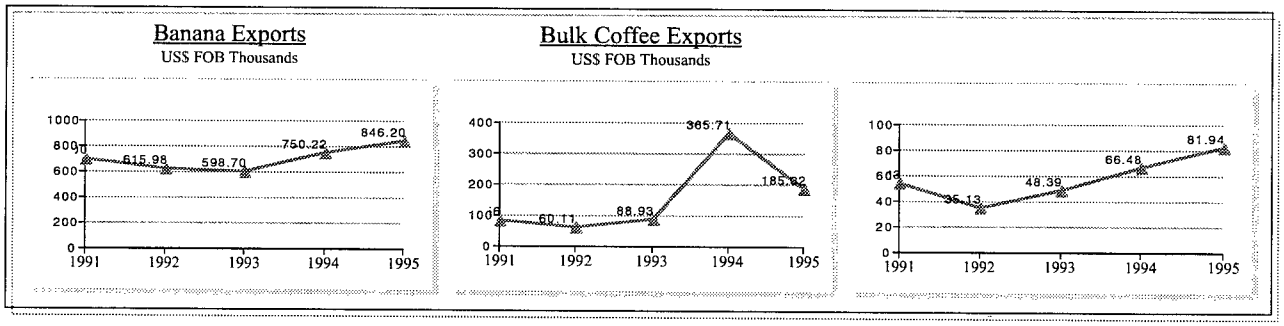
Site

The Port of Manta is located on the Pacific Ocean approximately 120 miles northwest of Guayaquil and 160 miles southwest of Quito.



Nature of Demand

Over the past several years, Ecuador has experienced a surge in export growth which requires an increase in shipping and cargo consolidation infrastructure. The increase in exports has strained shipping and transportation as a whole. From the year 1990, till today, exports have grown from US$ 2.7 billion to US$ 4.9 billion with the expectation of additional growth in 1997. Products such as bananas, oil, flowers and cocoa have experienced growth.



Manta has been the principal port for cocoa and coffee exports, and is now turning to handle a more diversified line of items. The containerized port of Guayaquil currently handles most of the country's imports and exports yet is overutilized with a slow turnaround time of 5 days.

Project Status

Keeping in mind the goal to have an internationally competitive port with the most updated equipment, the Port Authority of Manta has established plan for the short, medium and long term.

The project will be administered under the Law of Concession. Recent decrees by the Alarcón administration have named the port of Manta as one of 20 initiatives for development, lending further validity to its eventual construction.

In the short term, the project is identifying the required feasibility studies. Afterwards, the port will follow through with the concessional bidding process and subsequent construction.

Financing

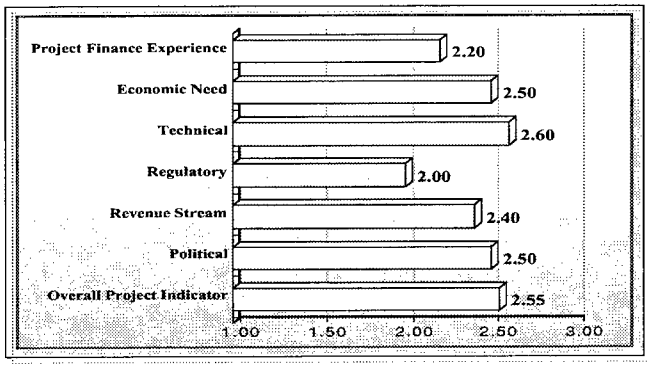
Financing of the project will flow through the private sector. Concession guidelines will be determined by end year 1997, with bids expected to go out in the first quarter of 1998. The project is expected to undergo a BOT (Build-Own-Transfer) concession.

Total project cost: US$ 80 Million.

Equipment and Service Procurement

- 2 Gantry Cranes
- 6 Fork-lift trucks
- Computerized equipment
- 5 Transtainers
- Buildings
- Engineering services
- 12 Chassis
- Civil Works
- Communication equipment
- 12 Tractors
- Security Services
- Wave breakers

Critical Project Indicators



Key Decision Makers

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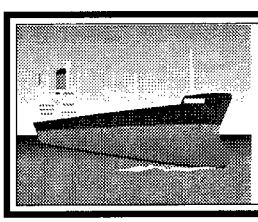
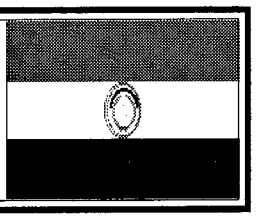


Transportation/Paraguay

Paraguay-Paraná Waterway



Project Summary

Project No:	**TRAN-40**
Subsector:	**Waterways**
Location:	**Eastern Paraguay, Southern Brazil**
Project Cost:	**US$ 100 million**
Export Potential:	**US$ 50 million**
Type:	**Concession**
Sponsor:	**Federal Government of Paraguay**

In order to improve the transportation of cargo from the interior of South America to ports on the Atlantic, a five-nation international committee has been formed to improve waterway transportation on the Paraná and Paraguay Rivers.

Technical Description

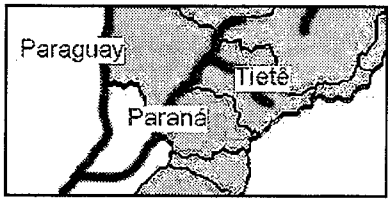
The goal of the project is turn the Paraná and Paraguay Rivers into a fully navigable waterway from Corumbá, Brazil to the mouth of the Paraná in Argentina. The waterway, with a total length of 2,170 Km, will require three major types of services:

a) dredging and deepening of the river channel
b) installation of signaling and communications systems
c) straightening of curves

This is project is distinct from the Tietê-Paraná Waterway in Brazil, although a long-term goal is to link the two waterways by a series of locks for the dams built on the Upper Paraná, or by a the Itaipú-Asunción Canal which will cross Paraguay.

Site

The Waterway is composed of the following sections of two rivers: the Paraguay, between Corumbá, Brazil and Asunción, Paraguay; and the Paraná between Asunción and the mouth of the Paraná which empties into the Rio de la Plata. The project being undertaken by the Inter-Governmental Committee does not include the Upper Paraná in Brazil.



Nature of Demand

Cargo traffic on the waterway is steadily increasing. Annual cargo movements on the entire waterway amount to 5 million tons. The Committee estimates that cargo volumes could double or triple within the next 10 years. On the stretch of waterway between Asuncion and Buenos Aires, cargo movements have increased by two-thirds since 1991, and are expected to grow at a rapid rate over the next few years:

Waterway transportation has a distinct cost advantage over the rail or highway alternatives. The transportation costs of a ton of grain from Asunción, Paraguay to San Lorenzo, Argentina, near the mouth of the Paraná are approximately US$ 2 -US$ 3 for waterway, as opposed to US$ 18 for railway, and US$ 20-US$ 22 for highway.

As a low-cost alternative to railroad or highway transportation, the market for the waterway is strong. Both the increases in waterway cargo volume and trade between the Mercosur countries supports the assertion that demand will continue to grow over the next few years. Supported by US engineering consultants with extensive waterway experience, the project will be technically sound.

Project Status

The engineering and environmental studies were completed by Louis Berger International, Inc. and Hidroservice. The Inter-Governmental Committee will organize the terms of reference and call for bids once international legal issues and intra-country regulations are resolved.

Financing

The Inter-Governmental Committee has not decided on how the waterway will be operated. One model is a private sector concession. The Committee could either maintain one concession covering the entire waterway, or divide it into multiple concessions. The concessionaire would be required to

finance and undertake the waterway improvements in return for the rights to collect tolls over a determined period.
The second model would allow the Committee to set up a public entity to collect tolls.

With the receipts, the entity would contract private companies to execute the necessary improvements. The Committee has reached agreement on two issues: a) international competitive bidding will be used, and b) toll receipts will go into a single fund. The member countries will not collect individual tolls for the stretches of waterway that pass through their countries. Rather, toll receipts collected at a given point on the waterway will be put into a single fund which will be redistributed for improvements as necessary at any point on the waterway.

Important questions remain as to the operation of the project. The Inter-Governmental Committee has not yet decided whether it will be operated by a private concessionaire or concessionaires, or operated by the Committee itself. Finally, as it is a five-nation project, decisions could easily be manipulated by political, rather than market reasons, and there are still outstanding legal issues.

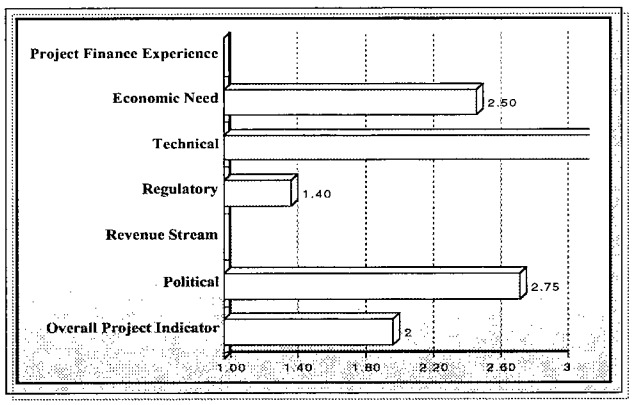
Equipment and Service Procurement

U.S. companies should be well positioned to compete for the major components of the project: dredging and signaling. According to the pre-feasibility studies, the civil works (earth moving and concrete pouring) component in the curve rectification component is relatively small.

The project will need the following equipment:
Signaling equipment
Communications systems
Monitoring systems
Radar equipment
Bulldozers
Toll collection systems

The principal services to be procured are:
Construction engineering supervision
Dredging

Critical Project Indicators



Key Decision Makers

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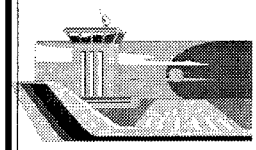


Transportation / Peru

Airport Modernization & Air Traffic Control System Upgrade

Project Summary

Project No:	**TRAN-41**
Subsector:	**Airport**
Location:	**Peru**
Project Cost:	**US$ 390 million**
Export Potential:	**US$ 51 million**
Type:	**Concession**
Sponsor:	**Corporación Peruana de Aeropuerto y Aviación Commercial**

Corporación Peruana de Aeropuerto y Aviación Commercial, S.A. (CORPAC) is the state entity responsible for infrastructure investments in Peruvian airports and air traffic control systems. The Airport Modernization & Air Traffic Control Systems Upgrade project will help to ensure that Peruvian airports receive the infrastructure and airspace systems which are necessary to meet present and future air traffic demands.

Technical Description

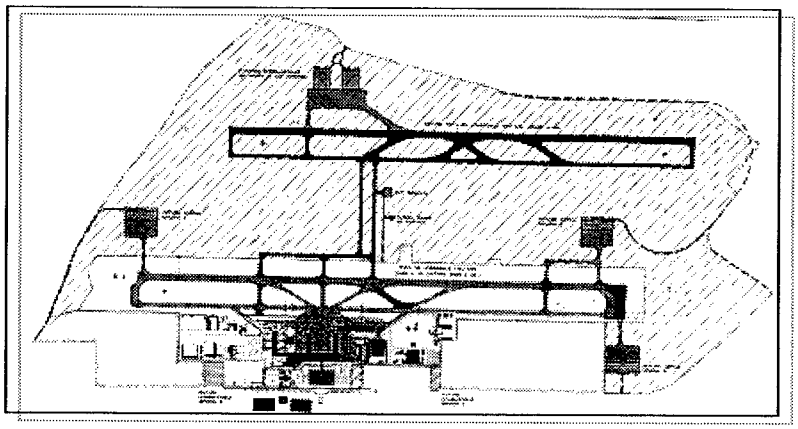
The project involves the modernization of airport facilities and air traffic control systems in 4 Peruvian airports, including: Lima's Jorge Chávez International Airport, Arequipa's Rodríguez Ballón International Airport, Cusco's Velasco Astete International Airport and Iquitos' Francisco Secada International Airport.

Jorge Chávez International Airport - Lima

Existing Facilities

Existing facilities at Jorge Chávez include a single 3,507.5 m by 45 m concrete runway served by a 22.5 m taxiway, and a 165,000 m^2 carrier apron which serves both a domestic and international con-

course in a single terminal facility. The terminal has 6 international and 7 domestic gates.



The airport's navigational equipment includes a high powered rotating beacon, runway and taxiway edge lights and threshold lighting. Jorge Chávez also has an instrument landing system (ILS) and a very high frequency omni-directional radio range (VOR) facility with collocated distance measuring equipment (DME).

Modernization Program - US$ 292.5 million investment

Phase 1: Remodeling and expansion of passenger terminal, rehabilitation of runway, modernization of navigation and secondary radar systems (US$ 50 million).

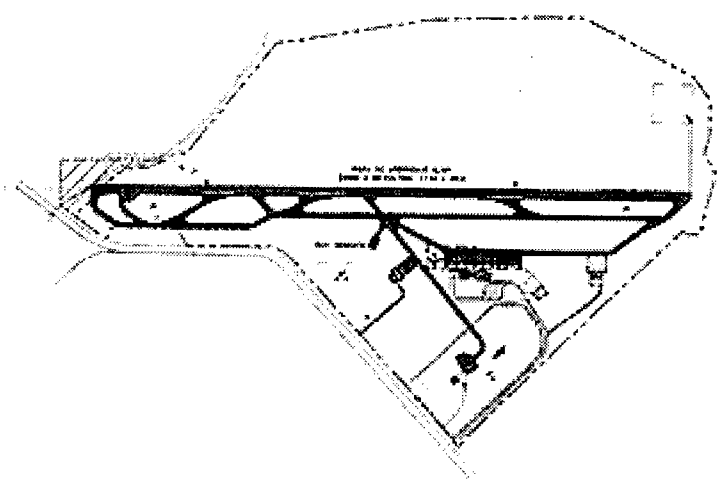
Phase 2: Construction of a second runway, airplane platform, taxiway, new terminal and complementary installations, new control towe and navigational/radar equipment (US$ 242.5 million)

Rodríguez Ballón International Airport - Arequipa - US$ 37 million investment

Existing Facilities

Existing facilities at Rodríguez Ballón include a 2,980 m by 45 m asphalt-paved primary runway and a 1,280 m by 23 m secondary runway, which also functions as a partial parallel taxiway. The airport has a 3,294 m^2 terminal, a 27,600 m^2 apron and six gates for aircraft.

Modernization Program - US$ 36.9 million Investment



Navigational aids include a rotating beacon, runway and taxiway edge lights, centerline lighting, threshold lighting, runway end indicator lights (REIL's), a precision approach path indicator (PAPI), a non-directional beacon (NDB) and a very high frequency omni-directional radio range (VOR) facility with collocated distance measuring equipment (DME).

Runway: Rehabilitation and expansion of runway, construction of high velocity departures, construction & extension of taxiway, markings and signage, construction of platform near terminal.

Terminal: Remodeling, amplification and modernization of passenger terminal, general aviation and support installations.

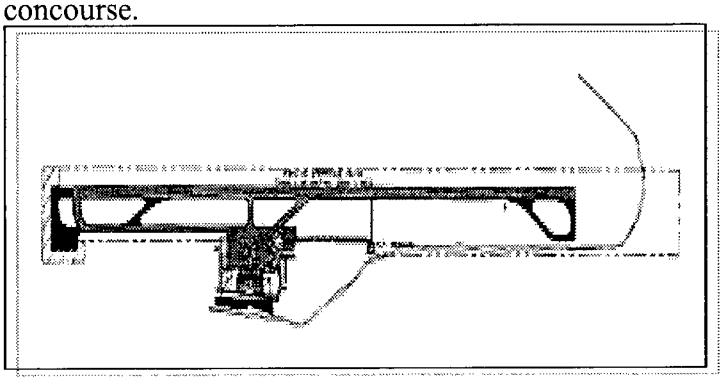
Equipment: Navigation, radar and general aviation equipment.

Velasco Astete International Airport

Existing Facilities

Velasco Astete has a single 3,400 m by 45 m asphalt runway served by a partial 1,350 m by 23 m taxiway, and a 41,350 m^2 concrete slab apron which has 4 gates primarily used for cargo operations and 2 gates for larger aircraft.

The airport has no lighted visual or electronic NAVAIDS, but is equipped with a non-directional beacon (NDB). The terminal facility has a total area of approximately 3,269 m^2, with a single floor concourse.



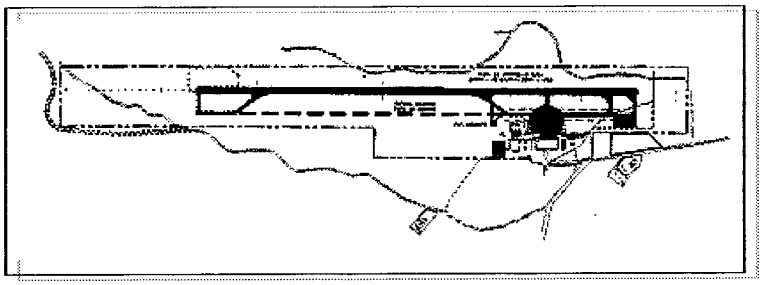
Modernization Program - US$ 28.3 million investment

Runway: Rehabilitation and expansion of runway, construction of high velocity departures, construction and extension of taxiway, parallel turnaround taxiway markings and signage, construction of platform near terminal.

Terminal: Remodeling, amplification and modernization of passenger terminal, general aviation and support installations.

Equipment: Navigation, radar and general aviation equipment.

Francisco Secada International Airport.



Existing Facilities

Existing facilities at Francisco Secada include a single 2,500 m by 45 m concrete runway with no taxiway, and a 48,175 m2 carrier apron with 8 gates.

Navigational equipment includes a rotating beacon, runway edge lights and threshold

Modernization Program - US$ 33 million investment

Runway: Rehabilitation and expansion of runway, construction of taxiway, markings and signage, construction of platform near terminal.

Terminal: Remodeling, amplification and modernization of passenger terminal, general aviation and support installations.

Equipment: Navigation, radar and general aviation equipment.

Site

Jorge Chávez International Airport is located approximately 9.6 Km northwest of Lima. Rodriguez Ballón is located approximately 8 Km north-northwest of the city of Arequipa, Velazco Astete is situated about 2 Km southeast of Cuzco and Francisco Secada Vignetta Airport is located approximately 7 Km southwest of the city of Iquitos.

Nature of Demand

Significant economic reforms, coupled with strong population growth over the past several years have placed increasing demands on commercial aviation infrastructure throughout Peru. Aviation forecasts for each of the 4 airports to be included in the modernization program indicate that air carrier operations and passenger enplanements are expected to double and in some cases triple by the year 2011. The following graph depicts aviation activity forecast summaries for the airports:

Jorge Chavez International Airport, Lima

Activity Element	1994	1996	2001	2006	2011
Annual Operations					
Air Carrier	44,254	49,839	64,128	77,890	87,642
Air Cargo	1,325	1,485	1,935	2,509	3,262
General Aviation	5,555	8,800	13,200	17,600	22,000
Military	6,344	4,500	3,000	1,500	1,500
Total Operations	57,478	64,674	82,258	99,499	114,404
Enplanements					
International	547,685	856,100	1,253,715	1,716,114	2,121,339
National	950,393	1,089,582	1,471,753	1,842,873	2,125,339
Total Enplanements	1,606,051	1,945,683	2,725,468	3,543,987	4,260,678

Velazco Astete Airport, Cusco

Annual Operations					
Air Carrier	7,521	8,930	13,696	17,357	23,010
General Aviation	1,280	1,592	3,421	5,696	8,503
Military	1,587	1,720	1,980	2,240	2,500
Total Operations	10,699	12,248	19,007	25,893	34,013
Enplanements					
International	3,516	7,410	28,739	57,415	99,337
National	248,042	325,430	513,512	688,051	894,028
Total Enplanements	251,558	332,340	542,251	755,466	993,365

Rodriguez Ballon Airport, Arequipa

Annual Operations					
Air Carrier	9,637	11,882	17,075	23,147	27,775
Air Cargo	100	150	225	300	825
General Aviation	1,125	1,544	3,015	4,325	7,311
Military	1,051	1,500	1,500	1,500	1,500
Total Operations	11,913	14,276	21,815	28,272	37,191
Enplanements					
International	1,460	4,467	15,848	34,525	60,176
National	230,825	293,317	464,394	628,408	799,494
Total Enplanements	232,344	297,784	480,242	663,933	859,665

CNL FAP Francisco Secada V., Iquitos

Annual Operations					
Air Carrier	3,041	4,954	6,866	8,044	11,054
Air Cargo	175	200	325	475	656
General Aviation	611	874	1,210	1,664	1,945
Military	2,651	3,100	3,100	3,100	3,100
Total Operations	7,578	9,128	12,266	13,173	16,744
Enplanements					
International	5,020	6,134	12,360	20,876	30,828
National	119,359	147,217	193,643	240,161	304,436
Total Enplanements	124,379	153,351	206,003	260,947	338,262

Project Status

A TDA-sponsored feasibility study for the Airport Modernization and Air Traffic Control Systems Upgrade project was completed by Birk Hillman Consultants, Inc. in August 1996. The feasibility study recommended the following implementation schedules:

Jorge Chávez:	
Runway, Vault, Security, ARFF Facility	1997-2000
Tower = 2000-2003; Markings & Signage	1998
Terminal Apron	2001-2002
Terminal Building	1997-2007
General Aviation	1999-2000
Rodriguez Ballón:	
Runway, ARFF Facility	1997-98
High-speed exits	1998-99
Markings & Signage	1997
Terminal Apron	2001-2001
Terminal Building	2000-2002
Velazco Astete:	
Runway, Visual Navaids, Markings & Signage	1997-98
Highspeed exits	1998-99
Parallel turnaround taxiway, Apron	2000-2001
Terminal Building	1999-2001
Francisco Secada:	
Runway	1999-2001
Visual Navaids, Markings & Signage	1997-98
Taxiway	1997-2000
Apron	1999-2000
Terminal Building	1997-1999

Financing

Although specific terms of financing are not yet defined, CORPAC intends to finance modernization of facilities and air traffic control systems at each of the 4 airports through concession agreements with private sector firms.

Equipment and Service Procurement

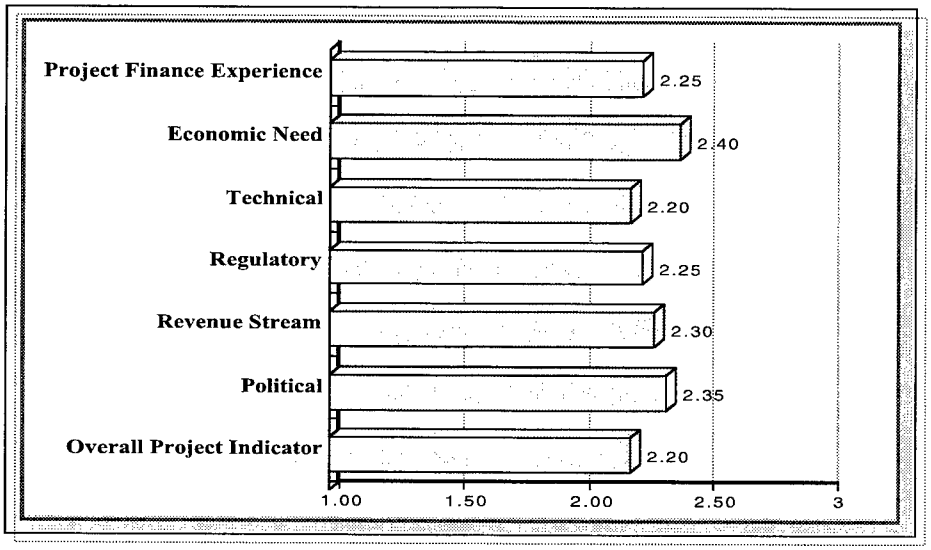
Equipment:

- Radios
- Air traffic control phase II
- Communications
- Electricity
- Rescue equipment
- Security
- Terminal equipment
- Regional lab
- Flight inspection
- Other equipment

Services:

- Specialized engineering
- Operations-related consulting

Critical Project Indicators



Key Decision Makers

Company	Corporación Peruana de Aeropuerto y Aviación Comercial
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Title	Gerente Generalde Ingeniería y Proyectos
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Company	Corporación Peruana de Aeropuerto y Aviación Comercial
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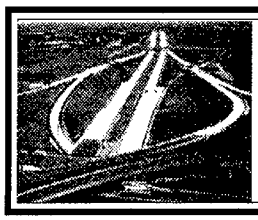
Title	Gerente de Proyectos
Address	Aeropuerto General Jorge Chavez Lima, Peru
Telephone	511-574-5578
Fax	511-574-5578



Transportation / Peru

Traffic Signaling Project

Project Summary

Project No:	**TRAN-42**
Subsector:	**Urban Transit**
Location:	**Lima, Peru**
Project Cost:	**US$ 18 million**
Export Potential:	**US$ 15 million**
Type:	**Procurement**
Sponsor:	**Municipalidad de Lima Metropolitana**

Lima currently has a limited network of computerized traffic signals, which cover 65 intersections in a central area of the city. The municipality of Lima plans to develop a comprehensive traffic management system which will involve a city-wide installation of traffic signaling equipment. The project is expected to be included in the Lima-Callao Urban Transport Project, which is being co-funded by the World Bank and the Inter-American Development Bank.

Technical Description

Preliminary plans suggest traffic signaling installation for approximately 450 intersections covering the entire central area of metropolitan Lima, as well as key intersections in several (potentially 6) outlying areas such as Miraflores and Callao. A feasibility study is currently underway which will provide more definitive information with regards to project scope.

Additional components which will be funded under the Lima-Callao Urban Transport Project include:

Bus Corridor Rehabilitation

A network of bus corridors throughout metropolitan Lima will be rehabilitated. The project will require traffic rerouting and roadwork.

Extension of Peripheral Road in Northern Lima

The peripheral road will unite Lima's principal highways (Central and Panamericana Norte y Sur) with the Callao Port and Lima Airport. The project is expected to be implemented under a private-sector concession agreement.

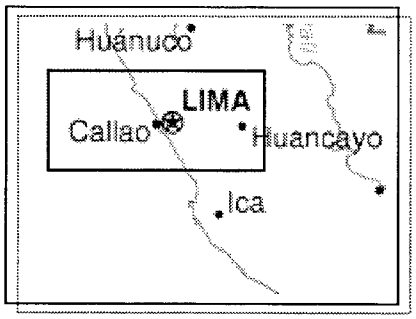
Transport Conditions Improvement Program

The program will include the following components:

- Paving Streets in low-income areas
- Road maintenance
- Traffic management
  - Signaling, traffic rerouting, institutional development of the entity responsible for coordinating traffic flow
- Road safety
  - Lighting, education, systems of information and accident analysis, vehicle and driver registration
- Non-Motorized Traffic
  - Rehabilitation and Construction of pedestrian walkways
- Reduction of Air Pollution
  - Renovation of bus fleet, air quality control equipment

Site

The project will be executed as a city-wide installation in the Lima-Callao Metropolitan area.



Nature of Demand

The Lima-Callao metropolitan area, with approximately 7 million inhabitants, is experiencing increased levels of traffic congestion and is in dire need of a comprehensive traffic management system to alleviate transit problems. Lima's current system lacks sufficient signaling equipment to handle increasing traffic congestion.

Although traffic signaling coverage does include 65 intersections in central Lima, the equipment frequently malfunctions. Traffic lights are neither synchronized nor do they respond to changes in traffic patterns during peak and off hours. Thus, traffic signals are often ignored by drivers.

The Mayor of the Municipality of Lima, Dr. Alberto Andrade Carmona, has designated traffic signaling as a priority project. The central government is expected to include traffic signaling in the Urban Transport Program which is being funded jointly by the World Bank and the Inter-American Development Bank.

Project Status

In July 1996, S. Rowitz & Associates and Inter Projects LLC completed a TDA-funded Definitional Mission for transportation projects in Peru. The Definitional Mission recommended that the TDA finance a feasibility study for the municipality of Lima's Traffic Signaling Project.

The feasibility study is currently underway and is expected to be completed by year-end 1997. Equipment and services procurement for a city-wide traffic signaling installation should take place during the third quarter of 1998. The bidding process for the Peripheral Road concession is slated to open by December 1997, followed by bidding for the Bus Corridor Rehabilitation Project and the Transport Conditions Improvement Program during the second quarter of 1998.

Financing

The project is expected to be financed under the World Bank/Inter-American Development Bank US$ 200 million Urban Transport loan.

Equipment and Service Procurement

Equipment:

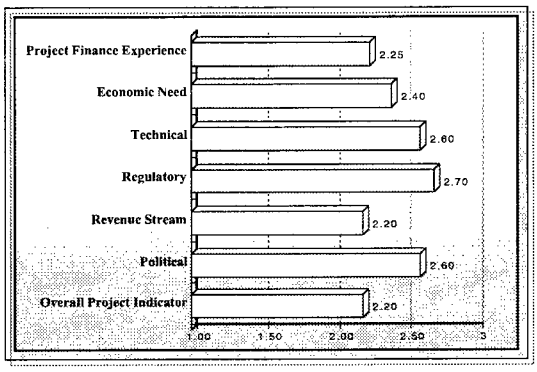
- Traffic signaling
- Communications
- Control systems
- Computers
- Traffic surveillance cameras
- Vehicle detectors
- Changeable message signs
- Cable
- Telephones
- Lighting
- Buses
- Pollution control equipment

Services:

- Basic and design Engineering
- Installation
- Feasibility studies
- Air quality analysis
- Traffic analysis

Total equipment and service imports for the project are expected to reach US$ 15 million.

Critical Project Indicators



Key Decision Makers

Company	Municipalidad de Lima Metropolitana
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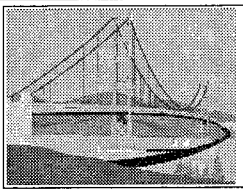
Telephone	511-433-7800
Fax	511-433-2968



Transportation / Regional

Buenos Aires - Colonia Bridge

Project Summary

Project No:	**TRAN-43**
Subsector:	**Bridge**
Location:	**Buenos Aires, Argentina - Colonia, Uruguay**
Project Cost:	**US$ 1 billion**
Export Potential:	**US$ 250 million**
Type:	**Procurement**
Sponsor:	**Binational Bridge Commission**

The Binational Bridge Commission, composed of representatives from Argentina's Secretariat of Public Works and Transportation and Uruguay's Ministry of Transportation and Public Works, plans to grant a 35-year BOT concession for the Buenos Aires-Colonia bridge.

Technical Description

The length of the bridge will be 41 Km, plus 9 additional Km of access roads. Preliminary designs suggest a four-lane highway, with each lane having a width of 3,65 meters. In addition, designs include guardrails and .70 meter shoulders. The concessionaire will ultimately determine construction technology and bridge configuration.

The bridge complex will include six toll booths — 4 manual/automatic and 2 with vehicle identification technology. The complex could also include border crossing facilities, a hotel, restaurants, duty-free shopping and other real estate developments at the discretion of the concessionaire.

Site

The bridge will connect Buenos Aires, Argentina (originating from Punta Lara) and Colonia del Sacramento, Uruguay over the Río de la Plata. Precise routing of the bridge is still under consideration.

Nature of Demand

With a total population exceeding 13 million, the metropolitan area of Buenos Aires is one of the word's largest. It is the commercial, political, financial and cultural center of Argentina. Colonia del Sacramento, Uruguay, supports 30,000 inhabitants and is a traditional tourist destination. It boasts one of the only remaining colonial centers and fortresses in the region, in addition to beautiful beaches, a casino, and other amenities. Thousands of Argentines vacation at the famous beach resort of nearby Punta del Este and take advantage of its hundreds of miles of undeveloped beaches.

Argentina and Uruguay are partners in the MERCOSUR Southern Cone free trade area, which also includes Brazil, Paraguay and Chile (as an associate member). Since the MERCOSUR agreement was signed in 1993, regional trade has increased by over 30 percent. The Buenos Aires-Colonia bridge will shorten the distance between Argentina and Uruguay by nearly 400 Km, in addition to providing a shorter link between Argentina and Brazil, the two countries which account for the bulk of MERCOSUR trade and traffic.

In 1993, over four million passengers crossed the Rio de la Plata, half of them paying fares in excess of US$ 50 each way. Forty-five percent of passengers cross the river in modern ferryboats traveling at speeds of just over 30 knots (34 mph). Over the past several years, ferryboat demand has grown in excess of 5 % per year. Strong growth in demand is expected to continue in the future.

Project Status

The following pre-feasibility studies have been completed: demand; economic, financial and risk evaluation; engineering and environmental impact. In addition, 4 surface drillings have been completed to gather engineering data.

The bidding process will take place in 2 stages: 1) Prequalification of candidates and 2) Qualification. Prequalification began on July 31, 1997 and qualification opened during September and will close by year-end 1997. Bridge construction should begin in mid-1998 and is expected to be completed in 5 years.

Seven groups have prequalified for bridge construction, including the following consortia: Unión Vial, Mitsubishi, Internacional Sudamericana, Ferrostaal DSD, Bechtel-Dragados-Techint-Dickerhoff-Hotchief, Unión del Plata and an Argentine-Korean-Italian-US (Parsons Corporation) consortia which is in formation.

Financing

Total investment for the Buenos Aires-Colonia bridge complex is estimated to reach US$ 1 billion, which will private-sector financed through a 35-year BOT concession. Return on investment (ROI) will be generated through tolls and complementary investments, such as hotels, restaurants, shops and other commercial real estate.

The basic underlying financing issue is whether an attractive ROI can be generated through tolls which will be reasonable enough to attract sufficient bridge traffic.

Equipment and Service Procurement

The estimated US export potential for this project is US$ 250 million, including:

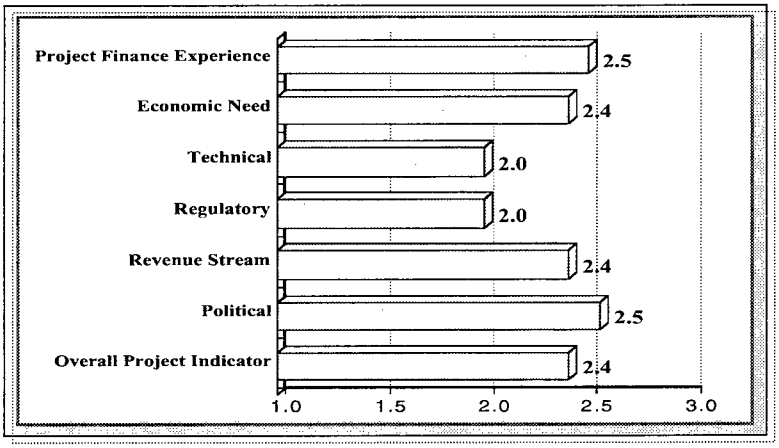
Equipment:

- Construction equipment, dredges, etc.
- Toll collection equipment
- Communications systems
- Control systems
- Equipment for commercial real estate, including hotels, restaurants, shops, etc.

Services:

- Construction management
- Bridge engineering and design
- Investment banking, insurance & other financial services

Critical Project Indicators



Key Decision Makers

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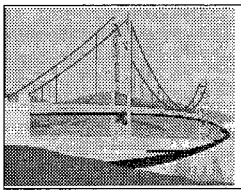


Transportation / Regional

Alba Posse - Porto Mauá International Bridge

Project Summary

Project No:	**TRAN-44**
Subsector:	**Bridges**
Location:	**Alba Posse, Argentina** **Porto Mauá, Brazil**
Project Cost:	**US$ 18 million**
Export Potential:	**US$ 9 million**
Type:	**Concession**
Sponsor:	**Provincial Direction of Roads**

The Provincial Direction of Roads of the Province of Missiones plans to grant a BOT concession for the Alba Posse - Puerto Mauá International Bridge, which will connect the city of Alba Posse in Argentina with Pueråto Mauá in Brazil.

Technical Description

The Alba Posse - Puerto Mauá Bridge is an international bridge over the Uruguay River which will follow Route 103 in the Province of Missiones. The bridge will link the Argentine city of Alba Posse with Puerto Mauá in Brazil.

Preliminary designs suggest a very simple design, entailing elementary structures such as buttress and girders only. However, the complete project will embrace many complementary works to preserve the bridge from maximum flood levels.

The bridge will have a total length of 740 m, a height of 25 m, a width of 8.3 m and 2 sidewalks, each with a width of 2 m. The foundation will be laid directly on a stony riverbed. The bridge will have 4 girders, each with a length of 40 m and a height of 2 m.

Site

The bridge will connect Alba Posse, Argentina, with Puerto Mauá, Brazil, over the Uruguay River. Only one other bridge, located in northern part of the Parana River, currently unites the two countries in the Province of Missiones.

Nature of Demand

Argentina and Brazil are partners in the MERCOSUR Southern Cone free trade area, which also includes Uruguay, Paraguay and Chile (as an associate member). Since the MERCOSUR agreement was signed in 1993, regional trade has increased by over 30% and is expected to increase by 5 times in the next 10 years. Such growth is expected to advance with the assistance of projects that provide speedy passage between Argentina and Brazil, two countries that are separate by rivers only without the existence of land borders.

The Alba Posse - Puerto Mauá Bridge will shorten the distance within a key MERCOSUR transport corridor by a matter of days. Current international trade conducted in this area is done by barge — an arduous and costly process.

Project Status

The Provincial Direction of Roads has completed a feasibility study which delineates recommended bridge design and other engineering specifications. The bidding process is expected to open by the 1st Quarter of 1998. Bridge construction should commence by year-end 1998.

Financing

Total investment for the Alba Posse - Puerto Mauá Bridge is estimated to reach US$ 18 million, which will be private-sector financed through a BOT concession agreement. The duration of the concession will be defined in the bidding documents.

Current tariff rates in the region have been between US$ 3 and US$ 4 for passenger cars while, larger vehicles must pay US$ 15 and US$ 20. According to feasibility studies conducted, the justification for bridge construction is demonstrated by tariff rates paid, current traffic on existing structures and expected future demand growth. The opportunity for services, financing and construction is considered ample for US service firms, equipment manufacturers and investment institutions.

Equipment & Service Procurement

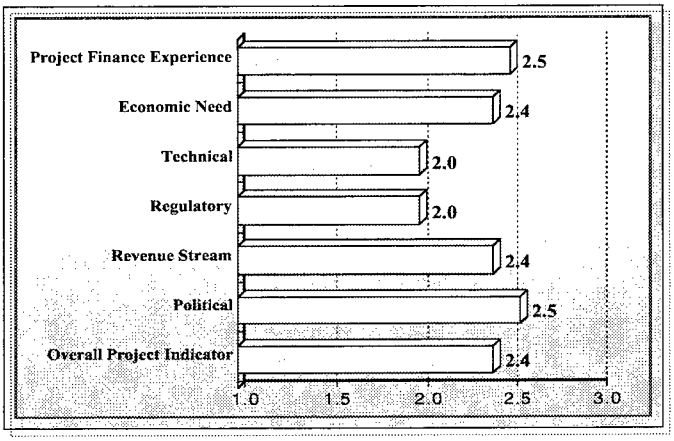
Equipment:

- Construction equipment, dredges, etc.
- Buttress
- Girders
- Toll Booths
- Communications Equipment
- Lighting
- Electrical Equipment

Services:

- Construction management
- Bridge engineering and design
- Project Financing Services
- Buttress Ocean-Transport Services
- Specialized Engineering
- Structural Survey Testing

Critical Project Indicators



Key Decision Makers

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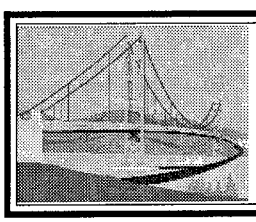


Transportation / Regional

San Javier - Porto Javier International Bridge

Project Summary

Project No:	**TRAN-45**
Subsector:	**Bridges**
Location:	**San Javier Argentina Porto Javier, Brazil**
Project Cost:	**US$ 20 million**
Export Potential:	**US$ 13 million**
Type:	**Concession**
Sponsor:	**Provincial Direction of Roads**

The Provincial Direction of Roads of the Province of Misiones plans to grant a BOT concession for the San Javier - Porto Javier International Bridge, which will connect the city of San Javier in Argentina with Porto Javier in Brazil.

Technical Description

The San Javier - Porto Javier Bridge is an international bridge over the Uruguay River which will follow Route 4 in the Province of Misiones. The bridge will link the Argentine city of San Javier with Porto Javier in Brazil.

Preliminary designs suggest a very simple design, entailing elementary structures such as buttress and girders only. However, like the Alba Posse - Porto Mauá Bridge, the complete project will embrace many complementary works to preserve the bridge from maximum flood levels.

The bridge will have a total length of 800 m, a height of 25 m, a width of 8.3 m and 2 sidewalks, each with a width of 2 m. The foundation will be laid directly on a stony riverbed. The bridge will have 4 girders, each with a length of 40 m and a height of 2 m.

Site

The bridge will connect the city of San Javier in Northeastern Argentina, with Porto Javier in Southern Brazil over the Uruguay River. Only one other bridge currently unites the two countries in the Province of Missiones located in northern part of the Parana River.

Nature of Demand

Argentina and Brazil are partners in the MERCOSUR Southern Cone free trade area, which also includes Uruguay, Paraguay and Chile (as an associate member). Since the MERCOSUR agreement was signed in 1993, regional trade has increased by over 30% and is expected to increase by 5 times in the next 10 years. Such growth is expected to advance with the assistance of projects that provide speedy passage between Argentina and Brazil, two countries that are separate by rivers without the existence of land boarders.

The San Javier - Porto Javier International Bridge will provide a vital link between 2 cities which funnel MERCOSUR trade. Current international trade over the Uruguay River is done by barge, a process which usually takes days to complete and entails high transport costs.

Project Status

The Provincial Direction of Roads has completed a feasibility study which delineates recommended bridge design and other engineering specifications. The bidding process is expected to open by the 2nd Quarter of 1998. Bridge construction should commence by year-end 1998.

Financing

Total investment for the San Javier - Porto Javier Bridge is estimated to reach US$ 20 million, which will be private-sector financed through a BOT concession agreement. The duration of the concession will be defined in the bidding documents.

Equipment & Service Procurement

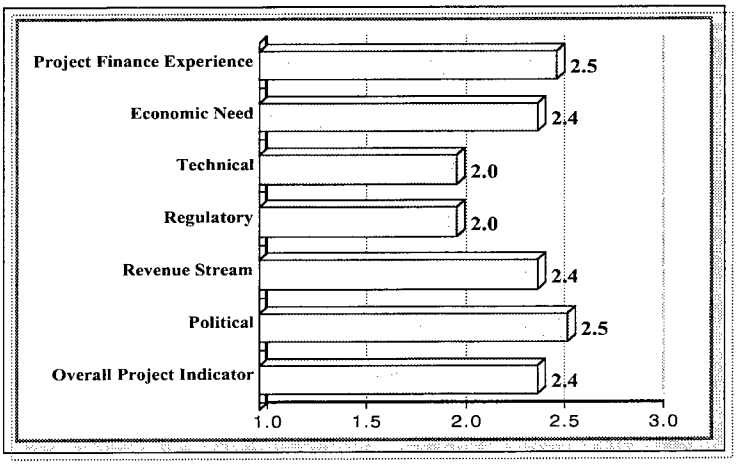
Equipment:

- Construction equipment, dredges, etc.
- Buttress
- Girders

Services:

- Construction management
- Bridge engineering and design

Critical Project Indicators



Key Decision Makers

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Transportation / Regional

Andean Highway Passes

Project Summary

Project No:	**TRAN-46**
Subsector:	**Highway**
Location:	**Argentine/Chilean Border**
Project Cost:	**US $200 million**
Export Potential:	**US $53 million**
Type:	**Procurement**
Sponsor:	**Dirección Nacional de Vialidad (DNV)**

The Dirección Nacional de Vialidad (DNV) is the Argentine agency responsible for determining national infrastructure investment requirements in the transportation sector. The DNV requested that the Inter-American Development Bank (IDB) provide technical assistance to study the prefeasibility of improving Andean highway pass connections and to determine optimal investment levels for high priority passes. The IDB and the US Trade and Development Agency (TDA) agreed to jointly finance this study under the IDB's Project Preparation Fund and the TDA's Evergreen Trust Fund[1].

[1] The Evergreen Trust fund is a revolving-fund account which the TDA established with the IDB to finance project feasibility studies. The account is immediately replenished once a drawdown has taken place.

Technical Description

Andean Highway Passes is a highway design engineering and civil works project which will upgrade and reconstruct selected transborder road connections and their access roads in Argentina. The object of the plan is to help integrate the Argentine and Chilean economies. The chart on the next page indicates key characteristics of the twelve highway passes under consideration for the project. As the table illustrates, the most promising candidates for upgrading and reconstruction include: Cristo Redentor in Mendoza Province, Cardenal Samoré in Neuquen Province, Puyehue in Rio Negro, Integración Austral in Santa Cruz and San Sebastian in Tierra del Fuego.

The project entails four primary components:

- A detailed engineering design of priority highway passes
- A detailed environmental impact assessment of the passes
- Civil works involving upgrading and reconstruction of all-weather surfaces
- Consulting engineering supervision services for road upgrading and reconstruction

Although the exact cost and number of kilometers of highway passes and adjoining access roads to be improved has yet to be determined, the IDB's preliminary estimates for the Andean Highway Passes project is total US$ 180 million.

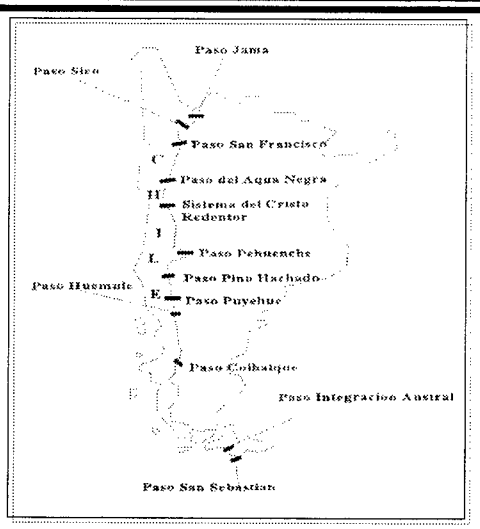
Characteristics of Andean Highway Passes Project

Highway Pass	Province / Territory	VehicleTraffic (Avg. Daily Traffic)
Paso Lima	Jujuy	6
Paso Sico	Salta	10
Paso San Francisco	Catamarca	2
Pso del Agua Negra	La Rioja	7
Paso Sistema del Cristo Redentor	Mendoza	735
Paso Pehuenche	Mendoza	5
Paso Pino Hacahado	Neuquen	15
Paso Puyehue	Neuquen	225
Paso Huemule	Rio Negro	10
Paso Coihauque	Chubut	30
Paso Integración Austral	Santa Cruz	150
Psao San Sebastian	Tierra del Fuego	150

Source: Geotecnica Consultants

Site

DNV has chosen 4 or 5 passes for improvement, based on a priority implementation program which will cover twelve transborder connections, including: Jama, Sico, San Francisco, Agua Negra, Cristo Redentor, Pehuenche, Pino Hachado, Puyehue, Huemule, Coihaique, Integración Austral and San Sebastian.



Nature of Demand

Trade between Chile and the South American Common Market (MERCOSUR), which came into effect in January 1995, has grown at an annual rate exceeding 20 %. Approximately 60 % of trade is conducted via highway connections between MERCOSUR partners. The key demand driver of the Andean Highway Passes Project lies in its ability to substantially reduce the transportation lag time and cost of transborder trade.

The existence of unpaved and seasonally-closed highway connections through the Andes mountains has artificially inflated transportation costs and limited the growth potential of international trade between Chile and its MERCOSUR trading partners. The Additional Protocol on the Integration of Chile and MERCOSUR requires that Argentina and Chile commit a minimum level of investment in their respective territories to improve Andean mountain pass highways. The Andean Highway Passes project will fulfill Argentina's investment commitments.

Project Status

A US TDA-sponsored Desk Study (DS) report was completed by Transportation and Economic Research Associates, Inc. (TERA) in March 1997. The Desk Study recommended that the US TDA fund a feasibility study for the Andean Highway Passes Project. Louis Berger International, Inc. was awarded the feasibility study contract and is expected to complete the study in Spring 1998.

The feasibility study will cover four major areas, including: road transport demand, preliminary engineering, preliminary environmental assessment and socio-economic prefeasibility. The study will screen the twelve highway passes under consideration based on engineering, economic, financial and environmental criteria to determine the priority level of each pass for inclusion in the implementation program. Civil works and equipment/services procurements for priority passes should follow feasibility study completion.

Financing

The IDB estimates the total project cost to reach US$ 200 million. Although the financial structure has not been fully defined, the IDB expects to finance approximately 50 % of the project cost, with the remaining 50 % co-financed by the Argentine government and other sources yet to be identified.

Financing Plan of Andean Highway Passes Projects
(in US$)

Financing Source	Foreign Cost	Local Cost	Total
IDB	54,000,000	36,000,000	9,000,000
GOA	18,000,000	27,000,000	45,000,000
Other	27,000,000	18,000,000	45,000,000
Total	99,000,000	81,000,000	180,000,000
Percent of Total	55.4%.	44.6%.	100%.

Equipment & Service Procurement

The estimated US export potential for this project is US$ 53 million, including:

Equipment:

- Earthmoving Equipment:
  Graders, Front-end loaders, Tandem & Pneumatic rollers, Backhoes, Bulldozers, Mobile sweepers.

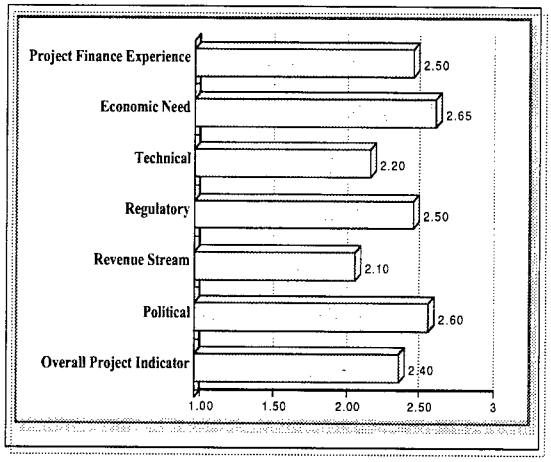
- Vehicles:
  Dump trucks, pick-ups, tractors, utility vans, flatbed trucks, Water tankers w/pumps, tractor trailers w/flatbed.
- Other Equipment:
  Mobile cranes, field office trailers, hydraulic drills, asphalt spreader, mobile generators, compressors, computers, welding equipment, vibratory plate compactors.
- Materials:
  Steel reebars

Services:

- Engineering design
- Detailed environmental impact assessment
- Installation of drainage and engineered superelevations
- Construction engineering supervision
- Civil works: upgrading and reconstruction of all-weather surfaces, demolition, tunneling, excavation, cuts and fills, etc.

The IDB expects to award separate civil works construction contracts for each highway pass in the implementation program and an overall consulting engineering supervision contract. IDB solicitation and procurement rules permit a single consulting engineering firm to compete for both the engineering design and supervision components of the project.

Critical Project Indicators



Key Decision Makers

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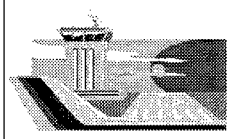
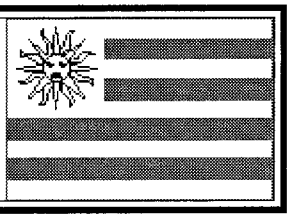


Transportation / Uruguay

Carrasco International Airport Modernization



Project Summary

Project No:	**TRAN-47**
Subsector:	**Airport**
Location:	**Montevideo, Uruguay**
Project Cost:	**US$ 160 million**
Export Potential:	**US$ 70 million**
Type:	**Concession**
Sponsor:	**Federal Government of Uruguay**

The Uruguayan Department of Defense (DOD) is responsible for the operation of the Carrasco International Airport in Montevideo, Uruguay. The DOD, which receives approximately 30% of airport revenue, has historically been the decision-making authority for airport-related infrastructure investments.

The Sanginetti administration plans grant comprehensive airport management and infrastructure development under a concession arrangement. The President has formed an ad-hoc committee, composed of the Chief of Staff and the Ministers of Transportation and Public Works, Defense, Tourism and Foreign Affairs to determine Uruguay's future airport infrastructure needs and to define the private sector participation required for meeting those needs.

Technical Description

Plans to modernize the Carrasco International Airport includes construction of a new passenger terminal and converting the existing passenger terminal into a cargo facility. The concession program will include:

- Improvement of existing take-off and landing runways (reinforcement, extension and visual aids)

- Modernization of current taxiing systems and construction of additional ones
- Platform construction
- Construction and operation of a new passenger terminal
- Concession of ground services provided to aircraft
- Proposal for commercial infrastructure and management (service area, shops, restaurants, etc.)

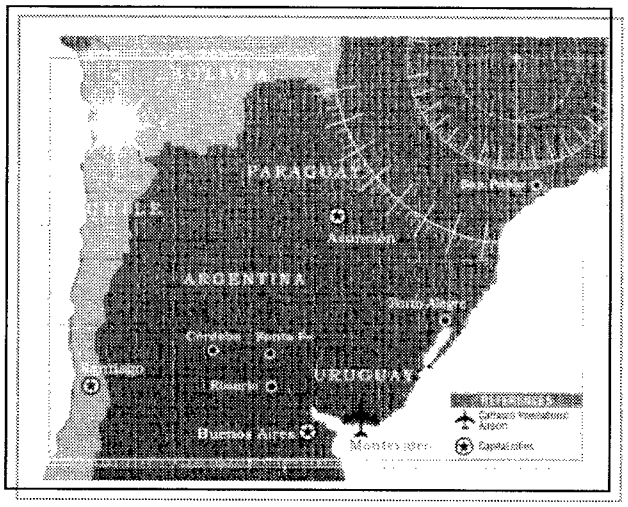
The federal government also plans to grant a BOT concession for the construction and operation of a cargo terminal. The concessionaire will transform the existing passenger terminal into a cargo terminal. Services to be provided in the cargo terminal will form part of a single concession.

Services will include:

- Facilities for Customs and Transportation Control
- Facilities for Plant and Animal Health Control
- Open and Closed Warehouses
- Cargo Consolidation and De-consolidation Facilities with Docks for Inbound and Outbound Goods
- Railway Connection
- Offices for Transportation Companies and Cargo Forwarders
- Services for Crews and Vehicles

Site

The Carrasco International Airport is located in Montevideo, the capital city of Uruguay. The airport is located on the outskirts of Montevideo, to the northeast of the city and approximately 14 Km from its commercial and financial center.



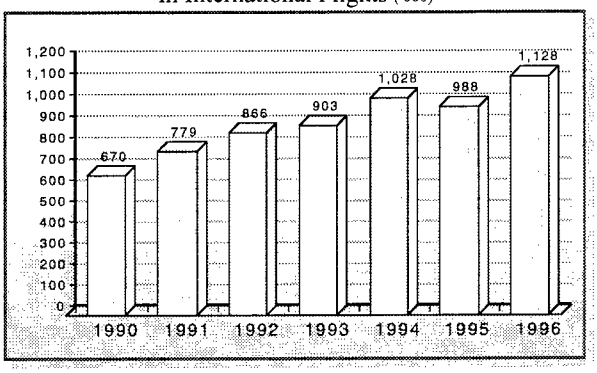
Nature of Demand

The nature of demand for modernization of the Carrasco International Airport is driven by the extent to increase air traffic has increased in recent years. In 1996, the total number of aircraft operations at Carrasco International amounted to 27,000. Both the figures for passenger traffic on international flights and cargo traffic have shown sustained growth over the past few years.

Montevideo concentrates a high level of international cargo by surface as its point of origin and destination. In 1995, Montevideo was either the origin or destination of 41% of the volume of cargo to or from Argentina. These figures increase as distance increases: 43% of the inbound and outbound cargo of Brazil, 68% of Chile and 83% of Paraguay. The physical volumes moved in 1995 totaled 740,000 tons.

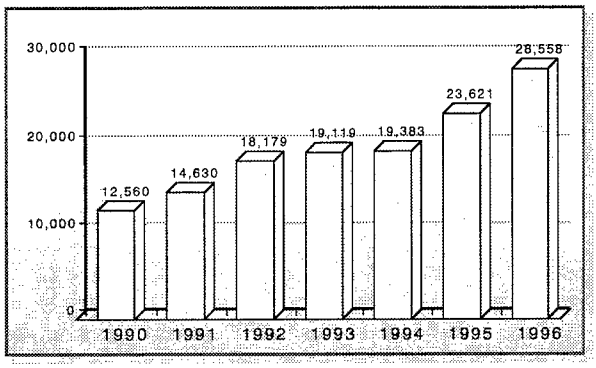
Montevideo, with a population of 1.6 million inhabitants, is the largest consumer market in Uruguay. For this reason, the cargo terminal is expected to become a major distribution center of goods destined for this market.

Evolution of the Number of Passengers in International Flights (000)



Source: Ministry of National Defense

Evolution of the Air Cargo Transportation (in tons)



Source: Ministry of National Defense

Project Status

President Sanguinetti has appointed a commission, formed by representatives from the Ministry of National Defense, the Ministry of Transportation and Public Works and the Budget and Planning Office, to draft the bidding documents for the concession program. The competitive bidding procedure will be called during the final quarter of 1997. An invitation to submit Letters of Interest for the airport modernization concession (with the exception of the cargo terminal) is not expected to be made prior to the bidding procedure itself.

The bidding process is expected to open in the 2nd quarter of 1998.

Financing

Total investments for the Carrasco International Airport Modernization project are anticipated to reach US$ 160 million, over a 20 year time frame. In addition to this estimated amount, "commercial proposals" must also be considered, for which the level of investment will depend upon each project submitted. The concession term, as well as the fee, will be defined in the bidding documents.

The Montevideo Cargo Terminal will require an investment of approximately US$ 8 million, financed

through a separate BOT concession arrangement. Both the terms of the concession and fees will be defined in the bidding documents.

Equipment and Service Procurement

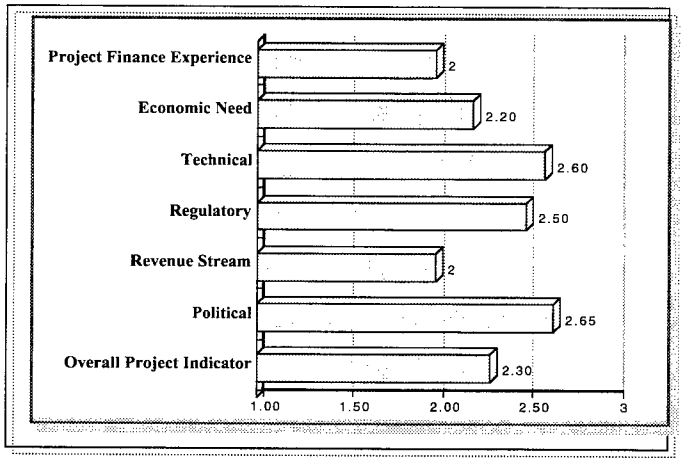
Equipment:

- Lighting, Signage, Navigational Aids
- Instrument Landing Systems
- Runway, Taxiway & Apron Construction
- Loading Bridges
- Rail
- Baggage Claim Equipment & Conveyor Systems
- Audio Equipment
- Flight Information Displays
- Public Address System
- Information Management Systems
- Escalators and Elevators
- Climate Control Systems
- X-ray Equipment and Magnetometers
- High Impact Carpet
- Warehouses and Offices

Services:

- Specialized engineering
- Operations-related consulting
- Planning, Design & Construction Management

Critical Project Indicators



Key Decision Makers

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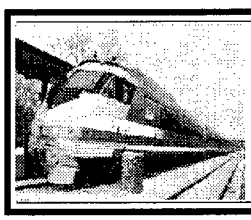


Transportation / Uruguay

Uruguay Forestry Intermodal Project

Project Summary

Project No:	**TRAN-48**
Subsector:	**Intermodal Systems**
Location:	**Uruguay**
Project Cost:	**US$ 130 million**
Export Potential:	**US$ 40 million**
Type:	**Public Service Concession**
Sponsor:	**Ministerio de Transporte y Obras Públicas**

Administración de Ferrocarriles del Estado, Uruguay's state-owned Railroad Administrator, will grant a private rail operator the public service concession to transport forestry products destined for overseas export.

Administración Nacional de Puertos, the state-owned National Port Administrator, will grant a public service concession for the development of an intermodal transfer facility in the Port of Montevideo.

Technical Description

Rail Line Operation Concession

The public service concession will provide exclusivity over rail lines marked as "forestry lines" over a time period which is currently undefined. Forestry lines are those which are located on a North-South axis and carry cargo to the Port of Montevideo over the following routes:

Rivera-Montevideo: Between Rivera Station and Station Central General José Artigas

Blanquillo-Montevideo: Between Blanquillo Station and Station Central General José Artigas

**Uruguay has a standard gauge rail network.*

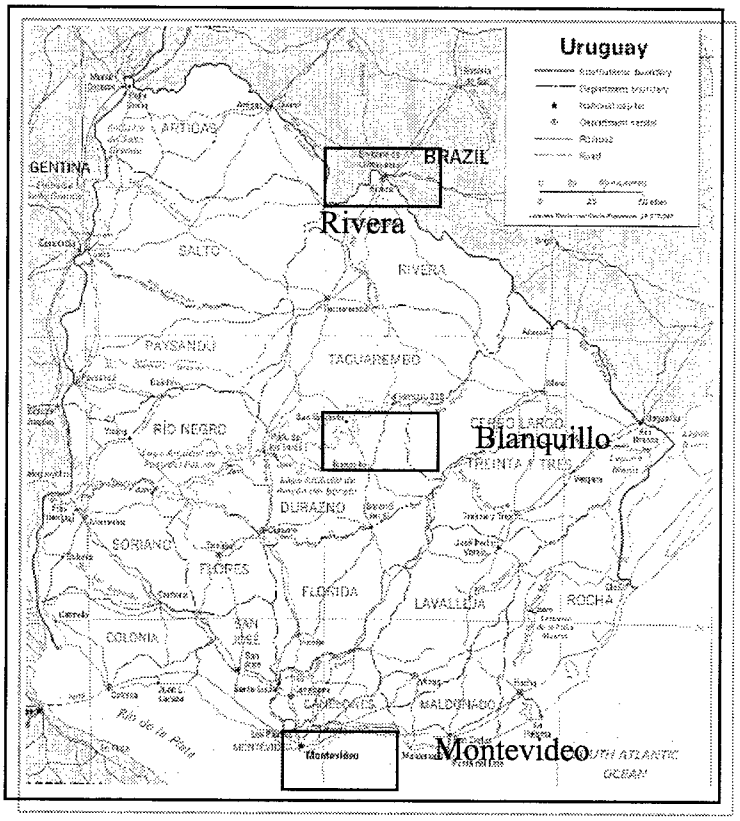
The concessionaire will be expected to operate the rail lines with its own rolling stock, and the Uruguayan Railroad Administration will carry out rail line improvements which will enable the two routes to meet Class 4 specifications. The investment program entails the rehabilitation of rails between the stations: Central - Pintado, Pintado - Churchill, Churchill - Rivera and Florida - Blanquillo; spanning approximately 500 Km.

Intermodal Transfer Facility Concession

The intermodal facility public service concession will entail the development of cargo transfer and storage installations for forestry products in the Port of Montevideo. It will be capable of receiving both rail and truck cargo and either storing the cargo on-site or transferring it directly to ships. The facility will have 5 railroad lines (4 dedicated to cargo transfer and 1 for operations and access to port installations), 2 cranes, wooden storage facilities and 2 vehicular access roads.

Site

The Rivera-Montevideo rail line runs North-South, from the Rivera Station on the Uruguay/Brazil border to the capital city of Montevideo in southern Uruguay. The Blanquillo-Montevideo line is also a North-South route, running from Blanquillo Station in the center of Uruguay to the outskirts of Montevideo, where it intersects with the Rivera-Montevideo rail line.



The intermodal facility will be constructed on the eastern side of the Port of Montevideo, in the zone parallel to the railroad tracks of the Central Railroad Station operating yard and separated by Sudamérica Avenue. The facility will be situated in an 850 m by 60 m area, which will contain railroad tracks, storage and vehicular access roads. The Port of Montevideo has complete port installations for overseas shipping operations and is located adjacent to the Central Railroad Station.

Nature of Demand

The forestry industry in Uruguay has experienced significant development since the late 1980s. The Forestry Development Plan, initiated in 1989, provided fiscal incentives to encourage a sustained increase in planted areas and allowed for the production of exportable forestry products in significant volumes. In the near future, Uruguay will be capable of exporting logs for pulp production (principally destined to Spain, Finland, Japan and other countries). By the year 2004, Uruguay should be capable of exporting value-added forestry products, such as wood chips, wood pulp, etc.

Timber availability in Uruguay will be twice its current level by 1999. It is expected to follow an exponential curve during the first decade of the 21st Century, surpassing over 8 million m^3 in the year 2004 and over 9.5 million m^3 in the year 2010. Principal tree plantations are located in 3 regions: the Coastal Region (western Uruguay, on the coast of the Uruguay River), Center-North Region and Southeast Region.

The chart on the right illustrates exportable forestry product availability through the year 2004.

Exportable Forestry Products Availability

	1998	2000	2004
Subtotal Litoral	230,700	845,900	4,005,270
Sawed	25,500	93,500	332,350
Pulpable	205,200	752,400	3,672,920
Subtotal Center-North	205,750	246,900	2,067,430
Sawed	148,750	178,500	1,495,150
Pulpable	57,000	68,400	572,280
Total South-East	121,600	532,000	1,315,560
Pulpable	121,600	532,000	1,315,560
Total	558,050	1,624,800	7,388,260
Sawed	174,250	272,000	1,827,500
Pulpable	383,800	1,352,800	5,560,760

Source: Dirección Forestal del Ministerio de Ganadería, Agricultura y Pesca

The Uruguayan Railroad Administration (AFE) estimates that forestry products exports moving through the Port of Montevideo will reach 3 million tons by the year 2000, which will require 11 trains carrying over 8,000 tons per day (900 tons/train). The Uruguay Forestry Intermodal Project is designed to meet this future demand.

Project Status

Rail Line Operating Concession

Expressions of Interest are currently being requested, and an International Public Bidding is expected to open during the first quarter of 1998. The timeline for the rail operating concession will be administered by the Ministry of Transport and Public Works and is scheduled as :

4th quarter 1997:	Rail Line Rehabilitation Program Begins
1st quarter 1998:	International Public Bidding for Concession Opens
3rd quarter 1998:	Bidding Closes / Proposals Requested
1st quarter 1999:	Contract Awarded
3rd quarter 1999:	Operating Concession Begins

Intermodal Facility

The National Port Administration is currently preparing bidding documents for the Intermodal Facility Public Service Concession. Pre-qualification and qualification of potential concessionaires, as well as the opening and closing of public bidding, is still undefined.

Financing

Rail Line Operating Concession

The concessionaire will finance costs associated with rail line operation, and will generate a return on investment through tariffs charged for the transport of forestry products. The Uruguayan Railroad Administration, in conjunction with the Uruguayan Railroad Company (Empresa Ferroviaria Uruguaya) will finance the rail line rehabilitation program, with an investment expected to exceed US$ 50 million.

Intermodal Transfer Facility Concession

The US$ 4.4 million investment which the intermodal transfer facility requires will be financed by a private sector concessionaire, who will generate a return on investment through tariffs charged for the use of infrastructure, storage and equipment.

Equipment and Service Procurement

Total equipment and services imports for the entire project is expected to reach at least US$ 40 million. Nearly 100% of equipment and services required is expected to be sourced externally.

Rail Line

The concessionaire will furnish all necessary equipment for the rail line, including:

- Rolling stock (tractive and tow)
- Signaling systems
- Communication, Security and Traffic control systems

The rail line concessionaire will also require the following services:

- Operating system design engineering
- Rail infrastructure and superstructure maintenance
- Financial services

Intermodal Facility

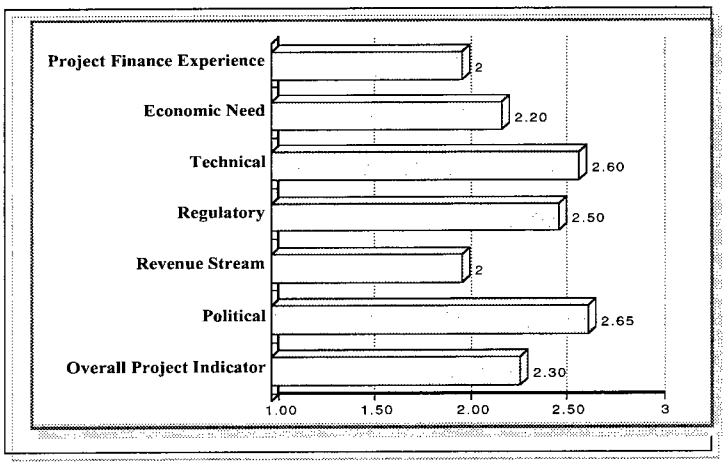
Equipment procurement for the intermodal facility will total US$ 1.6 million, including:

- Diesel -powered pneumatic cranes with directional gears
- Rail lines
- Storage facilities

Services required will total US$ 2.8 million, including:

- Arquitectural design
- Infrastructure and rail network superstructure
- Paving
- Electromechanical installations

Critical Project Indicators



Key Decision Makers

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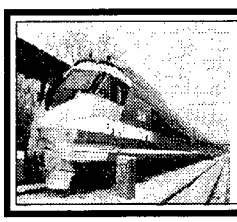


Transportation / Uruguay

Tren de la Costa

Project Summary

Project No:	**TRAN-49**
Subsector:	**Rail**
Location:	**Uruguay**
Project Cost:	**US$ 300 million**
Export Potential:	**US$ 100 million**
Type:	**Concession**
Sponsor:	**Ministerio de Transporte y Obras Públicas, Administración de Ferrocarriles del Estado**

Uruguay's Ministry of Transportation and Public Works is the entity responsible for concessioning infrastructure development in the transportation sector. The Ministry intends to grant a BOT concession for the design, construction and operation of the Tren de la Costa, an inter-urban passenger train which will run from Montevideo to Ciudad de la Costa.

Key project decision-makers include the Ministry of Transportation and Public Works, The Ministry of Housing and Environment, the State Railroad Administration and the Municipal Authorities of Montevideo and Canelones.

Technical Description

The design, construction, procurement and operation of the Tren de la Costa will be structured under a BOT concession agreement. Tren de la Costa will serve as an interurban passenger train which will run from the eastern zone of Montevideo to Ciudad de la Costa. The first stage of train construction will cover 27 Km, with total track eventually reaching 60 Km.

The train is expected to follow the principal avenues both in Montevideo and in Ciudad de la Costa (Italia and Giannattasio Avenues), whose widths vary (from a 1-2 m minimum to an 18-20 m maximum). The concessionaire will construct 7 stations in Montevideo and 4 stations in Ciudad de la Costa.

The route which the train will follow has a minimal slope, except in one zone, where it reaches a maximum of 6%. The train will pass through approximately 38 street crossings and avenues in Montevideo and 30 in Ciudad de la Costa.

Site

Tren de la Costa will pass through the Departments of Montevideo and Canelones, from the crossing of the Italia and Giannattasio Avenues to the coast of Río de la Plata and finally reaching Ciudad de la Costa. Ciudad de la Costa is the residential zone of the metropolitan area of Montevideo.

Nature of Demand

The intra-urban zone within the city of Montevideo which Tren de la Costa will service has the highest population in Uruguay, and Ciudad the la Costa has also experienced explosive growth over the past 20 years. Population growth in Ciudad de la Costa registered an average annual increase of 5% during the past decade, which is a significantly higher rate than the national average of 0.6%.

Approximately 70,000 persons use automotive or bus transportation on a daily basis along the route which Tren de la Costa will follow, with bus transportation being the most frequently used (60% of demand). Within the entire metropolitan area of Montevideo, demand for buses is 88%.

The combination of both geographical segments (Montevideo and Tren de la Costa), a market potential of 118,000 passenger equivalents for bus and 45,000 for auto is expected by the year 2000, assuming that current population growth continues. These numbers will be even higher if the population in Ciudad de la Costa increases at a more rapid rate.

Project Status

The Ministry of Transport and Public Works has contracted a consulting firm to conduct an prefeasibility analysis for Tren de la Costa. The calendar for the bidding process, as well as the project timeline, is listed on the right.

3rd Quarter 1998:	Call for International Bids
Year-end 1998:	Presentation of Proposals
3rd Quarter 1999:	Contract signing; Definitive Feasibility Study Commences
3rd Quarter 2000:	Conclusion of Definitive Study
1st Quarter 2001:	Construction & Procurement Begins
3rd Quarter 2004:	Construction Terminates, Train is Operational

Financing

Total investment for the Tren de la Costa is expected to reach US$ 300 million, although the precise amount will depend upon the technology used and the final engineering design which the concessionaire adopts. The concessionaire will generate return on investment through passenger tickets, as well as potential additional income (billboards along the route, advertisements in trains, kiosks in stations, commercialization of spaces in the station terminals of Tres Cruces and El Pinar).

The project will be financed through a BOT concession agreement with a private-sector entity. The time period for the concession has not yet been defined. The Federal Government will assume the cost of land expropriation and may also subsidize a portion of the total investment.

Equipment and Service Procurement

The Ministry of Transporte and Public Works estimates that, with the exception of construction materials for rail infrastructure, the majority of the equipment, materials and services required for train construction and operation will be imported.

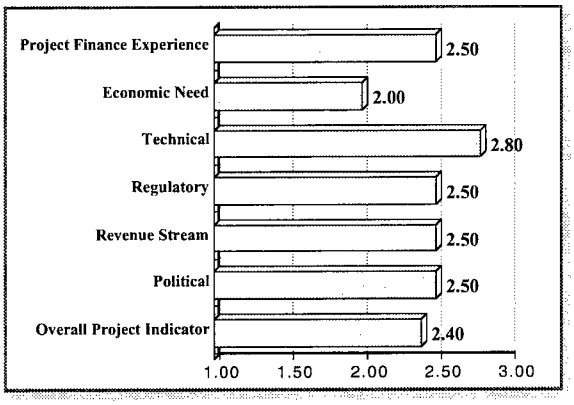
Equipment:

- Rolling Stock (Tractive and Towing)
- Signaling Systems
- Communications
- Security
- Traffic Control

Services:

- Design Engineering for infrastructure & superstructure
- Operations Consulting & Engineering
- Feasibility Study

Critical Project Indicators



Key Decision Makers

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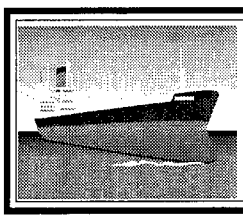


Transportation / Uruguay

Port of La Paloma

Project Summary

Project No:	**TRAN-50**
Subsector:	**Port**
Location:	**Uruguay**
Project Cost:	**US$ 140 million**
Export Potential:	**US$ 40 million**
Type:	**Concession**
Sponsor:	**Ministerio de Transporte y Obras Públicas**

The National Water Resources Directorate of Uruguay's Ministry of Transportation and Public Works is planning to grant a BOT concession for the construction, operation and maintenance of the deep water port of La Paloma.

Technical Description

The Port of La Paloma, which was originally envisioned as a fishing and pleasure boat port, will be constructed for commercial purposes under a single BOT concession agreement. The natural conditions of its harbor allow for ships of 15' draft to operate and, potentially, the port could accommodate a 40' draft through the construction of a closing breakwater and an access channel approximately 2 Km long.

In analyzing the traffic possibilities that the port could handle, the Ministry of Transportation and Public Works has determined that the most competitive design is achieved with drafts of more than 10 m (33'). As a deep water port, Paloma will be able to:

- handle large chippers (34' to 36' and up to 40' draft)
- be competitive with containers, since it is a line port and not a feeder (40' draft)
- be competitive with bulks, for which it must have the capacity to eliminate lightening (bulk cargo ships of up to 40' draft)

The concessionaire will be responsible for the integral development of the Port of Paloma, including:

Maritime infrastructure
- Breakwater Wall, dredging, access canal, etc. necessary for the development of a deep water port (The port's proximity to the Atlantic Ocean substantially shortens the longitude which will be required for its access canal, in addition to reducing dredging volumes necessary for construction and maintenance).

Terminals
- Container terminal, in addition to terminals for the following products: wood chips, logs, fish, grain and automobiles (Potential concessionaires will determine which of these terminals will be economically viable, and should mention this in their proposals).

Access roads, Rail connections and Intermodal transfer facilities
- Silos, transfer station, platforms, etc. which port operations will require.

Environmental Considerations

The Port of Paloma is located in a region of hot springs and other important tourist attractions. Thus, the concessionaire will be responsible for minimizing, wherever possible the impact that the deep water port will have on the surrounding environment. Potential concessionaires should reflect these environmental concerns in their proposals.

Existing Infrastructure

Existing infrastructure includes a 700 m long breakwater with an "Akmon" covering and 2 parallel docks covering a total length of 530 m. Infrastructure also includes 2 fixed docks (55 and 70 m long) of reinforced concrete owned by the National Navy and a 70 m wooden dock which will be used for pleasure boat docking.

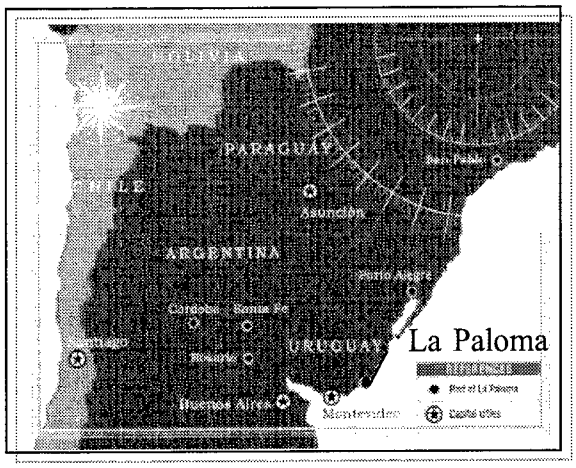
The inner harbor covers a 72 hectare area and dredging is possible up to 5 m below sea level in the 340 m sector of the harbor east of the docks and 4 m below sea level for the remaining area. On the southern side of the harbor lies a sandbar which hinders the operation of 350 m of the current docks. Dredging in this area is not convenient because it would prevent docking in the rest of the harbor. The 350 m area is currently used by fishing and pleasure boats.

The port's surrounding land area covers 62 hectares, and includes the following buildings:
- Administrative building (under construction)
- Housing and offices (200 m^2 area)
- Small storehouses/sheds
- A processing plant for fish and fishmeal (ASTRA), occupying a total area of 18,000 m^2 (currently inactive & in process of judicial liquidation)
- Parking lots (4,500 m2)

* The property is accessible by rail, although rail infrastructure has not been adequately maintained.

Site

The Port of Paloma is located on the coast of Southeastern Uruguay, in the Department of Rocha (ROU), 240 Km northeast of Montevideo and 30 Km from the city of Rocha.



Nature of Demand

Cargo transport originating from the Cuenca Basin, particularly for heavy cargo, is slow and expensive due to the shallow nature of the Paraná, Uruguay and La Plata rivers, which do not permit port access for large ships. As a result, smaller ships must be used and heavy cargo must be carried in several loads. A deep water port, with modern terminals designed for efficient intermodal transfer, would facilitate the movement of heavy cargo while reducing transport, unloading and dredging costs.

The Mercosur agreement is stimulating increased trade between Southern Cone countries & fueling demand for additional intermodal transport facilities. The Port of Paloma will respond to this increased demand. The competitive advantages of the Port of Paloma stem from the following characteristics:

- depth - 20 m water level with current 15' draft, potential for 40'
- proximity to the deep waters of the South Atlantic
- port's hinterland embraces the Greater Buenos Aires area, the Argentina Mesopotamia (the provinces which lie between the Paraná and Uruguay rivers), Southern Brazil and Paraguay
- ease with which the maritime structure can be developed at a low cost
- availability of open land will enable port facilities to be easily extended as far as necessary in the long-term

In relation to local production, a substantial increase in wood production in Uruguay over the past several years has resulted in congestion problems for the country's principal terminal which handles wood exports - - the Port of Montevideo. The construction of terminals to handle the export of logs and wood chips in the Port of Paloma will help to alleviate congestion.

Project Status

The Ministry of Transportation and Public Works sent out a call for Letters of Interest in June 1996. The Ministry received responses from 4 firms and appointed a commission to analyze the proposals. Based on the conclusions of the commission, the ministry decided that sufficient interest exists to proceed with the bidding process.

Currently, the terms of reference for the competitive bidding are being defined and the Ministry is organizing a series of meetings with potential concessionaires for November and December 1997. Bidding documents will be completed following the meetings and it is foreseen that the call for bids will take place during the 1st quarter of 1998, with a closing date set for the 3rd quarter of 1998.

Financing

The estimated investment for the Port of Paloma is expected to reach up to US$ 140 million, depending upon the quantity and characteristics of the port terminals proposed. This amount will be 100% private sector financed, through a BOT concession agreement.

Although the duration of the concession will be established in the terms of reference, Uruguayan law permits a maximum time period of 50 years. It is also possible that they will be defined as variables for evaluation in the proposals to be submitted by the bidders themselves for the bidding procedure.

Port Infrastructure	US$ 55 million
Port Terminals	US$ 55 million
Equipment	US$ 30 million
Total	**US$ 140 million**

Equipment and Service Procurement

The Ministry of Transportation and Public Works estimates that nearly all equipment required for the Port of Paloma will need to be imported.

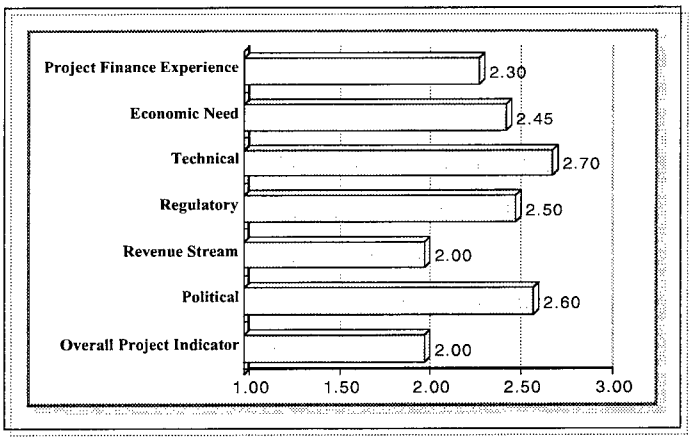
Equipment:

- Container Terminal
- Terminals for woodchips, logs, fish, grain & automobiles
- Elevators
- Quay Crane and Transfer Gantry Cranes
- Gantry-type Ship Unloaders (large capacity)
- Conveyor Belts
- Ship Loaders & Receiving Hoppers
- Receiving & Loading lines
- Warehousing Silos
- Computer Systems
- Communications Technology
- Pumping Systems
- Electrical Facilities & Transmission Line
- Rail Infrastructure

Services:

- Geotechnical Engineering
- Maritime Hydraulic Engineering
- Port Design
- Environmental Impact Studies
- Structural Engineering
- Potable Water/Sewage-related Services
- Electric and Mechanical Services
- Road Surveying and Design

Critical Project Indicators



Key Decision Makers

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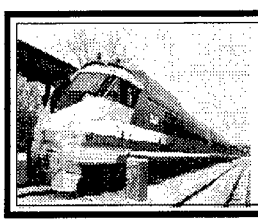
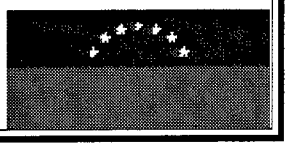


Transportation/Venezuela

Southwestern Rail Network



Project Summary

Project No:	**TRAN-51**
Subsector:	**Rail**
Location:	**Southwestern Venezuela**
Project Cost:	**US$ 123 million**
Export Potential:	**US$ 110 million**
Type:	**BOT Concession**
Sponsor:	**Corporación de los Andes & Instituto Autónomo de Ferro-**

Corporación de los Andes (CORPOANDES) is the company that has conducted the feasibility studies for the construction of a rail network in the southwestern region of Venezuela. Projects that entail the construction of rail transportation are considered under the Law of Modernization and organized through the Instituto Autónomo de Ferrocarriles del Estado (FERROCAR), the state rail transportation agency.

Technical Description

CORPOANDES intends to construct a railroad network in Southwestern Venezuela which will run from La Fría to La Ceiba (226 Km), then on to Baraquisimeto for a total length of 466 Km. Stations will be situated in La Fría, El Vigía, Nueva Bolivia and Carora, while mounting blocks will be placed at Coloncito, Sánta Elena de Arenales, Sabana de Mendoza and San Antonio.

The network will use rail-type ASCE 100 and diesel - electric rolling stock with the following characteristics:

Mining Loads:
- 3 Locomotives Series 333 Type CoCo, 120 Ton, 1,875 Kw
- Total Cargo Capacity of 3,790 Tons (49 cars and mining cargo)

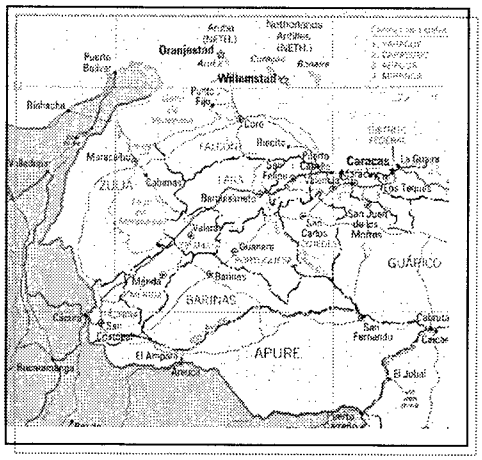
General Cargo:
- 1 Locomotive Series 333 type CoCo, 120 Ton., 1,875 Kw
- Total Cargo Capacity of 734 Tons (11 cars and general cargo)

Cargo Cars:
- Empty Car 27 Tons, Net Tonnage 53 Tons, Total 80 Tons

Passenger Transportation:
- 3 Passenger Cars (2 operators) of 80 seats each.

Site

The Southwestern Rail Network will run through the states of Táchira, Mérida, Zulia and Trujillo. The network's area of influence will include the southern zone of Lake Maracaibo and the Colombian department north of Santander. The route will extend from La Fría to La Ceiba (226 Km) to Baraquisimeto (226 Km).



Nature of Demand

The major demand for such a project stems from the continual growth of mining throughout the region and trade between Venezuela and Colombia.

Project Status

The bidding process for the BOT concession is expected to open during the 2nd Quarter of 1998. Although the concession guidelines have not yet been drafted, they are expected to be formulated by the 1st Quarter of 1998.

Financing

The project will be financed through a BOT concession agreement, in addition to government incentives. According to feasibility studies conducted, revenue generated through passenger fares and cargo handling will cover the cost of the project. The return on investment, according to Corporación de Los Andes, will be 12% during the first twenty years of the network's operation (2005-2025).

Trailer rates used for the financial analysis are competitive and run at about US$ 175 per Ton. Capital used for investment on the project will provide a ROI of 18.7% and 19.7%. Recuperation of initial investment has been calculated at 8 years.

Equipment & Service Procurement

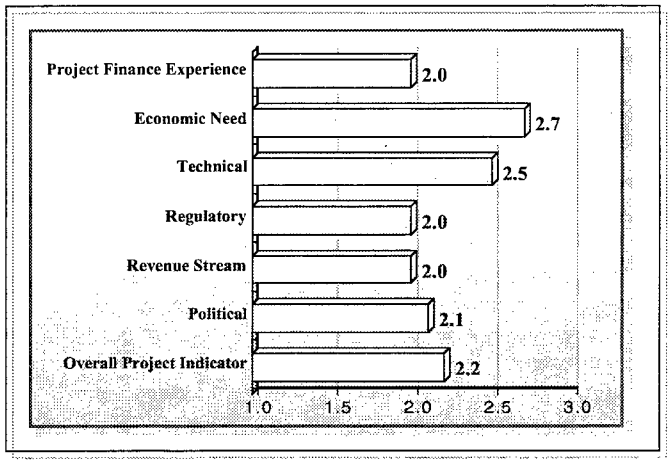
Equipment:

Construction equipment
Signaling equipment
Railroad switches
Communication systems
Complementary structures
Installations for handling combustibles
Rolling stock and locomotives

Services:

Financial services
Inspection and procurement services
Project management
Capital expenses

Critical Project Indicators



Key Decision Makers

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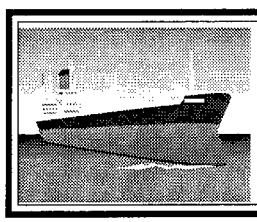


Transportation / Venezuela

Puertos del Litoral Central (PLC) Privatization

Project Summary

Project No:	**TRAN-52**
Subsector:	**Port**
Location:	**Litoral Central, Venezuela**
Project Cost:	**US$ 22 million**
Export Potential:	**US$ 12 million**
Type:	**Privatization**
Sponsor:	**Fondo de Inversiones de Venezuela**

In 1996, Venezuela's Transportation and Communications Ministry granted a concession to state-owned Puertos del Litoral Central PLC), S.A. for the administration and maintenance of the Port of la Guaira.

The Venezuelan government, through the Venezuelan Investment Fund (Fondo de Inversiones de Venezuela) now intends to transfer its shares of PLC stock into private hands. Sale of the company will include transfer of the Port of la Guaira concession.

Technical Description

Puertos del Litoral Central Description

Capital	Bs. 10,000,000 (US$ 20,215 @ 494.68Bs/$ on 8/14/97)
Administrative Organs	Shareholders, Board of Directors (President, 2 Principal Directors, 2 Asst. Directors)
Tariff Regimen for Port Service	Tariffs are regulated through Ministry of Transport and Communications Decrees.
Port Infrastructure	Pertains to the Republic of Venezuela and under Control of the Ministry of Transport and Communication. Does not constitute a PLC asset.
Shareholder Composition	100% of shares are owned by the Venezuelan Investment Fund (representing 10,000 shares with a nominal value of Bs. 1,000 per share)
Number of Workers	140 (Management, Professionals and Administrators)
Annual Port Service Income	Bs. 690,000,000 (US$ 1,394,841)

Characteristics of Port Installations:

- Longitude of multipurpose berths: 530 m
- Areas of open storage: 22 Hect.
- Covered storage: 120,000 m
- Main office: 9,100 m2
- 12 Vertical silos: 12,000 tons

Description of Port Infrastructure:

- 12 berths for general cargo
- 4 multipurpose berths
- 1 specialized "roll-on, roll-off" berth
- 1 mechanized grain berth
- 2 coastal traffic berths
- 4 berths for passenger ships
- 1 berth for small vessels
- 1 berths for fishing boats
- 2 berths for navy vessels

Concessionaire Obligations

- Guarantee Continuity of Port Service
- Accomplish Minimum Port Requirements Plan
- Present 25-year plan (in 5 year increments) for Port Modernization
- Maintain Natural Disaster, Labor and Civil Responsibility Insurance

Concessionaire Rights

- Charge Tariffs for Services Rendered
- Dictate Standards Regarding Operating Companies and Port Regulation

Port Administration

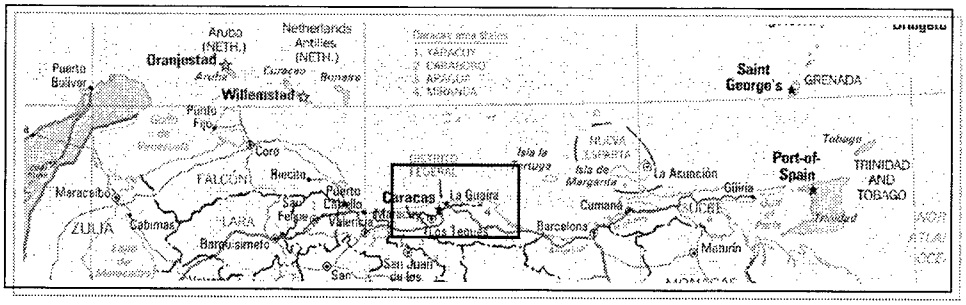
- Port Infrastructure
- Coordination with Administrative Authorities
- Contracting, Supervision and Control of Port Operating and Service Companies
- Concession for use of berths and storage/deposit areas
- Internal access roads

Port Maintenance

- Port Installations, Infrastructure and Equipment
- Canal Dredging, Buoys and Signaling
- Protection Against Fires and Natural Disasters
- Collection and Deposit of Residues

Site

The Port of la Guaira is located on the Caribbean Sea, in the Federal District just north of Caracas.



Nature of Demand

The Port of la Guaira serves the city of Caracas, which is the political, financial, commercial and cultural center of Venezuela. La Guaira is Venezuela's primary port for passenger transport and secondary port for cargo handling.

Project Status

The Venezuelan Investment Fund is currently awaiting approval from the Ministry of Transportation and Communications for the tariff regimen which will be in operation at the time of privatization. Privatization is expected to be completed by the first quarter of 1998. Pre-qualification of bidding candidates has not yet begun.

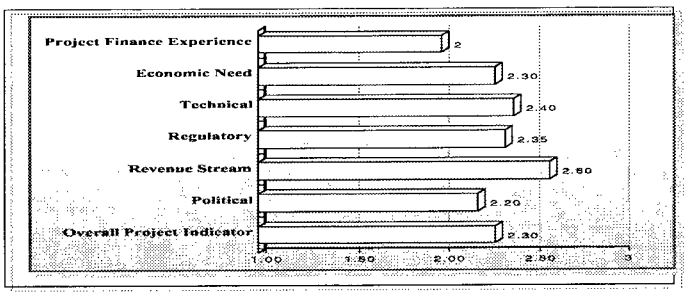
Financing

The concessionaire will be responsible for presenting a 25-year infrastructure investment plan for the Port of la Guaira to the Transportation and Communications Ministry. Infrastructure investments can be financed either solely by the concessionaire or through national or international consortia.

Equipment & Service Procurement

Although the future concessionaire will ultimately determine infrastructure investment for the Port of la Guaira, the engineering firm *Ingeniería Dit Harris* has developed a preliminary investment plan which suggests a minimum investment of US$ 22 million to be executed over a period of 3 years.

Critical Project Indicators



Key Decision Makers

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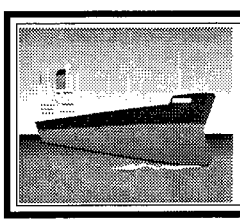


Transportation / Venezuela

DIANCA Shipyard Concession

Project Summary

Project No:	**TRAN-53**
Subsector:	**Port**
Location:	**Puerto Cabello Venezuela**
Project Cost:	**US $ 450 million**
Export Potential:	**US $ 50 million**
Type:	**Concession**
Sponsor:	**Fondo de Inversiones de Venezuela**

The Cabello Shipyard, which was built in 1905 to serve as a Venezuelan Navy arsenal, was converted into the Diques y Astilleros Nacionales, C.A. (DIANCA) for commercial use in 1947 and transferred to the Venezuelan Investment Fund (FIV) in 1975.

Today, DIANCA is a company dedicated to the repair, maintenance and modification of ships. The FIV currently controls 100 % of DIANCA shares, which it plans to transfer to the private sector under a 25-year renewable operating concession.

Technical Description

Capital: US$ 2.3 million, including US$ 1,9 million in shares.

Shareholder Composition: 100% of shares are owned by the Venezuelan Investment Fund *(representing* US$ 288 million preferred and US$ 1,601common shares.

Puerto Cabello Shipyard

Area

- Covered: 32,391 m2
- Total: 500,000 m2

Principal Installations

DRY DOCK

- 220 m long, 32 m wide
- 30,000 ton ship capacity, 55.5% utilized

SYNCROLIFT MECHANICAL SHIPPING ELEVATOR

- 125 m. long, 27 m. wide, height of 11 m.
- 5,000 ton capacity, 30.4% utilized
- capacity for 6 shipping sites and docks covering a total of 1,070 m

PIERS

- 1,070 m. of piers with a depth of up to 11 m.
- The piers are utilized for gangway repairs, welding, piping, mechanics, electricity, electronics, modifications, metallic carpentry, sanding and painting, and tank-coating for ships of up to 100,000 tons.

OFFICES

Labor Force: 975 workers

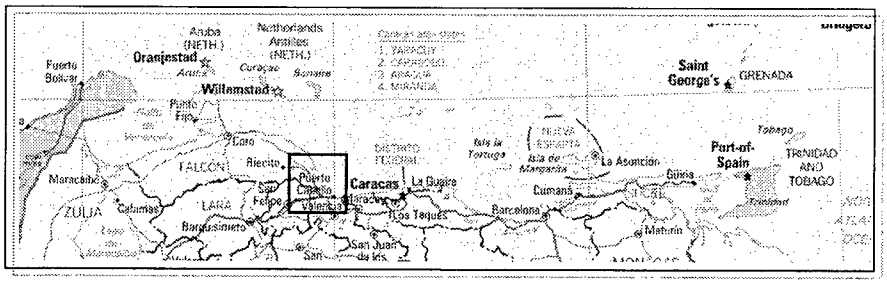
Principal Clients: Instituto Nacional de Canalizaciones (INCANAL), PDV Marina, Venezuelan Navy, Conferry and other domestic private companies, Foreign shipping companies.

Services Performed:

- Compressed air (125 PSI), Electric energy (440-220 V-AC/60 Hz-220-110 VDC)
- Salt and freshwater
- Fire prevention systems
- Land transport
- Tugboats
- Gases (oxygen, propane)
- Tank restoration
- Sewers
- Cleaning
- Guarding

Site

The Cabello shipyard is located in the Santa Lucia Valley, which is situated in the State of Carabobo in northern Venezuela. The shipyard lies on the Caribbean Sea, in Venezuela's central-coastal zone.

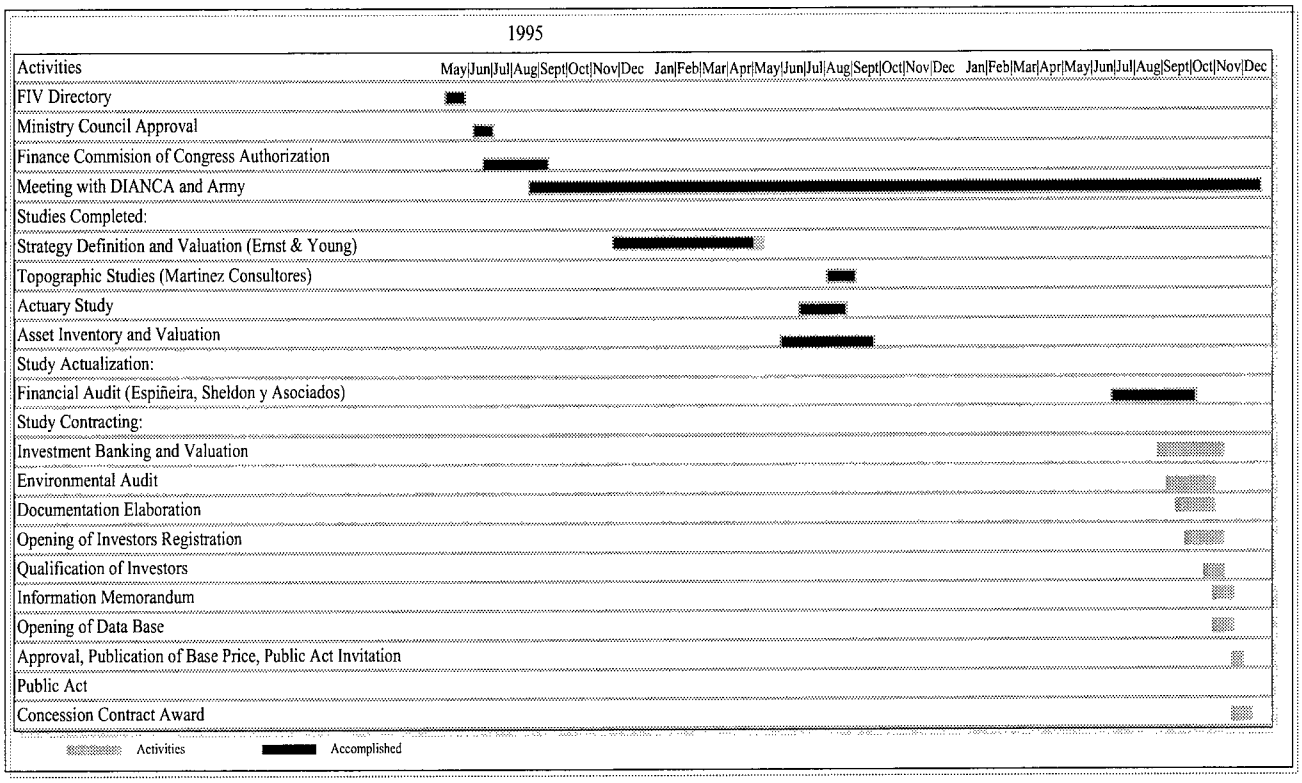


Nature of Demand

DIANCA is located near Puerto Cabello, which is Venezuela's principal cargo port. In addition, the shipyard is situated in an industrial and commercial zone, in close proximity to the El Palito oil refinery, Venezuela's petrochemical industry and the Pequiven and Planta Centro national electric generation enterprises. DIANCA's geographic location is ideal for servicing commercial fishing boats and petroleum tankers.

Project Status

The following chart displays a comprehensive timeline for the DIANCA Shipyard Concession project. Investor qualification is expected to occur by November 1997, and the concession will be awarded by year-end 1997.



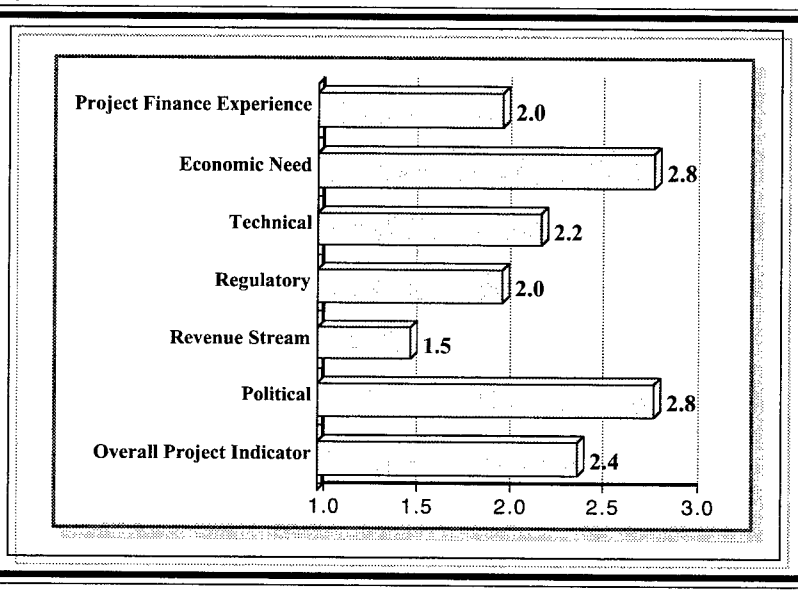
Financing

A concession will be granted for a period of 25 years, which will be renewable for another 25 years. FIV is currently conducting a valuation of DIANCA to determine the optimal level of investment which will be required to accomplish the modernization and expansion of the Cabello Shipyard over the short, medium and long-term. These investments will be taken into consideration during the development of the concession contract, to ensure that the concession will generate a substantial return on investment over its economic horizon.

Equipment & Service Procurement

The concessionaire will be responsible for investing in all necessary repairs for shipyard operation over the life of the concession. The FIV plans to invest approximately US$ 3.4 million over the short-term in physical assets and human resource restructuring.

Critical Project Indicators



Key Decision Makers

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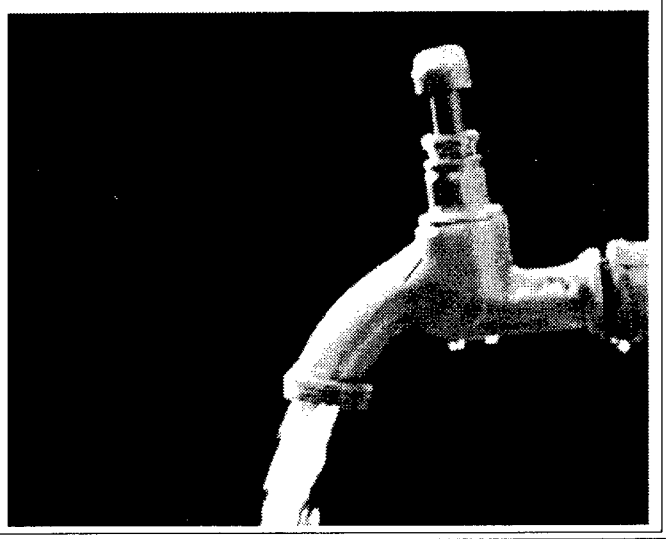
The Environmental Sector in South America



Introduction

Latin America's efforts to erase years of environmental neglect are boosted by the region's renewed growth and increasing incomes. While environmental efforts in Latin America have increased dramatically over the past five years, even more financial commitments will be needed to achieve important environmental improvements demanded by the public.

24 Environmental Projects

Total Value	US$ 3.85 Billion
US Export Potential	US$ 959 Million
Potable/Wastewater	19
Air Pollution	1
Plastic Recycling	1
Sewage Treatment	3

Environmental officials have sought to augment the available capital and technology to improve environmental conditions through privatization efforts. Concessions have been granted to the opening of wastewater and potable water plants as well as entire water systems, landfill construction and operation and hazardous waste disposal. Successful privatization requires the capacity to not only provide services but the institutional capacity to invoice and collect tariffs combined with a culture of user fees. The development of this capacity is increasing although progress has been slow, impeding the flow of financing into the sector.

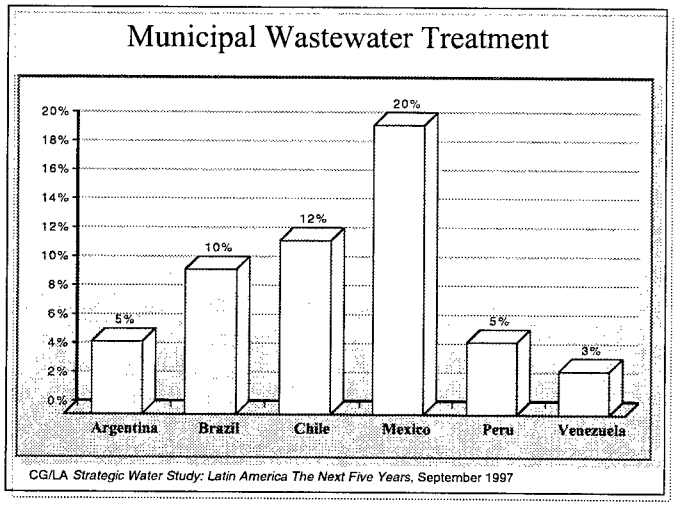
Environmental Investment

Environmental investment is the one sector of infrastructure investment that is primarily regulatory and enforcement driven, as opposed to driven by economic need. South American governments, often supported by multilateral institutions and Export Credit Agencies are putting significant efforts into developing the regulatory, institutional policy-making and enforcement infrastructure. Important strides have been made in this area and will result in the development of a sustainable environmental market-place driven by predictable policy-making and enforcement.

Sewage collection, treatment and potable water sectors dominate the South American environmental marketplace because of the importance of water resources on living standards, public health and even economic development. While the bulk of resources are dedicated to the water sector, US companies will find that serious environmental challenges and projects exist in all sectors, including hazardous waste, solid waste management, and air pollution.

Water Markets

Strong growth in both the potable water and sewage sectors provides great opportunities for piping and piping installation and rehabilitation, pumps, filters, engineering and system design, chemicals, plant and system operations and investments in concession programs. Potable water coverage ranges from 67% in Peru and Brazil to over 90% in Chile. Sewage collection ratios are significantly lower, ranging from approximately 32% to 77%. No South American country has a high level of waste water treatment coverage and not a single country treats more than 12% of its municipal wastewater effluent.



While South America has made great strides in delivering potable water coverage there is still large unmet demand. Furthermore, the quality of many existing systems is lacking, resulting in interrupted service or low-quality water. The system as a whole requires investment to expand networks both in rural and growing metropolitan areas while at the same time increasing the number and performance of its potabilization plants. Water supply issues are also critical as many metropolitan areas have simply outgrown the existing supply capability requiring investments in massive projects to collect, transport and deliver new sources of water.

There is a recent emphasis on improved sewage collection and treatment which will drive important short and medium-term opportunities for US equipment and services as well as investment. The emphasis is brought about by the negative consequences of the lack of infrastructure in collection and treatment which includes the spread of infectious diseases such as cholera and the threatening of both groundwater and surface water drinking water supplies.

South American governments have pursued two strategies to bring increased resources in the water sector. First, they have decentralized the sector in an attempt to build local, self-supporting water utilities that could generate sufficient cash through user fees. This process is moving forward but has been difficult due to the lack of local administrative capacity and populations not accustomed to paying for water services. Second, governments have invited the private sector both to build new wastewater treatment and potable water plants though BOT concessions as well as to operate, administer, and invest in entire water systems.

Argentina, for example, is concessioning the complete water system where the private sector is in charge of investing and operating the water system at the local level — even billing and collecting directly water fees from consumers. Other countries have moved more slowly, preferring to offer BOT concessions, mostly for new wastewater plants, such as in Chile and Brazil. Other countries, such as Colombia and Venezuela, maintain government ownership of the water systems but contract out day-to-day operations to the private sector.

While US companies have been very active in South American markets, European firms continue to dominate most major projects. Many of these European firms are utility based and are more accustomed than US firms to the private ownership and operation of water systems — and seem less risk averse to investing in these privatizations. US companies, supported by US government efforts, will have to continue to be aggressive if they are to maintain and expand their presence in this very important market over the next five to ten years.

Hazardous Waste

Developing a safe and integrated strategy for hazardous waste in South America has been one of the most difficult challenges in the environmental sector. On site storage remains the only viable option given a real lack of third party storage and disposal facilities. A successful strategy means integrating a complex set of factors including conflicting local regulations and transportation restrictions as well as the political issue of new facility siting.

The already great need is increasing with the saturation of on-site storage capability. Venezuela alone generates 600,000 tons of solid waste per year, while Metropolitan São Paulo generates upwards of 150,000 tons annually. At the same time Venezuela lacks even a single third party disposal or storage facility, while Brazil is just beginning to develop hazardous waste disposal capabilities.

Solid Waste

The collection and disposal of solid waste in Latin America is lacking by US and other industrialized countries' standards. Informal landfills dominate and official municipal landfills are most often open-air, un-compacted with no internal liners. In Brazil, 95% of all solid waste is disposed of in this manner and in Venezuela only two of the countries 13 major landfill, are considered sanitary. Solid waste is often the responsibility of local municipal officials who are strapped for cash and hence tend to utilize the cheapest alternatives possible.

This situation is changing, opening a market for US. companies to provide technology and know-how. The market drivers for improvement in this sector include:

1. High per capita income, means more garbage per capita putting a strain on landfill space. For example, urban waste in Brazil has increased 400% in the last 15 years.

2. Less land available due to urban sprawl.

3. Unsanitary landfills are increasingly seen as public health risks and as risks to precious ground water supplies.

There is a growing market for recycling services and equipment as governments see this as a low cost alternative that produces an income stream while reducing the strain on landfills. Recycling efforts and projects are growing in all countries with US firms having much to offer to aid these efforts.

Air Pollution

Major air pollution problems plague many Latin American cities especially places such as Santiago and São Paulo. Governments have responded first by attempting to better quantify and model the problem (resulting in a demand for monitoring equipment and air modeling analysis), and then by reducing pollution sources. In many cases this has meant increased enforcement of major industrial sources which has led to increased demand for industrial pollution abatement equipment.

As industrial pollution sources were identified and reduced, South American governments turned toward the more difficult problem of reducing the contribution from vehicle sources. Here strategies have included fuel reformulation efforts including expensive efforts to switch to unleaded fuels. PDVSA in Venezuela is not only switching its production to unleaded gasoline but encouraging the use of natural gas vehicles, including forming a natural gas fleet. Brazil's President recently proposed that catalytic converters be mandatory on all cars. Santiago is studying ways to encourage the production of cleaner burning cars and buses.

Thus, while strong opportunities will continue for US companies in providing air monitoring systems in industrial abatement programs, there is great interest in technologies or programs to reduce vehicle emissions.

The Mining and Petroleum Sectors

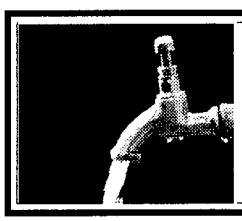
Latin America has a large mining and petroleum sector which both have significant environmental challenges. In many cases and for many years, there has been a subtle "out of sight, out of mind" policy toward these activities which served as major revenue generators while at the same time usually being located in remote areas.

This situation is changing as public attention has focused on the environmental problems in the mining and petroleum sectors and as publicly held enterprises have shifted to private hands. For US companies with expertise in dealing with mitigating contamination from mining sources, South America is a lucrative market.

For example, PDVSA, which is expected to drill 1,200 new wells over the next several years, is now pursuing an aggressive effort to attain compliance with all internationally accepted environmental practices. The same trend is true of copper companies in Peru and Chile, aluminum and steel companies in Venezuela, and gold mining companies in Brazil.

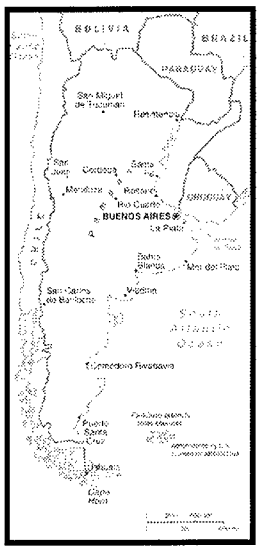
Industrial Environmental Compliance

While enforcement is not a major driver for industrial environmental projects, South America is yielding excellent industrial cleanup opportunities for US companies. Industrial solid and hazardous waste, wastewater, and air pollution are all being remedied, albeit at different rates in South America. Projects are primarily being driven by the two factors: firstly, large export markets and the number of multinationals established have created a high degree of interest in achieving ISO 14000 compliance or third party certification; and secondly, large multilateral funded hydrographic basin cleanup projects are resulting in industrial clean-up efforts.



Environment / Argentina

Provincial Water Supply Program



Project Summary

Project No:	**ENV-01**
Subsector:	**Potable Water**
Location:	**Province of Tucumán, Argentina**
Project Cost:	**US$ 914 million**
Export Potential:	**US$ 20 million**
Type:	**Procurement**
Sponsor:	**Secretaría de Obras Públicas de la Nación**

The Secretaria de Obras Públicas de la Nación is promoting this water supply project in order to remedy drought problems in Argentina, in an attempt to create sustainable development in the regions. Provincial governments also play an important role in the development of the project, nevertheless, the federal government's Secretaría de Obras Públicas is the entity responsible for managing it.

Technical Description

The project has been divided into two projects which will be executed simultaneously. Phase I begins in the last quarter of 1997 and is expected to be concluded by 2001, and the second phase begins in 1998, and is expected to be concluded by 2005.

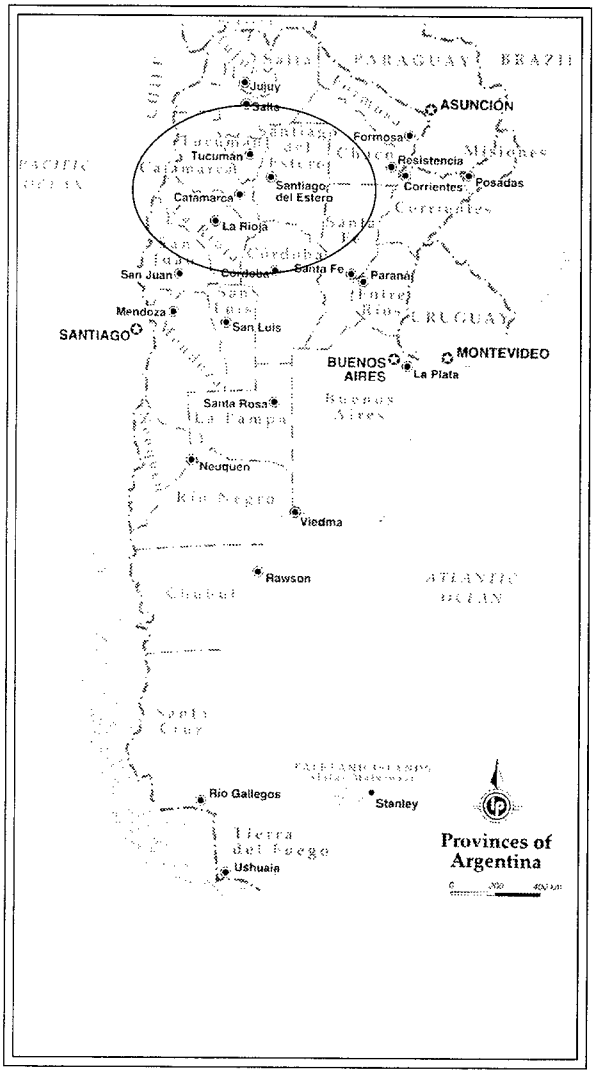
Phase I
Construction of a pumping station with capacity for 15 m^3/second for 71 meters
Construction of a 420 Km hydraulic canal to channel water
Construction of El Churqui dam with a capacity of 140 m^3/hour
Construction of El Itin dam with a capacity of 70 m^3/hour
Construction of El Bols—a dam with a capacity of 38 m^3/hour

Phase II
Construction of Villa Loba dam with a capacity of 96 m^3/hour
Construction of a 110 Km hydraulic canal to channel water
Construction of El Sauzal dam with a capacity of 1,000 m^3/hour

The concessionaire will supply water as a wholesale operator to the entity responsible for potable water service in Venado Tuerto and in 5 surrounding towns. Responsibilities of the concessionaire will include:

- Detailed design of the trunk system (with capacity to service 37 localities)
- Construction of the trunk system
- Operation and maintenance of the trunk system, in addition to payment collection
- Operation and maintenance of system expansions and payment collection in expanded area

Site



The project encompasses several Argentine provinces, covering approximately 34,000 hectares in Tucumán, Santiago del Estero, Catamarca and La Rioja.

Nature of Demand

The overall objective of the project is to provide potable water to a vast region that is currently obtaining water via trucks and to foster development of the region. The region encompassed by the project faces severe droughts.

The project will benefit 140,000 rural families as well as control flooding problems in the province of Tucumán, and tap hydro-electric potential in Argentine hydrographic basins.

Project Status

The project depends on an inter-provincial agreement which is being evaluated and should be signed during the last quarter of 1997. Work will be completed in two phases. Phase one should commence during the last quarter of 1997, and will be concluded by the year 2001. Phase two will begin in 1998 and dam construction is

scheduled for completion in the year 2005. All feasibility studies have been concluded and procurement for equipment and services for phase one are on-going.

Financing

The project cost structure by phase is:

Phase I	US$ 411	Million
Phase II	US$ 508	Million

The federal government is financing the project. There is strong political support for the project at both federal and provincial levels. Multilateral support for the project has not been defined.

Equipment and Service Procurement

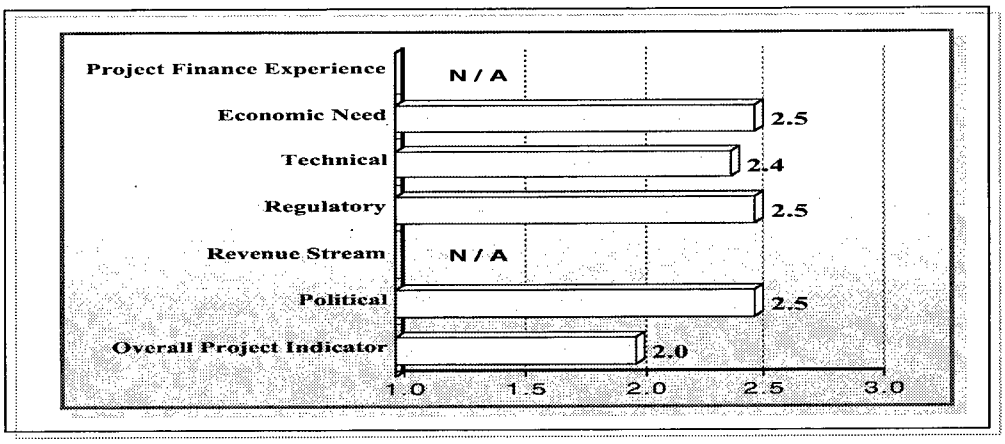
Equipment:

Elevation stations
Pumps
Valves
PVC tubing
Monitoring equipment
Potabilization plant
Chlorinating equipment
Connectors

Services:

Construction management
Design
Operation of potabilization plant

Critical Project Indicators



Key Decision Makers

Company	Ministerio de Economía, Obras y Servicios Públicos de la Nación
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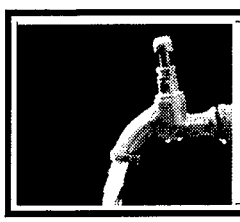
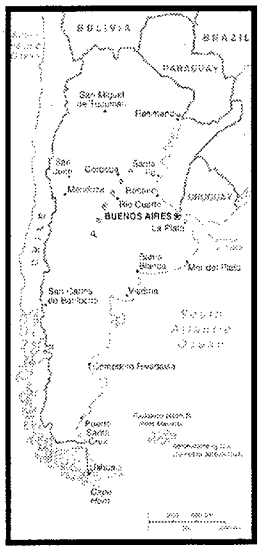


Environment / Argentina

South Santa Fe Potable Water System



Project Summary

Project No:	**ENV-02**
Subsector:	**Potable Water**
Location:	**Santa Fe, Argentina**
Project Cost:	**US$ 36 million**
Export Potential:	**US$ 10 million**
Type:	**Public works Concession**
Sponsor:	**Ministerio de Obras, Servicios Públicos y Vivienda**

The Housing and Public Works Ministry is responsible for infrastructure development in the potable water subsector for the Province of Santa Fe. The Ministry is granting a BOT concession to the private sector for the construction and operation of a potable water supply system to service the Southern portion of Santa Fe Province.

The concession will be awarded by a commission which comprises the Coordinator of the National Sanitation Plan, the Undersecretary of Public Works Santa Fe Province and the Mayor of Venado Tuerto.

Technical Description

The first stage of the project involves the construction and operation of a trunk line for potable water distribution to service Southern Santa Fe Province. The concessionaire will construct a 120 Km primary aqueduct with a diameter of 0.6 to 0.8 m. The aqueduct will transport water underground from the cities of Máximo Paz and Cepeda to the city of Venado Tuerto.

The concessionaire will supply water as a wholesale operator to the entity responsible for potable water service in Venado Tuerto and in 5 surrounding towns. Responsibilities of the concessionaire will include:

- Detailed design of the trunk system (with capacity to service 37 localities)
- Construction of the trunk system
- Operation and maintenance of the trunk system, in addition to payment collection
- Operation and maintenance of system expansions; payment collection in expanded area

Site

The potable water system will be located in South Santa Fe Province, between the cities of Cepeda and Venado Tuerto.

Nature of Demand

The groundwater supply in the Province of Santa Fe has a high concentration of salts and arsenic due to the industrial development of its major cities. The south Santa Fe aqueduct will supply six cities in the province with clean drinking water.

Although potable water coverage in Argentina is 83%, an estimated 6 million urban residents have no access to a safe water supply. According to Argentina's National Sanitation Plan, approximately US$ 4.3 billion will be required to meet infrastructure requirements in potable water and wastewater through the year 2001.

The Argentine government hopes to stimulate investment in potable water and wastewater treatment through private sector participation. Concessions have already been granted for the provision of water and sanitation services in Córdoba, Tucumán, Formosa, Corrientes, Santa Fe and Greater Buenos Aires. Additional concession agreements are planned throughout the provinces, including Neuquén, Misiones, Maipu, Paraná and Salta.

Project Status

Prequalification bidding documents have been drafted and the Ministry of Housing and Public Works is awaiting approval of provincial legislation which will permit the accumulation of debt under the US$ 20 million World Bank loan slated for the project. Once legislation is approved, the Ministry foresees no further delays.

Pre-qualification is expected to occur in late November or early December 1997. Economic offers will be accepted starting in February or March 1998. The winning bid will be the one which offers provision of service at the lowest rate for the end user. The project's construction timeline is 18 months.

Financing

The South Santa Fe potable water project will be carried out under a public works concession, which involves the construction, operation and maintenance of the system. The concession will cover a period of 30 years.

The local government of Santa Fe Province will subsidize US$ 20 million of the project's total investment, through a World Bank loan. The concessionaire will be responsible for financing the remaining US$ 16 million. The Province of Santa Fe will provide guarantees for minimum potable water consumption levels to assure the concession's success.

Equipment and Service Procurement

Equipment and services procurement will include the following:

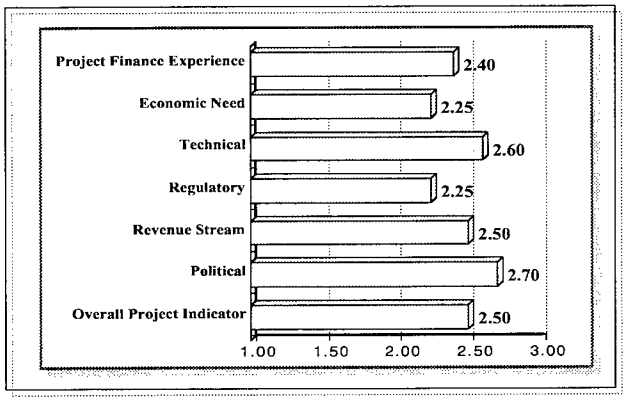
Equipment:

- Control system
- Water pumps
- Electromechanical equipment
- Tanks
- Flexible iron tubing
- Aqueduct

Services:

- Specialized engineering
- Technical inspection
- System development

Critical Project Indicators



Key Decision Makers

Company	Ministerio de Economía, Obras y Servicios Públicos
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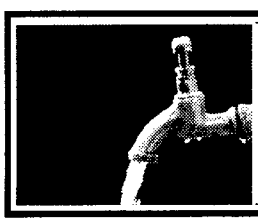
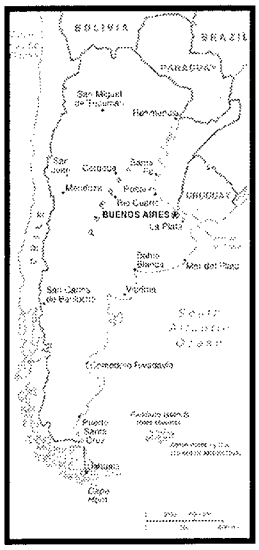


Environment / Argentina

Center-North Santa Fe Aqueduct



Project Summary

Project No:	**ENV-03**
Subsector:	**Potable Water**
Location:	**Province of Santa Fe, Argentina**
Project Cost:	**US$ 150 million**
Export Potential:	**US$ 35 million**
Type:	**BOT Concession**
Sponsor:	**Ministry of Civil Works and Housing and Public Services**

The Ministry of Civil Works and Housing and Public Services, Province of Santa Fe is promoting a solution to the region's needs for irrigation and potable water supply in order to achieve sustainable economic development and social improvements.

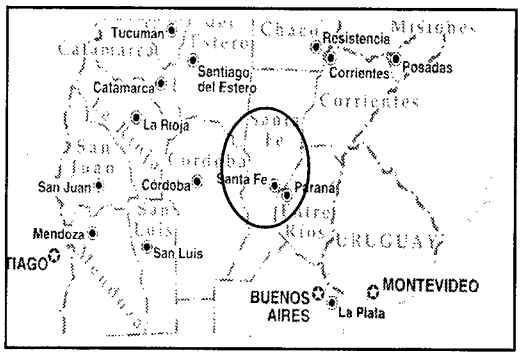
Technical Description

The project is a 30-year BOT concession for the construction, operation and maintenance of an aqueduct system in the province of Santa Fe.

The project involves the construction of a 85 Km aqueduct with a diameter of 1400 mm, from which the northern and southern ducts will be derived. The northern duct will be 321 Km in length and variable diameter between 1,000 and 250 mm. The southern duct will be 115 Km in length with variable diameter between 800 and 400 mm. In addition, a 19-Km connection duct will have to be constructed.

The water will be derived from the Coronda River, a tributary of the Paraná River. The project also includes the construction of three elevation stations, and a potabilization plant. Furthermore, three connections to the province of Cordoba are being studied.

Site



The aqueduct system is located in the central and northern regions of the province of Santa Fe.

Nature of Demand

The proposed project will provide an integrated solution to the problem of potable water supply to the region in the center and northwest of the province of Santa Fe. The project will provide potable water to 87 localities, benefiting a total population of 396,500 inhabitants.

The region experiences severe water supply problems, having no hydrographic basins or underground water sources.

Project Status

An inventory of the sources of potable water supply has been concluded and preliminary designs have been produced at the provincial level.

The province of Santa Fe has yet to hire a private consulting firm to produce a feasibility study. The province has prioritized the project and will hire a consultant to produce the feasibility study during the fourth quarter of 1998.

Financing

The project has strong political support from the province of Santa Fe, which will subsidize the cost of water to the end-users. It remains unclear whether the concessionaire will be responsible for the collection of fees from the end-users, or if the province will guarantee collection for the service. This will be determined after the completion of a feasibility study.

Equipment and Service Procurement

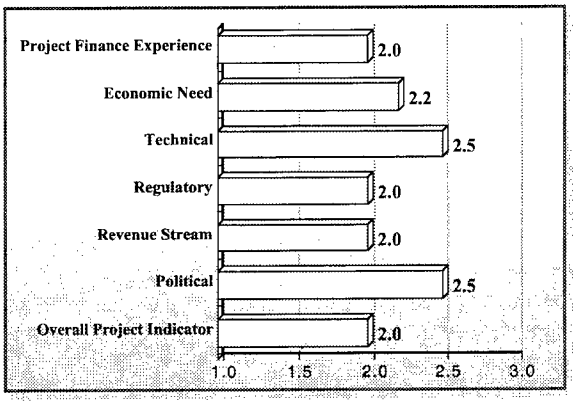
Equipment:

- 3 elevation stations
- Pumps
- Valves
- PVC tubing
- Monitoring equipment
- Potabilization plant
- Chlorinating equipment
- Connectors

Services:

- Construction Management
- Design
- Operation of potabilization plant
- Operation and maintenance of aqueduct system
- Billing and collection services (To be determined upon conclusion of a feasibility study).

Critical Project Indicators



Key Decision Makers

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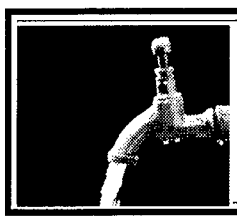
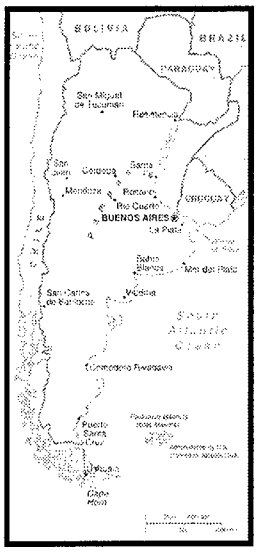


Environment / Argentina

Misiones Water and Wastewater Concession



Project Summary

Project No:	**ENV-04**
Subsector:	**Potable Water**
Location:	**Province of Misiones, Argentina**
Project Cost:	**US$ 40 million**
Export Potential:	**US$ 15 million**
Type:	**BOT Concession**
Sponsor:	**Adminstración Provincial de Obras Sanitarias (APOS)**

The Administración Provincial de Obras Sanitarias (APOS), is the Province of Misiones' water and sanitation utility, covering the province's four principal cities: Posadas (the Capital), Puerto Iguazú, El Dorado and San Pedro. APOS services approximately 430,000 inhabitants.

Technical Description

The project consists of the concession of the APOS water system, and involves the construction of a wastewater collection and treatment system for the city of Posadas (300,000 inhabitants). The project also includes potable supply network expansions and improvements in three other cities. It will also include metering, rehabilitation and maintenance of the existing system.

The project will include:

- Expansion of the sewage collection network in the city of El Dorado
- System Improvements through reduction of physical and non-physical losses
- Administration of a World Bank loan to build and operate the Posadas Wastewater System, including construction of a sewage treatment plant
- Expansion of potable water supply network in the city of San Pedro
- Improvements to potabilization plants

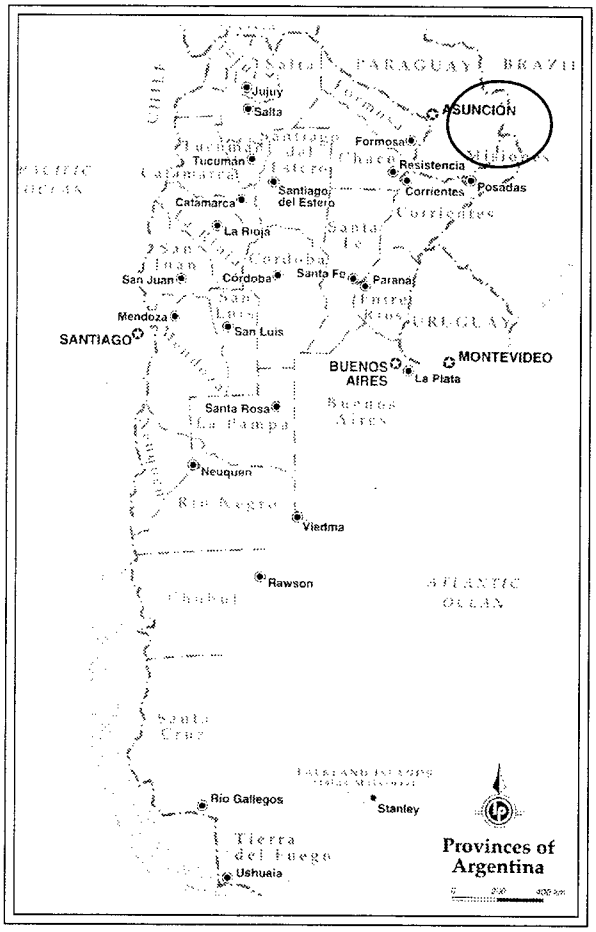
Phase II

- Construction of Villa Loba dam with a capacity of 96 m^3/hr
- Construction of a 110 Km hydraulic canal to channel water
- Construction of El Sauzal dam with a capacity of 1,000 m^3/hr

The concessionaire will supply water as a wholesale operator to the entity responsible for potable water service in Venado Tuerto and in 5 surrounding towns. Responsibilities of the concessionaire will include:

- Detailed design of the trunk system (with capacity to service 37 localities)
- Construction of the trunk system
- Operation and maintenance of the trunk system, in addition to payment collection
- Operation and maintenance of system expansions; payment collection in expanded area

Site



The Misiones water and wastewater concession will service the population of Posadas, which is the capital of Misiones Province. Posadas has a population of approximately 300,000 inhabitants.

Nature of Demand

Current coverage ratios for drinking water are estimated to be 75%, up from 69% in 1995. The company's revenues are approximately US$1.5 million annually with a 60% collection ratio. The sewage collection coverage ratio was 11% in 1991 and only 22% in 1995.

Project Status

The concession is still being defined in terms of the cities which would be included in a single concession. El Dorado and the town of San Pedro might actually be bid as separate projects. The bidding process was opened in September 1998.

Financing

The World Bank has granted a loan to finance the construction of a wastewater system of the provincial capital and is driving the overall project. Currently, there is no independent regulatory entity, and the provincial service provider performs both functions. The definition of an independent regulatory entity is critical in order to carry out a concession to the private sector. The concession terms have not been defined, however they should include the smaller city systems.

Equipment and Service Procurement

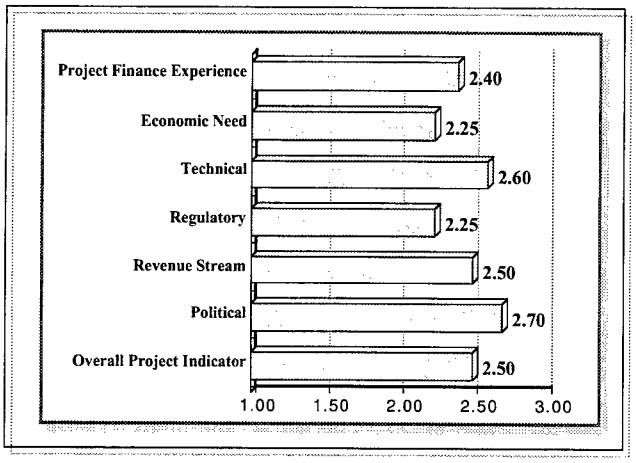
Equipment:

- Filtering systems
- PVC piping
- Flowmeters
- Pressure sensors
- Transformer stations
- Water tanks
- Cleaning grids
- Sand removers
- Pumping well
- Submersible pumps
- Sludge compacting equipment
- Digesters
- Monitoring equipment

Services:

- Construction management
- Design
- Operation of potabilization plant
- Operation and maintenance of aqueduct system

Critical Project Indicators



Key Decision Makers

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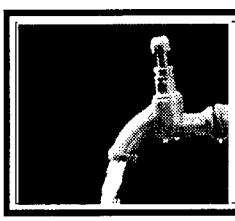


Environment / Bolivia

Misicuni - Hydroelectric Plant - Water Distribution for Cochabamba Phase I

Project Summary

Project No:	**ENV-05**
Subsector:	**Potable Water**
Location:	**Cochabamba, Bolivia**
Project Cost:	**US$ 226 million**
Export Potential:	**US$ 80 million**
Type:	**BOOT**
Sponsor:	**Empresa Misicuni**

The Misicuni Company, along with the new Ministry of External Commerce and Investment, will be concessioning the continuation of a project that has been the object of much debate and political grandstanding. Although, extremely controversial, the government is determined to complete the project and put an end to the water shortage in Cochabamba.

As a project that has been contemplated various times under multiple technical and financial structures, options for its execution are extensive. Misicuni has identified three basic options from which the concessionaire can choose for completing phase one of the project. The options are as follows:

Misicuni Múltiple o Global 120 MW - Irrigation - All Inclusive	*US$ 338 million*
Misicuni I - Water Only Without Electrical Generation	*US$ 159 million*
Misicuni I - Water & Hydroelectric Generation	*US$ 226 million*

The Bolivian Government is promoting the Misicuni I option which includes both water and hydroelectric generation (total expenditure US$ 226 Million). Further advancement in the form of larger irrigation capacity and electrical generation may be initiated as a 2nd or 3rd phase of the project.

Technical Description

The Misicuni project will supply drinking and irrigation water in the central valley, the lower valley and Secaba, which together comprise the city of Cochabamba, the metropolitan area of Quillacolla-Sacaba and nearby areas.

- The projects include a 105 m land dam over the Misicuni River for the creation of a reservoir with a capacity of 125 million m^3 and a total usable volume of 94 million m^3. Current designs allow for an increase in dam size to 125 m. Such growth dynamics may be viable as a 2nd phase project proposed in the future.

- A pressure conduction tunnel from the dam to the Cochabamba Valley will run a distance of 20.7 Km. With two access windows, one to the Titori River and the other to Calio, the project may expand its water distribution capacity during periods of flow fluctuation.

- An equilibrium chimney with an inclined pool 450 m long and medium pressure tunnel of 1.5 Km will be connected to the principal tunnel.

- A forced conduit of 2.4 Km which descends to the foot of Calio will move water to the hydroelectric plant. The plant will consist of two 40 Mw generators, with a provision for expanding to 120 Mw with the addition of another unit.

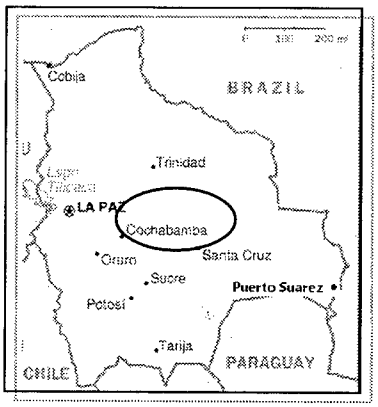
- The transmission line will carry 24.9 Kv, running 25 Km from the plant in Molle Molle to the substation in Valle Hermoso.

- Once water has passed through the hydroelectric units, it will be collected in a reservoir with a volume capacity of 50,000 m^3 for distribution as drinking water and land irrigation.

- A 10.3 Km conduit of potable water will then be installed to supply the city of Cochabamba. A primary channel will also be included for the irrigation of approximately 6,000 acres.

Site

The Misicuni Phase I project is located in the Department of Cochabamaba in the northeastern range of the Andes mountains, 40 Km from the city of Cochabamba.



Nature of Demand

The Misicuni water distribution and hydroelectric generation project will provide the city of Cochabamba with much-needed water for both household use and for irrigation, in addition to producing electricity for the country and the region as a whole.

The demand for irrigation is generated by the large volume of growth being experienced in the agricultural production of Soya and grains. The plains of del Valle of Cochabamba are extremely viable for agricultural development. However, development has been curtailed by water scarcity.

Potable Water Demand

The city of Cochabamba has a population of 280,000 inhabitants. Current coverage for water and wastewater treatment is 60% and 65% respectively. A major sector of the population must therefore purchase bottled water to meet its needs. Individuals with potable water access pay a tariff rate of US$ 0.4 per m^3, while those that purchase bottled water pay US$ 2 to US$ 3 per m^3.

Once constructed, the project will supply 6.9 m^3 per second of water to the region, 2 to 2.3 m^3 of which will be used as potable water while the remainder will serve irrigation purposes. Factoring in the annual population growth of the region, potable water demand is expected to reach 0.1640 to 0.175 m^3 per day per inhabitant.

Potable Water. City of Cochabamba

Year	Population (in 000)	Coverage	Compsumption per Capita (liters/Hab)	Demand (liters/sec)
2000	572	75 %	144	1,370
2005	707	90 %	160	2,084
2010	873	90 %	165	2,465
2015	1,079	90 %	170	3,009
2020	1,333	90 %	175	3,725
2025	1,347	90 %	175	4,315

Agricultural Demand for Water

The project is expected to irrigate a total land area of 5,918 acres in the central valley and south of Cochabamba, furnishing large volumes of water to the major companies or to the Association of Irrigation through connections to the infrastructure of Misicuni. The estimated price for water used in irrigation is US$ 0.08 per m^3 for the distribution of 1.4 to 1.9 m^3 of water.

Electricity Component

In phase one, Misicuni will produce 80 MW of electricity, for a yearly production of 300 Gw/h. When connected to the main grid, Misicuni's hydroelectric potential will be fully utilized at 100%. By the year 2001, Misicuni will furnish 7% of the country's total generation.

Project Status

The Misicuni project has undergone all finalized studies and is prepared for concession. Feasibility studies were conducted by Dames & Moore and Black & Veach and were completed in July 1997. The study "Programa de Participación Privada, Proyecto Multiple Misicuni Fase I," determined the strategy for including private participation in the successful completion of the work, taking into account governmental investment ranging from US$ 60 to 70 million.

Financing

The Misicuni project has been structured as a 40-year concession under a BOOT scheme.

The project will also include a government investment of US $60 to 70 million for the construction of the 20.7 Km water tunnel to supply the city of Cochabamba. The concessionaire will, in addition to the investment, count on a guaranteed market to distribute water to the city. The guarantee will be provided by an exclusive contract with SEMAPA (the municipal potable water company) for the distribution of potable water, while water for irrigation will be guaranteed by "Cuanta Agua para Cochabamba," a constitutional law to provide the region with water.

The electrical energy generation provided by the project will have access to the national interconnected system, not to mention the possibility of distribution to larger electricity users.

Currently, there is no participation by a bilateral or multilateral agency apart from a grant by the Italian Government of US$ 18 million for the construction of the tunnel. The tariff rates for water distribution are considered favorable for the financiability of the project. Please refer to Nature of Demand for a further analysis of these rates.

Equipment and Service Procurement

Total equipment and services are expected to be broken into 4 major areas. The first area consists of electromechanical and hydromechanical equipment, for a total investment of US$ 60 million. An investment of US$ 80 million for importing materials for the tunnel and dam comprise the second large procurement area. The third area (US$ 15 million) consists of concrete additives, explosives and lubricants. The final area involves services such as specialized engineering, consulting and construction management, estimated at US$ 15 million.

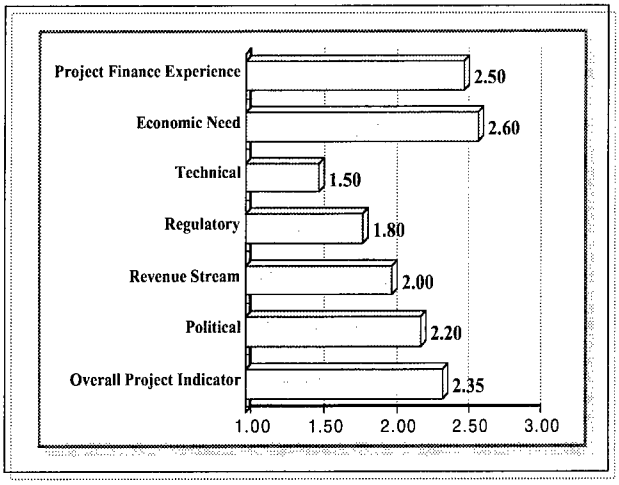
Equipment:

- Equipment, machinery and materials for tunnel construction
- Tubing, both PVC, iron and cast iron for carrying water
- Electrical transmission line
- Two 40 MW hydroelectric generators (2nd phase will add one generator)
- Hydromechanical equipment
- Valves, control panels, flood gates
- Substations
- Explosives
- Steel
- Control meters
- Testing stations
- Piping

Services:

- Specialized engineering
- Construction management
- Construction engineering
- Designing
- Installation specialists

Critical Project Indicators



Key Decision Makers

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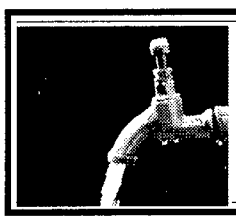


Environment / Brazil

Juquitiba Potable Water and Waste Water

Project Summary

Project No:	**ENV-06**
Subsector:	**Potable Water/ Wastewater**
Location:	**Northern São Paulo City**
Project Cost:	**US$ 373 million**
Export Potential:	**US$ 50 million**
Type:	**BOT or Procurement**
Sponsor:	**SABESP**

Sabesp, the state-owned water and sanitation company of São Paulo, has established a very aggressive investment plan which encompasses the execution of several key projects in water supply and sanitation. The driving force behind the investments is pending the opening of the water and sanitation sector in Brazil to private sector participation. Privatization models are being studied by the Federal Government will be completed by the end of 1997. Sabesp is the largest water company in Latin America.

Technical Description

The Juquitiba Project will be either a BOT project or an equipment procurement project. Juquitiba will produce 4.6 m^3/s of water for off-take and on-delivery to SABESP customers. It will support SABESP's goal to extend potable water coverage in the areas it services to 100% by 1998. The Juquitiba project will create more system reliability, which in turn will allow for future expansions. Upon completion of the project, SABESP will increase the supply available to customers by 8%.

The project involves expansion of water and sewage systems driven by increased demand and coverage goals. The project involves expansions of raw water production, primary treatment facilities and the aqueduct network, as well as various improvements to the distribution network. The developer will be responsible for construction and operation of the water delivery and processing system, which will consist of:

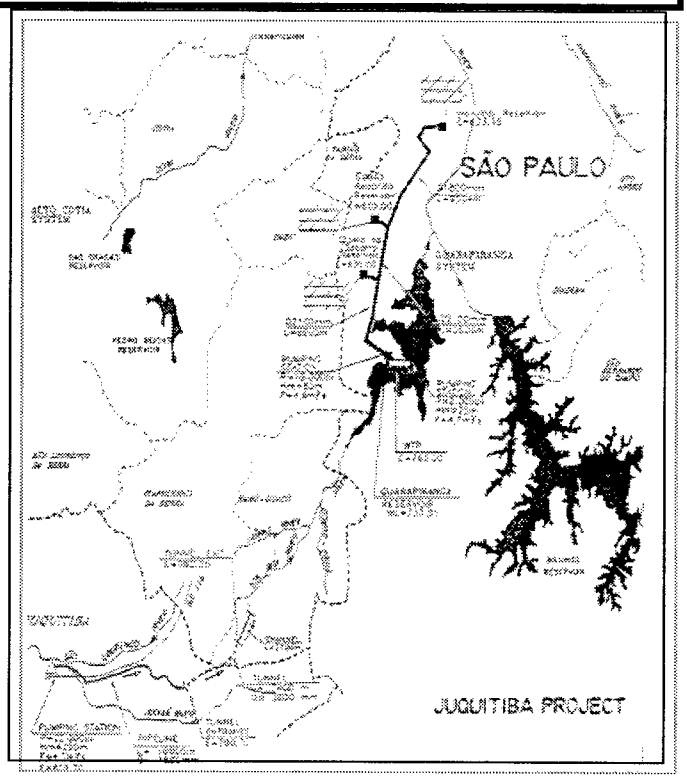
- Water off-take from Juquiá River
- Transport of water through 16.6 Km of pipeline and a 7.4 Km tunnel

- Rectification of a portion of an existing 18 Km stream bed through which water will flow to the Guarapiranga Reservoir in southwest São Paulo
- A 4.7 m^3/s water treatment plant located at the Guarapiranga reservoir
- A pipeline system of 18.4 Km for delivery of potable water to three existing SABESP-controlled reservoirs

The Juquitiba project is in the process of being structured by SABESP and has important strategic considerations for US companies interested in participating in Brazilian water markets.

Site

The project is in the northern region of metropolitan São Paulo.



Nature of Demand

The state of São Paulo is experiencing continued growth, which spurs a fundamental need for water and sewerage services. The project is strongly supported by commitments from SABESP and political authorities. The subsequent table highlights supply and demand forecasts through the year 2000.

Forecasted Water Supply and Demand in the MSPR Integrated System

	1995	1996	1997	1998	1999	2000
Total Population in Service Areas ('000)	17,632	17,897	18,165	18,438	18,635	18,834
Water Coverage	92%	95%	97%	100%	100%	100%
Sewerage Coverage	69%	74%	79%	85%	85%	85%
Average Daily Water Demand (m3/s)	57.4	59.1	60.1	62.0	61.8	61.7
Peak Daily Water Demand (m3/s)	67.2	69.2	70.2	72.5	72.3	72.2
Source Deficit (m3/s)	**2.8**	**4.5**	**5.5**	**7.4**	**7.2**	**7.1**
Treatment Capacity Deficit (m3/s)	**7.5**	**9.5**	**10.5**	**12.8**	**12.6**	**12.5**

Source: SABESP, SAM 75, May 1995 and Metropolitan Water Program, November 1996

Project Status

SABESP is currently defining the financial structure of the project. The project will be structured either as a BOT concession or as a project executed by SABESP. Either alternative will represent equipment procurement opportunities for US companies.

Financing

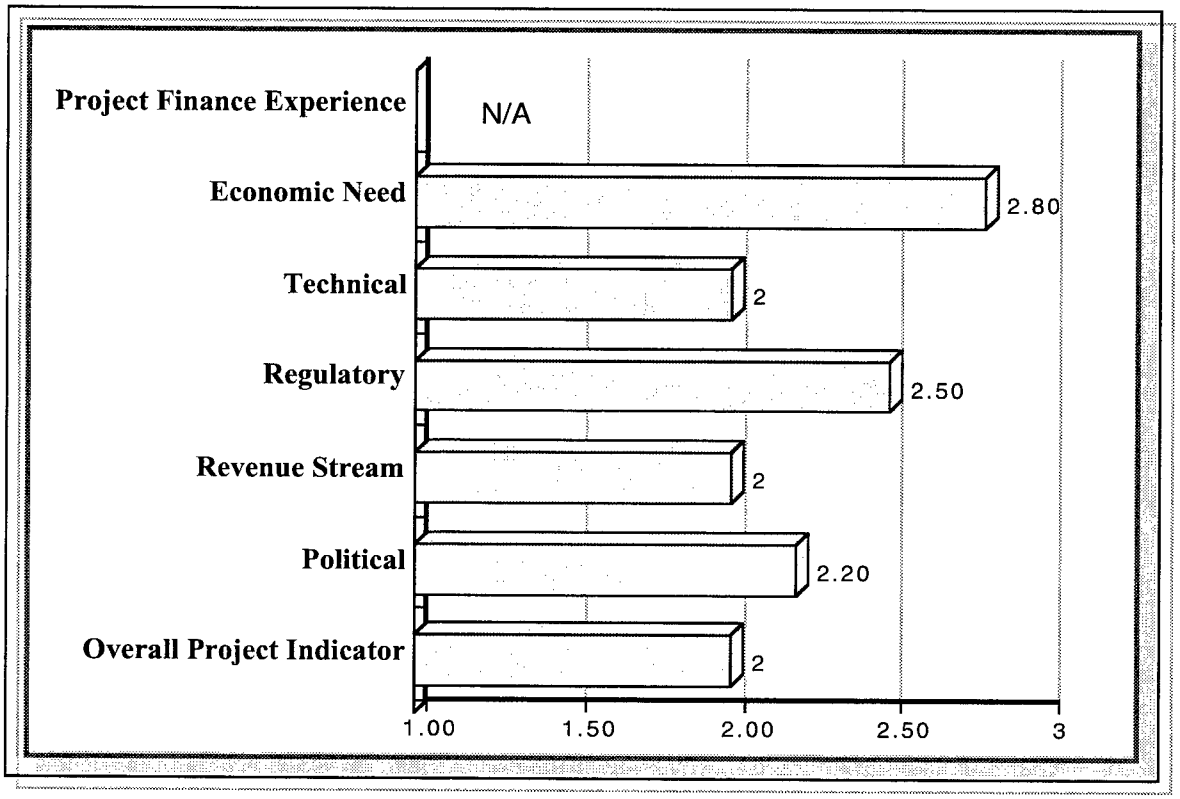
The Juquitiba project was originally conceived as a concession project. SABESP carefully structured Juquitiba in coordination with the IFC to ensure that the project will be financeable. This project will likely set the trend for future concessions to Brazilian state water companies. The project guarantees have been structured based on SABESP's accounts receivables.

Currently, the project is being reevaluated, as SABESP attempts to determine whether it wishes to "tie up" its receivables to guarantee a concession of the project. SABESP has the alternative of raising capital through its receivables and subsequently using this capital to execute the project, without concessioning it. The project will move forward, irrespective of the financial structure selected, and presents excellent procurement opportunities for US firms.

Equipment and Service Procurement

Preliminary Estimates for Capital Expenditures	**US$ Equivalent (millions)**
• Raw Water Pumping Station at Juquiá (22.0 MV)	21
• Raw Water Pipeline 16 Km to tunnel (1500 mm diameter)	31
• Tunnel - 7.4 Km length (3000 mm diameter)[1]	31
• Natural channel and Santa Rita river - 3.46 Km of rectification	3
• Pumping Station from Reservoir to Treatment Plant (2.0 MV)	5
• Water Treatment Plant (4.7m^3/s capacity)	56
• Pumping Station into system (11.2 MV)	20
• Urban Pipelines 18.4 Km total (diameter: 2100 mm for 12 km, 1800 mm for 6.4 Km)	53
Total Direct Capital Expenditure Costs	**221**
• Engineering and Management Costs (5% of direct expense)	11
• Contingency (10% of direct expense)	33
Total Capital Expenditures	**265**

Critical Project Indicators



Key Decision Makers

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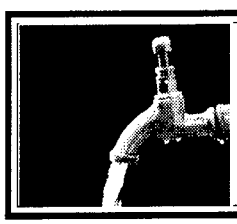
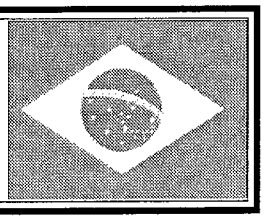


Environment / Brazil

Pirapama Water Supply System



Project Summary

Project No:	**ENV-07**
Subsector:	**Potable Water**
Location:	**Pirapama, Brazil**
Project Cost:	**US$ 300 million**
Export Potential:	**US$ 55 million**
Type:	**Joint Venture**
Sponsor:	**Secretariate of Infrastructure, State of Pernambuco**

The State of Pernambuco initiated construction of the Pirapama Water Supply System in 1991. Construction has been postponed since January 1995, however, due to a lack of financial resources. The State Government of Pernambuco is currently seeking a joint venture partner to finance the remaining US$ 150 million (50% of the total investment) which the project will require for completion.

Technical Description

The Pirapama System is a complete water supply system, composed of a storage dam, a pumping station, a water main and extensions, a water treatment station, reservoirs and complementary sections of distribution rings. These components will have the following charactoristics:

Storage Dam

The storage dam will be located on the Pirapama River, in the municipality of Cabo. It will be mixed-gravity type, composed of earth and compacted rocks, with a maximum height of 34 m and a length of 270 m. The dam will be capable of accumulating 61 million m^3 of water, and will regulate an average flow of 7.9 m^3/sec. Projected water collection is 14.6 m^3/sec, 5.6 m^3/sec of which will flow from the Pirapama River.

Pumping Station
The pumping station will hold 6 sets of centrifugal pumping engines, with horizontal axles, double suction and split casing. Each engine will support a flow of 1.4 m^3/sec.

Water Mains
The system will have 2 primary water mains and several sub-water mains. The water main for untreated water will be composed of steel carbon piping, with a diameter of 1,800 mm and an extension of 3.8 Km. The treated water main will also have steel carbon piping, with a diameter of 1,800 mm and an extension of 18.8 Km. Sub-water mains will include 172 m of 800 mm piping for Cabo (main district), 1.3 Km of 800 mm and 600 mm piping for Ponte dos Carvalhos and 3.2 Km of 1,200 mm and 1,000 mm piping for Prazeres.

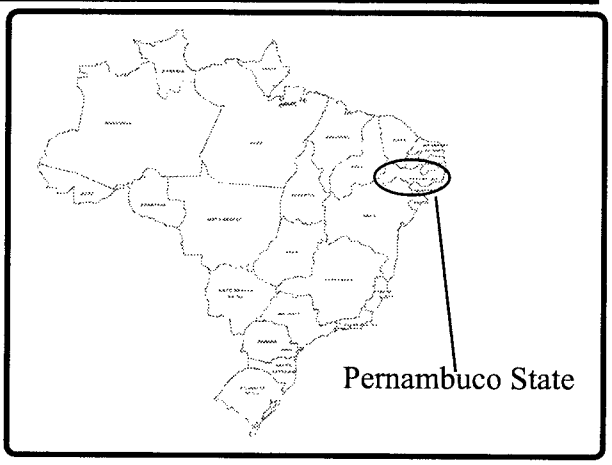
Water Treatment Station
The water treatment station will have the capacity to produce 5.6 m^3/sec of treated water. It will hold a measurement box and structures for the collection of untreated water, a rapid mixing chamber, a flocculator, intermediary mixture canal, 10 sand filters, a semi-underground reservoir of 20,000 m^3, a reservoir to wash the water from the filters, a collection tank for the water flowing from the filters, loam lakes and interconnecting canals between the processing units. The treatment station will also contain support buildings, such as a workshop and storage building, a chemical house, a platform for chemical products, an administrative building, a guardhouse scale, and electric substation.

Reservoirs
A total of 4 reservoirs will be constructed, including one at Cabo with 3 cells of 4,500 m^3, one in Jordao with 4 cells of 22,500 m^3 each, one in Prazeres with 2 cells of 22,500 m^3 each and one in Ponte dos Carvalhos with 3 cells of 4,500 m^3 each.

Distribution Rings
Distribution rings will connect the reservoirs with the distribution network. The rings will be composed of 27.6 Km of steel carbon pipes with diameters between 600 and 1,500 mm.

Site

The Pirapama Water Supply System is located on the Pirapama River, in the municipality of Cabo. Cabo is situated in the state of Pernambuco, in northeastern Brazil.



Nature of Demand

Estimate of Present Demand

Class	Savings	Unitary Demand (m3/savings/mon)	Consumption/year M3/year
Residental	610.017	25	183.005.100
Commerical	40.838	60	29.403.360
Industrial	2.652	500	15.912.000
Public	2.269	300	8.168.400
Subtotal	6.55.776		236.488.860
Losses (49%)			150.763.200
Total Demand			387.249.660
Present Supply			307.680.000
Deficit			-79.561.660

Currently, the water supply in the metropolitan region of Recife is under an intermittent operative regime, with interruption of the supply on alternate days due to an imbalance between supply and demand.

The demand referred to here goes beyond the simple necessities of the local population. It should be understood as that which refers to the sum total of the effective consumption of the users, in addition to consumption through clandestine connections and losses resulting from leakages in the distribution networks.

The State of Pernambuco has instituted a water rationing requirement of 16.65 m^3/savings/month to reestablish the balance between supply and demand in the region. In addition, the Water Company of Pernambuco, COMPESA, has developed an Institutional Development Plan (PDI) to reduce the index of water losses in the state by 25% over the next 10 years.

Project Status

The state of Pernambuco initiated construction of the Pirapama Water Supply System in 1991, with the construction of storage dam and the water treatment station (ETA). The construction process has stalled several times, considerably prolonging the initial 30-month timeline. Once a joint venture partner is integrated into the project, the state believes that system construction will proceed uninterrupted.

Financing

The Pirapama Water Supply project will require a total investment of US$ 300 million. The State of Pernambuco is financing 50% of the project, and is seeking a joint venture partner to cover the remaining 50% (US$ 150 million). The state has derived its 50% share from its General Budget and through loans obtained from the Calxa Econômica Federal (CEF), directly through the state government.

Equipment and Service Procurement

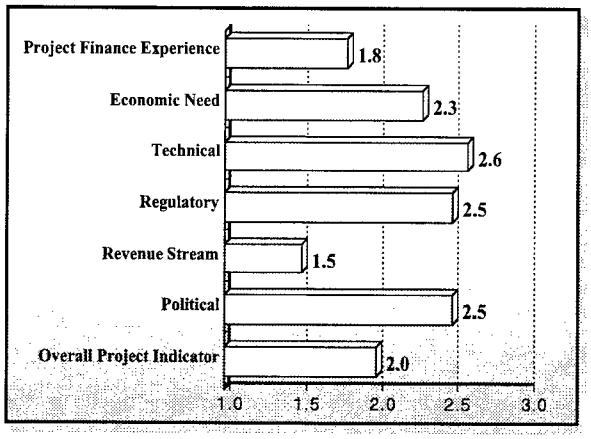
Equipment:

- Control system
- 6 Sets of centrifugal pumping engines, with horizontal axles, double suction and split casing (each with flow of 1.4 m^3/sec, with a potency of 1,600 CV)
- 2 water mains (3.8 Km w/1,800 diameter & 18.8 Km w/ 1,800 diameter)
- Sub-water mains (172 m of 800 mm pipe, 1.3 Km of 800 mm and 600 mm pipe, 3.2 Km of 1,200 and 1,000 mm pipe)
- Water treatment station (w/capacity to produce 5.6 m^3/sec of treated water)
- Flocculator, intermediary mixture canal, rapid mixing chamber
- 10 sand filters
- Collection tank, loam lakes, interconnecting canals
- Semi-underground reservoir (20,000 m^3)
- 4 reservoirs (2 of 4,500 m^3, 2 of 22,500 m^3)
- Flexible iron tubing
- Distribution rings (27.6 Km steel carbon pipes w/600 & 1,500 mm diameters)

Services:

- Geological engineering
- Technical inspection
- System development
- Terrain surveying

Critical Project Indicators



Key Decision Makers

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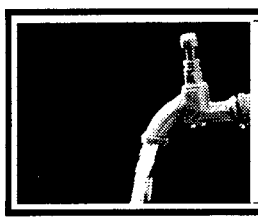


Environment / Brazil

Central Plastic Recycling Plant in São Paulo

Project Summary

Project No:	**ENV-08**
Subsector:	**Recycling**
Location:	**State of São Paulo, Brazil**
Project Cost:	**US$ 15 million**
Export Potential:	**US$ 10 million**
Type:	**Turnkey Operation**
Sponsor:	**PLASTIVIDA**

Plastivida is a non-profit organization and a permanent board member of ABIQUIM, the Brazilian Association for the Chemical and Derivative Products Industry.

The Central Plastic Recycling Project sponsored by Plastivida, is a precursor to several similar environmental projects in Brazil which will deal with the urban solid waste problem.

Technical Description

The central plastic recycling project will construct an industrial unit to recycle plastics generated in the metropolitan area of São Paulo. The unit will recycle the following types of plastic: PP, HDPE, LDPE, PS, PVC and PET.

Three types of processes are being studied for the project:

Mechanical Process: physical separation of different types of plastics for reuse as secondary raw materials.

Energy Generation Process: Thermal generation plant will use the plastics to generate energy through an incineration process.

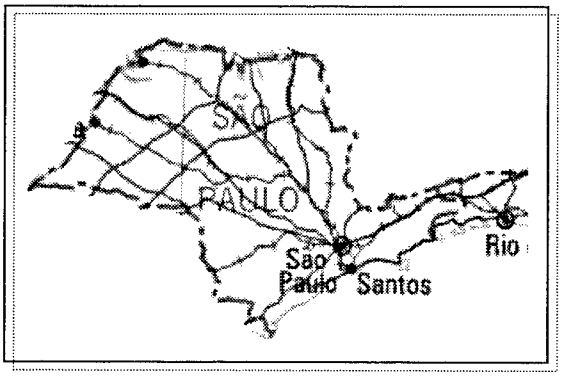
Chemical Recycling Process: This option will likely not be adopted immediately, given the elevated costs involved.

The project will likely be implemented in three phases using all three of the above described processes. Plastivida intends to begin with a mechanical process, followed by energy generation and then chemical recycling.

The project will need municipal support so that plastics will be separated from the remaining urban solid waste. The final product will have a commercial value, both in pellet and in final product form.

Site

The exact location for the construction of the plant has not been defined yet. The central plastic recycling unit will be built in a municipality in the surroundings of the metropolitan area of the city of São Paulo.



Nature of Demand

The lack of physical space for urban landfills in several metropolitan regions in Brazil is leading public sector officials to come up with solutions for urban solid waste disposal. Currently, less than 2% of urban waste is recycled and only 3% receives any form of processed treatment or incineration. Around 95% of urban solid waste is thrown into open air landfills, where it takes years to decompose. The Brazilian government intends to transfer the responsibility of treating and appropriately disposing of urban garbage to the private sector, with the public sector role curtailed to education campaigns.

Urban waste has grown by over 400 % in the past 15 years, and its treatment and appropriate disposal have been largely ignored by public sector officials. With the continued growth of cities and the inability to expand municipal landfills, recycling projects are being studied throughout the country.

The separation of plastic from other urban solid waste will prolong the useful life of municipal landfills, hence, avoiding sanitation problems of the surrounding populations.

The city of São Paulo's waste has six times more plastic than in 1970, a rate which has been increasing since the introduction of the *Real Plan*. The *Real Plan* resulted in a surge in real household income growth, which subsequently led to an increase in processed consumer goods (particularly foods) which use plastics. Currently approximately 20% of total urban solid waste in the city of São Paulo is plastic, generating 2,000 tons of plastic waste daily.

The increase in what is referred to as "technological waste" (computers, televisions) also compounds the problem of plastic content in urban waste.

Project Status

The project is in the formulation phase, and a feasibility study must be concluded prior to final project elaboration. Feasibility study financing is currently being negotiated by Plastivida.

Financing

Project financing will be determined upon conclusion of a feasibility study. It is clear that the project will have to be fully financed by the private sector, with aggregate investments of approximately US $15 million for implementation of the first two phases of the project: physical separation and thermal generation through incineration.

Equipment and Service Procurement

The following equipment and services will be required for the project although specific procurement schedules and equipment specifications will be determined only after the conclusion of a feasibility study.

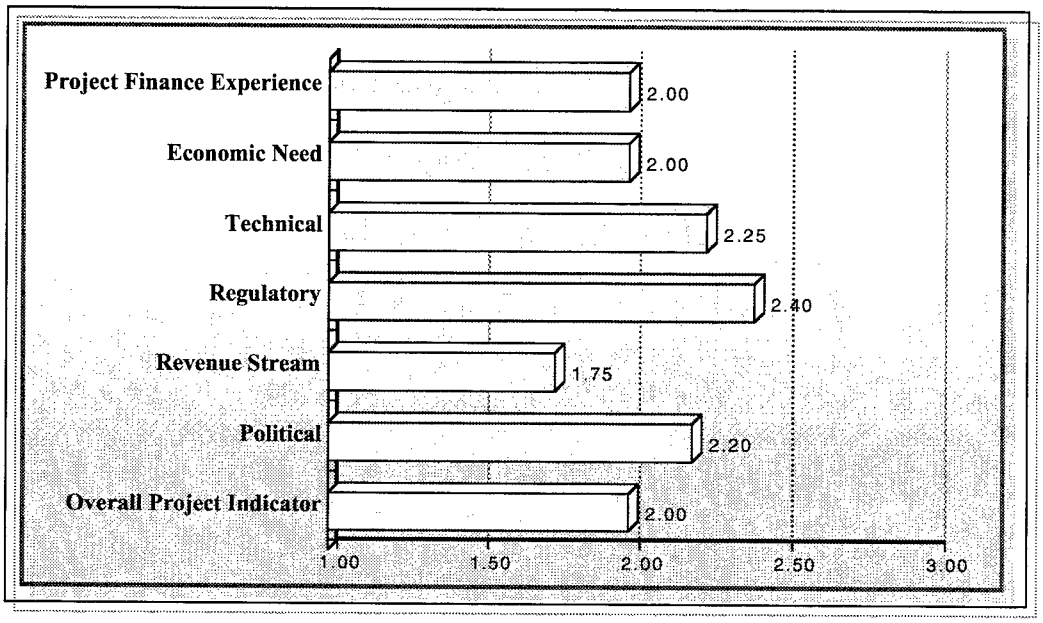
Equipment:

- Separation technologies, including density sensitive separators
- Decontamination equipment
- Materials handling equipment
- Thermal incinerator and refusion equipment
- Plastic washing process
- Infrared Sensors
- Monitoring and control systems

Services:

- Feasibility study services

Critical Project Indicators



Key Decision Makers

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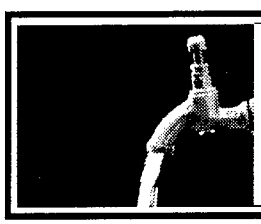


Environment / Brazil

São Paulo Coastal Clean-Up Program

Project Summary

Project No:	**ENV-09**
Subsector:	**Potable Water/Waste Water**
Location:	**Coast of São Paulo**
Project Cost:	**US$ 373 million**
Export Potential:	**US$ 50 million**
Type:	**Procurement**
Sponsor:	**SABESP**

SABESP, the state-owned water and sanitation company of São Paulo, has established a very aggressive investment plan which encompasses the execution of several key projects in water supply and sanitation. The driving force behind the investments is the pending opening of the water and sanitation sector in Brazil to private sector participation. Privatization is being implemented by the Federal Government, and anticipated to be completed by the end of 1997.

Technical Description

The project will expand water supply and sewage systems and treatment plants in 9 coastal cities of the state of São Paulo. Estimated investments in city systems are shown on the graph on the right.

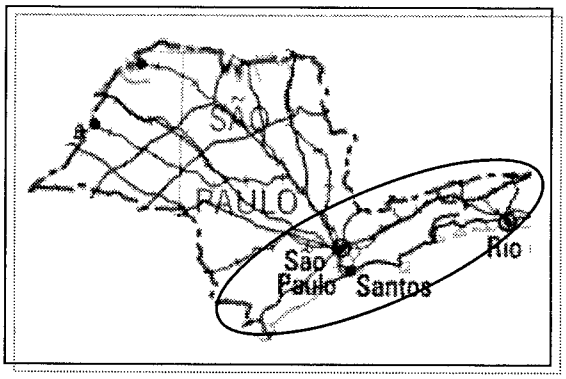
SABESP's goal is to attain 100% piped potable water coverage for the 9 municipalities and an 85% coverage ratio for sewage collection.

The project will include potabilization plants, distribution and collection networks and sewage treatment plants. The bid specifications being outlined for sewage collection plants include dissolved air flotation technology and conventional treatment.

City	Water US$ million	Sewage US$ million
Bertioga	5.6	25.8
Santos	5.1	19.3
Guaruja	7.8	55.7
Cubatão	12.9	16.7
São Vicente	7.2	50.5
Praia Grande	7.5	26.8
Mangagua	2.4	27.8
Itanhaem	3.6	54.5
Peruibe	5.6	38.4

Site

São Paulo has a 622 Km coastline with several important cities, all serviced by SABESP. The municipalities in question are the largest and most important cities in terms of tourist destinations and fixed population. The cities experience a very high fluctuation in population during the summer months and especially during weekends, as residents of metropolitan São Paulo commute to their beachfront homes.



Nature of Demand

Cities along the São Paulo coastline have been growing steadily over the past several decades, resulting in environmental degradation. Currently all sewage collected is disposed into outflow pipes receiving no treatment. Furthermore, SABESP has low coverage ratios for both water supply and sewage collection (relative to metropolitan ratios).

The chart on the right illustrates the percentage of potable water and sewage collection coverage in select cities.

City	Potable Water (%)	Sewage Collection (%)
Bertioga	39.3	25.8
Santos	100	19.3
Guaruja	98	42.5
Cubatão	88.1	14.1
São Vicente	94.6	44.9
Praia Grande	100	38.2
Mangagua	100	0
Itanhaem	85.1	4.7
Peruibe	100	9.5

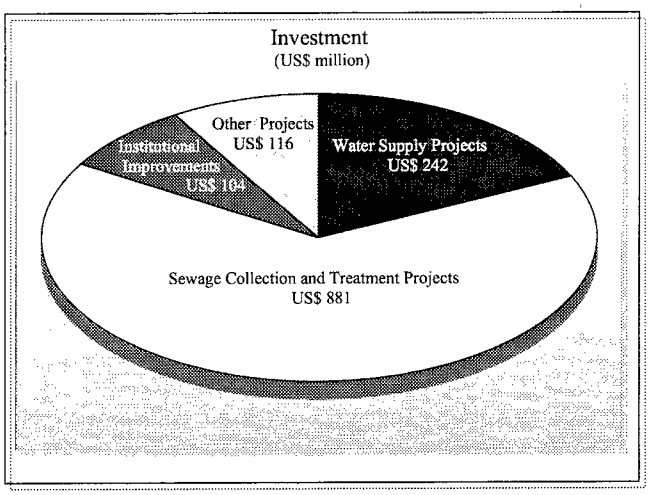
Project Status

Procurement schedules will be posted by SABESP during the first quarter of 1998. Investment budgets have been approved by SABESP and civil works are on-going in some locations.

Financing

The project will be financed through SABESP's internal cash flow, and will be subsidized by receipts from the Metropolitan Region of São Paulo due to the low metering and collection ratios in the coastal communities.

SABESP retains municipal concessions for the majority of coastal cities for water supply and for sewage collection. The company has established an overall investment budget for the coast of São Paulo of US$ 1.3 billion over the following 3 years. Investments are broken down in the categories shown on the graph.



Equipment and Service Procurement

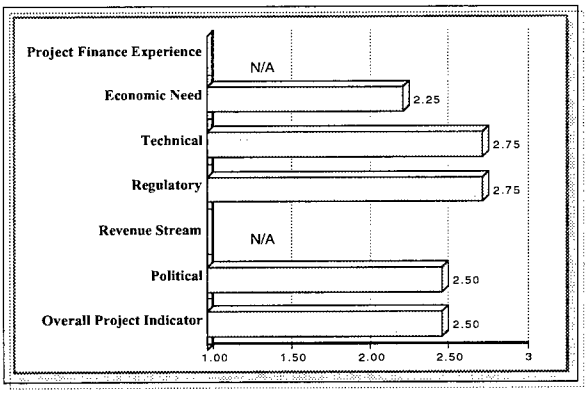
Equipment:

- Filtering Systems
- Stirring and Flocculation Equipment
- Electrical Wiring
- Transformer Stations
- Water Tanks
- Cleaning Grids
- Sand Removers
- Oxidation Ditches
- Chlorination and Declorination Equipment
- Pumping well
- Submersible Pumps
- Chlorination and Contact Chamber
- Sludge Compacting Equipment
- Digesters
- Monitoring Equipment
- Flowerets
- PVC Piping

Services

- Specialized DAF Engineering
- Construction Management
- Construction Engineering

Critical Project Indicators



Key Decision Makers

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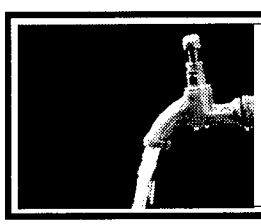
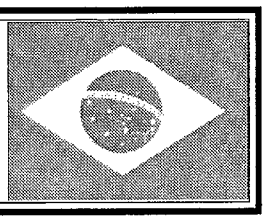


Environment / Brazil

Copasa Sewage Treatment Concession



Project Summary

Project No:	**ENV-10**
Subsector:	**Wastewater**
Location:	**State of Minas Gerais**
Project Cost:	**US$ 70 million**
Export Potential:	**US$ 10 million**
Type:	**BOT**
Sponsor:	**COPASA**

COPASA, one of Brazil's largest water companies, has among the highest operating efficiencies in terms of metering and coverage ratios. The company is responsible for operating sewage and water concessions for most of the cities in the state of Minas Gerais. It is attempting to increase its sewage treatment coverage in conjunction with the PROSAM Investment Progam, a major investment program financed partially by the World Bank.

COPASA operates 486 water concessions and is expanding to supply services in rural areas. It supplies water to 8.3 million people through 1.97 million connections attaining a 95.3% coverage. The company has been aggressively adding to the number of concessions it operates. COPASA operates 57 sewage collection concessions reaching 74.8% coverage, servicing 3.5 million people through 717,000 connections. Only 2% of the sewage collected is treated. COPASA has one treatment plant in the city of Belo Horizonte.

Technical Description

The project involves construction and operation of two wastewater treatment plants in the state of Minas Gerais, in southeastern Brazil. Although both treatment stations (the project) are part of the PROSAM investment plan, they will need to be constructed and operated by the private sector due to inability of the state to generate its own resources to fund the project.

The project also includes the construction of sewage collection ducts which will feed into the advanced primary treatment wastewater plants.

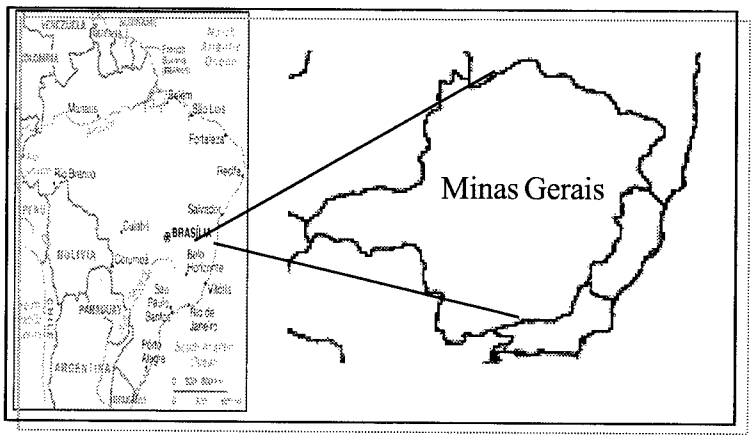
Two wastewater treatment plants will be constructed:

1. Onça Treatment Station for 2.6m3/sec
2. Arrudas Treatment Station for 4.5m^3/sec

The projects will be two separate BOTs and will generate opportunities for US companies as concessionaires and as exporters of technology and design services.

Site

Minas Gerais is the country's third-most industrialized state, and has been growing at a rate which exceeds the national average. The capital, Belo Horizonte, has a population approaching 3.7 million and is growing at an average of 3% per year.



The wastewater treatment plants will be near the metropolitan Belo Horizonte region and the river basin surrounding the city of Contagem. Specifically, the Arrudas and Onça sub-basins are located in the upper "das Velhas" river basin, which is the most important tributary of the São Fransisco River.

Nature of Demand

Both the Onça basin and the River Arrudas are severely contaminated due to sanitary flows from the capital city Belo Horizonte and the highly industrialized satellite city of Contagem.

The environmental degradation of these river basins is causing disease and has been neglected for several years due to lack of political will to remedy the problem, coupled with adverse economic factors. The projects will remove at least 35% BOD with advanced primary treatment.

Project Status

From 1986 – 1988, construction of the Arrudas treatment plant was ongoing. However, work was suspended due to lack of funding. Both treatment plants are included within the PROSAM investment program, and will need to be built by the private sector.

COPASA is working on the terms of reference to issue a public international tender for concessions of the two plants. These should be ready by the 4th quarter of 1997 and the 1st quarter of 1998, respectively.

Financing

PROSAM (Programa de Saneamento Ambiental das Bacias do Arruda e do Onça) is the largest basic sanitation program ever undertaken in the state of Minas Gerais, with total investments of US$ 307 million (primarily for collection networks) broken down as follows:

Source	Investment (in thousands of US$)
World Bank	144,023.00
Minas Gerais State Government	12,546.00
COPASA	51,182.00
City of Belo Horizonte	1,557.00

COPASA's investment budget for 1997 is US$ 300 million. The wastewater treatment will total around $70 million of this budget. The investment goal over the next five years is to provide 181,000 new sewage connections, as well as 198,500 potable water connections.

COPASA is committed to seeing the projects move forward, in part due to the increased public scrutiny and World Bank involvement in the company's investment plan. The projects will be structured as individual BOTs, the terms of which are still to be determined.

The critical factor in financing the projects is the state of Minas Gerais providing a guarantee mechanism for the eventual concessionaires. COPASA is studying the options for creating a financeable structure, as this is the principle obstacle facing the project.

Equipment and Service Procurement

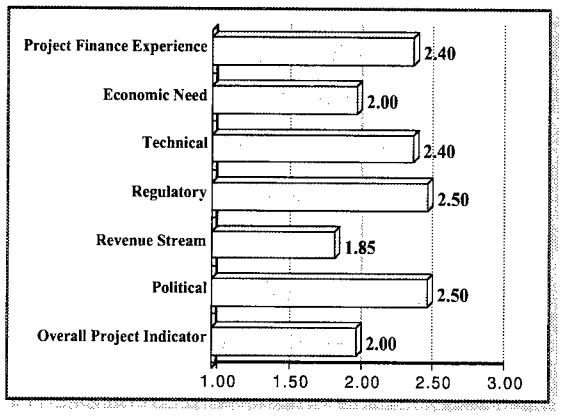
Equipment:

- Filtering systems
- Stirring and flocculation Equipment
- Electrical wiring
- Transformer stations
- Water tanks
- Cleaning grids
- Sand removers
- Pumping well
- Submersible pumps
- Sludge compacting equipment
- Digesters
- Monitoring equipment
- PVC piping

Services:

- Specialized engineering and design
- Construction management
- Construction engineering

Critical Project Indicators



Key Decision Makers

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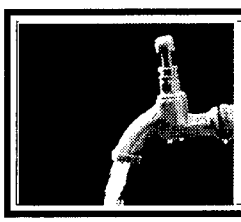


Environment / Brazil

SANEPAR Water Loss Reductión Program

Project Summary

Project No:	**ENV-11**
Subsector:	**Potable Water**
Location:	**State of Paraná, Brazil**
Project Cost:	**US$ 50 million**
Export Potential:	**US$ 40 million**
Type:	**BOT**
Sponsor:	**SANEPAR**

SANEPAR, the state-owned water company of Paraná, is attempting to consolidate its position in the market as municipal concessions expire and pressure is placed on state water companies to increase efficiencies.

The Paraná Water Loss Reduction program is a procurement opportunity based on the need for efficiency gains in the state's water systems. Other states in Brazil will be implementing similar programs in the near future.

Technical Description

SANEPAR experiences a 32% physical water loss ratio, along with a 13.5% non-physical loss ratio. The company has begun a pilot program to reduce both physical and non- physical water losses in 1996. The success of the pilot program has resulted in the creation of the overall Water Loss Reduction Project, which is being funded through internal cash flows.

The proposed project will repair leaks and automate the water system with a goal of reducing the amount of state water losses by 13%.

The program has two components:

- To prevent further physical losses, SANEPAR needs leakage detection equipment, as well as pipe rehabilitation, which will likely be accomplished through trenchless technologies.

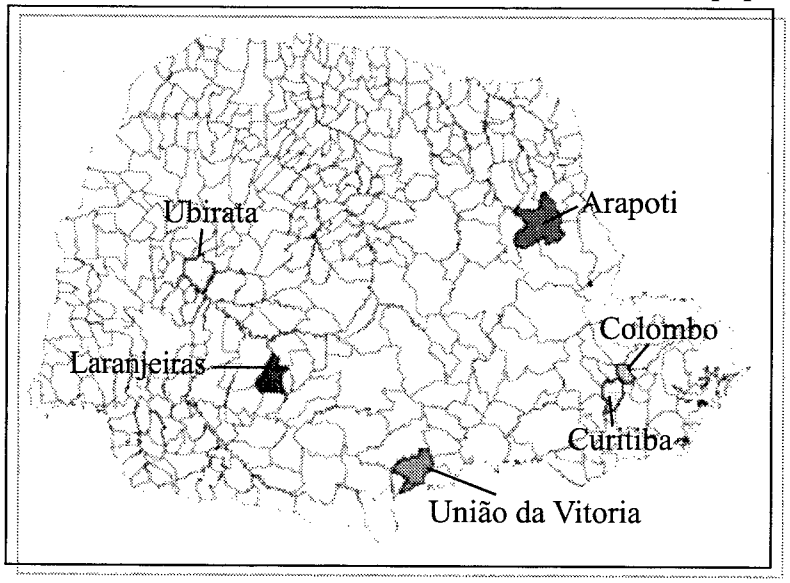
- Non-physical losses will be addressed through procurement and installation of flow meters, as well as the installation of automatic controls for lift stations and reservoirs. In addition, equipment is needed to automate water treatment and monitoring.

Site

SANEPAR, Paraná's state-owned water company, is responsible for water supply, sewage collection and wastewater treatment throughout the state. The company is considered amongst the most efficient state water companies in the country, with 2.36 employees for every thousand connections.

SANEPAR currently provides potable water services to 6.9 million people (98% of the urban population) in 314 municipalities and rural areas through 1.7 million connections. SANEPAR's total network extension is 31,381 Km for water.

The company services 2.1 million people with sewage collection services through 396,000 connections. SANEPAR's network extension is 7,030 Km reaching a coverage ratio of 32%.



Nature of Demand

There is currently a 42% water loss ratio in Paraná, including physical losses and loss through illegal connections and improper meters. The high financial cost associated with these losses is the impetus for this project. The state's goal is to improve its water systems in order to increase its ability to generate investments internally.

Project Status

SANEPAR began a pilot program to reduce water losses in 1996, which yielded positive results. The US Trade and Development Agency has approved a feasibility study grant to implement a major water loss-reduction program for SANEPAR's largest system, Curitiba, which will go into effect in December 1998. The Curitiba component of the water loss program is estimated at US$ 14 million, which should yield immediate export potential for US companies of US $10 million.

Financing

SANEPAR will finance the water loss reduction program. The project has been included as a priority in the company's 1998 investment budgets.

SANEPAR's yearly combined overall investment budget for 1998 and 1999 is estimated at US$ 400 million. US$1.9 million in investments in the pilot program in 1996 resulted in US$27 million in savings within a one-year period, which is a strong incentive for the project to move forward without any institutional or political resistance.

Estimated Costs

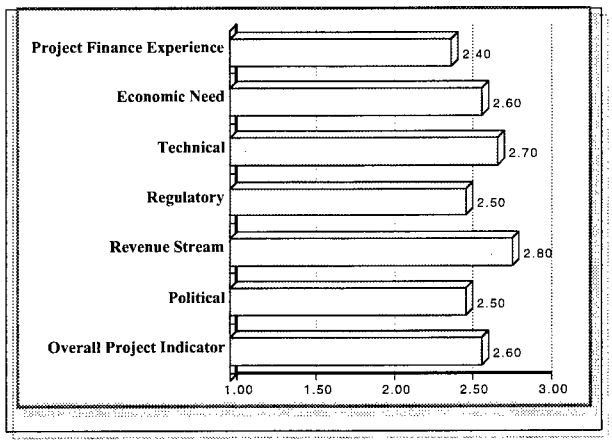
Projected Investment	Cost (US$)
Flow Meters	5,000,000
Automation of System	30,000,000
Research and Elimination of Leaks	15,000,000
Total	**50,000,000**

Equipment and Service Procurement

The project involves procurement of the following components and services:

- Class C and Class D flowmeters
- Pressure and leakage sensors
- Automatic controls for lift stations and reservoirs
- Monitoring systems
- Pipe rehabilitation services

Critical Project Indicators



Key Decision Makers

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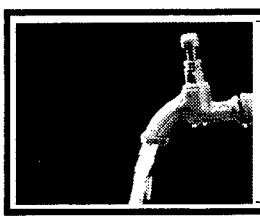
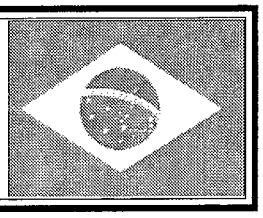


Environment / Brazil

SANEPAR Wastewater Treatment Stations Subconcessions



Project Summary

Project No:	**ENV-12**
Subsector:	**Wastewater**
Location:	**State of Paraná, Brazil**
Project Cost:	**US$ 26 million**
Export Potential:	**US$ 11 million**
Type:	**BOT**
Sponsor:	**SANEPAR**

The State of Paraná, through its state-owned water and sanitation company (SANEPAR), is offering a sub-concession to private developers to build wastewater treatment plants in the cities of Arapoti, Colombo, Laranjeiras do Sul, Ubiratã and Porto União.

Technical Description

The project entails a concession for the provision of wastewater collection and treatment services in five cities in the interior of the state of Paraná.

Projected Costs
(in US$ 000)

City	Projected Cost	Connections
Arapoti	3,636	4,369
Colombo	2,744	2,769
Laranjeiras do Sul	2,402	2,940
Ubiratã	3,206	4,564
União da Vitória, Porto União	11,250	11,200
Total	**23,238**	**25,842**

Site

The cities for which SANEPAR is offering a concession currently have no wastewater treatment. SANEPAR provides potable water services to all five municipalities and is responsible for tariff setting and collection.

Nature of Demand

SANEPAR has one of the most efficient treated water coverage ratios in Brazil, servicing 92% of urban areas, and on average 99% of Paraná's population as a whole. The company currently has a 70% sewage treatment ratio. To keep pace with state levels, the company is striving to increase this amount of sewage treatment in the five cities proposed for the project.

Project Status

SANEPAR began a pilot program to treat wastewater in 1996, which yielded positive results. Millennium Science & Engineering completed a definitional mission (DM) study in June 1997. The DM recommended opportunities for potential BOOT (build, own, operate, transfer) or other model for wastewater upgrades and concessions and their financing in Paraná. Bidding documents should be ready by the 1st quarter of 1998.

Financing

The project is offered as a sub-concession to SANEPAR, which retains the concessions for the five cities in question. Thus, the concessionaire will not take on the risk of the municipalities, but rather the risk of concessioning to SANEPAR, which is in good financial standing. The concessionaire will not have control of receivables, as sewage billing is invoiced as a percent of water bills, which are processed by SANEPAR.

The Paraná State sewage treatment projects will be among the first structured wastewater projects in Brazil. Developers will have the opportunity to build working relationships with SANEPAR for future projects.

Equipment and Service Procurement

Arapoti

- 67,122 m sewage collection system
- 4,369 domestic connections
- 8,906 m interceptors
- Sewage Treatment Plant #1:
  - Upflow ascendant sludge blanket (UASB)
  - Sand removal unit
  - Sludge drying unit
  - Lagoon
- Sewage treatment plant #2:
  - 2 Upflow ascendant sludge blankets (UASB)
  - Sand removal unit
  - Lagoon
  - Lift station with outflow of 41 m^3/h

PROJECTED COST: US$ 4 million

Laranjeiras do Sul:

- 57,165 m sewage collection system
- 2,940 domestic connections
- 2 Lift stations, composed of:
  - 1 UASB
  - Treatment lagoon

PROJECTED COST: US$ 2 million

Ubiratã:

- 108,931 m sewage collections system
- 4,564 domestic connections
- 6,160 m collection ducts
- 2 lift stations
- 2 sewage treatment plants:
  - UASB
  - Treatment lagoons

PROJECTED COST: US$ 3 million

Colombo:

- 27,552 m sewage collection system
- 2,769 domestic connections
- 1,858 m interceptors
- 4 Lift stations
- 1 Sewage treatment plant:
  - 2 UASB
  - Lagoon
  - Sludge drying unit
  - Operating station

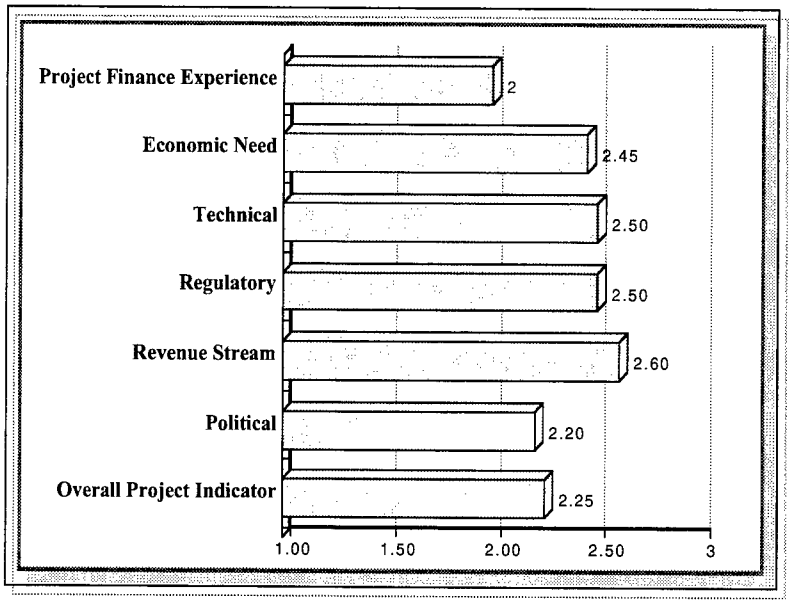
PROJECTED COST: US$ 3 million

União da Vitória, Porto União:

- 227,023 m sewage collection system
- 5,793 m interceptors
- 7 sewage treatment plants
- 10 lift stations
- 17,016 m collector mains
- 11,200 domestic connections

PROJECTED COST: US$ 11 million

Critical Project Indicators



Key Decision Makers

Company	SANEPAR
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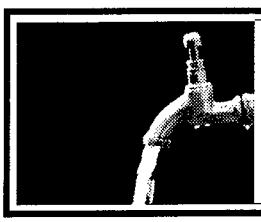


Environment / Chile

El Carmelo Potable Water System Expansion

Project Summary

Project No:	**ENV-13**
Subsector:	**Potable Water**
Location:	**Iquique, Chile**
Project Cost:	**US$ 44.130 million**
Export Potential:	**US$ 22 million**
Type:	**Procurement**
Sponsor:	**ESSAT**

Empresa de Servicios Sanitarios de Tarapacá (ESSAT) is a state-owned subsidiary of the Enterprises Division of CORFO (Chile's Economic Development Agency). CORFO is currently in the process of transferring the operation of these companies into private hands. By year-end 1997, a law should be in place which will define the strategy for privatizing the state-owned companies.

Technical Description

El Carmelo consists of the construction of sixteen 200-meter wells, a 740 liter/second water pump, holding tanks, 64,000 meters of flexible iron tubing and aqueducts of 600, 800 and 900 millimeter diameters. The project will include development of an operating system capable of controlling distance through telemetry and a system for generating electricity which involves solar panels, various generators and a hydroelectric plant.

Existing Infrastructure

Iquique's existing potable water production system ("Canchones") draws 680 l/s of groundwater through thirteen 120 m deep wells. The system transports the water through two water pumps and two 80,000 meter tubes, one of flexible iron with 450-800 mm. diameters and the other of steel with 400-700 mm. diameters. The steel tube has exhausted its useful life. The system also includes loading tanks and a 3.5 Kw hydroelectric plant.

Site

El Carmelo will be located in Pampa del Tamarugal, which is situated 65 Km east of the city of Iquique, in the desert region of Tarapacá. Iquique lies on the Pacific coast, approximately 1450 Km north of Santiago and just under 200 Km from the Chilean/Peruvian border.

Nature of Demand

CORFO has estimated that water and sewage-related investment requirements from 1997-2010 throughout Chile will reach nearly US$ 3.4 billion. This estimate includes US$ 1.5 billion in potable water production and distribution requirements.

The city of Iquique, located in the desert climate of Chile's extreme North, will need to increase its groundwater intake by 740 liters per second over the next 25 years to comply with the Development Plans established under Chilean law. The *El Carmelo* project will enable ESSAT to meet current and future demand for potable water in the city of Iquique, based on population estimates through the year 2020. ESSAT has already determined potable water rates in Iquique for the next 5 years based on these estimates.

This project has complete local, regional and federal government backing and has been approved by the Superintendence of Public Services, the Finance Ministry and the Ministry of Public Services.

Project Status

Two exploration wells which have been drilled to test hydrogeological conditions of the groundwater are set to become operational. In addition, ESSAT has finalized project design, initiated construction of a reservoir in the well zone, and has begun to procure equipment through an international bidding process. This equipment includes: tubes, mechanized and non-mechanized equipment, valves, vents, electromagnetic gauges, deep well pumps and horizontal shaft pumps. Equipment remaining to be procured includes: a control system, solar panels, a 740 l/s water pump, holding tanks, flexible iron tubing, aqueducts of 600, 800 and 900 mm diameters, an operating system capable of controlling distance through telemetry, generators and hydroelectric plant facilities. ESSAT has contracted an engineering firm to oversee the large number of specialized engineers which this project will require over

a relatively short period of time.

The BOT concession for El Carmelo was awarded to a private firm in September 1997, under an international bidding process. Construction is expected to begin in November 1997 and should be completed in December 1998.

Financing

This project will be 100 % financed by ESSAT, via both internal funds and a loan from Chile's Central Bank under Finance Ministry authorization.

Equipment & Service Procurement

Equipment and services procurement will include the following:

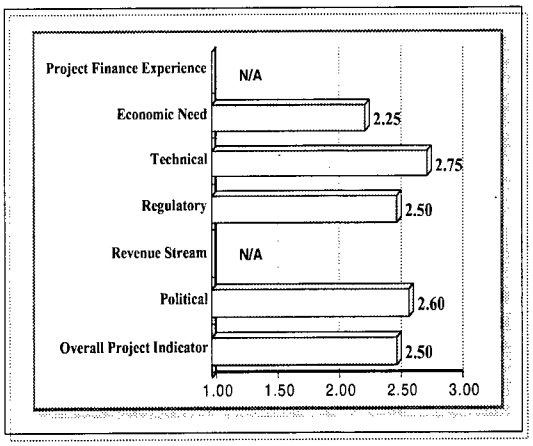
Equipment:

- Control System
- Solar Panels
- 740 l/s water pump
- Tanks
- Flexible iron tubing
- Aqueducts (600, 800 and 900 mm diameters)
- Operating system capable of controlling distance through telemetry
- Generators
- Hydroelectric plant facilities

Services:

- Specialized engineering
- Technical inspection
- System development

Critical Project Indicators



Key Decision Makers

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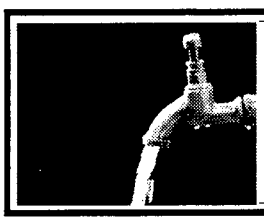
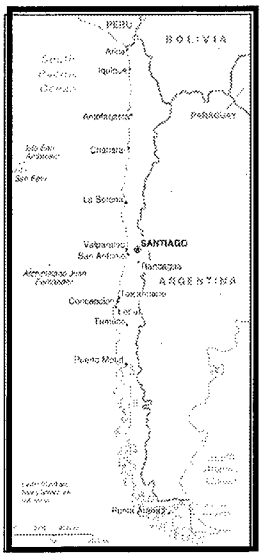


Environment / Chile

Santiago - South Wastewater Treatment Plant



Project Summary

Project No:	**ENV-14**
Subsector:	**Wastewater**
Location:	**Santiago, Chile**
Project Cost:	**US$ 303 million**
Export Potential:	**US$ 185 million**
Type:	**BOT Concession**
Sponsor:	**EMOS**

EMOS (Empresa Metropolitana de Obras Sanitarias), the Sanitary Waterworks Company of Santiago, is a state-owned entity responsible for the provision of potable water and wastewater services within the Metropolitan Region of Santiago. Under the Wastewater Treatment Program of Greater Santiago, EMOS is planning to grant concessions for the construction and operation of the Santiago-South, Zanjón de la Aguada and Mapocho wastewater treatment plants.

Technical Description

The Santiago-South Wastewater Treatment Plant will utilize Conventional Activated Sludge technology. Preliminary designs indicate:

Liquids: Preliminary Treatment (Elimination of sand, greases, oils and solids of large size), Primary Sedimentation, Aeration, Secondary Sedimentation and Disinfection

Sludge: Solidification of Secondary Sludge, Anaerobic Digestion and Dehydration

Treated wastewater will flow into the Mapocho River, to be utilized for irrigation purposes. EMOS estimates that treated wastewater from the Santiago-South Plant will have the capacity to irrigate 4,000 hectares of land in the Greater Santiago area.

Design Parameters:

Parameters	2000	2004
Water Flow (m^3/s)		
Annual Average	3.5	6.4
Maximum per hour	5.78	10.88
Bio Oxygen Demand $_5$ (kg/day)		
Annual Average	77,000	160,000
mg/l	262	289
Total Suspended Solids (Kg/day)		
Annual Average	77,000	160,000
mg/l	262	289
Evaporated Suspended Solids (mg/l)	197	217
Temperature (°C)		
Annual Average	19	19
Monthly Min.	11	11
Annual Max.	24	24

During initial operation, the plant is expected to transport 25 tons of sludge (dried at 60% of ST) in 4 trucks per day. By the year 2024, the plant should have the capability to transport 8 truckloads per day of the same tonnage. Disposal of sludge will take place on adjacent land through the Monofill System, following additional dehydration in a mechanical centrifuge and drying areas.

Site

The plant will serve the southern portion of Santiago, which constitutes the communities of Puente Alto, La Pintana, El Bosque, San Bernardo, Maipú, Cerrillos and parts of La Florida and Estación Central.

Areas (2004)	
Santiago Treatment Plant	91.5 Ha.
Process Area	35 Ha.
Sludge Area	10 Ha.

Nature of Demand

Under Santiago's current wastewater treatment system, untreated wastewater is being discharged directly into the Maipo, Zanjón de la Aguada and Mapocho Rivers. These three rivers supply water for the network of irrigation canals throughout the Metropolitan Region of Santiago.

	Average Water Flow	Spanning Km	Slope
Rio Maipo	93.6	22.2	0.9
Rio Mapocho	5.3	35.7	1.18
Zanjón de la Aguada	0.5	27.5	1.0

Santiago's primary rivers have high levels of bacterial contamination, a situation which is elevating the number of illnesses such as typhus, hepatitis and cholera contracted through the consumption of contaminated fruits and vegetables. Recent environmental legislation in Chile now mandates a strict water quality standard for wastewater reuse.

Project Status

The Santiago-Sur Wastewater Treatment Plant will be constructed in 4 stages, with the plant set to be operational by 2001. The following chart outlines the construction timeline for the project. The BOT concession is expected to be awarded by year-end 1997.

	Initial Stage	Expansion I	Expansion I	Expansion I
Initial Year of Operation	2001	2006	2012	2018
Final Year of Operation	2006	2012	2018	2024
Stage Duration	5	6	6	6

Financing

This project will be financed through the private sector, through a 24-year BOT concession. The total investment is expected to reach US$ 302.9 million. The chart on the right outlines specific investment components of the project:

Initial Investment including complementary costs	US$ 173.0 million
First Expansion	US$ 23.3 million
Second Expansion	US$ 29.6 million
Third Expansion	US$ 18.3 million
Total Investment	**US$ 244.2 million**
Complementary Costs:	
Land (91.5 hectares)	US$ 2.6 million
Outflow Pipe	US$ 4.3 million
Maipo Collector (13 Km pipe, 600-1200 mm)	US$ 9.0 million
Maipu Collector (12 Km pipe, 800-1200 mm)	US$ 15.7 million
Maipu-San Bernardo Collector (21 km pipe, 1200 1600 mm diameter)	US$ 27.1 million
Total Complementary Cost	**US$ 58.7 million**

Equipment & Service Procurement

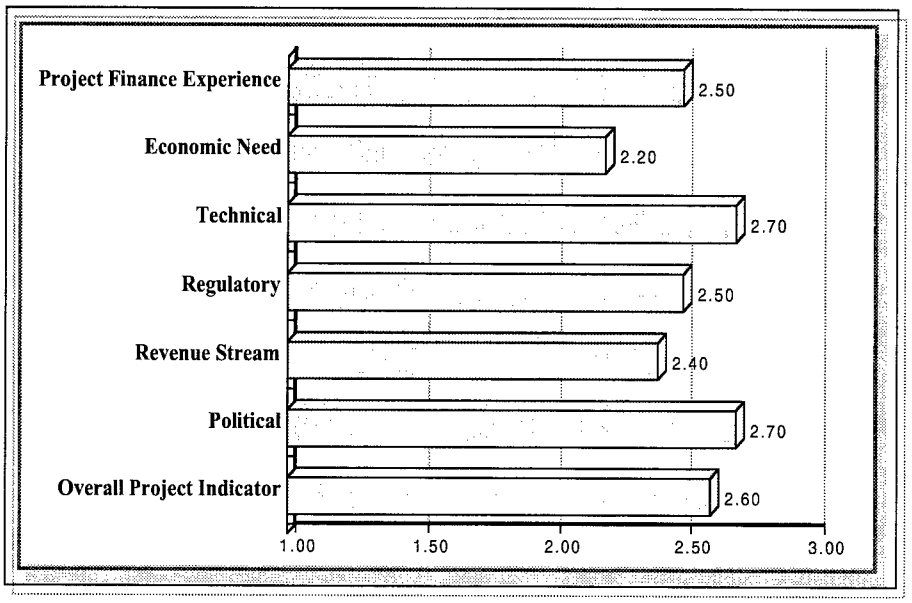
Equipment:

- Emissary
- Tubing
- Interceptors
- Pumps
- Flow Meters
- Monitoring Equipment

Services:

- Engineering and Design

Critical Project Indicators



Key Decision Makers

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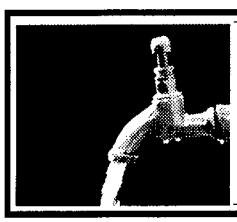
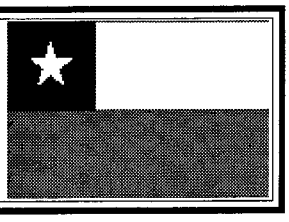
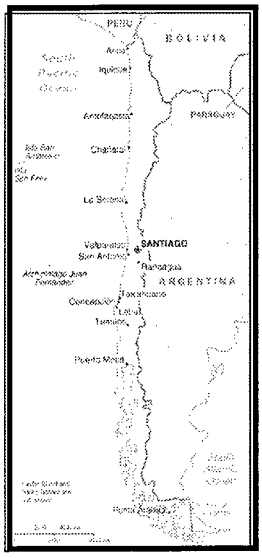


Environment / Chile

Privatization of ESVAL Water Utility





Project Summary

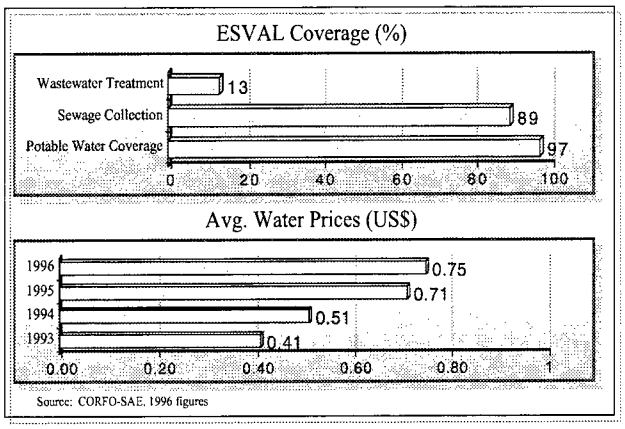
Project No:	**ENV-15**
Subsector:	**Potable Water & Wastewater**
Location:	**Valparaíso, Chile**
Project Cost:	**US$ 100 million**
Export Potential:	**US$ 20 million**
Type:	**Privatization**
Sponsor:	**CORFO-SAE**

Corporación de Fomento de la Producción (CORFO) is a public entity responsible for economic development and industrial promotion throughout Chile's 13 regions. CORFO is currently the majority stockholder in the country's 13 state-owned water utilities.

Under presidential directive, CORFO will sell its majority shares to the private sector. The Enterprise Management System (SAE), a newly-created division within CORFO, will be responsible for directing the privatization process. Once the law required for enabling private ownership in the sanitary sector is finalized, ESVAL and ESSAL will be the first of the 13 companies to be privatized.

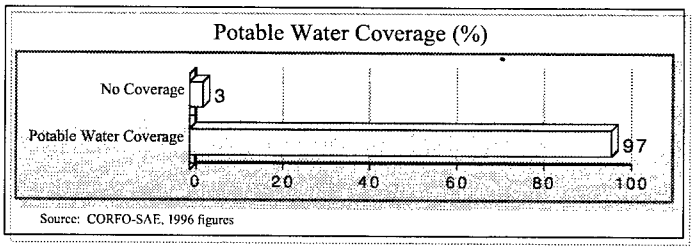
Technical Description

ESVAL is responsible for the provision of potable water, sewage and wastewater services in Chile's Region V, which has a population of 1.3 million. As of 1996, potable water coverage in the 5th Region was 97%, sewage collection was slightly lower at 89% and only 13% of the population had wastewater treatment coverage. The company has an average water tariff of US$ 0.75/m^3.

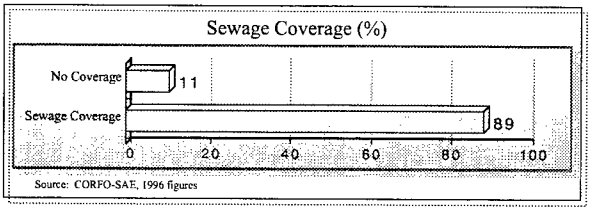


Potable Water Coverage

The coverage ratio for potable water services in Region V is quite high, at 97%. Approximately 1.3 million inhabitants in the region have access to potable water, while 40,000 residents lack coverage.



In 1996, ESVAL produced 135.54 MM m^3 of potable water and invoiced 87.83 MM m^3, for a water loss of 35%.

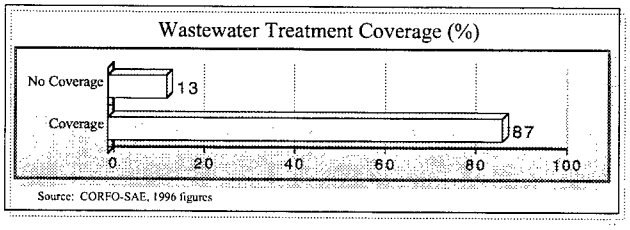


Sewage Collection

Sewage collection services in Region V cover 89% of the population, nearly 2 million residents. A total of 150,000 residents have no access to sewage collection services.

Wastewater Treatment Coverage

ESVAL's wastewater treatment services cover only 13% of the population. A total of 175,000 residents are serviced, while the majority of the population (1.2 million) is without coverage.



ESVAL currently has 6 wastewater treatment facilities in operation, including the Cabildo, Nogales, Putaendo, Llay-Llay, Catemu and Casablanca plants.

Site

ESVAL is located in the city of Valparaiso and is responsible for potable water, sewage and wastewater treatment services for Chile's Region V, which has a population of 1.34 million inhabitants.

Nature of Demand

Achieving potable water and sewage coverage for 100% of the Chilean population is a high priority of the Frei Administration. In fact, President Frei has announced that he intends to reach not only this goal, but also 68% wastewater treatment coverage nationwide by the end of his term in office in March 2000. The federal government has determined that private investment and participation in the water sector are essential for achieving these objectives.

Project Status

In May 1995, a law for revising Chile's current water sector regulations was introduced on the floor of the National Congress. The new law will enable private sector companies to participate in the operation of the country's 13 state-owned water utilities. The proposed law has achieved Senate approval and is currently under review by a mixed congressional commission which will resolve controversial issues regarding sanitary law modifications so that the law can receive final approval.

The new sanitary law is expected to be approved by December 1997. ESVAL's privatization is predicted to take place in March 1998, followed by the privatizations of ESSAL (Region X) by the 3rd Quarter of 1998, ESSAR (Region IX) during the 2nd Quarter of 1999 and ESSAN (Region II) by the 3rd Quarter of 1999.

Financing

A total of 23% of ESVAL stock has already been transferred to private hands via the Santiago Stock Exchange. The remaining 77% is held by CORFO and the General Treasury of the Republic. Under current water sector legislation, private participation in ESVAL is not restricted.

The federal government is expected to retain approximately 35% of the company's total equity, while 65% will be transferred to the private sector.

Equipment and Service Procurement

ESVAL is expected to invest over US$ 72 million in infrastructure development in the potable water, sewage and wastewater subsectors for 1997, and similar investments are anticipated through the year 2010. CORFO-SAE estimates that ESVAL will invest over US$ 200 million from 1997-2010.

Equipment and services procurement will include:

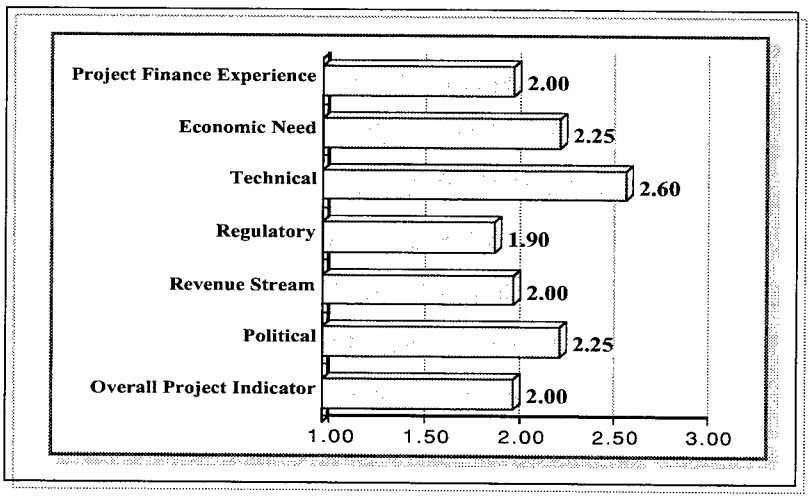
Equipment:

- Emissary
- Tubing
- Interceptors
- Pumps
- Flow Meters
- Monitoring Equipment
- Control Systems
- Tanks
- Flexible iron tubing
- Aqueducts

Services:

- Specialized engineering
- Technical inspection
- System development
- Installation
- Design

Critical Project Indicators



Key Decision Makers

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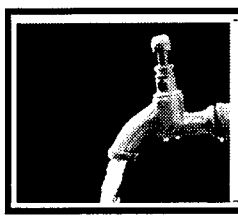


Environment / Chile

Privatization of ESSAL Water Utility

Project Summary

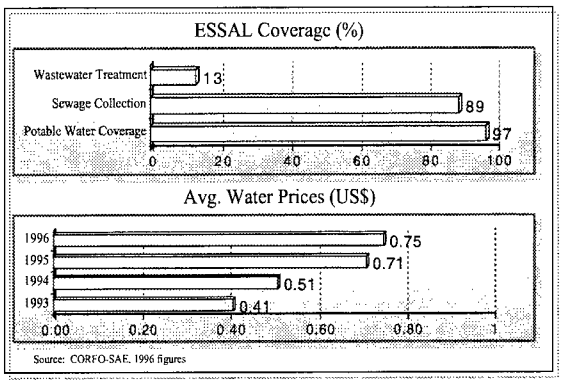
Project No:	**ENV-16**
Subsector:	**Potable Water & Wastewater**
Location:	**Puerto Montt, Chile**
Project Cost:	**US$ 50 million**
Export Potential:	**US$ 10 million**
Type:	**Privatization**
Sponsor:	**CORFO-SAE**

Corporación de Fomento de la Producción (CORFO) is a public entity responsible for economic development and industrial promotion throughout Chile's 13 regions. CORFO is currently the majority stockholder in the country's 13 state-owned water utilities.

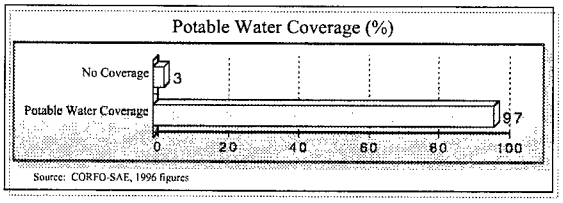
Under presidential directive, CORFO will sell its majority shares to the private sector. The Enterprise Management System (SAE), a newly-created division within CORFO, will be responsible for directing the privatization process. Once the law required for enabling private ownership in the sanitary sector is finalized, ESSAL and ESVAL will be the first of the 13 companies to be privatized.

Technical Description

ESSAL is responsible for the provision of potable water, sewage and wastewater services in Chile's Region 10, which has a population of approximately 500 million. As of 1996, potable water coverage in the 10th Region was 97%, sewage collection was 75% and only 18% of the population had wastewater treatment coverage. The company has an average water tariff of US$ 0.63/m^3.

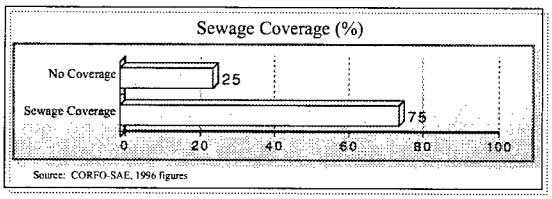


Potable Water Coverage



The coverage ratio for potable water services in Region 10 is 97%. Approximately 480,000 million inhabitants in the region have access to potable water, while 15,000 residents lack coverage.

In 1996, ESSAL produced 38.33 MM m^3 of potable water and invoiced 23.99 MM m^3, for a water loss of 37%.

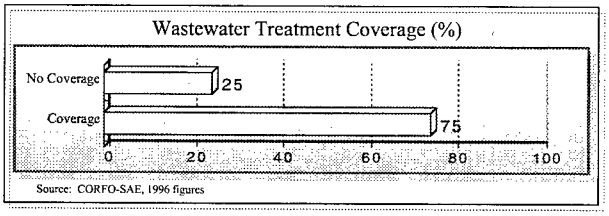


Sewage Collection

Sewage collection services in Region 10 cover 75% of the population, which corresponds to approximately 371,000 residents. A total of 123,589 residents have no access to sewage collection services.

Wastewater Treatment Coverage

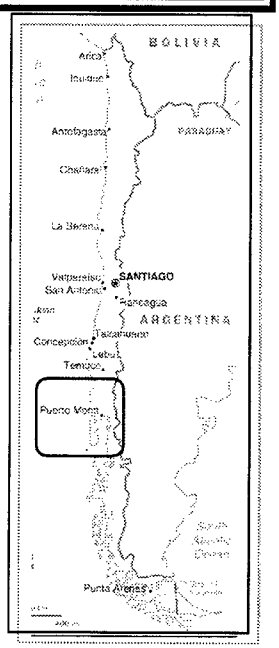
ESSAL's wastewater treatment services cover 18% of the population in Region 10. A total of 88,984 residents are serviced, while 405,372 residents are without coverage.



ESSAL currently has 6 wastewater treatment facilities in operation, including the Chonchi, Quellon, Puerto Montt, Los Muermos, San Jose and Purranque plants.

Site

ESSAL is located in the city of Puerto Montt and is responsible for potable water, sewage and wastewater treatment services for Chile's Region 10, which has a population of 494,356 inhabitants.



Nature of Demand

Achieving potable water and sewage coverage for 100% of the Chilean population is a high priority of the Frei Administration. In fact, President Frei has announced that he intends to reach not only this goal, but also 68% wastewater treatment coverage nationwide by the end of his term in office in March 2000. The federal government has determined that private investment and participation in the water sector are essential for achieving these objectives.

Project Status

In May 1995, a law for revising Chile's current water sector regulations was introduced on the floor of the National Congress. The new law will enable private sector companies to participate in the operation of the country's 13 state-owned water utilities. The proposed law has achieved Senate approval and is currently under review by a mixed congressional commission which will resolve controversial issues regarding sanitary law modifications so that the law can receive final approval.

The new sanitary law is expected to be approved by December 1997. Privatization of ESSAL should take place during the 3rd Quarter of 1998, followed by the privatization of ESSAR (Region 9) during the 2nd Quarter of 1999 and ESSAN (Region 2) by the 3rd Quarter of 1999.

Financing

CORFO holds a majority of ESSAL stock. The remainder is held by the General Treasury of the Republic. The federal government is expected to retain approximately 35% of the company's total equity, while 65% will be transferred to the private sector.

Equipment and Service Procurement

ESSAL is expected to invest nearly US$ 13 million in infrastructure development in the potable water, sewage and wastewater subsectors for 1997, and similar investments are anticipated through the year 2010. CORFO-SAE estimates that ESSAL will invest nearly US$ 150 million from 1997-2010.

Equipment and services procurement will include:

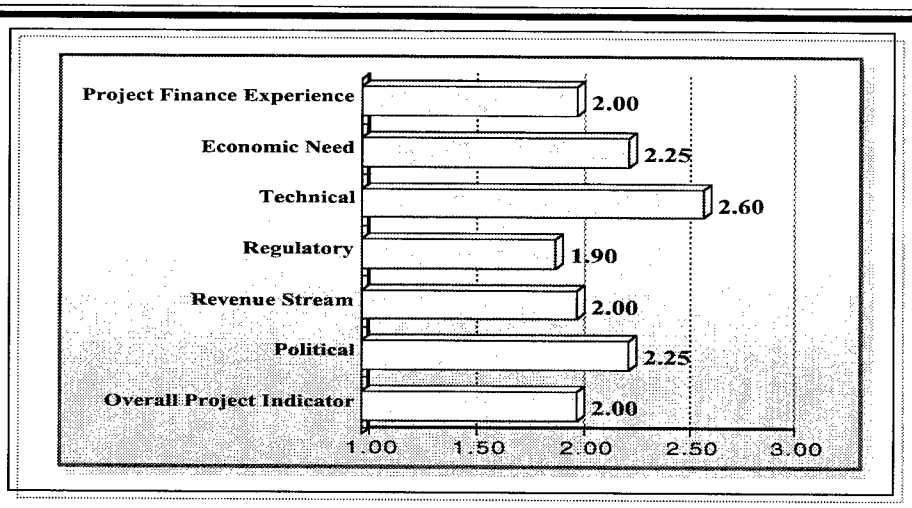
Equipment:

- Emissary
- Tubing
- Interceptors
- Pumps
- Flow meters
- Monitoring equipment
- Control systems
- Tanks
- Flexible iron tubing
- Aqueducts

Services:

- Specialized engineering
- Technical inspection
- System development
- Installation
- Design

Critical Project Indicators



Key Decision Makers

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Company	CORFO-SAE
Name	Manuel Rivera
Title	Director
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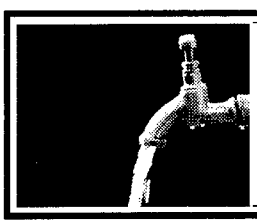
Telephone	562-365-6420
Fax	562-360-9016



Environment / Ecuador

Recuperation of the Guayaquil Estuary

Project Summary

Project No:	**ENV-17**
Subsector:	**Potable Water**
Location:	**Guayaquil, Ecuador**
Project Cost:	**US$ 130 million**
Export Potential:	**US$ 80 million**
Type:	**Procurement**
Sponsor:	**Municipality of Guayaquil**

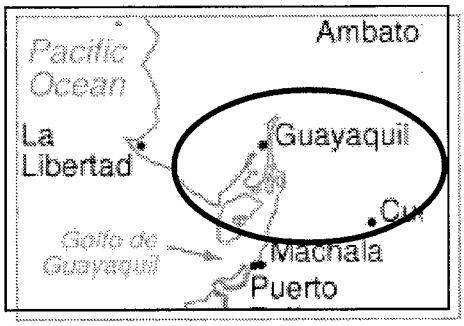
As the industrial heartland of Ecuador, Guayaquil is growing at an alarming rate. The Municipality of Guayaquil is therefore looking to recuperate the water and wastewater management system in order to meet this need.

Technical Description

The objectives of the project include the realization of studies needed to fulfill the requirement to recuperate the salted estuaries of Guayaquil. The directive includes the cleaning of water and the building of systems to provide the city with a cleaner and safer water supply.

Site

The Guayaquil estuary is located in the outskirts of the city. The "Estero Salado," or salted estuary is the name given to the waters in the arm of the Gulf of Guayaquil entering 70 Km into the city and making up various pools of deposited water for the city.



Nature of Demand

The city of Guayaquil has in the past years transformed itself into a mecca for international business. The country's exports and trade balance are all successively tied to the region. The city now accounts for a large portion of the development growth experienced by the country.

In response to such growth, the city must improve its current infrastructure. In doing so, the municipality of the city has aggressively taken on the challenge of providing more electricity, better water and smoother roads.

Project Status

Currently, the Municipality is looking for companies to complete the prefeasibility studies and the full feasibility studies. Once completed and analyzed, the project should move forward toward implementation.

Financing

The city of Guayaquil will make most of the investment in equipment and services. CONADE, the Secretariat of Planning and National Development will disperse funds provided by the Inter-American Development Bank (IDB) up to 20% of feasibility studies. For full implementation, the IDB has funded 80% of the prefeasibility, feasibility and selection of the best alternative for implementation.

Equipment and Service Procurement

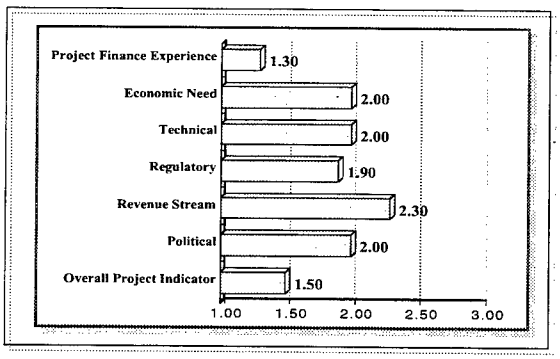
Equipment:

- Artificial Oxygenation Systems
- Drainage Machines
- Water Treatment Equipment
- Quality Control Monitoring Devices

Services:

- Water Control Specialists
- Engineering Specialists
- Specialized Consulting
- Purchasing and Shipping

Critical Project Indicators



Key Decision Makers

Company	Municipality of Guayaquil
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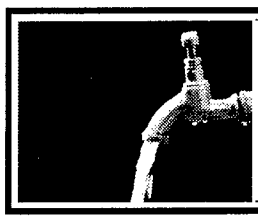


Environment / Peru

Tacna Potable Water and Wastewater Expansion

Project Summary

Project No:	**ENV-18**
Subsector:	**Potable Water and Wastewater**
Location:	**Tacna, Peru**
Project Cost:	**US$ 32 million**
Export Potential:	**US$ 12 million**
Type:	**Procurement**
Sponsor:	**EMAPA TACNA**

Empresa Municipal de Agua Potable y Alcantarillado de Tacna (EMAPA TACNA) is the municipal entity responsible for providing potable water and wastewater services to the population of Tacna, which is located in southern Peru, near the Peruvian/Chilean border

Technical Description

The Tacna Potable Water and Wastewater Expansion project involves:

Potable Water

- Well drilling in the Tacna Valley with a volume of 100 l/s
- Capacity expansion of Alto Lima water treatment plant from 50 l/s to 400 l/s
- Residential meter installation
- Water storage expansion by 11,000 m^3
- Construction of 120 Km of networks and 17,600 residential connections

Wastewater Treatment

- Installation of aerators with a 132 l/s capacity and a 300 HP installed potential
- Construction of the La Yarada wastewater plant with a 145.9 l/s capacity
- 107 Km collection system and residential connections (19,800 units)

Existing Infrastructure

Potable Water

The city of Tacna currently sources its potable water supply through surface water collectors on the Uchusuma Canal (350 l/s), in addition to well water from the Ayro Region and the Caplina Canal (50 l/s). Well water from Sobraya (10 l/s) is also used.

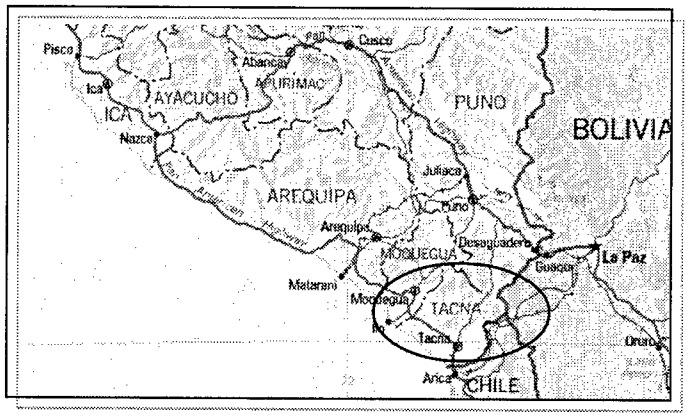
Water sourced from the Uchusuma and Caplina canals is transported to the potable water plants of Calana (350 l/s) and Alto Lima (50 l/s), which are experiencing operational problems. Tacna has 6 treated water reserve tanks with a capacity of 17,400 m^3 and 335 Km of tubing.

Wastewater

The wastewater system includes a 253 Km network of secondary collection which transports wastewater through principal collectors to the Tacna wastewater treatment plant. The plant has 2 aerating pools followed by 2 stabilization pools with a 132 l/s capacity.

Site

The city of Tacna, capital of the Department of Tacna, is located near the Peruvian/Chilean border and in the center of the Valley of Caplina/ Uchusuma.



Nature of Demand

The project will enable EMAPA TACNA to meet current and future demand for potable water and wastewater in the city of Tacna through the year 2015. EMAPA TACNA estimates that without this project, unmet demand in Tacna would reach approximately 285 l/s through the year 2000 and 860 l/s in 2015.

The expansion project has total local, regional and federal government backing and has been approved by PRONAP, Peru's governmental authority overseeing water sector-related infrastructure development outside of Lima.

Project Status

EMAPA TACNA has already completed feasibility studies for the project. Definitive studies are currently underway and are expected to be completed in June 1998. Project implementation will begin in 1999, with a 1-year expected duration.

Financing

Tacna Potable Water System
1st Phase Investment

Year	Intake	Treatment	Transport	Reservoir	Network	Meters	Environ-ment	Total
1997	0	0	0	0	0	$471,497	0	$471,497
1998	$72,605	$58,420	$20,152	$32,002	0	$572,263	0	$755,442
1999	$1,626,359	$1,283,155	$451,406	$716,887	$62,788	$649,623	$44,388	$4,834,606
2000	0	0	0	0	$1,444,194	$808,204	0	$2,252,398
2001	0	0	0	0	$885,300	$231,924	0	$1,117,223
2002	0	0	0	$19,443	$916,475	$243,353	0	$1,179,271
2003	0	0	0	$435,529	$948,704	$255,336	0	$1,639,569
2004	0	0	0	0	$982,021	$267,900	0	$1,249,921
2005	0	0	0	0	$1,012,419	$281,072	0	$1,293,491
2006	0	0	0	0	$957,128	$278,062	0	$1,235,190
2007	0	0	0	0	$986,213	$290,675	0	$1,276,888
2008	0	0	0	0	$1,016,122	$303,845	0	$1,319,967
2009	0	0	0	0	$1,046,876	$317,596	0	$1,364,472
Total	$1,698,965	$1,341,575	$471,558	$1,203,861	$10,258,241	$4,971,348	$44,388	$19,989,935

Source: Hidroservice / BWAS

EMAPA intends to finance 70% of the project through Inter-American Development Bank (IDB) resources. The remaining 30% is anticipated to come from internal funds and internal credits from FONAVI, the National Housing Fund.

Tariffs for potable water and wastewater service, estimated to be US$ 0.6442 per m^3 for both services, will generate a sufficient return on investment for the project.
(Exchange rate: S2.6387/$ Sept 2, 1997)

Tacna Wastewater System
1st Phase Investment

Year	Network	Collector	Treatment	Environment	Total
1998	0	0	$146,209	0	$146,209
1999	0	0	$1,388,989	$43,745	$1,432,734
2000	$724,308	0	$1,388,989	0	$2,113,297
2001	$669,263	0	0	0	$669,263
2002	$695,110	0	0	0	$695,110
2003	$721,876	0	0	0	$721,876
2004	$749,591	0	0	0	$749,591
2005	$778,286	0	0	0	$778,286
2006	$701,297	0	0	0	$701,297
2007	$723,545	0	0	0	$723,545
2008	$746,428	0	0	0	$746,428
Total	$6,509,705	0	$2,924,187	$43,745	$9,477,637

Source: Hidroservice / BWAS

Equipment and Service Procurement

Equipment and services procurement will include the following:

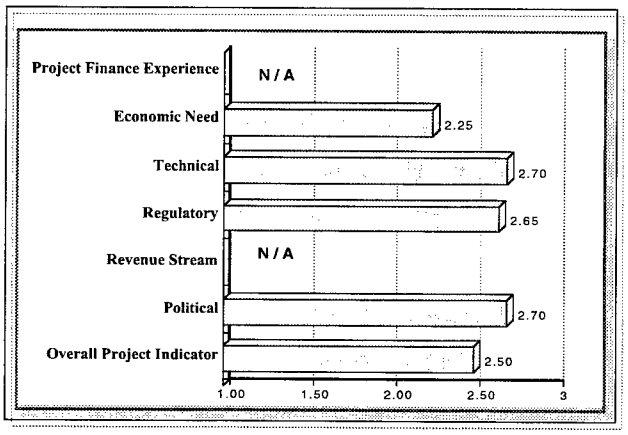
Equipment:

- Micrometers
- Aerators (132 l/s capacity, 300 HP installed potential)
- Collection system (107 Km)
- Tubing

Services:

- Specialized engineering
- Environmental studies
- System development

Critical Project Indicators



Key Decision Makers

Company	EMAPA TACNA
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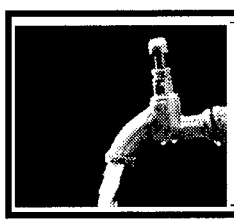


Environment / Uruguay

Montevideo Sewage Expansion
Program Phase III

Project Summary

Project No:	**ENV-19**
Subsector:	**Wastewater**
Location:	**Montevideo, Uruguay**
Project Cost:	**US$ 200 million**
Export Potential:	**US$ 20 million**
Type:	**Procurement**
Sponsor:	**Intendencia Municipal de Montevideo**

In 1854, Montevideo was the first city in Latin America to offer sewage collection services to its population. By 1920, the control of basic sanitation in Montevideo was transferred over to the city, and the city implemented a plan to meet sustained growth (in basic sanitation demand) until 1950.

From the 1950s onward, Montevideo's sewage service suffered due to under-investment and industrialization, leading to contamination of the southern coast and low service quality levels in the city.

In the 1970s, studies were conducted to determine how to remedy the situation, which culminated in an overall basic sanitation program for the city of Montevideo to increase and improve sewage collection coverage and treatment. The program was financed by the Inter American Development Bank and put in motion in 1991. The first and second phases of the program have already been concluded and the third phase is underway.

Technical Description

The objective of the project is to expand and improve the sewage collection and disposal system of the city of Montevideo, including the construction of pre-treatment units.

Specifically Phase III entails:

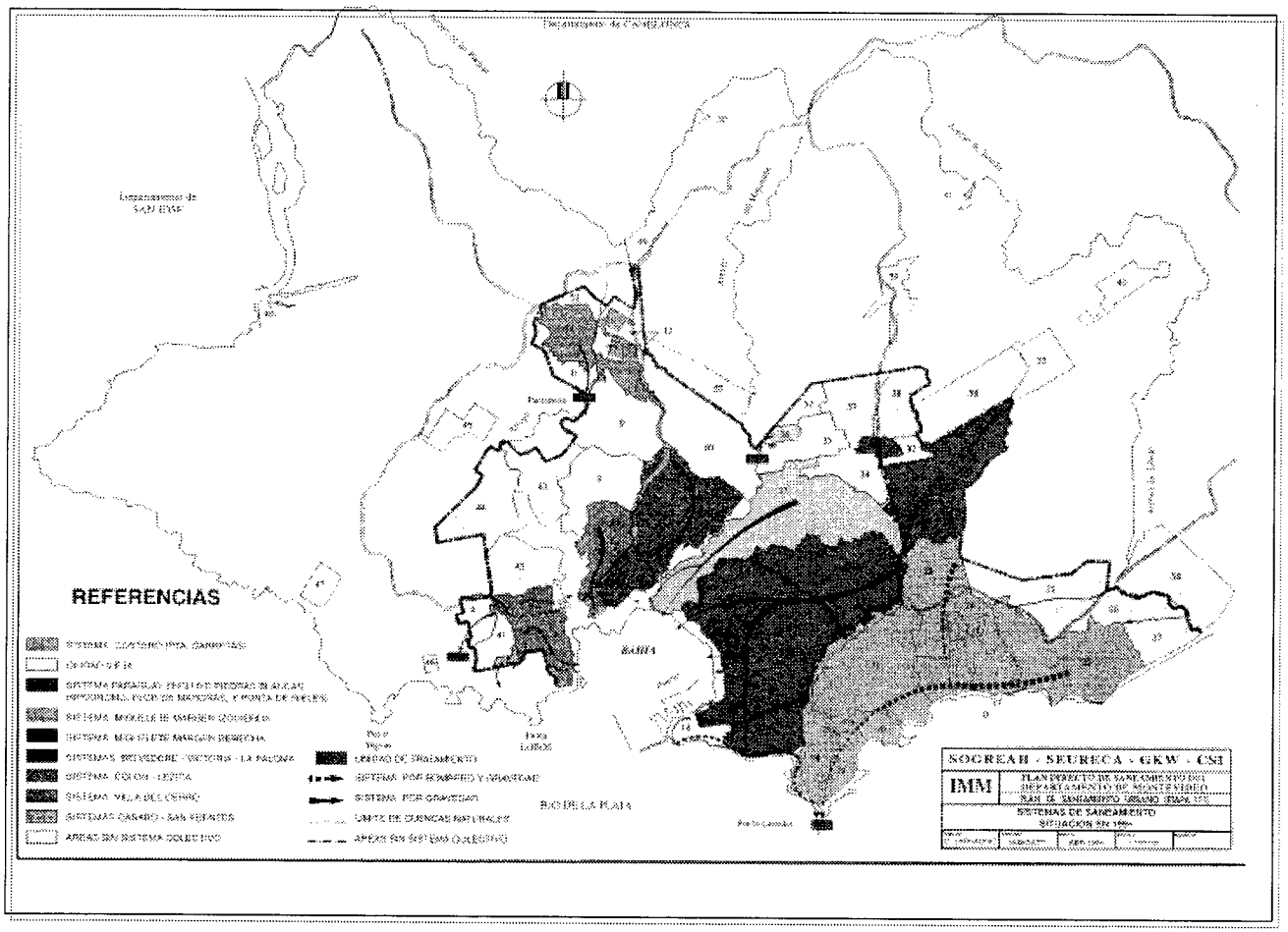
- Expansion of sewage and storm drainage systems: The project envisions expansion of 45.5 Km of drainage networks and 32 Km of sewage collection networks
- Construction and expansion of sewer mains
- Construction and expansion of interceptors
- Construction of 18 pumping stations
- Construction of 3 pre-treatment plants with outfalls
- Rehabilitation of the existing sewage collection network

The project also entails a strong consulting component which includes:

- creating a solid waste master plan
- establishing details for design of network expansion system
- optimizing operations and maintenance activities
- creating an industrial pollution monitoring and control plan

Site

The project is located in the Montevideo metropolitan region, servicing a population of 1.3 million in an area of 2,850 ha.



Nature of Demand

The project will reduce industrial and household pollution in the city's water bodies, particularly in the Pantanoso, Miguelete and Carrasco watersheds and Montevideo bay. The impetus for the project is to avoid the degradation of water bodies and improve living standards for the population in the Montevideo metropolitan region.

The project will service an additional 153,000 people, attaining a sewage collection population coverage ratio of 90.8 % by the year 2,000. The current coverage ratio is 80.2 %.

Project Status

The first two phases of the "Plan de Saneamento Urbano de Montevideo", the Montevideo Urban Sanitation Program, have already been executed.

The current phase (III) is underway, and approximately US $30 million worth of equipment and consulting services have already been bid. Bids are on-going.

Financing

The project is being financed by the Inter American Development Bank. The breakdown of sources of funds for phase III is as follows:

- Inter American Development Bank — US$ 153 million
- Local Government (Montevideo and Federal) — US$ 65 million

The project is a continuation of a program which has been successfully implemented to date, and counts with strong political support. Procurement is on schedule and will be conducted through an international public bidding process.

Equipment and Service Procurement

Approximatly US$ 35 million in both equipment and services have already been procured. The remaining needs are the following:

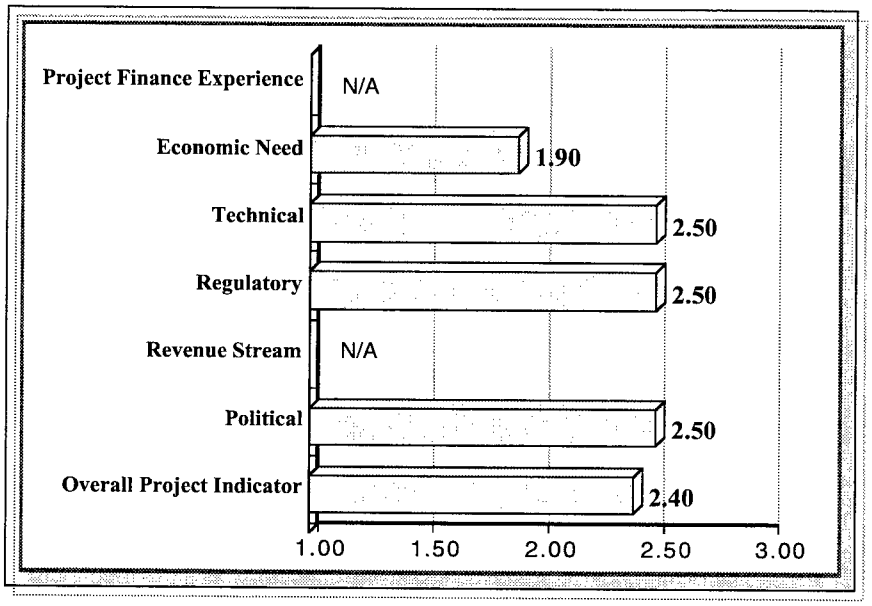
Equipment:

- Pumping Stations
- Monitoring Equipment
- Interceptors
- Collection ducts
- Electromechanical assembly of pumping and pre-treatment stations

Services:

- Consulting services to formulate a solid waste plan and an industrial pollution monitoring and control master plan
- Design and engineering services
- Civil works such as tunneling, laying piping and rehabilitating of networks
- Consulting operations and maintenance activities

Critical Project Indicators



Key Decision Makers

Company	Intendencia Municipal de Montevideo
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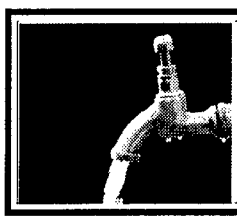
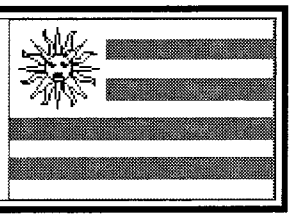


Environment / Uruguay

Maldonado Concession



Project Summary

Project No:	**ENV-20**
Subsector:	**Water & Wastewater**
Location:	**Maldonado, Uruguay**
Project Cost:	**US$ 140 million**
Export Potential:	**US$ 25 million**
Type:	**BOT**
Sponsor:	**OSE, Administración de las Obras Públicas del Estado**

OSE, the state administrator of sanitary works, is responsible for supplying the entire country (with the exception of the capital, Montevideo) with potable and wastewater service . The agency was established in December1952, and currently reports to the Ministry of Housing, Land Management and the Environment. Working under the recent framework for awarding concessions, the agency has been provided the authority to concession out water and wastewater management for the entire country. OSE plans to begin this process with the concessions of Maldonado, Colonias and Catelone. The Maldonado Concession is an OCE priority for the short-term, while Colonias and Catelones will be executed within the next year.

Technical Description

Maldonado Drinking Water System and Wastewater Disposal

The Maldonado Drinking Water System currently consists of five independent components: Maldonado, Punta del Este, San Carlos, Piriapolis and Pan de Azucar. Each system forms its own independent network with individual discharge sites.

Punta del Oeste provides for the treatment of water prior to discharge into the ocean. The plant removes thick solids, greases and floating material before being released into the open sea. The plant includes a thick manual cleaning grid, screw pumps, 3 thin automatic-cleaning grids, and 2 sand and grease removers.

Maldonado's sanitary network then pumps the discharge to Punta Piedras del Chileno where it is treated again and disinfected with chlorine gas prior to discharge. The facilities include a thick manual cleaning grid, sand remover, Parshall flow-gauge, 4 submersible pumps, 2 circular continuous sweeping settlers, chlorination contact chamber, 2 digesters and sludge compacting equipment.

The ***San Carlos System*** consists of a manual cleaning grid, sand remover and Inhoff tank. Effluent is discharged into the San Carlos River and the digested sludge is discharged onto drying fields.

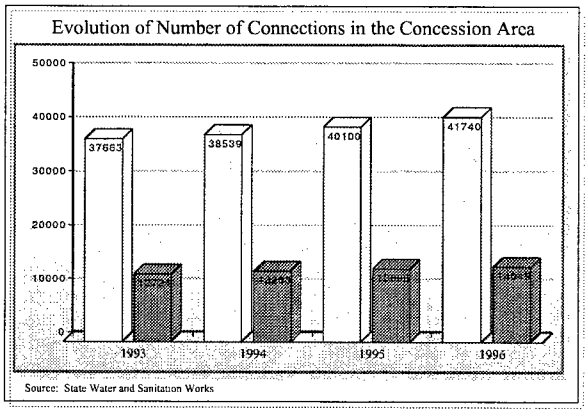
The Pan de Azucar System consists of a secondary treatment plant containing an active sludge treatment system. The treatment plant also receives discharge from the cesspool cleaning and emptying companies in the town that collect wastewater produced in areas without sewerage.

The Pirapolis system discharges untreated materials directly into the ocean.

Works to be Executed by OSE

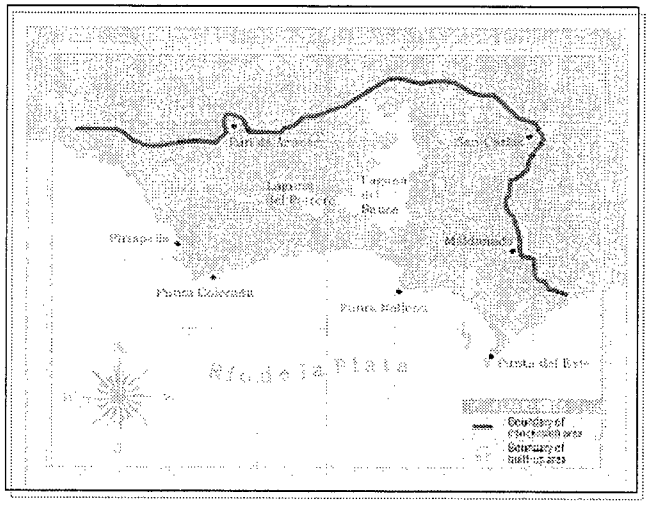
OSE will carry out improvements to the system in addition to the investments to be made by the concessionaire. These inlclude:

- Extension and modernization of the Laguna del Sauce treatment plant
- Reservoirs at Sierra Ballena
- Main pipeline to Maldonado-Punta del Este
- Main pipeline to Pan de Azucar
- Reinforcement of the main pipeline to San Carlos
- Mains from Piriapolis to Balneario Solis
- Reinforcement of the primary networks
- Operational development of the Maldonado-Punta del Este sub-system
- San Carlos wastewater disposal works
- Maldonado wastewater disposal works



Site

The Department of Maldonado is located 100 miles east of Montevideo on the southeastern coast of Uruguay on the Atlantic Ocean.



Nature of Demand

The Maldonado water and wastewater concession services the areas of Rio de La Plata, consisting of a total population of 66,000 customers for drinking water and 34,500 for wastewater *(please refer to table)*. In addition to such services, Maldonado is increasingly becoming a tourist attraction for Brazilians, Paraguayans, Argentine and Europeans visiting the Southern Cone. An influx of wealthy Uruguayans also vacation in Maldonado during the summer months.

Geographical Distribution of Connections and Customers

Service	Drinking Water		Sewage	
	Connections	Customers	Connections	Customers
Maldonado	13,310	17,225	4,521	7,062
Punta del Este	11,342	29,000	2,581	18,074
San Carlos	7,749	9,029	4,190	5,074
Piriápolis	7,055	8,617	1,985	3,198
Pan de Azucar	1,855	2,259	925	1,121
Total	41,509	66,130	14,202	34,529

Source: State Water and Sanitation Works

Project Status

The concession process is currently underway. The data room will be opened to companies that qualify. The final tender will be published in 1998. The bidding will be open to all companies, even if they did not submit expressions of interest. The deadline for expressions of interest closed on September 12, 1997.

Financing

The project will rely entirely on funds provided for the concession, currently valued at US$ 140 million. Total concession value may change as bids may fluctuate between companies. The concession is currently slated for a period of 30 years. The process will turn over all aspects of running the services, including maintenance and receivables management.

Characteristics of the Concession

- Physical concessions include existing facilities formed by 40,000 water connections and 14,000 sewer connections.
- Works that the OSE has begun or is in the process of implementing.
- Sanitation works to be executed at US$ 140 million.

Corporations that have experience and expertise in drinking water operations and sanitary systems of similar size to Maldonado are invited to participate. In consideration of the need for the execution of additional investments as dictated by the bid, the concessionaire must be adequately linked to a company that can fulfill the construction and engineering services required.

The concession is split into two significant periods. The first of these periods covers the initial 6 years wherein 50% of the concessions investment will be made. The remaining 50% of investment will be conducted from the 7th to the 30th year. The second period will comprise works contemplated in the preliminary studies conducted on the ocean outfall and new areas provided with sewage management systems.

Equipment and Service Procurement

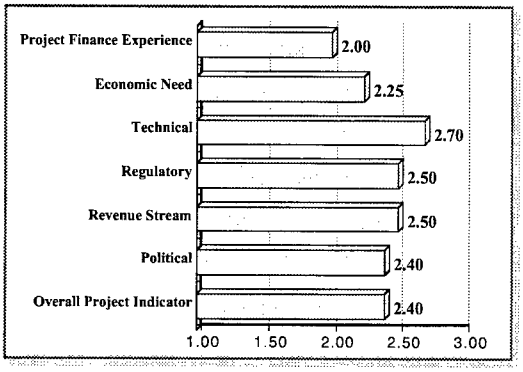
Equipment:

- Filtering systems
- Stirring and flocculation equipment
- Electrical wiring
- Transformer stations
- Water tanks
- Cleaning grids
- Sand removers
- Oxidation ditches
- Chlorination and declorination equipment
- Pumping well
- Pipeline
- Submersible pumps
- Chlorination and contact chamber
- Sludge compacting equipment
- Digesters

Services

- Specialized hydra-engineering
- Construction management
- Construction engineering

Critical Project Indicators



Key Decision Makers

Company	OSE Administración de las Obras Sanitarias del Estado
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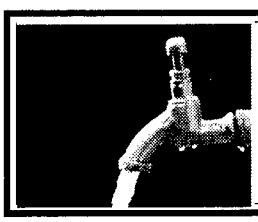


Environment / Venezuela

El Palito Refinery Process Wastewater and Oily Sludge Treatment Management Project

Project Summary

Project No:	**ENV-21**
Subsector:	**Water Treatment**
Location:	**El Palito, Venezuela**
Project Cost:	**US$ 43 million**
Export Potential:	**US$ 15 million**
Type:	**Procurement**
Sponsor:	**Corpoven, S.A.**

Corpoven is a vertically integrated corporation of PDVSA (Petróleos de Venezuela S.A.), Venezuela's state-owned oil company. Covering exploration, production, refinement, transportation, and commercialization of oil and gas, Corpoven is the chief operator in the eastern, central western and southern regions of Venezuela. The company currently operates 3,300 wells, three refineries, one fractionation plant and one cryogenic complex integrated with two liquid natural gas extraction plants. In addition, the company runs three shipping terminals, 4,000 Km of oil pipeline, 5,000 km of gas pipelines, two distribution systems for combustibles and 762 service stations.

In order to comply with Presidential Decree No. 883 of 1995, Corpoven's El Palito Refinery is required to revamp its existing effluent treatment system and construct new processing plants with more efficient environmental technology. The Wastewater and Oily Sludge Treatment Project will address this requirement.

Technical Description

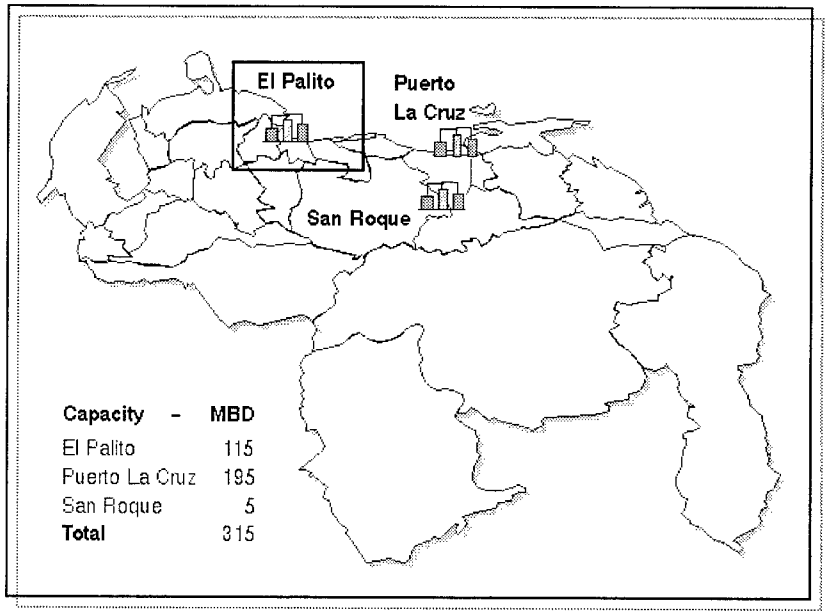
The project will include equipment upgrades within El Palito's existing wastewater treatment plant plus new facilities geared toward pretreatment at the source and waste minimization. The overall

project will require feasibility studies to address design and technological issues, as well as engineering services, equipment procurement, construction and start-up or revamp of the following units:

- Activated Sludge Plant
- Marine Outfall and Diffuser System
- Improvements in Oil Treatment
- Sour Water Pretreatment Plant
- Crude and Fuel Oil Tank Drainage Pretreatment
- Olefins Merox Spent Caustic Pretreatment
- Spent Naphtha Merox Solvent Pretreatment
- Fuel Oil Reservoir Residual Water Pretreatment
- Improvements to Alkylation Neutralization Section

Site

Corpoven's El Palito Refinery is located on Venezuela's northern coast, approximately 100 miles west of Caracas and 25 miles north of Valencia. The 1960's Refinery includes a BTX complex and an MTBE TAME plant, which were completed in 1989 and 1992 respectively. The refinery currently produces 117 thousand barrels per day.



Nature of Demand

Environmental legislative reform is a growing trend throughout Latin America, sparked by the Rio Summit, the spread of bi and multilateral trade agreements and an increasing environmental sensitivity among the Latin American public. Heightened regional and international attention focused on the hazards of emissions and wastewater contamination has prompted many Latin American governments to adopt stricter environmental standards. Compliance with new environmental regulations is forcing companies throughout the Americas, particularly in the energy sector, to upgrade and refit existing facilities with environmental technology which will enable them to operate at permissible effluent and emissions levels.

Corpoven has developed an aggressive strategy in response to environmental legislative reform in Venezuela. Specifically, the company intends to proactively address new regulations which dictate permissible effluent quality as established by the Venezuelan Ministry of the Environment. In doing so, Corpoven plans not only to lead the Venezuelan oil and gas industry in environmental standard compliance, but also to meet or exceed international regulatory standards.

Project Status

The project is currently undergoing feasibility studies of various magnitudes. The company under contract to carry out the studies is Harza Engineering. Studies are projected to be completed by late 1997 or early 1998. By the year 2000 it is expected that all at-source wastewater reduction projects will be ready for full start-up and operation.

PROJECT	Total MS	1996	1997	1998	1999	2000	2001	2002	2003	2004
Project Approval										
Feasibility Study										
Activated Sludge Plant and Improvements	19.10									
Marine Outfall and Diffuser System/Contingen	6.10									
Segregation and Collection Systems	5.80									
Alkylation Neutralization Section Expansion	5.70									
Effluents Pre-Treatments	4.60									
Sour Water Plant	2.10									
INVESTMENT	43.40	1.80	4.30	9.00	10.30	9.70	4.30	1.50	1.50	1.00

Financing

This project will be 100 % financed by Corpoven, whose total investment is expected to reach approximately US$ 43 million.

Equipment & Service Procurement

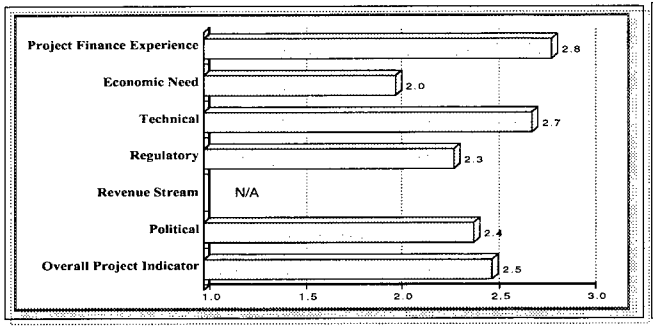
Equipment and Facilities:

- Activated Sludge Plant
- API / DAF Units
- Equalization Tanks
- Marine Outfall and Diffuser System
- New Sour Water Plant
- Improved Condition System
- Improved Tank Trains and Collection Sewers
- New Instrumentation and Control Room

Services:

- Engineering and construction services
- Feasibility study

Critical Project Indicators



Key Decision Makers

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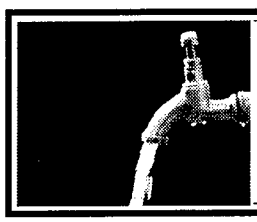
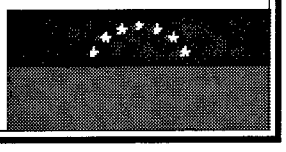


Environment / Venezuela

Cardón Refinery Environmental Compliance Projects



Project Summary

Project No:	**ENV-22**
Subsector:	**Wastewater, Air Pollution, Oily Sludge Disposal**
Location:	**Falcón, Venezuela**
Project Cost:	**US$ 74 million**
Export Potential:	**US$ 48 million**
Type:	**Concession**
Sponsor:	**Maraven S.A.**

Maraven S.A. is one of three major holding companies under PDVSA, Venezuela's state-owned oil and gas producing company. The Cardón Refinery Environmental Compliance Projects will enable Maraven to adhere to current environmental regulations in Venezuela governing the activities of the petroleum industry. The projects follow the timeline of activities which Maraven submitted to the Venezuelan Environmental Ministry (MARNR).

Technical Description

Maraven S.A. plans to grant a concession for the implementation of 3 environmental compliance projects at the Cardón Refinery. The projects include the following sub-sectors: wastewater treatment, air pollution control and oily sludge disposal.

Wastewater Treatment Projects

Treatment of Processed Water (TAP)
The fundamental objective of the project is to separate processed water from oily and cooling water. Once separated, the processed water is treated to eliminate oils, sulfurs, ammonia and other contaminants prior to being discharged into the ocean.

Treatment of Oily Water (TAA)
Involves the collection and treatment of all water in the refinery which is susceptible to contamination by hydrocarbons. The water is funneled through a network of tubes and collection tanks to an existing API Separator, before receiving secondary treatment.

Treatment of Black Water (TAN)
Involves the recuperation and refitting of 60 existing septic tanks and sewers, in addition to the construction of installations capable of receiving black water from the vessels/tankers which dock at the 4 piers of the refinery. A network of black water collectors will be constructed in the refinery's administrative buildings. The collectors will be sent to the refinery's existing wastewater treatment plant.

Air Pollution Control

Emissions Control in Sulfur Recovery Plants
The project will control emissions of sulfur dioxide (SO2), hydrogen sulfide (H2S) and particles in 2 existing sulfur recovery plants following current environmental guidelines in Venezuela. Emissions control will require modifications of the 2 plants, in addition to the incorporation of new technologies for the treatment of gases.

Catalyst Disintegration Emissions Control
Entails control of total particle emissions (refined catalyst) in the catalytic disintegration unit through the installation of electrostatic precipitators. It will also be necessary to revamp the carbon monoxide boiler to reduce its CO emissions. Maraven might consider the possibility of installing a new boiler.

Storage Tanks Emissions Control
Involves the installation of internal floating coverings in 34 crude and refining product storage tanks. The coverings will permit adequate storage of each product in accordance with its RVP while eliminating harmful hydrocarbon emissions.

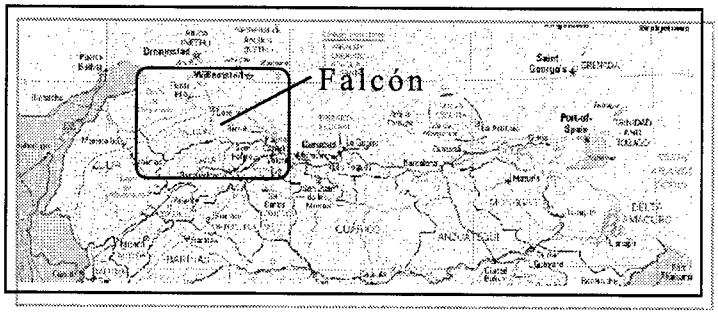
Modernization of the Operation of Ovens in the Distillation Units, the Gas Plant and the Tar Decomposing Plant
The project will define and implement the best operational types of ovens available for use in the Cardón Refinery's distillation units, gas plant and tar decomposing plant. The new ovens will reduce current levels of carbon monoxide and align them with environmental regulations standards.

Oil Sludge Disposal

The oily sludge project will identify, design and install in the Delayed Coker Unit new equipment and modifications to existing equipment which will permit the disposal of the oily sludge which the refinery generates.

Site

All of the environmental compliance projects will be undertaken on the site of Maraven's Cardón Refinery, which is located in the urban area of Punto Fijo-Los Taques, in the municipality of Carirubana. Carirubana is situated in the southeastern sector of the Paraguaná Penninsula in the state of Falcón (one of Venezuela's 22 states), which lies approximately 350 miles from Caracas.



Nature of Demand

The project is being driven by the necessity to comply with current environmental regulations in Venezuela and to carry out Maraven's internal policies with respect to environmental conservation. Failure to comply with regulations would generate considerable costs in the future in terms of environmental clean-up, penalties and fines. In addition, Maraven believes environmental compliance is essential for maintaining a solid corporate image, good relationships with neighboring communities, a strong position in the hydrocarbon market and the commercial acceptance of its products.

Project Status

The Cardón Refinery Environmental Compliance Project is composed of sub-projects, each with its own execution timeline which has been approved by the Environmental Ministry.

Wastewater Treatment
The wastewater treatment program is 30% complete, and the 3 sub-projects will be completed by December 2000.

Treatment of Processed Water (TAP)
- Currently undergoing detailed and construction engineering studies.

Treatment of Oily Water (TAA)
- Basic engineering stage estimated to be completed in December 1997. Detailed engineering, procurement and construction should begin during the 1st Quarter of 1998, with completion scheduled for July 2000.

Treatment of Black Water(TAN)
- Contracting phase for basic and detailed engineering, which should be completed in July 1998. Equipment procurement is expected to begin during the 4th Quarter of 1998, with construction slated for 1999.

Air Pollution Control
INTEVEP is currently undertaking conceptual engineering for the 4 pollution control sub-projects. The US Trade and Development Agency is funding the feasibility study for the FCC (Catalytic Disintegration Plant) through a US$ 94,000 grant, while Maraven is providing US$ 23,000. The Air Pollution Control sub-projects will be completed by the year 2008.

Emissions Control in Sulfur Recovery Plants
- Will be executed during the next general shut-down of the plants, slated for the year 2003. Basic engineering studies will commence in 1999.

Catalyst Disintegration Emissions Control
- Will be executed during the next general shut-down of the plants, slated for the year 2003. Basic engineering studies will commence in 1998.

Storage Tanks Emissions Control
• Will be executed during the general repair process for each tank, which should begin for the first 10 tanks in 1998. The project is expected to be completed in the year 2008.

Modernization of the Operation of Ovens in the Distillation Units, the Gas Plant and the Tar Decomposing Plant
• Currently in the conceptual engineering stage. Detailed engineering is slated for the 2nd Quarter of 1998, procurement during the 1st two quarters of 1999 and installation and start-up in 1999.

Oily Sludge Disposal
Foster Wheeler is conducting a feasibility study to identify disposal options in the delayed coker unit. The project will be implemented during the next general shut-down for unit maintenance, slated for the year 2000. Detailed engineering and procurement should occur in 1999.

Financing

Maraven S.A. has not yet defined the financial structure of the project, and plans to delineate project financing through the upcoming feasibility study. However, the company is considering BOO, BOT, BLT and Take or Pay schemes. Maraven prefers to use non-recourse financing for the project, through a Single Purpose Company (SPC).

Estimated Cost
(US$ million)

Wastewater Treatment	39.0
Air Pollution Control	29.5
Oil Sludge Disposal	5.0
Total	73.5

Equipment & Service Procurement

Equipment:

Wastewater Treatment
- Pumps
- Induced Flotation Units
- Steel Tubing
- Electric Motors and Aerators
- Chemical Products
- Tanks

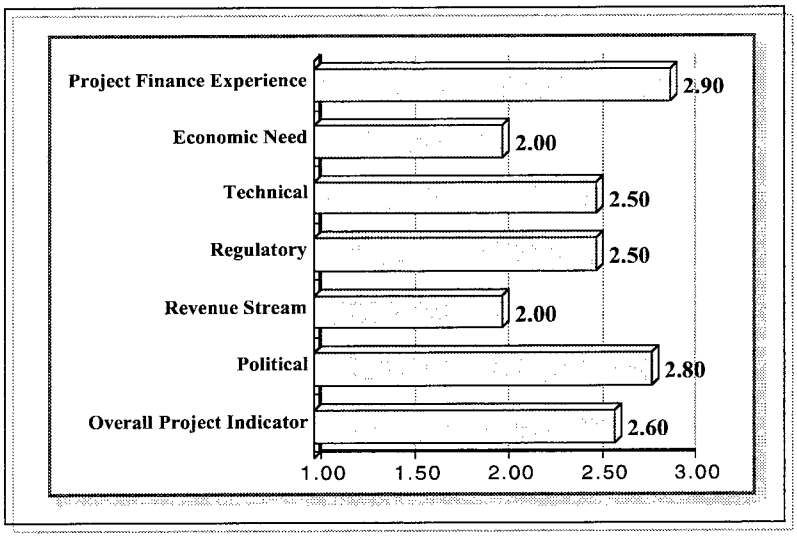
Air Pollution Control
- Pumps
- Drums
- Carbon Monoxide Boiler
- Electrostatic Precipitator
- Reactors
- Tubing
- Connections
- Valves

Oily Sludge Disposal
- Pumps
- Filters
- Controls
- Centrifuges
- Electric Motors
- Tubing
- Valves
- Tanks
- Chemical Products

Services:

- Civil, Sanitary, Environmental & Industrial Engineering
- Chemical and Mechanical Specialists
- Administration of Resources and Project Control

Critical Project Indicators



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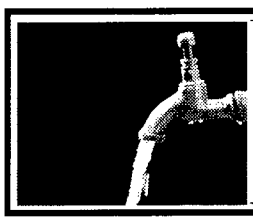
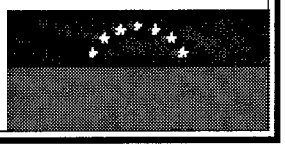


Environment / Venezuela

Monagas - Potable Water and Wastewater



Project Summary

Project No:	**ENV-23**
Subsector:	**Potable Water & Wastewater**
Location:	**Monagas, Venezuela**
Project Cost:	**US$ 71 million**
Export Potential:	**US$ 30 million**
Type:	**Procurement**
Sponsor:	**Aguas de Monagas, C.A.**

Aguas de Monagas, C.A, formerly the state-owned water company of Monagas, is now owned by Ingenieros Dragados de España. The company plans to improve potable water and wastewater services in the State of Monagas through decentralization, institutional strengthening and increased private sector participation, including increased foreign competition. The principal objective of the project is to increase the efficiency and quality of potable water and wastewater services in the State of Monagas.

Technical Description

The project involves the development of a model for decentralization, institutional strengthening and increased private sector participation in potable water and wastewater services for the State of Monagas. Specifically, the project will accomplish the following objectives:

- Institutional strengthening of Aguas de Monagas, C.A., including achieving financial autonomy and involving the private sector in the management and operation of the company
- Rehabiliting and improving of the quality of potable water and wastewater services in Monagas
- Establishing a framework for the development and decentralization of the potable water and wastewater sector at a national level, including the management of water resources

To accomplish these objectives, the project will include the following components:

Aguas de Monagas Operations

- Evaluation and improvement of commercial practices
- Supervision of the Aguas de Monagas management contract

Aqueduct & Sewage Systems

- A modernization and expansion plan for the aqueduct and sewage systems, includes final design of rehabilitation works financed under the project and development of a preventative maintenance program

Public Awareness & Client Satisfaction

- Implementation of a public awareness campaign
- Development of a client satisfaction survey and utilization of an ONG for evaluating the project's success

Rural Services

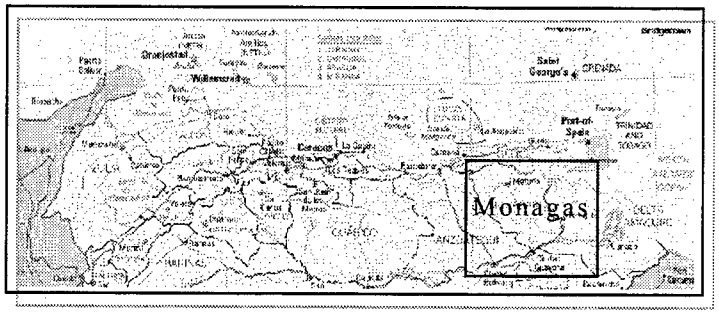
- Investments and technical assistance to improve rural potable water and wastewater services and to create managerial capacity at the community level
- Investments will include civil works, equipment and materials for the improvement and expansion of rural systems, with the objective of providing for a basic level of service

Macro-level Framework

- Promotion of private sector participation in the potable water and wastewater sector
- Training, equipment and general consulting services to promote and advance the modernization of the potable water and wastewater sector in Venezuela
- The introduction of the legal and regulatory framework currently under preparation for the sector, as well as the creation and strengthening of national institutions operating in the sector
- Studies, equipment and consulting services to support the design, creation and functioning of an Organization of Water Users (OUA), for the management of water resources in Venezuela

Site

The project will be executed in the state of Monagas, Venezuela.



Nature of Demand

The Venezuelan market for wastewater treatment and equipment is estimated at US$ 44 million for 1997, and is expected to increase by approximately 9% over the next 2 years. The US Department of Commerce estimates that the growth rate for imports of potable water supply and wastewater treatment equipment will reach approximately 8-10% over the next 3 years.

US companies are in a strong position to supply pumping systems, water filtering laboratory equipment to measure physical and chemical concentration parameters, bulldozers and trucks. Prospects for analytical instrumentation, automated control and monitoring equipment, physical-chemical processes, filtration products, sludge treatment, chemical and biochemical processes, pumping systems, pipes and fittings are also encouraging.

Project Status

The project is expected to begin by year-end 1997 and will be completed over a 4-year period. While there is an open bidding process for any projects over US$ 250,000, investment projects are only advertised locally. US competitors are encouraged to find joint venture partners with Venezuelan construction and engineering firms. Technical capability and equipment of US firms is needed for the modernization of the water project. The Monagas project is a pilot project that will serve as a model for the management of other water projects in Venezuela.

Financing

The World Bank is financing US$ 39 million for the restructuring of the Venezuelan water market. The Inter-American Development Bank is financing the US$ 5.5 million for institutional strengthening and the nationwide training program. The final US$ 26.5 million will be financed through a combination of federal government funds (US$ 10.3 million), state funds (US$ 2.7 million), municipal funds (US$ 1.4 million) and internal Aguas de Monagas funds (US$ 12.2 million).

Equipment & Service Procurement

Equipment and services procurement will include the following:

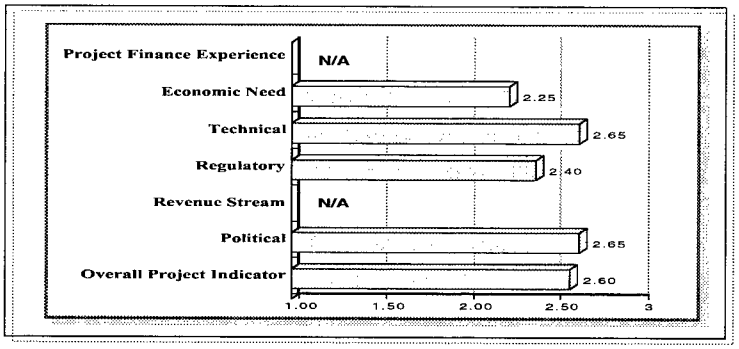
Equipment:

- Control systems
- Water pumps
- Tanks
- Flexible iron tubing
- Aqueducts
- Flow meters
- Monitoring equipment
- Tubing
- Interceptors

Services:

- Management consulting services
- Advertising, market research and promotional services
- Engineering services
- Design of preventative maintenance program
- Technical assistance
- Creation and strengthening of national institutions

Critical Project Indicators



Key Decision Makers

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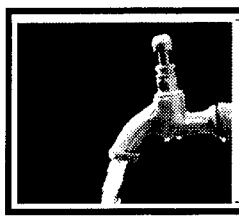
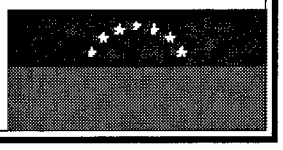


Environment / Venezuela

Hidrolara - Potable Water and Wastewater



Project Summary

Project No:	**ENV-24**
Subsector:	**Potable Water & Wastewater**
Location:	**Lara, Venezuela**
Project Cost:	**US$ 38 million**
Export Potential:	**US$ 10 million**
Type:	**Concession**
Sponsor:	**Hidrolara / Hidroven**

Hidrolara C.A., a subsidiary of state-owned Hidroven, is currently responsible for providing potable water and wastewater services in the state of Lara under a concession contract with state municipalities. Hidroven plans to contract a private sector management team to take over the administrative, technical, commercial and financial responsibilities of Hidrolara.

The company will also sign concession agreements with the private sector for the rehabilitation and modernization of Hidrolara's potable water and wastewater infrastructure. The principal objective of the project is to increase the efficiency and quality of potable water and wastewater services in the State of Lara.

Technical Description

The project involves the physical rehabilitation of distribution and treatment systems and the modernization of Hidrolara. The new management team will be responsible for developing and implementing adequate structure, operating and financial systems, procedures and manuals, and staff training programs needed for an effective corporate transformation.

Corporate Restructuring

Under the terms of the contract, management will be responsible for instituting the following systems:

- Integrated commercial system consisting of digitized invoicing and receivables
- System of accounting, budgeting, projection and cash flow management
- System of operational statistics, with an emphasis on performance indicators
- System of administration of physical assets, inventory and supplies

In addition, the restructuring program will undertake revising and modernizing the existing system for meeting client needs, as well as conducting a technical evaluation of corporate assets.

Technical Assistance

Institutional strengthening in this area will include situational diagnostics, internal audits, revision of accounting procedures, client satisfaction surveys, and methodologies for the extension of potable water and wastewater service to smaller localities.

Technical assistance will also be required for the development of the Master Plan for the supply of potable water, wastewater and rain water for the cities of Barquisimeto, Quibor, Tocuyo and Cabudare, as well as optimization studies for existing water plants and for the use of electromechanical equipment in the company's operations.

Infrastructure Rehabilitation / Modernization

Hidroven will also grant concessions to private operators for rehabilitating and modernizing existing infrastructure in Hidrolara's potable water and wastewater systems. The rehabilitation/modernization program will entail:

Phase One

- Rehabilitation, repair, replacement and modernization of electromechanical and hydraulic machinery in the Barquisimeto water plants, as well as the rehabilitation of wells in Macuto
- Optimization of water distribution network in Barquisimeto, including network sectorization, control valve installation, and other minor corrective measures necessary to minimize deficiencies and re-establish adequate operating conditions
- Incorporation of a commercial system for legal and illegal non-registered connections, estimated at 81,000
- Procurement, installation and replacement of water meters for approximately 17% of system connections

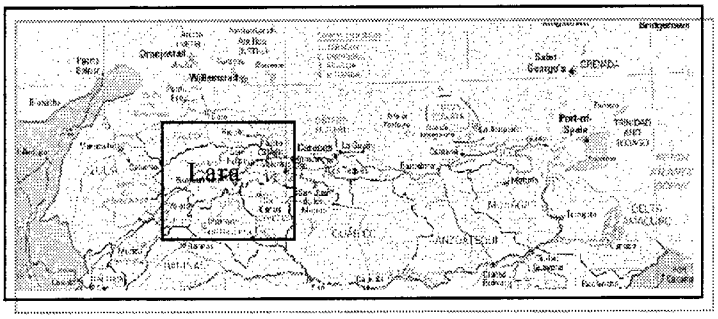
Phase Two

- Installation and replacement of water meters for approximately 33% of system connections
- Repair, replacement and modernization of electromechanical and hydraulic equipment in water plants servicing Barquisimeto and Carora
- Modernization of water tanks and pumping stations in Tocuyo and Villa Rosa

Phase Three

- Rehabilitation and replacement of collection system in the central zone of Barquisimeto
- Execution of minor installations to achieve greater operating efficiency and enhanced quality of service in the potable water and wastewater systems of smaller populations of the state of Lara.

Site



The project will be executed in the state of Lara, in Western Venezuela. With a total area of 19,800 Km^2, Lara represents 2.2% of Venezuelan territory and houses 9 municipalities, including the cities of Barquisimeto, Cabudare, Quibor and Carora.

Lara's population of approximately 1.3 million represents 6.1% of the country's total population. The municipality of Irribarren, whose capital is Barquisimeto, contains 60% of the state's population in an area which corresponds to 13% of Lara's territory. The municipalities of Torres and Urdaneta, however, hold 56% of the territory and contain only 15% of the population.

Nature of Demand

The Venezuelan market for wastewater treatment and equipment is estimated at US$ 44 million for 1997, and is expected to increase by approximately 9% over the next 2 years. The US Department of Commerce estimates that the growth rate for imports of potable water supply and wastewater treatment equipment will reach 8-10% over the next 3 years.

US companies are well-established suppliers of pumping systems, water filtering laboratory equipment to measure physical and chemical concentration parameters, bulldozers and trucks. Prospects for analytical instrumentation, automated control and monitoring equipment, physical-chemical processes, filtration products, sludge treatment, chemical and biochemical processes, pumping systems, pipes and fittings are also encouraging.

Project Status

Hidroven plans to award the management contract for Hidrolara on December 1, 1997. The bidding process for concessions relating to infrastructure rehabilitation and modernization, as well as developing a commercial system for unregistered water connections opened on November 1, 1997 and is expected to close on December 31, 1999.

The corporate restructuring program will begin on May 1, 1998 and should be completed by the year 2001. Infrastructure rehabilitation and modernization will commence in January 1998 and should be finalized in the year 2000.

Financing

The Inter American Development Bank will finance 50% (US$ 19 million) of the project's total cost through a loan agreement with the Venezuelan government. These funds, in addition to Hidrolara's internal cash flow, will be used to finance infrastructure rehabilitation and modernization.

The contracting organization responsible for corporate restructuring and institutional strengthening will provide capital to support the endeavor during the first 3 years of the contract. This variable cost will provide the private operator with an incentive to improve the operating efficiency and financial viability of Hidrolara.

Equipment & Service Procurement

Equipment and services procurement will include the following:

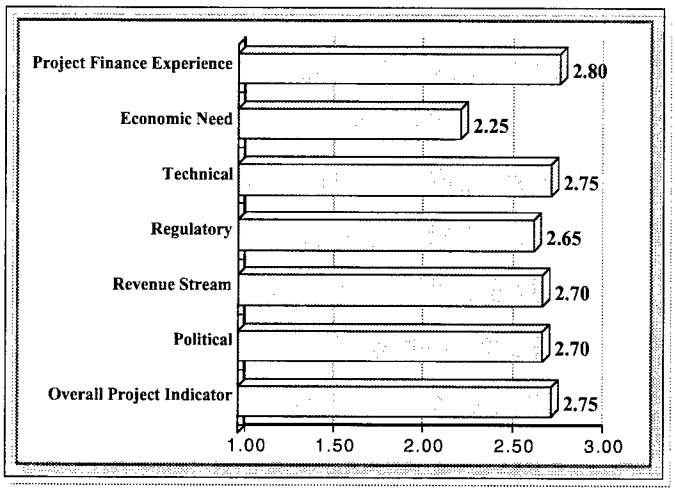
Equipment:

- Control systems
- Water pumps
- Tanks
- Flexible iron tubing
- Flow meters - (Macro/Micro)
- Monitoring equipment
- Tubing
- Interceptors
- Computers, printers, software

Services:

- Management consulting services
- Engineering services
- Technical assistance

Critical Project Indicators



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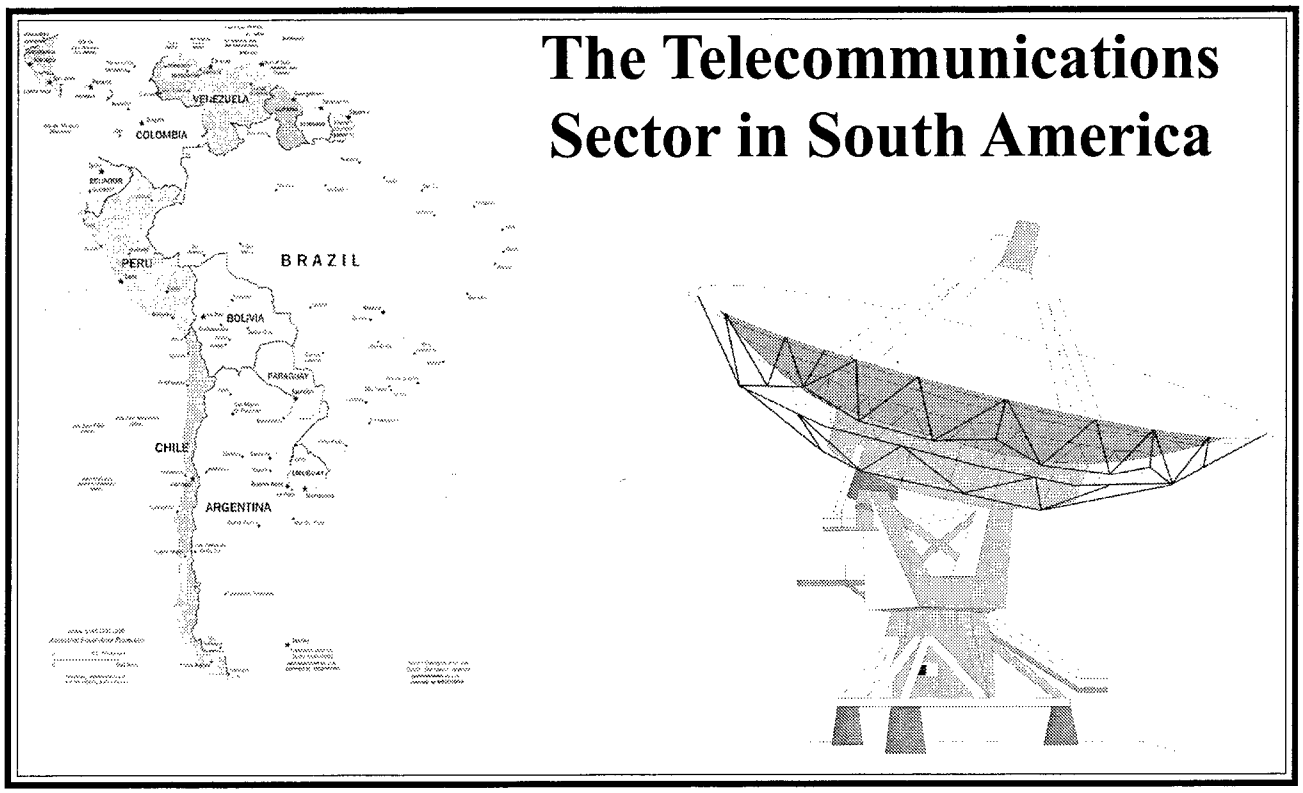


The Telecommunications Sector in South America

Introduction

Advances in information and communication technologies have created opportunities to improve quality and increase the delivery of a range of services from health care, education, agricultural and rural development, to banking and commerce. Many of the countries in South America, including some of the smaller economies, are recognizing that each country in the region must have modern telecommunications capabilities to be an attractive site for potential investors and to join the global information network.

6 Telecommunications Projects

Total Value	US$ 786 Million
US Export Potential	US$ 546 Million
Rural Telephony	2
PCS	2
Network Expansion Small Business	1
Telemedicine	1

The telecommunications revolution in Latin America has moved dramatically forward in many of the countries in South America, offering greater opportunities for the private sector and increased services for their citizens. Each country, however, remains in a different phase of transformation. The trend in South America is to liberalize the telecommunications sector while dealing simultaneously with issues such as universal service and regulation. The telecommunications related projects described here only cover some of the multitude of opportunities available to US investors in the region.

Liberalization

Around the region many countries are committed to full liberalization of their telecommunications market. In 1997 Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Peru and Venezuela signed the WTO telecom liberalization pact, committing themselves to opening their telecom markets fully to international investors. The 69-nation agreement covers 90% of the world's telecom market.

Many nations are recognizing the advantages to open competition in telecommunications. In the Government of Colombia's *Plan Nacional de Telecomunicaciones Section 3.5*, they analyzed the pros and cons of public monopolies and regulated competition. While they rationalied some areas of governmental control better served by state monopolies, they recognized a number of important disadvantages.

Advantages

- Greater government influence and ability to maintain subsidies for social telephony (universal service)
- Important cash flow for the government

Disadvantages

- Reduced access to investment capital
- Reduced access to foreign knowledge and technology
- Politization of decision-making
- Slower development of a crucial sector of economy
- Poor performance in meeting social goals.

On the other hand, the advantages for competitive telecommunications services included:

- lower prices
- greater access to capital
- greater services
- improved efficiency with a much faster introduction of new technologies

Chile led the way in privatizing, the telecommunications sector in 1989. The telecommunications sector in Chile has grown 14% since then. Others such as Peru, Argentina and Bolivia have followed in Chile's footsteps.

While many have privitized others remain in different stages of development. Ecuador is in the midst of privatizing ENTEL, the state-owned telecommunications company which was split into Andinantel S.A. and Pacifictel S.A. As of August 20, 1997 35% of the shares of each company will be sold to one or two national or international companies, which will

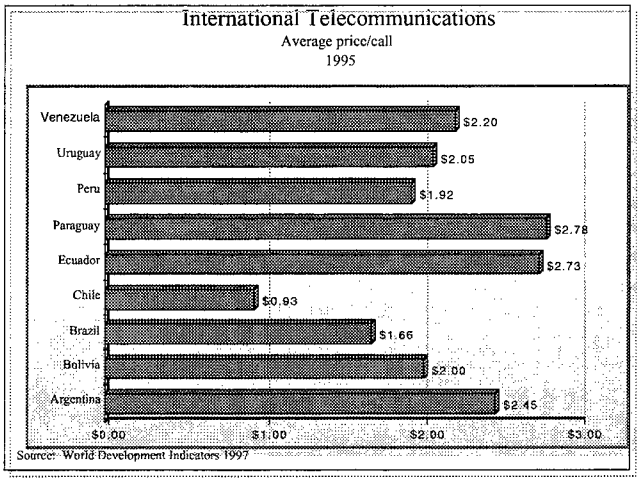
Acquisition of South American Telecom Companies

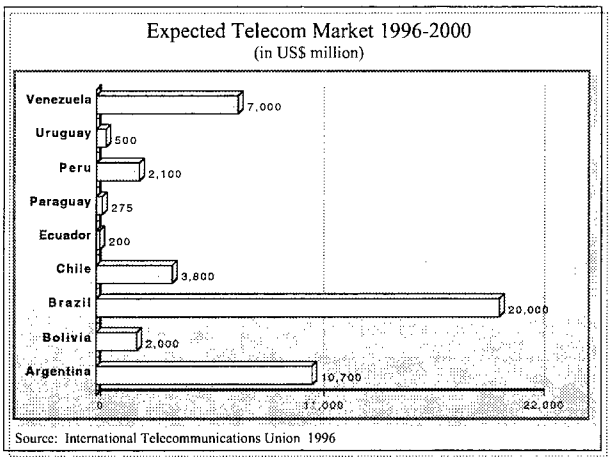
Country	Company	Year	Acquirer
Argentina	Telefonica de Argentina (South)	1990	Telefonica de Espana
	Telecom de Argentina (North)	1990	France Telecom & STET
Bolivia	ENTEL	1995	STET
Chile	CTC	1990	Telefonica de Espana
	Entel	1995	STET
Peru	CTP & Entel	1994	Telefonica de Espana
Venezuela	CANTV	1991	GTE

Source: Informatics 2000 Conference

be responsible for managing and operating the former state-owned entities. Additionally, Brazil passed its *General Telecommunications Law* in July 1997 paving the way for the eventual privatization of TELEBRÁS, the holding company for 27 regional telephone companies and the long-distance carrier EMBRATEL. The time-line is set to begin in early 1998.

Some countries, such as Uruguay, are not privatizing. In a 1992 public referendum, Uruguay overwhelmingly opposed the privatization of the state-owned telecom company, ANTEL. Paraguy's telecommunications sector is run by ANTELCO, a state-owned enterprise. Although state-owned, it has allowed private investment in mobile and other telecommunications since 1991. Many state-owned telecommunications companies have come under pressure for having artifically-high rates. Antel recently reduced its rates by 37%.





Others have entered the privatization market cautiously. An example is Venezuela. While partially privatizing some telecommunications services in 1991, CANTV in Venezuela will retains a monopoly on basic telephone services up to the year 2000. Even with these restrictions, the telcom market is the fastest growing market in Venezuela. Peru, on the other hand, has privatized the majority of the telecommunications market under a 5-year monopoly concession ending in 1999. Part of the concessionary arrangement is the requirement to make large investments in the telecommunications infrastructure. The telecommunications market in South America remains one of the fastest growing sectors and has an enormous investment potential. Brazil alone has an expected telecom market of over US$ 20 billion by the year 2000.

Universal Service

The goal of most countries is to provide basic telecommunications services to any citizen who desires it. This concept is known as universal service. The fear that rural communities will be denied basic services under concessions is a key issue preventing the conversion to privatized telecommunications in Latin American countries. These policy and equity issues are being discussed as to whether the public or private sector will better serve rural communities. There is a growing consensus that the most

effective way to reach this goal is by promoting competition. In the following project profiles we outline two rural telephony projects that provide opportunities for US suppliers of telecommunications in rural markets. Many other prospects exist as telephone density is still low in most South American countries.

Regulation

One of the areas most needed in the South American telecommunications industry is the development of regulatory agencies that will oversee the advent of competitive and equitable telecommunications with provisions for universal service. South American telecommunications officials have discussed telecommunications policy as it relates to economic development and hemispheric integration. They are committed to putting in place flexible regulatory frameworks that can easily adapt to rapid change and innovation in telecommunications markets and technology.

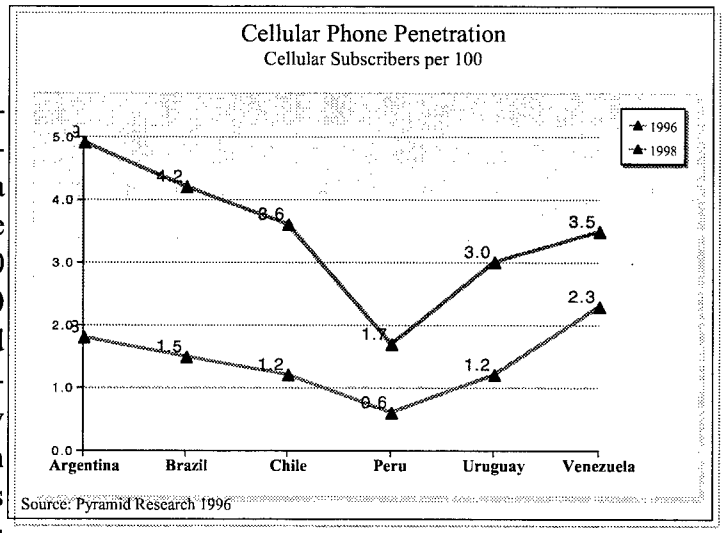
South American countries are implementing independent regulatory agencies to integrate telecommunications investments with the granting of concessions for public services. An example is the Organismo Supervisor de Inversión Privada en Telecommunicaciones (OSIPTEL) in Peru, which has been given more regulatory control to grant concessions for the utilization of spectrum to provide the best public benefit. *The General Telecommunications Law* recently passed in Brazil calls for the establishment of an autonomous regulatory agency, Agencia Brasilera de Telecomunicacão.

Trends and Opportunities

Digital communications has hit South America. On September 30, 1997 Uruguay became the first country in the Americas (and the sixth in the world) to have a 100% digitized phone system. ANTEL, the state-owned telephone company, completed the digitalization process begun in 1985. While state-owned, ANTEL is a fairly responsive monopoly, with a teledensity in Uruguay of 24 lines per 100 inhabitants.

Wireless

CONATEL, the Venezuelan Telecommunications Regulatory Agency, has granted 175 concessions/licenses for cellular, paging, data package switching networks and other value added services. Currently, there are 450,000 cellular subscribers in Venzuela and over 120 telcom companiese. The market is estimated to grow by more than 1.5 million cellular subscribers, 600,000 pagers and 360,000 two-way radios by the year 2000, a 400% increase in telecommunications services. Opportunities exist in all sectors of the telecommunications



market. Nationwide cellular services are provided by CANTV and Telcel, an international consortium of Bell South, Racal Telecom (UK) Sociedad Financiera Bancor and COMITEL (Venezuela). To cover the estimated demand, cellular operators will have to invest US$ 900 by the year 2000.

Under the Triennial Telecommunications Plan 1996-1999, Venezuela calls for the issuance of the European Global System Mobility (GSM) standard, Personal Communications Systems (PCS).

Currently, they are opening concessions for Personal Communications Services (PCS) in Chile which offer digital, wireless system that can support faxing, paging, voice imaging, and data transmission. Argentina will grant 2 licenses for PCS in 1997.

B-Band

The Consortium BCP formed by the Estado de Sao Paulo, , Banco Safra, BellSouth and Splice Telecomunicacoes won the Band-B service in the city of São Paulo. In two years the group will invest US$ 500 million to build a digital network using TDMA Technology. Bell South will integrate the cellular system with the local telephone network. The Tess consortia led by Telia (Sweden) was awarded the concession for the interior of the State of São Paulo (Region 2), while the BCP consortium, led by BellSouth, won another concession for Region 10 States of Piaui, Ceara, Rio Grande do Norte,Paraiba, Pernanbuco and Alagoas. Other regions will follow the Region 10 concessions.

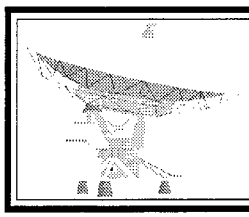
Satellite Communications

Simon Bolivar Satellite Project, restarted in 1995 by the Association of Andean Telecommunication Corporation, has been undertaken by the member countries of the Andean Community in a joint effort to have a satellite telecommunications system under their control, operation and administration. The feasibility study completed by SATEIL CONSEIL was presented January 30, 1997 to the management committee. The Simon Bolivar Satellite project will be launched by the year 1999.

Telecommunications Opportunities in South America

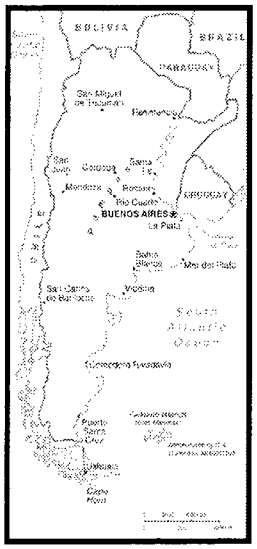
Country	Opportunity	Schedule	Useful Information
Argentina	PCS Allocation	postponed until October 20, 1997	2 licesnses will be awarded
Bolivia	PCS Allocation		
Brazil	B-Band licenses	Through 2Q 1998	3 licenses awarded
	Telebrás privatization	2Q 1998	General Law Passed 7/97
	New SMR licenses	Late 1997	
Chile	PCS Allocation	TBD	
Ecuador	EMETEL Privatization	September 1997	
Paraguay	B-Band Licenses	August 4, 1997	
	WLL TENDER	July 29, 1997	
Peru	PCS and TDMA Allocation	1Q 1998	
	Provincial B-band		international public tender
Uruguay	Digital Network	September 1997	
Venzuela	BANTEL Privatization		FOGADE to sell 85% share

Source: ITC Latin American Telecom Report June 19, 1997



Telecommunications/Argentina

PYMES Project
SME Market Penetration Initiative



Project Summary

Project No:	**TEL-01**
Subsector:	**SME Service**
Location:	**Buenos Aires**
Project Cost:	**US$ 36 million**
Export Potential:	**US$ 10 million**
Type:	**Joint Venture**
Sponsor:	**AT&T Argentina**

The PYMES (Pequeñas y Medianas Empresas) Project is a joint venture opportunity established by AT&T Argentina. The project would provide informatics services to the increasing number of small to medium-sized enterprises (SMEs) in the metropolitan region of Buenos Aires and other Argentine cities. AT&T has completed preliminary studies and is conducting an investigation and analysis of the opportunities for providing various telecommunications services to the SME market.

Technical Description

The project involves the provision of high-tech "Value Added" services to SME's (Small and Medium Size Enterprises), including computer networks, links and/or telecommunications systems that offer facilities and benefits greater than basic telephony services.

Services provided would include the formation and management of marketing teams, demo equipment, and central information processing units. In addition, the project would provide line hook-up, new equipment (computers, phones, message systems, equipment servicing, spare parts), not to mention any infrastructure needed for providing the value added services through AT&T central processing nodes.

Value Added Services

The value added services would include e-mail, fax mail, voice mail, and other electronic information services.

Site

The project will provide services to the provinces with the greatest potential, including Buenos Aires, Santa Fe, Cordoba, Mendoza and Entre Rios.

Nature of Demand

SMEs employ approximately 75% of the labor market and make up 45% of Argentina's GDP. In fact, 98% of all business enterprises in Argentina, regardless of the nature of their activities or the location of their national headquarters, are SMEs. By promoting their development, many experts believe that Argentina can bolster its GDP, decrease its unemployment and increase its competitiveness in the global economy. AT&T believes that by positioning itself as both an SME enabler and problem-solver, AT&T can facilitate its regional business expansion, while simultaneously fostering regional economic development.

Type of Company	Number of Employees	Average Annual Revenue
Micro Enterprise	1 to 10	up to $200,000
Small Enterprise	10 to 50	$200,000 - $1,000,000
Medium Enterprise	50 to 100 (commercial) 50 to 200 (industrial)	$1,000,000 - $15,000,000

In a political context, the government of Argentina has begun to move forward in providing services and assistance to the growing SME market. In doing so, the Argentine government has made promises in the past few months that a National SME Department will be created to assist the market and to address business needs in a more direct and effective way. This commitment implies that the SME market will be given an increasingly higher priority in national affairs. The SME Department will also get SME assistance funds, which are currently distributed through various public offices.

Province	Population	Number of SMEs	Main Industries
Buenos Aires	12,608,046	490,000	agriculture, meat, publishing, plastics, metal, machinery
Santa Fe	2,782,809	108,000	meat, dairy products, wood, furniture, metal, agriculture
Cordoba	2,766,683	108,000	machinery, metal, auto parts
Mendoza	1,500,000	45,000	wine, fruits and vegetables, mining
Entre Rios	1,020,257	31,000	dairy products, wood, furniture

The SME market is large and will require large capital investment in management services, communications equipment and computers. The city of Buenos Aires, with an SME population of 490,000, comprises the largest market segment in Argentina. With an initial market penetration of 5% in the SME market, the potential for equipment sales and services is large. The equipment procurement for the 24,500 SMEs could reach an equipment export amount of US$ 24 million considering a cost-sales volume of US$ 1,000 per company for computers and other equipment. Additional cash flow would be generated through monthly user fees. The analysis, although rough in nature, provides ample justification for development and eventual start up.

Project Status

Preliminary studies have been conducted and definitive studies are currently under development. AT&T is seeking joint venture partners to assist in the full development and implementation of the project. Specifics on the terms of the agreement with joint venture partners have yet to be delineated.

The project will involve a four phase market penetration strategy. Phase one will target 1,800 medium-sized exporters in the province of Buenos Aires while the second phase will focus on the 1,000 most important companies in Cordoba. Phases three through five will entail the development of the Santa Fe and Mendoza markets.

Financing

Financing will be structured through multilateral funding, private funding and the consortium developed by the initiative. AT&T is currently evaluating the possibility of introducing banks and financial institutions to provide credit to SMEs by developing special departments to capitalize on the market.

It is likely that the Inter-American Development Bank (IDB) and the World Bank will be involved in the project financing. The IDB has begun funding programs for the commercial development of non-financial services, Development and Commercial Centers for SMEs in certain provinces throughout the country, support projects for rural SMEs and special projects to develop small and medium-sized businesses in Buenos Aires. The World Bank has also implemented various programs in Argentina to support microenterprises as well as small and medium-sized businesses.

Project revenue streams are derived through end-user fees, installation and the purchase of equipment. Risks will be shared by AT&T and joint venture partners.

Equipment and Service Procurement

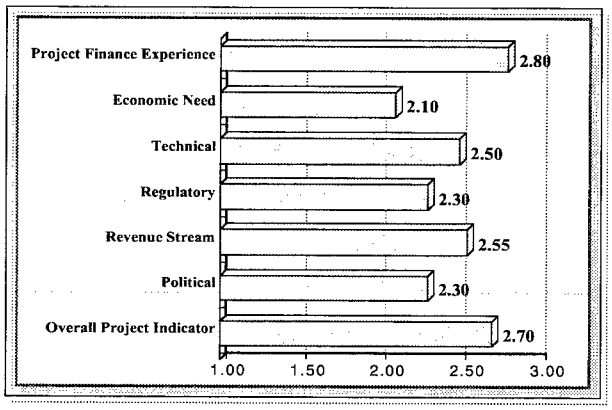
Equipment

- Additional Lines
- Nodes
- Spare / Replacement Parts
- Computers and Telecom Equipment
- Software

Services

- Project Finance Services
- Informatics
- Computer Programming

Critical Project Indicators



Key Decision Makers

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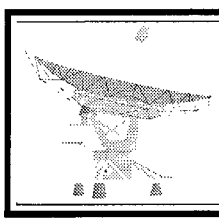
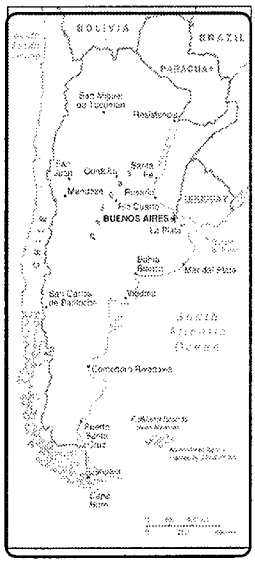


Telecommunications/Argentina

Telemedicine Project



Project Summary

Project No:	**TEL-02**
Subsector:	**Telemedicine**
Location:	**Argentina**
Project Cost:	**US$ 12 million**
Export Potential:	**US$ 7.5 million**
Type:	**Joint Venture**
Sponsor:	**Federal Government of Argentina**

The Argentine Federal Government is modernizing the country's health provision services. Among its programs to improve the sector is an effort to share information between the national and international medical communities, utilizing technology to complement and accelerate the decentralized learning process.

Technical Description

The project consists of creating a network of multimedia conference rooms in Argentine hospitals capable of interactively consulting with each other. Further more, the project includes the creation of a high-speed electronic network by which high-volume data transfers may be achieved. The technology employed will likely be ISDN, (Integrated Service Digital Technology), and will be determined by the private sector project participant.

A subsequent program would complement the project, utilizing "on-line" world wide web technology to create a learning system.

Site

The telemedicine project has no specific location and could be utilized in all parts of Argentina, including remote rural communities. The project will, however, require special conference rooms with multimedia capabilities, spread throughout the country in national, provincial, and municipal hospitals.

Nature of Demand

The Argentine government is trying to use information technology to make decentralized learning and information sharing a feasible alternative. This project is a precursor to several similar projects which will emerge in the region, as South America adopts state-of-the-art technology to improve its social welfare. The information technology, used in the context of a knowledge revolution (refer to *Sectoral Overview* in this briefing book) is being driven by both the public and private sectors and will result in excellent opportunities for US equipment suppliers, as well as specialized software and integrated systems developers.

The ability of information and communications technology to reduce costs and extend the reach and quality of health care to a broader number of people is far-reaching. It provides education and training, easy access to information and expertise, productivity tools which aid in reducing costs, and basic communications tools.

Project Status

The telemedicine project has been conceived and promoted by the federal government, however, it requires a private sector partner to market the project and move it forward. Three provinces in Argentina (Cordoba, Misiones, Salta) as well as Buenos Aires have begun introducing interactive, multimedia systems and have begun to introduce internet-based proprietary learning facets.

Financing

The project will require financing from the private sector for the project, which also will be responsible for marketing it to hospitals and educational institutions in Argentina. Political backing for the project is limited only to concept development. It is necessary for the Argentine government to develop an institution which will oversee the project.

The general context of the project requires that these conference rooms be replicated within and outside Argentina, which will require an integrated marketing effort in order to benefit users as well as educational institutions. The telemedicine project represents an example of what South American governments are going to be promoting, as large federally-financed social welfare projects are increasingly transferred to private-sector responsibility.

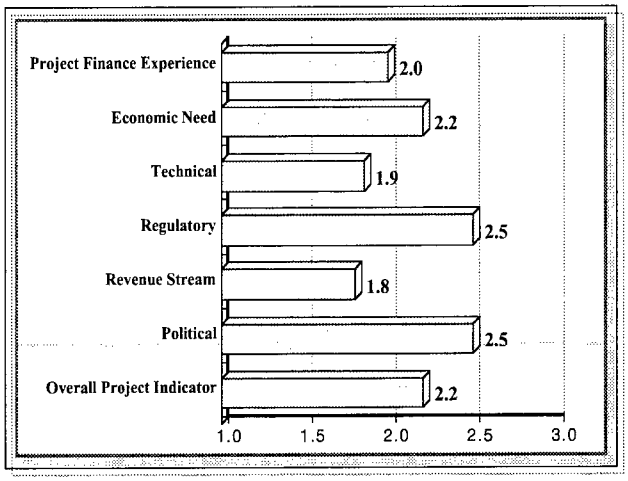
Equipment and Service Procurement

The project will require information and communications technology, and presents excellent opportunities for US suppliers. The project will need the following:

Equipment:
Integrated service digital networks
Fiber optic networks
Integrated software development
Automated teller machine networks
Videoconference equipment
High performance computers
Sound system solutions
Network safety systems

Services:
Integrated software development
Training
System maintenance and upgrade
Coordination of educational programs
Video conferencing services

Critical Project Indicators



Key Decision Makers

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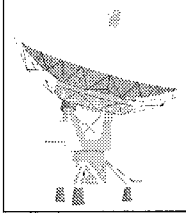


Telecommunications/Peru

PCS License

Project Summary

Project No:	**TEL-03**
Subsector:	**PCS**
Location:	**Peru**
Project Cost:	**US$ 600 million**
Export Potential:	**US$ 450 million**
Type:	**License**
Sponsor:	**Vice Ministerio de Comunicaciones, Vivienda y Construcción**

Personal Communications Services (PCS) is a digital, wireless system, capable of supporting paging, fax and voice mail, as well as video imaging and data transmission. PCS is considered to be at the forefront of telecommunications technology. Local Multipoint Distribution Services (LMDS) are telecommunications services which also bring informatic, voice and video services together in a system or a band for business, security, entertainment, etc.

Technical Description

The Ministry of Communications, Housing and Construction is preparing to open public bidding for licenses to operate PCS and LMDS systems in Peru. Some companies have already announced their intention to enter the market with PCS and LMDS systems with medium-term investments of approximately US$ 300 million.

The number of licenses to be distributed and the timeline for public bidding has not been decided. A regulatory study will be conducted by year-end 1997 to establish clear guidelines which encourage free competition in the PCS market and determine service quality standards for the final user.

Site

PCS coverage in Peru will depend on the investment programs of individual licensees. However, initial network development is expected to occur in Lima, which represents Peru's largest market for PCS.

Nature of Demand

Developing a PCS and LMDS market in Peru is a high government priority, and the Ministry of Communications is prepared to develop the regulatory framework to establish market guidelines as soon as possible, according to market needs. Telecommunications companies in Peru are urging the government to establish a legal framework for PCS and LMDS to ease market entrance. Some companies are currently preparing to enter the market.

Project Status

The project is currently in the planning phase. A regulatory study must be completed before the PCS market can be opened to private investment. The study is expected to be completed by year-end 1997. Public bidding for licenses to operate PCS should take place in 1998.

Financing

This project will be 100% financed by the private sector, through PCS licenses granted to private investors.

Equipment and Service Procurement

Although the winner of the first PCS license will establish technology requirements, equipment procurement will probably include the following:

Equipment:

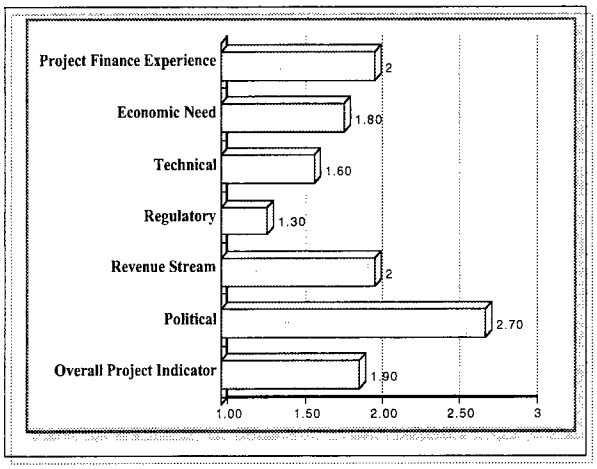
- Radio base stations
- Mobile terminals
- Antenna technologies
- Electromechanical devices

Services:

- Specialized engineering
- Technical applications services

US companies have an excellent opportunity to supply equipment for the new systems. Two Peruvian firms are already planning to enter the market with investments of US$ 300 million.

Critical Project Indicators



Key Decision Makers

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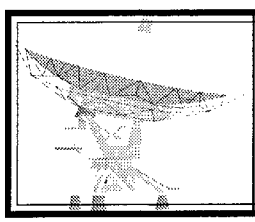


Telecom / Peru

Rural Telephony

Project Summary

Project No:	**TEL-04**
Subsector:	**Rural Telephony**
Location:	**Peru**
Project Cost:	**US$ 59 million**
Export Potential:	**US$ 42 million**
Type:	**Equipment**
Sponsor:	**Telefónica del Perú**

Telecommunications services, with the exception of local, long-distance and international services, have been freed from control of state-owned CPT (Peruvian Telephone Company), which serviced Lima telephone lines, and ENTEL PERÚ (National Telecommunications Company), which operated in the rest of the country. The state monopoly on local, long-distance, and international telecommunications will expire in June 1999.

In 1994, Telefónica Internacional of Spain (now called Telefónica del Perú) won a public tender for a 35% share in CPT and ENTEL PERU. The tender included the global administration of both companies, as well as the concession of local, long-distance and international telephone services for a 20-year period, granting exclusivity rights during the first five years.

Technical Description

The project will expand telecommunications service to rural populations in Peru over the period 1998-1999. Telefónica initiated the Rural Telephony project in 1994 and has already provided service to more than 1,000 rural residents.

Under the terms of Telefónica's concession agreement with the Peruvian government, the company is obligated to provide services to 1,500 rural residents. Telefónica intends to surpass this obligation

through the provision of telecommunications services to 1.5 million Peruvians in 3,000 rural areas before the termination of the concession agreement in 1999.

Site

The project will cover all of Peru's 24 regions, focusing on rural areas within these Departments which exceed 400 inhabitants.

Nature of Demand

The Law of Telecommunications and the Law of Progressive Demonopolization, passed in the early 1990s, demonstrates the Peruvian government's priority to reform and modernize telecommunications infrastructure. The reforms will ultimately bring quality and quantity of services up to international standards. Currently there are 1.23 million telephone lines in Peru, equivalent to 5.2 lines per 100 inhabitants. The average waiting period to have a new line installed has declined from 81 months in 1991 to a current period of less than 2 months.

Project Status

The project was inaugurated in June 1994, and will terminate in June 1999.

Financing

Telefónica del Perú will finance this project internally and through the FITEL Fund, which the Peruvian government established for the development of telecommunications infrastructure projects in rural areas.

Equipment and Service Procurement

Total equipment and service imports for the project are expected to reach US$ 42 million.

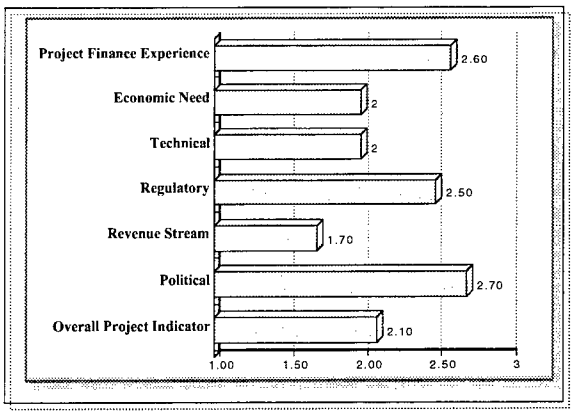
Equipment:

- Multi-access Radial Digital Equipment
- VSAT Systems
- Digital Cellular Equipment
- Wireless Access Equipment
- Switching Systems
- Transmission

Services:

- Installation & Repair Services

Critical Project Indicators



Key Decision Makers

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Telecommunications / Venezuela

Rural Telephony - Venezuela

Project Summary

Project No:	**TEL-05**
Subsector:	**Rural Telephony**
Location:	**Northwestern and Southwestern Venezuela**
Project Cost:	**US$ 50 million**
Export Potential:	**US$ 10 million**
Type:	**Procurement**
Sponsor:	**Conatel**

The Compañía Anónima Nacional Teléfonos de Venezuela (CANTV) holds legal monopoly over the telecommunications industry (basic telephony) in Venezuela through the year 2000. Under the CANTV monopoly, the federal government can only offer concessions for the provision of rural telephony in areas which CANTV is not currently servicing, and has not developed a plan for providing service to within 2 years of the origination of CANTV's concession (November 1991).

CONATEL, the Comisión Nacional de Telecomunicaciones, has signed three concession agreements with private operators to provide rural telephony services in Venezuela. One of these concessionaires is INFONET Redes de Información, C.A., which holds a 20-year concession to provide rural telephony services to populations in Northwestern and Southwestern Venezuela.

Technical Description

The project involves the expansion of telecommunications services to rural populations in 8 Venezuelan states. Rural populations include cities or towns with 5,000 or fewer inhabitants.

INFONET Redes de Información plans to install a rural telephony system integrated by a trunking transmission network which will permit the interconnection of INFONET switchboards with the switchboards of other telecommunications operators for both basic and mobile telephony. The system will be integrated through 2 microwave bands of 34 Mbps which will cover relatively short distances and a satellite network to connect remote areas.

INFONET will install 3 principal switchboards. The local distribution network will include 2 wireless sub-networks, the first of which will utilize GSM (Global System Mobile) technology with digital channels of 64 Kbps. An additional local distribution network will operate in an 800 Mhz band using Digital Trunking (E-SMR) technology.

INFONET will develop the mobile networks required for basic and mobile service in a portion of the concession area during phase one, while phase two will involve the expansion of these networks to the remaining localities.

Site

Under the terms of the concession agreement, INFONET will service the northwest and southwest regions of Venezuela, an area which covers the states of Trujillo, Lara, Portuguesa, Mérida, Barinas, Zulía, Táchira and Apure. The concessioned zone also covers towns on the Venezuelan-Colombian border which are situated in the states of Zulía, Táchira and Apure.

Nature of Demand

The telecommunications sector in Venezuela is expected to require an investment of nearly US$ 10 billion over the next five years. An estimated US$ 200 million will be required for extending between 200,000 and 400,000 lines in rural areas throughout Venezuela, such as the zone covered under INFONET's concession.

The three rural telephony concessions which have been awarded will include both basic service and value added services such as cellular, data transmission, paging and satellite communications. Opportunities for US equipment suppliers include GSM, switches, cell sites and telephones. The Venezuelan telecom market has historically been highly receptive to US equipment and service suppliers, although European firms are posing strong competition.

Project Status

INFONET Redes de Información was awarded the concession in January 1997. CONATEL awarded two additional rural telephony concessions for service in Eastern and Central Venezuela to private operators in August 1997.

INFONET is currently in the process of completing phase 1 of the project and is expected to begin phase 2 by year-end 1997. Equipment and services procurement is ongoing.

Financing

INFONET Redes de Información is financing the US$ 50 million investment for the project internally. The company intends to extend rural telephony service in two phases, with each phase having a total investment requirement of US$ 25 million.

Equipment and Service Procurement

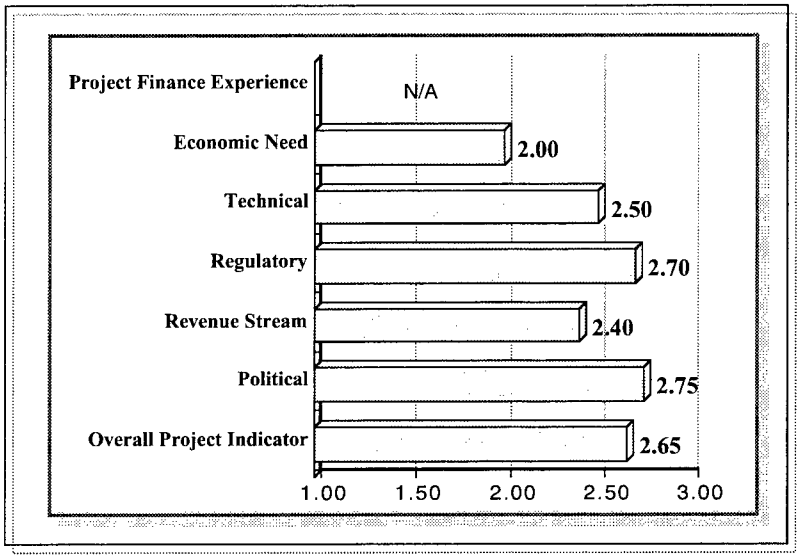
Equipment:

- GSM (Global System Mobile) equipment
- Microwave systems and related equipment
- Satellite systems and related equipment
- Monitoring equipment
- Switching systems
- Transmission
- VSAT antennas
- Omni-directional antennas
- Domestic antennas
- Service quality monitoring equipment

Services:

- Installation and repair services
- Electrical engineering
- Specialized telecommunications Technicians
- Civil engineering

Critical Project Indicators



Key Decision Makers

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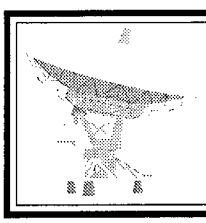
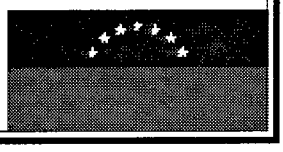


Telecommunications / Venezuela

CONATEL Spectrum Management



Project Summary

Project No:	**TEL-06**
Subsector:	**Spectrum Management**
Location:	**Venezuela**
Project Cost:	**US$ 30 million**
Export Potential:	**US$ 27 million**
Type:	**Procurement**
Sponsor:	**CONATEL**

CONATEL, the Comisión Nacional de Telecomunicaciones, is responsible for overseeing infrastructure development at a national level in the Venezuelan telecommunications sector. CONATEL intends to award a government contract to a private operator to implement the Automated System for the Administration and Management of Radio-electric Spectrum (SAGER) project throughout Venezuela.

Technical Description

In order to achieve an effective administration and control of the radio-electric spectrum, CONATEL is procuring an integrated system, and operations expertise. The project includes procurement of the following:

- 1 Central Control Unit (CNC)
- 5 Auxiliary Control Towers (CAC)
- 10 Mobile Units (UM)
- 10 Sets of portable equipment (EQP)

The project will allow for: 1) planning and administration of the radio-electric spectrum, 2) technical approvals and licensing of radio-electric emissions, 3) locating radio-electric emissions, and 4) the establishment of a standard for the telecommunications system.

Site

The central station of the SAGER system will be located in Caracas. Remote stations will be situated in various regions throughout the country, including: the Northwest, the Central-North, the Southwest, the Northeast and the Southeast.

Nature of Demand

The SAGER system will replace Venezuela's existing a spectrum management network, which dates from the 1970s. The new system is expected to generate more than 50% of the income which CONATEL will require to guarantee its financial autonomy.

The telecommunications sector in Venezuela is expected to require an investment of nearly US$ 10 billion over the next five years. The Venezuelan telecommunications market has historically been highly receptive to US equipment and service suppliers, although European firms are posing strong competition.

Project Status

CONATEL is currently analyzing proposals from potential contractors for implementation of the SAGER project. Pre-qualification of bidders closed on October 30, 1997 and qualification ended on February 28, 1997. The contract is expected to be awarded by year-end 1997. Construction and installation of the SAGER network is slated to begin on May 1, 1998 and should be completed by November 30, 1988.

Financing

A total of 70% of the US$ 30 million investment required to implement SAGER will be financed by the public sector, through the Corporación Andina de Fomento. The contractor will finance the remaining 30%.

Equipment and Service Procurement

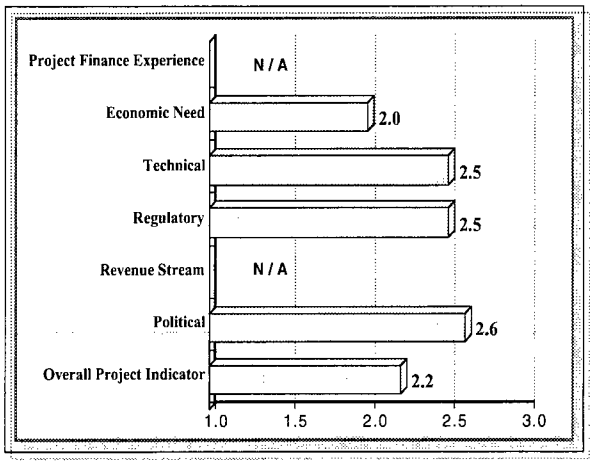
Equipment

- Computer Hardware
- Specialized Software
- Monitoring Equipment
- 10 Mobile Units (VEHICLES)
- Fixed Antennas for Base Stations

Services

- Installation & Repair Services
- Design Engineering
- Planning and Control
- Specialized Telecommunications Technicians
- Civil Engineering
- Inspection during assembly
- Testing

Critical Project Indicators



Key Decision Makers

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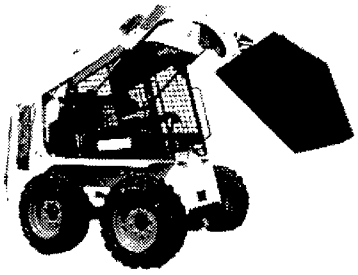
The Industrial Sector in South America



Introduction

The industry sector encompasses projects that do not fall neatly into one of the other four categories — energy, transportation, telecommunications or environment — but may cross over into one or more of these sectors. South America has a large and diverse industrial base, which has been growing at increasing rates given the opening of markets, coupled with privatization of state-owned industries and deregulation of industrial sectors. The industrial projects presented here are diverse, offering exceptional opportunities for US equipment suppliers and investors. The strong manufacturing and engineering component of this sector relies on high-technology equipment and services, ranging from environmental monitoring to highly specialized processing and survey equipment. Inflows of direct foreign investments into the region are driving the creation of industrial parks and new export driven units.

12 Industrial Projects

Total Value	US$ 1.72 Billion
US Export Potential	US$ 618 Million
Chemical	4
Agribusiness	2
Mining	3
Petrochemical	1
Construction	1
Multisectoral	1

The South American industrial base ranges from agribusiness, and raw materials extracting, to processed foods and capital equipment manufacturing. Industrial growth is high in the region as a whole, particularly in Brazil and Argentina in all sectors, and Chile and Venezuela in the mining and petrochemical sectors, respectively.

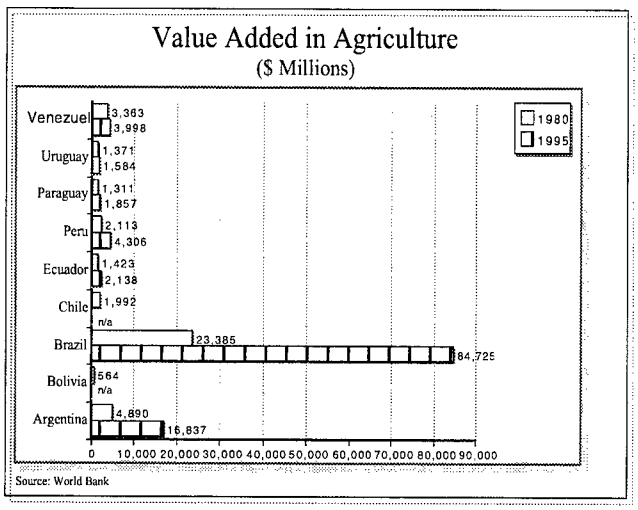
Two interesting drivers that characterize most of South American industrial growth are
1) new investments occurring through joint ventures with international companies, and multinational plant expansions, 2) a recovering internal consumer base as well as export-led initiatives. The next five years will prove the most important period for South American industrial growth as the region's economic stability promotes new investments and lower interest rates, allowing these investments to be made efficiently.

The following industrial sectors present the greatest potential due to their growth rates, as well as the multiplying effect they have on new derivative infrastructure projects: agribusiness, mining, petrochemicals, manufacturing, and knowledge. These sectors are both driving new infrastructure demand, and overall Gross Domestic Product Growth (GDP).

Agribusiness

Agriculture and related activities comprise approximately 10% of South American GDP. The increases in absolute terms for the sector in all the countries within the scope of this analysis have been significant.

Federal and state governments all over the region have designated the agricultural sector as a source of export revenue earnings. This is reflected in several infrastructure projects profiled within the 125 projects profiled, primarily in the transportation and irrigation areas: The Santa Fé aqueducts in Argentina and Misicuni irrigation in Bolivia, the Uruguay forestry multi-modal terminal, and numerous ports and rail projects all over the region. Brazil, in particular, has numerous agriculture driven infrastructure projects in the transportation sector, including the Ferronorte, Ferroeste, and North-South railroads, the Araguaia Tocantins waterway, and the Port of Sepetiba.



Agribusiness in the region is investing heavily to remain competitive in world commodity markets, a phenomenon which is opening market opportunities for US companies specializing in information technology for the sector.

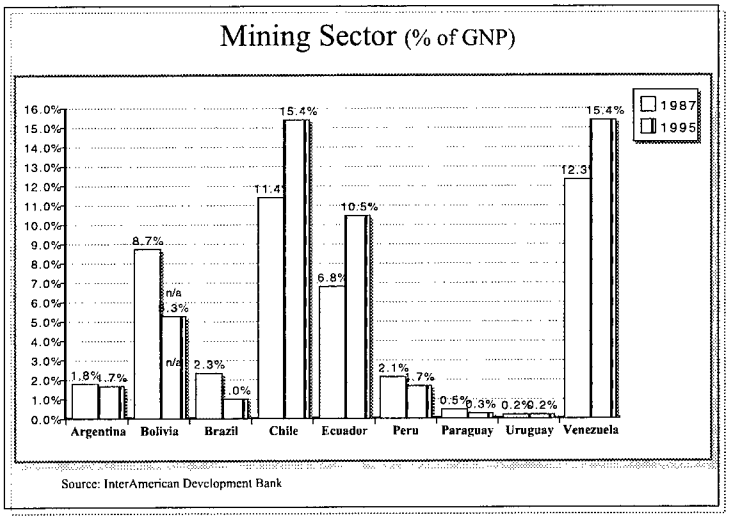
Related to the agribusiness sector is the fastest growing industrial sector in South America, the processed foods industry. Higher per capita GDPs are fostering increased demand for processed foods, which has resulted in the construction of new industrial facilities and the expansion of others. The growth in this sector has only begun and offers excellent opportunities for US process control equipment suppliers, besides offering investment opportunities.

Mining

The mining sector in South America is becoming more important because of regulation changes by sovereign governments. The sector is, for the most part, deregulated, and open to foreign participation. This has driven investments in the sector which is yielding, particularly in Chile and Brazil.

Overall representation of the mining sector in South America is falling, although absolute investments are increasing and are important infrastructure drivers.

Within the 125 projects profiled in this book, several projects (in all categories) are related to the mining sector, which points to the importance of the sector as an infrastructure driver. The Atacama gas pipeline in Argentina will provide energy to process minerals, the Unaí Pirapora railroad in Brazil is being built by the private sector to transport minerals and iron ore to the port of Tubarão, the Port of Mejilliones in Chile will be primarily used for copper exports, and the Don Mario gold and copper mine in Bolivia illustrates the private sector participation in the sector. Mining projects will surface in remote regions in South America driven by the opening of markets by the federal governments, as is seen in the Welding Metal project in the North of Brazil, which contemplates a mining activity by the fifth year of operation.



Petrochemicals

The petrochemical sector in South America is concentrated in Venezuela, Brazil and Argentina. All three countries have large scale investments, being executed through partnerships with international companies and federal holding companies. Petrochemicals represent between 5 and 10% of total manufacturing GDP in South American countries.

Several petrochemical projects are underway in the region, stimulated by the deregulation of the Brazilian oil sector and Venezuelan PDVSA's expansion plans. It is estimated that Petrobrás will invest (jointly) in excess of US $10 billion in new petrochemicals plants, and PDVSA will invest an additional US$ 5 billion in new petrochemical plants over the next five years.

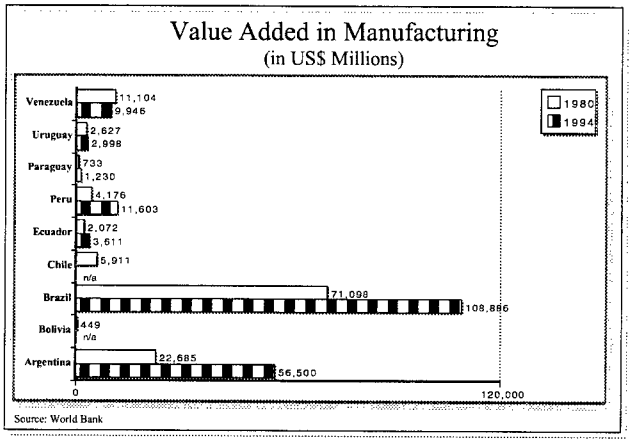
Several projects are highlighted here which have a direct and indirect relationship to the petrochemical industry. Two profiles representative of the opportunities emerging from the deregulation and growth of the sector for US companies are the Jose Industrial Park in Venezuela, which aggregates investments of US$ 715 million to expand and modernize an industrial park in Northern Venezuela; and the Pecém port project in Northeast Brazil, where Petrobrás is investing in the creation of an industrial park. The project, in turn, is driving the demand for port facilities as well as environmental and energy services. New facilities and expansions such as these will be replicated throughout the region (concentrated in Brazil, Argentina, and Venezuela) and should be pursued by US companies given the joint venture nature of the investments. Approximately 80 percent of all new ventures in the petrochemical area are being undertaken jointly (often times with US companies such as Mobil and Chevron) which foster a high level of foreign engineering and construction firm participation.

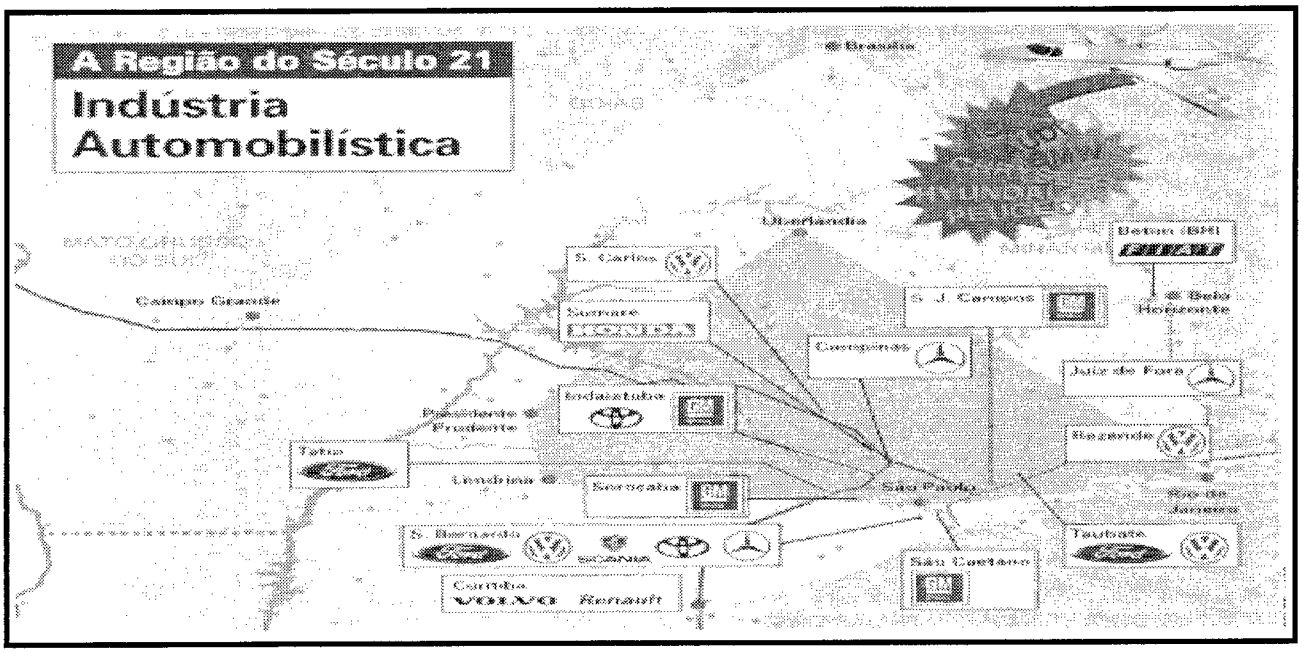
Manufacturing

The manufacturing base in South America is diverse and accounts for an excess of 30 % of the gross domestic product of most countries. The transformation industry in general is undergoing significant changes, and investing in plant modernization since the opening of markets with lower tariff barriers and free market policies. Industrial output is growing at an increasingly fast rate, however, with a difference from traditional regional manufacturing output growth in the past: private sector investments and efficiency increases are driving growth currently, as opposed to federal government spending in the past. The growth in absolute terms in every country analyzed is expansive.

The growth in the region's manufacturing base is best illustrated by the increase in auto manufacturers installing themselves in the region. There are in excess of US$ 20 billion planned investments over the next five years within the South and Southeast of Brazil alone by the auto industry.

The inflow of private sector capital in new manufacturing plants has resulted in a need to provide basic infrastructure to the region. Several of the projects profiled within this book are being created to meet this need. The best examples of this are the projects developed in the Mercosur trade block, which have created infrastructure needs through integration. Projects such as the Brazil Bolivia Gas Pipeline, the hydroelectric dam in the province of Salta, and the vehicle and container terminal in the Port of Parnaguá are all examples of infrastructure projects driven by manufacturing demand.

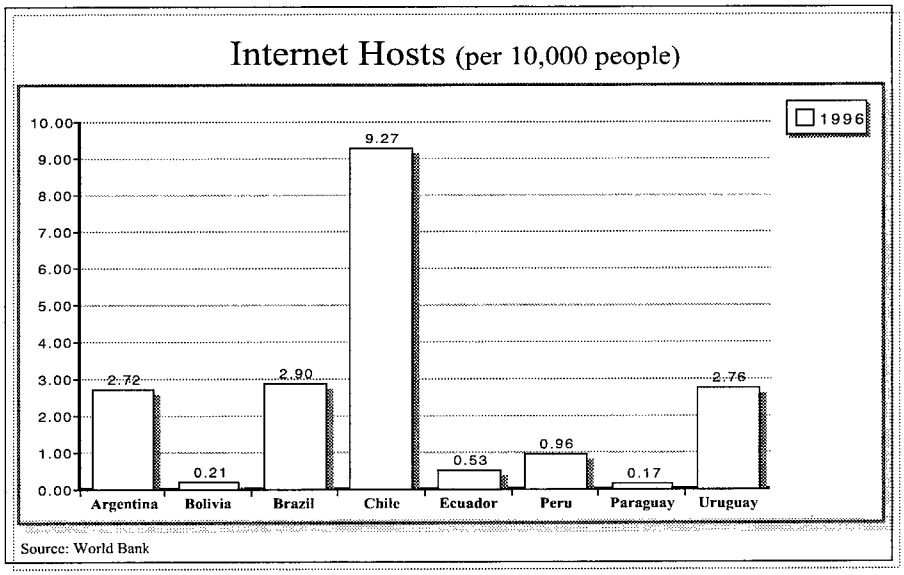




Knowledge Industry

Often times overlooked by economists and private sector vendors, the knowledge industry is being created in South America, driven by public-private sector partnerships. For example, the Telemedicine project in Argentina will likely be replicated into other areas and other countries. Perhaps more importantly, South America is participating in the global knowledge revolution. Governments and private sector companies are all aware of information requirements and are modernizing their information technology systems continuously to keep pace with their industrialized counterparts.

It is clear that the knowledge industry is driving more efficient infrastructure creation, and, with a greater degree of transparency.



Industry / Argentina

Boron Derivatives and Sewage Treatment

Project Summary

Project No:	**IND-01**
Subsector:	**Mining Derivatives**
Location:	**Salar de Diabilillos Puna, Argentina**
Project Cost:	**US$ 8 million**
Export Potential:	**US$ 1.5 million**
Type:	**Concession**
Sponsor:	**Secretariat of Mines and Energy, Province of Salta**

The Secretariat of Mines and Energy is seeking a company capable of extracting Boron from Salta mines. It is one of the first projects designed to take advantage of the Atacama natural gas pipeline. In addition, the project is but the beginning of the mining sector's expected expansion in the region--an untapped region expected of having abundant mineral wealth.

Technical Description

The project will produce derivatives of boron with new technology that has no deterrent effects on the environment, with recycled discards from products produced throughout Argentina. Products that would contribute to the project include, Boron (99.7%), Sodium Sulfate (99.5% dry), and experimental ceramics.

Expected productive capacity is 2,000 tons/ monthly of boron concentrate - 1,200 tons/ monthly Boron and 250 tons/ monthly of sodium sulfate.

The technical process begins with the mechanical extraction of minerals which are then upgraded by what is referred to as dry-wet separation. Once the upgrading has taken place, boron derivatives remain which may be shifted out through the sewage treatment process and collected for sale and use. The process provides value added materials in the cleaning of mining extraction procedures. Once the sewage has been collected, it is disposed of through thermal energy techniques.

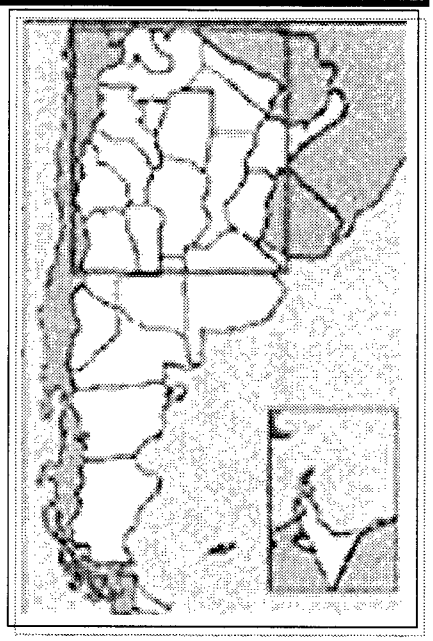
The thermal disposal system utilized is dependent on the natural gas provided by the CMS Atacama pipeline.

Flow Process:

Mining → **Upgrading (Dry + Wet Separation)** → **Boron Derivatives** → **Sewage Treatment (Thermal Energy Processing)**

Site

The boron concentration plant will be located in Salar de Diabilillos - Puna Santeña, 140 Km from San Antonio de los Cobres. The San Antonio de las Cobras industrial park were the plant will be located does not have the needed infrastructure for the project. Therefore, the plant will have to be built from the ground up, in that location.



The plant's close proximity to the Atacama pipeline is critical to the success of the project. The power potential of the pipeline will allow for the project's feasibility. In addition, the close proximity to the town of San Antonio is convenient for personnel working in the factory.

Nature of Demand

There is substantial export demand for boron concentrate, boron and sodium sulfate. World market prices continue to rise while total demand is slowly becoming drained. The boron plant will export products to the EU (European Union) and to Mercosur partners with an estimated 50%/50% export demand to each region.

Current financial analysis of the Chilean boron industry stipulates an increase in export sales and price competitiveness in the region with regard to world prices. Mercosur demand is expected to rise quickly as the use of Boron products increases both on a domestic level and an industrial level.

Project Status

The Secretariat of Mines and Energy of the provincial government of Salta is conducting a feasibility study on the project. They hope to initiate the project by January 1998.

The Mining Investment Law of Argentina allows for mining in areas near the industrial park.

Financing

The project is expected to be jointly financed by private and public funding. There is interest by the provincial government to provide 25% of the financing while 75% will be provided by private partners.

Equipment and Service Procurement

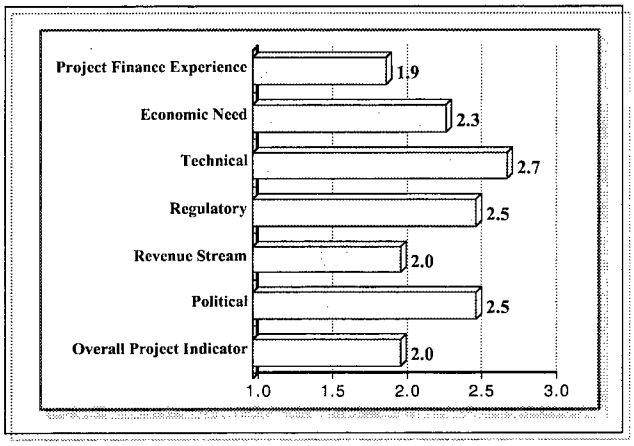
Equipment

- 30 ton Mining Trucks
- Mineral processing equipment
- Gravitational Separators
- Centrifuge Separators
- Transportation Equipment
- Pressure Equipment
- Communication Equipment
- Mineral reading machines for quality control

Services

- Chemical Concentration Studies
- General Engineering
- Project Engineering
- Chemical Engineering

Critical Project Indicators



Key Decision Makers

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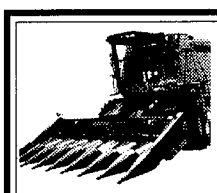
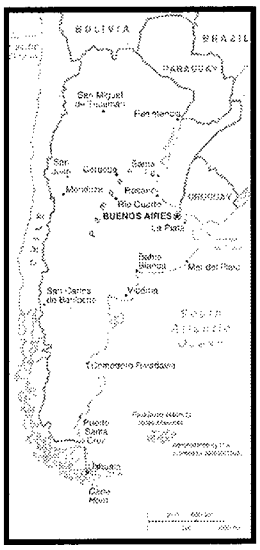


Industry / Argentina

Integrated Development of Quena Morillo



Project Summary

Project No:	**IND-02**
Subsector:	**Agribusiness**
Location:	**Province of Salta, Argentina**
Project Cost:	**US$ 52 million**
Export Potential:	**US$ 12 million**
Type:	**BOT Concession**
Sponsor:	**Ministerio de la Producción y el Empleo**

The Ministry of Production and Employment is tasked with the development and study of viable projects that would assist in the creation of opportunities for the Province of Salta. The Ministry has focused on building an infrastructure to facilitate the expansion of the existing agricultural industry and boost production destined both for domestic and international markets.

Technical Description

The Integrated Development of Quena Morillo Project will be undertaken in 2 phases. Phase one will entail the installation of a hydraulic unit while phase two will involve the construction of an underground tunnel for the distribution of water for agricultural irrigation. The objective of the irrigation component is to cover 15,000 acres.

Hydraulic Works:

The concessionaire will construct a lateral intake on the western portion of the Bermejo River, at a branch of the Bermejo called "Quena". The prospect of locating the inlet on Quena is due to studies specifying that the placement is the most stable in the region from a fluvial point of view. The flow is expected to reach 13m^3 per second. The flow may be increased to accommodate future demand.

Underground Canal & Irrigation / Drainage Works

The canal proposed for the project will provide irrigation for approximately 4,500 acres between the towns of Embarcación and Padre Lozano. At a total length of 112.96 Km and a 13 m^3 per second capacity, the canal will provide a valuable water supply to the area. The design of the canal has been made to run parallel to the existing railroad and paved road, creating a protective zone from erosion and temporal flooding. The layout should also assist during construction, operation and maintenance.

Once the canal has been constructed, the distribution of water for irrigation and subsequent drainage will commence. The system will be constructed according to the demand for irrigation at the end of construction of the canal system. At the moment, the system has been designed to provide water to nearby farming and grazing lands.

Site

The project is located in the Northwestern region of the Province of Salta, within the departments of San Martín and Rivadavia. The project area is located approximately 240 Km directly north of the city of Salta. The principal of access road through Salta is National Road #8. Rail access is secured through the General Belgrano Railroad that pertains to the locality of Embarcación and passes through the towns of Pedro Lozano, Hickman, Pluma de Pato and Morillo.

Nature of Demand

The justification for the project is based on the agricultural productive capacity of the zone and the growing trade between the Mercosur countries. Cattle grazing is expected to utilize 150,000 acres in the region, which is already experiencing water shortages. The agricultural production of Salta is registered to have 400,000 acres with only half, 200,000 acres, under irrigation.

In terms of the amount of irrigating capacity provided by the project, it will generate 7% additional capacity. Although the amount is not substantial in size, the production increase is considered adequate to justify its completion.

The project will enable the region to graze 40,000 more head of cattle, resulting in a significant increase in the current cattle populations in San Martín and Rivadavia of 70,500 head. The total increase is calculated at 60%. Since the Argentine market for beef is currently saturated, increased production would be destined as exports.

In addition to cattle grazing, the region is rich in the possibilities of providing a variety of seeds for export or for domestic use. Agricultural studies have included such products as bananas and honey for domestic and international markets. The proposition to create a viable project is possible given the current production of such products and the demand for the goods.

Project Status

The *Italconsult* and *Italconsoop* consulting companies provided feasibility studies containing demand projections and preliminary designs for the project to the Province of Salta in December 1988.

The province is currently placing greater importance on the project's completion due to increased trade within the Southern Cone. The concession for the project should be granted in the short-term, once proper stipulations have been drafted by the provincial government.

Financing

The Province of Salta is contemplating an investment of US$ 8 million for works which the intake area and canal will require. The regional investment will be complemented with private investments through concessions in the form of BOT or BOO. The project may require a minimal total investment of US$ 52 million, although there is also an option of expanding current designs into a larger project of US$ 95 million.

Public Investment
in US$ 000

	Minimum Investment	Maximum Investment
Intake from Bermejo River	6,000	6,000
Adduction Channel	9,096	
Irrigation for 4,500 Ha (Between Quena and Lozano	1,296	36,320
Irrigation for 10 Ha (Lot 20)	36,388	1,296
Total	**52,780**	**94,760**

Equipment and Service Procurement

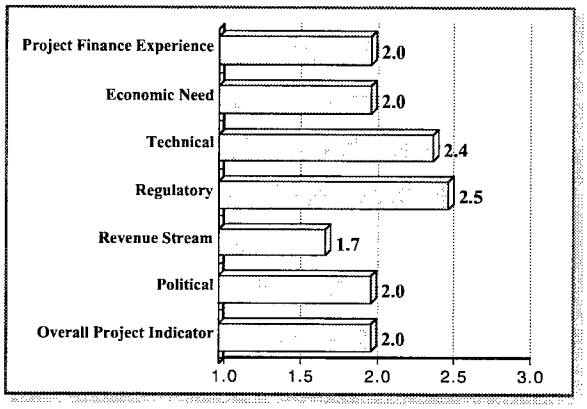
Equipment:

- Escalators
- Trucks
- Hydraulic Equipment
- Transmission Line
- Pumps
- Irrigation Equipment
- Valves - Tubing

Services:

- Structural Engineering
- Construction Engineering
- Environmental Impact Consultants
- Project Finance Specialists

Critical Project Indicators



Key Decision Makers

Company	Regulador de los Servicios Públicos de la Provincia de Provincia de Salta
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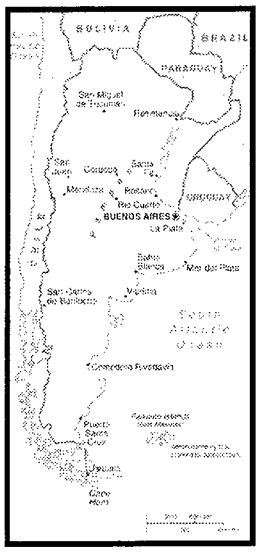
Industrial / Argentina

Mendoza Irrigation Project



Project Summary

Project No:	**IND-03**
Subsector:	**Agribusiness**
Location:	**Province of Mendoza, Argentina**
Project Cost:	**US$ 100 million**
Export Potential:	**US$ 15 million**
Type:	**JV - Investment**
Sponsor:	**Province of Mendoza**

The province of Mendoza is attempting to create an integrated plan to develop the region's agricultural output. The project has several strategic implications on the development of the region and, specifically as it refers to derivative projects. Agribusiness is a priority of the government, and will include imports of US information technology, as the region enhances its production efficiencies and invests in capital production methods.

Technical Description

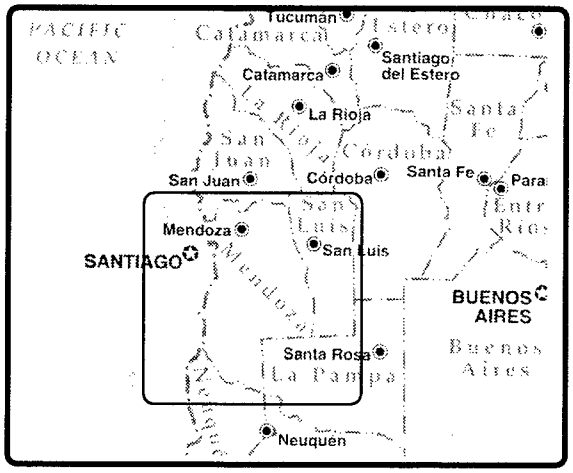
The project's technical characteristics are being defined as the province attempts to develop a master plan for efficient use of the hydrographic basins in the region. The master-plan for the use of water resources has a strong political backing, as the regional development hinges on the ample availability of water in the region. The project involves:

- Development of a master-plan detailing the necessary design and construction work
- Environmental impact assessments
- Rehabilitation of existing piping infrastructure
- Modernization of distribution network
- Information technology implementation in order to monitor supply pressure and quantity
- Institutional improvements to operations of the system
- Expansion of potable water distribution system.

Exact specifications for the project will be ready after detailing the master-plan.

Site

The project is located in the province of Mendoza. Specifically, the project will evaluate the irrigation potential in northern Mendoza, where 80 percent of the provincial population resides. The project involves the upper Mendoza and lower Tunuyán river basins.



Nature of Demand

The province of Mendoza is located in the east entral region of Argentina, and enjoys tropical weather and high agricultural output. There are a total of 33 thousand agricultural units in the province, which are responsible for the production of wine, fruits and vegetables for domestic consumption as well as for the export markets.

The preparation of a masterplan for the region's water resources is essential to promote sustained development in the region, given its reliance on agribusiness.

Project Status

The project's technical characteristics are being defined as the province attempts to develop a master plan for efficient use of the hydrographic basins in the region. It is unclear whether the province of Mendoza will make the funds available to conclude the master plan once the preliminary studies are concluded.

The government anticipates that the project will begin in April 1998, and has an expected construction time of 18 months.

Financing

The project will be fully financed by the province of Mendoza. The project has strong political support, both at the federal and provincial levels. Legislation is in place to allow for a joint venture or a concession.

The masterplan for the use of water resources has a strong political backing, as the regional development hinges on the ample availability of water in the region.

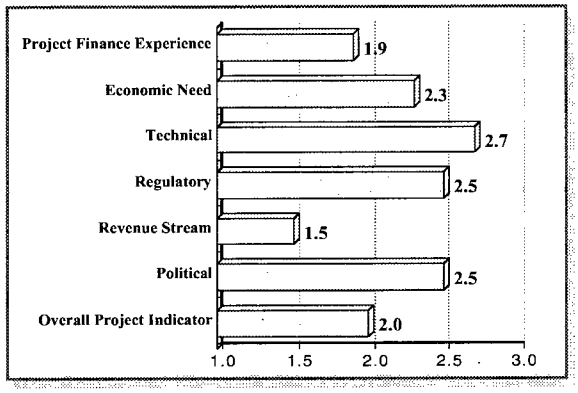
It is likely that multilateral support for the project will be necessary.

Equipment and Service Procurement

Equipment:
- Measuring equipment – flowmeters
- Pumping stations
- Valves
- PVC tubing
- Monitoring equipment
- Interceptors
- Chlorinating equipment
- Connectors

Services:
- Construction management
- Design
- Environmental impact studies
- Feasibility studies
- Preparation of a master plan

Critical Project Indicators



Key Decision Makers

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Industry / Argentina

Norquimica Plant Relocation

Project Summary

Project No:	**IND-04**
Subsector:	**Chemical**
Location:	**Province of Salta, Argentina**
Project Cost:	**US$ 12 million**
Export Potential:	**US$ 5 million**
Type:	**JV - Investment**
Sponsor:	**Norquimica**

Norquimica S.A. is an 11-year-old privately held company in the Province of Salta which is proposing to move its Boric Acid production facilities from the city of Salta to the locality of Olacapato, Department of Los Andes in the same province.

Technical Description

The relocation is propagated by the Atacama gas pipeline which will run through the town, providing a low cost energy source to the factory.

The current production and reserves in the Norquimica plant are:

- 12,000 Tons of Boric Acid
- 3,000 Tons of Borax dehydrated
- 5,000 Tons of Boric Acid Calcium Salt
- 15,000 Tons of grounded natural minerals
- 100,000 Tons of Mineral Reserves

Norquimica plans to relocate 4 plants include the following: Technical Grade Boric Acid Plant, Technical Grade Hydrated Borax Plant (10 times), Technical Grade Hydrated Borax Plant (5 times) and Boric Acid Calcium Salt Plant.

Technical Grade Boric Acid Plant
- Mechanized Plant
- 20,000 tons productive capacity annually

Technical Grade Hydrated Borax (10 times)
- Mechanized Plant
- 6,000 tons productive capacity annually

Technical Grade Hydrated Borax (5 times)
- Mechanized Plant
- 6,000 tons productive capacity annually

Boric Acid Calcium Salt Plant
- 20,000 tons productive capacity annually

Site

The project will be located in the locality of Olacapato in the Department of Los Andes, Province of Salta. The relocation site is situated 300 km from the current location.

Nature of Demand

Demand is driven not only by the chemical market, but also through the opportunity to take advantage of Atacama gas pipeline being constructed through Olacapato. The Norquimica plant is currently valued at US$ 10 million. Relocation will provide lower operating costs and a revaluation to US$ 20 million.

Relocating the plant will continue to provide access to the Mercosur, but more importantly will enable export to the Pacific Rim through Autofagasta, Chile, located only 500 Km from the new location.

The project will also provide the plant with a reduction in transport costs for raw materials now being carried 400 miles to the processing site. Relocation will reduce raw material transportation to 100 Km. Considering an annual transportation amount of 100,000 tons per year of mineral at US$ 30 per ton, the annual cost is US$ 3 million . Transportation costs are expected to total US$ 10 per ton (US$ 1 million), a savings of US$ 2 million.

Norquimica also expects additional savings of US$ 500,000 with the abatement of using Big-Bags for the transportation of raw minerals. The environmental repercussions of moving the plant are favorable. It will reduce the shipment distance of valuable and dangerous minerals to processing.

Project Status

The Boric Acid Plant relocation is expected to be occur in June 1998. Currently, the company is studying the best possible way to implement such a move without damaging the environment while determining what equipment will be needed at the new location.

In addition, the project is based on the construction of the gas pipeline expected to run through the region. If the gas project is in any way hampered, the result will be a change of schedule for the relocation.

Financing

Norquimica is seeking financing alternatives and is considering the possibility of entering into a strategic alliance. The company believes that the total projected savings of US$ 2.5 million which the relocation will yield will enhance the project's financeability. The financing initiative and method to proceed have not been fully delineated but are expected to be defined by year-end 1997.

Equipment and Service Procurement

All equipment imported for use in mining projects is exempt from taxes according to the "Ley de Inversiones Mineras #24.196" of April 1993.

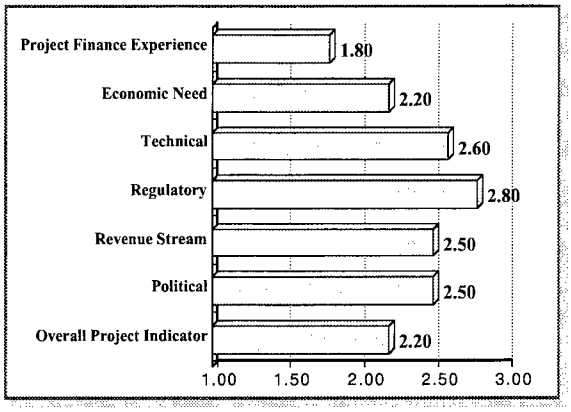
Equipment:

- Vapor Generators
- Energy Generators
- Evaporators
- Continual Centrifuges

Services:

- Industrial Engineering
- Chemical Engineering
- Financing Specialists
- Environmental Consultants
- Hazardous Materials Transportation Specialists

Critical Project Indicators



Key Decision Makers

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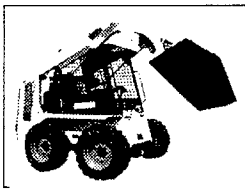


Industry / Bolivia

Vinto Metallurgical Processing Privatization

Project Summary

Project No:	**IND-05**
Subsector:	**Mining / Processing**
Location:	**Bolivia**
Project Cost:	**US$ 73 million**
Export Potential:	**US$ 40 million**
Type:	**Privatization**
Sponsor:	**Ministerio de Comercio Exterior e Inversiones**

Under the new Ministry of External Commerce and Investment and a directive from the newly-elected Bolivian government, the Vinto Metallurgical Processing plant will be privatized. In addition to the Vinto project, Huanuni and Colquiri, the two mining facilities that provide the raw minerals for processing, will be privatized.

Such initiatives run concurrent to the major changes being undertaken by Bolivia to move forward under free market principals and less government intervention.

Technical Description

Vinto

The Vinto plant is a fully-functioning company, with operations in the processing of tin and antimony. The complex is considered one of the most important in Latin America in the processing and refinement of non-phosphorus minerals.

The property is 842,977 m^2 with 59,160 m^2 of building space and an interior distribution system of 4.5 Km. Electricity is generated through an electrical substation with an installed potential of 30 MW.

The complex is made up of 3 factories which perform the following processes:

1 The tin foundry generates an annual nominal production of 20,000 tons of refined tin.
2 The second foundry has an annual nominal capacity of 10,000 tons of refined tin.

Although originally designed as two separate tin factories in the same complex, the productive capacities of these 2 tin foundries have since become integrated. They produce approximately 24,000 to 25,000 tons of refined tin per annum.

3 The antimony factory produces an annual output of 4,271 tons of metallic antinomy and 903 tons of antimony in the form of trioxide.

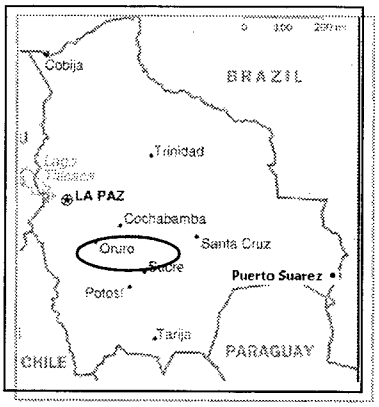
The plant complex was originally manufactured by *Klockner Industries Anlagen* of Germany with a non-conventional technology. The reduction process that normally occurs in two steps is carried out in one with the introduction of a variant that permits a one-stop operation. The operating cycle produces tin that is within 10% Sn, the minimum levels treated in volatization ovens. From the process, it is possible to recycle the tin-iron alloy used in the processing.

Huanuni & Colquiri

The Huanuni mining company provides much of the raw tin processed at Vinto, while Colquiri provides
the antimony. The total project sized has yet to be determined and is currently under study.

Site

Vinto is located 7.5 Km from the city of Oruro at an altitude of 3,728 m above sea level. Huanuni is located in the province of Pantaición Dalence in the department of Oruro. The site is located 50 Km from Oruro and 277 Km from La Paz. Colquiri's operations are located in the province of Inquisivi in the department of La Paz. The project is centered 75 miles from the city of Oruro an 240 km from the capital city of La Paz



Nature of Demand

The demand is driven by the need for iron and antimony in the construction of highways, bridges, factories and goods, areas in which the Southern Cone has seen considerable growth. Since its inception, the Vinto company has provided metallurgical goods throughout the country. In doing so, the firm has established and calculated the demand based on expected growth throughout the country.

Additional opportunities involve the export of metallurgical products to the Mercosur free trade zone. The product has the potential to be exported to Chile, Paraguay, Uruguay, Argentina, and Brazil, in addition to the Andean pact countries to the Northeast.

Project Status

The Empresa Metalúrgica Vinto (EMV) is 100% owned by the Bolivian Government. The government, in its attempt to provide an environment for free liberal trade, has established the Ministry of External Commerce and Investment tasked with the privatization of state companies and services.

Vinto, Huanuni and Colquiri will be privatized under the traditional model of privatization where proceeds flow directly to the government. The process is in its initial phases and international bidding is expected to commence during the 1st Quarter of 1998.

Financing

The estimated book value of El Vinto is expected to be approximately US$ 73 million. In addition to the mining companies that provide the factory with inputs, the total cost of the project should run at an approximate value of US$ 100 million. Valuation of the two smaller mining companies is being analyzed and will be conducted in the short-term.

Equipment and Service Procurement

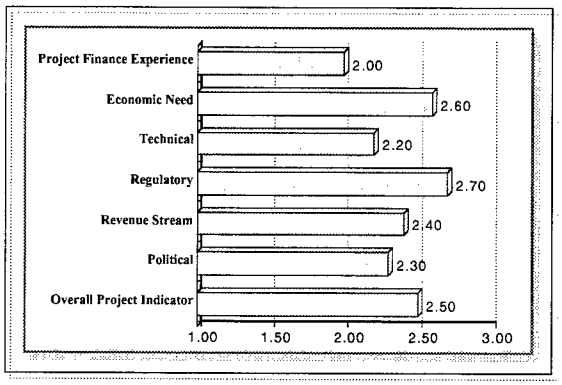
Equipment:

- Communication Equipment
- Processing Equipment
- Informatics
- Advanced Processing Technology
- Conveyer Systems
- Breakage Machines
- Air Ventilators
- Wastewater Equipment
- Cleaning Equipment

Services:

- Banking and Investment Services
- Technical Consulting
- Engineering Consultants
- Professional Auditors
- Environmental Consulting

Critical Project Indicators



Key Decision Makers

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Industry / Bolivia

Don Mario Mine Project

Project Summary

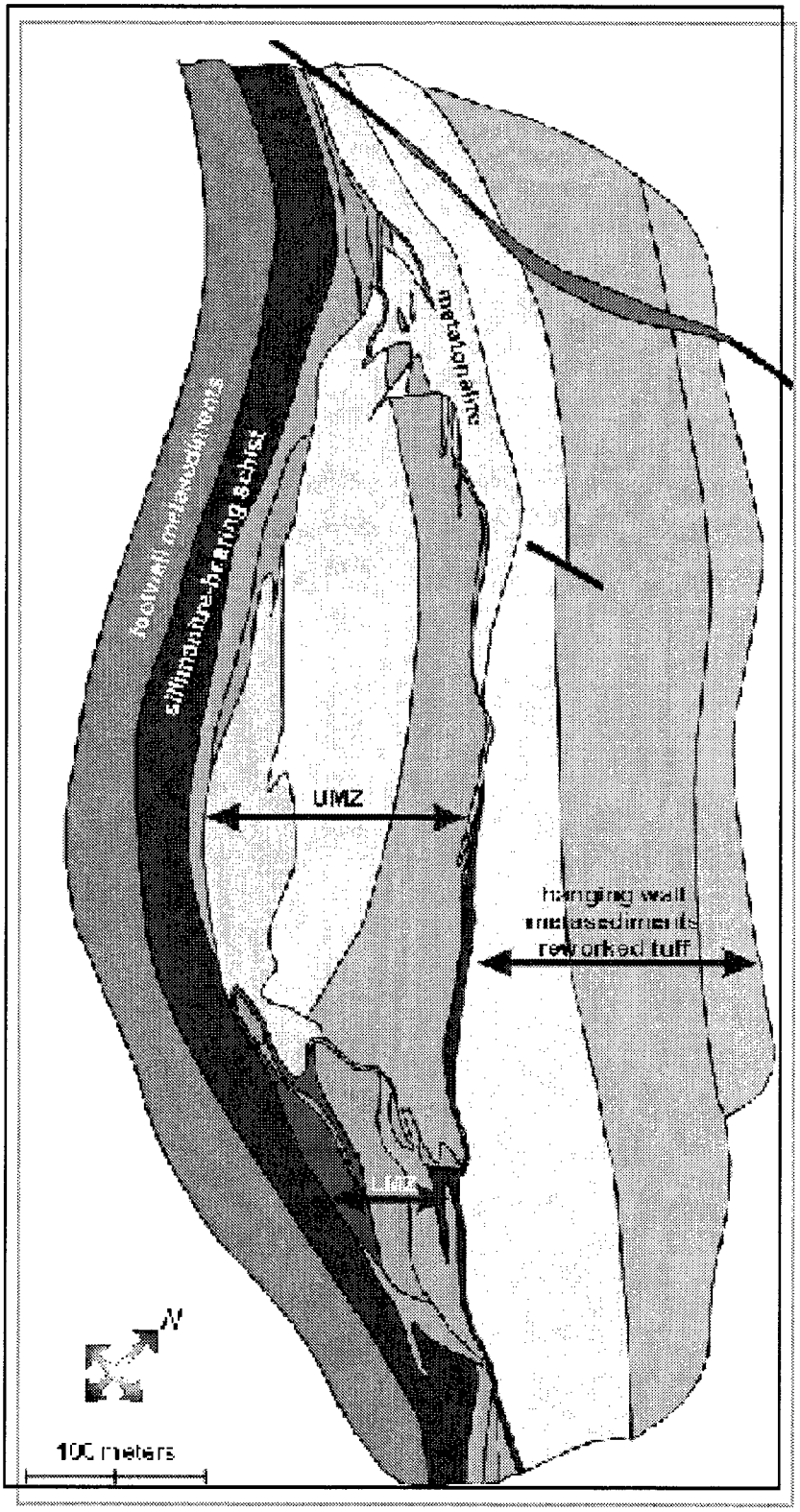
Project No:	**IND-06**
Subsector:	**Mining**
Location:	**Santa Cruz, Bolivia**
Project Cost:	**US$ 40 million**
Export Potential:	**US$ 16 million**
Type:	**Procurement**
Sponsor:	**Orvana Resources Corporation**

Orvana Resources Corporation is an international minerals exploration company with properties in North and South America, the Caribbean and Europe. The company's corporate strategy is to discover, acquire and define mineral deposits and, when appropriate, enter into arrangements with mine operators for the development of these deposits and share in the profits from mining. Currently, the company is preparing for the additional investments needed for extracting gold from the Don Mario Mine in Bolivia. Such investments will require equipment and service procurements in the range of US$ 40 million , of which 40% is expected to be US products and services.

Technical Description

Don Mario contains two main bodies of mineralization: an Upper Mineralized Unit (UMU) with Au, Cu, Pb, and Zn (as oxide and sulfide mineralization) in a unique calc-silicate lithology, and a Lower Mineralized Unit (LMU) with high-grade gold associated with sulfide Cu, Bi, Ag, hosted in amphibole-garnet-cordierite-biotite schist. Moderately folded Lower Mineralized Zone (LMU) host strata strike Northwest with a steep dip.

Data suggests a mid-Proterozic age for high-grade gold mineralization. Orvana's recently completed drilling results have been used to update a 1996 Technical Scooping Study prepared for Orvana by Pincock Allen & Holt. The updated information suggests that mining high grade sulfide deposit, the LMU portion, will generate strong cash flows.



Don Mario is a gold-copper ore-body suitable for near-term development containing two mineralized bodies:

1. A 1.5 million ton, steeply dipping underground-mineable Lower Mineralized Zone continuing high grade gold volumes (containing 12-13 grams Au/ton).

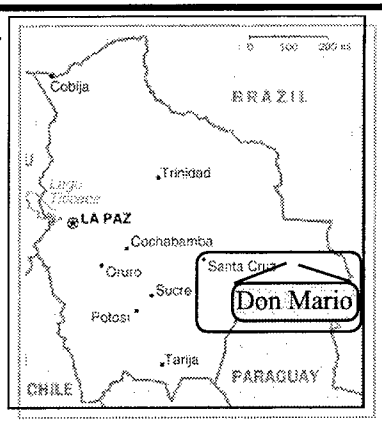
2. A potentially surface-mineable 5.5 million ton Upper Mineralized Zone containing equal commercial value of gold (1-2 grams Au/ton) and copper (1-2%).

Underground and surface mining will fluctuate from a rate of 750 to 3,250 tons. Current studies expect that mining will remain at 750 tons per day, although greater amounts are possible. The project will utilize standard mining and processing techniques to recover 100.000 ounces of gold per year at a cost of US$ 120 per ounce as well as 15-20 million lbs of copper per annum.

While development of a modern mining operation in any relatively remote location is not without challenge, there are no land, legal, environmental or processing factors which represent insurmountable problems to its profitability in the near-term.

Site

The Don Mario project is located in Eastern Bolivia, 380 Km east of Santa Cruz. The property is accessible by road and air. Air access is available through a 1,300 m airstrip suitable for twin engine aircraft located near the project camp.



Nature of Demand

The project has advanced to a point where a high profit-low risk gold mining operation is judged to be feasible at Don Mario. Without question, the mining of gold and copper deposits is a profitable endeavor given the accessibility of the products, and the amounts possibly recovered. Such information is supported by both the current price of gold and copper, as well as feasibility studies undertaken by the company.

In addition to the market conditions of gold and copper, future mine development in Bolivia is considered to be an opportunity for the benefit of the company shareholder, project suppliers, company employees and Bolivia as a whole.

Project Status

The project is a result of a concession purchased in April 1996 for 15 exploitation sights and 5 exploration concessions totaling 1,395 sq Km. Work on the Don Mario project has advanced to the point where completion of a detailed study on the feasibility of placing an underground mine into production is warranted. The company is currently negotiating with potential development partners and reviewing financial options.

Potential Bidding Dates

Feasibility Studies:	Fourth Quarter 1997
Permitting/ Environmental Work:	December 1997
Process / Facility Design:	June 1998
Construction Contracts:	Fourth Quarter 1998

Projected Starting and Completion Dates

Feasibility Studies:	January - December 1998
Permitting/ Environmental Work:	January - December 1999
Process / Facility Design:	July 1998 - December 1998
Construction Contracts:	September 1998 - September 1999
Operations Commencing:	Fourth Quarter 1999

Factors which may adversely affect project scheduling include financing, permit passing, weather and miscellaneous market influences

Financing

The company is currently reviewing financing options and believes that host government financial support is possible while multilateral financing is likely. In addition to other avenues of financing, the company has a good credit rating and is listed on the Toronto Stock Exchange and the TSE-300 Index. The project is considered viable and is expected to generate a strong return on investment.

Mineral Resource:	1,200,000 ounces gold equivalent
Mineable reserves:	1,467,000 tonnes at 12.95 gm/T gold (631,000 ounces)
Mine life:	5.4 years at 750 T/day
Gold production:	560,000 ounces recovered using a conventional gravity/cyanidation/carbon plant recovery (ADR) circuit
NPV at 5% discount:	$68.2 million at $370/ounce gold
IRR:	68.4%
Capital cost:	$38.654 million, with capital payback in less than 18 months ó does not include VAT tax which totals an additional $4.8 million
Cash cost:	+/-$105/oz gold, +/-$35/T ore

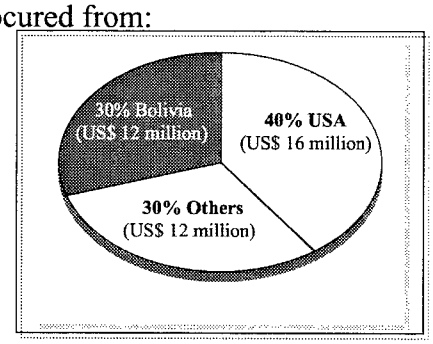
* Currently being revised

Equipment and Service Procurement

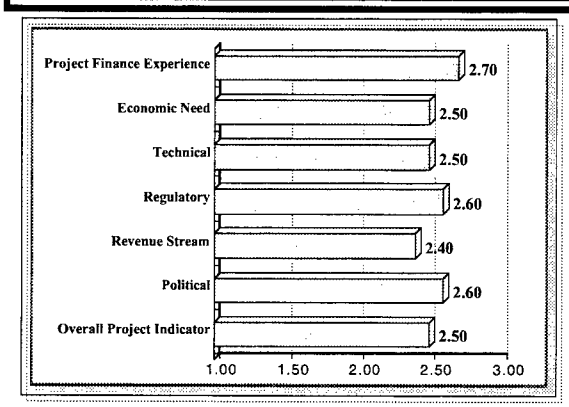
Description of Major Equipment and Contracted Services Required:

- Environmental Monitoring
- Permitting
- Mind and Mill Process Design and Construction
- Road Design and Construction
- Communication Equipment
- Power Generation

Anticipated Equipment and Services is expected to be procured from:



Critical Project Indicators



Key Decision Makers

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Industry / Bolivia

Sponge Iron Plant

Project Summary

Project No:	**IND-07**
Subsector:	**Sponge Iron**
Location:	**El Muntun, Bolivia**
Project Cost:	**US$ 200 million**
Export Potential:	**US$ 150 million**
Type:	**Joint Venture**
Sponsor:	**Ministerio de Comercio Exterior e Inversiones, COMIBUL**

Under the new Ministry of External Commerce and Investment and a directive from the newly electred government, the mining sector will be further developed. The project involves COMIBUL (Corporación Mineria de Bolivia) and Ministerio de Comercio Exterior e Inversiones, who will be tasked with the process of privatization and transfering operations to the public sector.

Technical Description

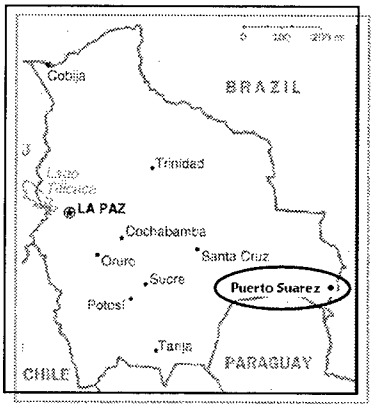
Information collected over the past few years shows clear evidence of large deposits of iron ore in Southeastern Bolivia which may be utilized for iron ore processing. The information is backed by feasibility studies providing data on the implementation of a conventional processing plant for iron ore.

Previous studies did not find the project to be viable, because they lacked a critical element for the project's justification. The Bolivia-Brazil gas pipeline currently under construction provides the needed materials for the conduction and eventual processing of the iron ore. The completion of the pipeline will provide a much-needed energy resource for the development of the region -- a region which many believe may contain some of the largest, untapped iron ore deposits in the world.

Currently, iron ore mines in this region are undeveloped and infrastructure consists of a small-scale production plant with a small cleaning plant and mineral classification office.

Site

The project is located in "El Mutun," an iron mining area in Southern Bolivia in the state of Santa Cruz, south of Puerto Suarez on the Bolivia-Brazil border.



Nature of Demand

During the last decade, the production of iron ore has sharply fallen while the technology for mining and processing has sharply improved. These circumstances have lowered the cost of production but have yet to increase the material's global supply. Demand for the product has not wavered and is slowly rising on a global scale and on a regional basis (Mercosur).

Bolivia's central geographic location, as well as the recent capitalization of its rail network wil enable the product to be distributed throughout the Southern Cone. Opportunities also include distribution to the Pacific Rim via nearby Chilean ports.

Project Status

The project has undergone basic studies but there have been no definitive studies. Past studies did not include the possible use of natural gas as a power source nor as a conductive compound, and therefore are not valid for the project's current needs.

The project is presently moving forward with attempts to locate funding for feasibility studies. The Bolivian Government's National Secretariat of Exterior Commerce and Investment has referred to the project as one of "National Interest." It will therefore have the full backing of the government in terms of promotion and presentation to multilateral institutions and companies interested in proceeding with the initiative.

Financing

The basic structure of the project consists of a joint venture. The project is property of the Republic of Bolivia but is considered exploitable through private funding and administration.

The role assumed by the government is the conclusion of a pre-feasibility study, project promotion and transfer to the public sector. At the moment there is no established contract or relationship with a bilateral or multilateral agency.

Equipment and Service Procurement

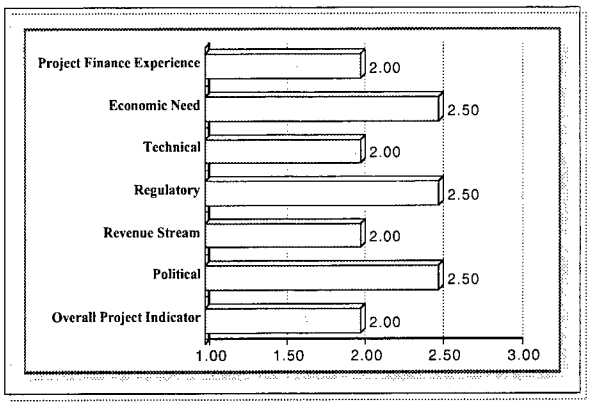
Equipment:

- Perforation Equipment
- Back Hoes
- Trucks
- Paletization Plant
- Reduction Plant
- Natural Gas Treatment Plant
- Transportation Systems
- Telecommunications Equipment
- Processing and Mineral Concentration Equipment

Services:

- Specialized Exploration Services
- Feasibility Studies
- Specialized Consulting

Critical Project Indicators



Key Decision Makers

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Industry / Bolivia

Fancesa Cement Factory Privatization

Project Summary

Project No:	**IND-08**
Subsector:	**Cement**
Location:	**Sucre, Bolivia**
Project Cost:	**US$ 45 million**
Export Potential:	**US$ 15 million**
Type:	**Privatization**
Sponsor:	**Ministerio de Comercio Exterior e Inversión**

Fancesa has 3 institutional stockholders, each holding 33% of corporate stock. One of the shareholders has made the decision to sell its holdings and in parallel form, the Board of Directors of Fancesa is raising capital through the release of additional shares. The Bolivian Government plans to hold an international public bidding for the sale of both the 33% holdings and the newly subscribed shares as a single package, transferring majority ownership of Fancesa to the private sector.

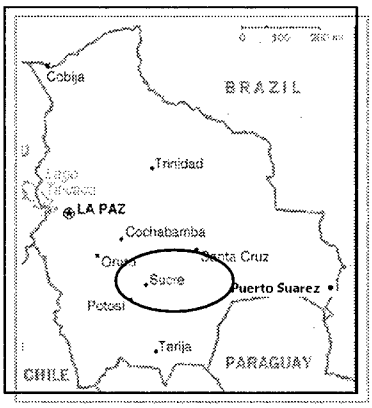
Technical Description

Fancesa is the second largest cement factory in Bolivia, with a total market share of 26%. The company has a capacity of 270,000 metric tons (MT) of clinker, 300,000 MT of Portland cement and 1,350 MT of processed cement. The factory has a quarry of approximately 9,600 million MT, with a 90% carbonate base.

Fancesa has a total asset value of approximately US$ 55 million and total liabilities of US$ 10 million, resulting in a net worth of US$ 45 million. Over the past 5 years, Fancesa has realized an average gross income of US$ 5.6 million and an average net income of US$ 4.4 million. Annual sales are US$ 18 million.

Site

The factory is situated 6 Km from the city of Sucre, in close proximity to the most important markets in Bolivia (Santa Cruz, Cochabamba).



Nature of Demand

Fancesa initiated operations in 1960. Demand for cement in the city of Sucre stems essentially from the Bolivian market, which consumes approximately 1 million MT per year. Between 1986 and 1990, demand has doubled, primarily due to macroeconomic stabilization and the moderate growth Bolivia has achieved since 1985.

From 1991-93, demand for cement experienced a modest increase (approximately 8%), and from 1994 to the present demand has risen by a rate of 10% per year. Principal markets for Fancesa cement include: Santa Cruz (60% of total sales), Chuquisaca (19%), Cochabamba (10%) and Potosi (8%).

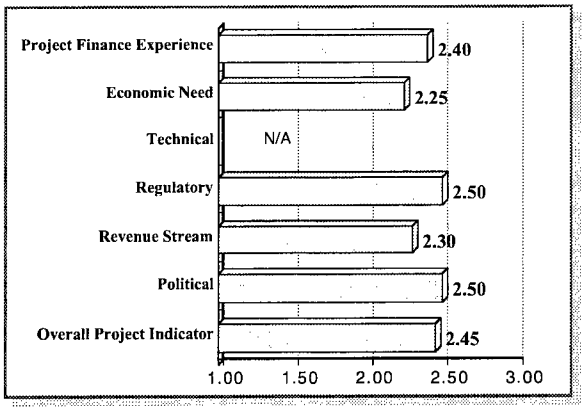
Project Status

The Bolivian Government is currently developing technical-financial studies in preparation for the privatization of Fancesa. The studies are expected to be completed in December 1997. The international public bidding process will commence during the 3rd Quarter of 1998.

Financing

The Bolivian Ministry of External Commerce and Investment will sell the pre-existing 33% share group, in addition to the newly subscribed shares as a complete package. The objective of this sale is to allow a private sector investor to gain majority ownership of the company. The package of shares will be sold through an international public bidding.

Critical Project Indicators



Key Decision Makers

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Industry / Bolivia

Ammonia - Urea Plant

Project Summary

Project No:	**IND-09**
Subsector:	**Chemical**
Location:	**Puerto Suarez, Bolivia**
Project Cost:	**US$ 350 million**
Export Potential:	**US$ 75 million**
Type:	**Concession / JV**
Sponsor:	**Technopor Ltd.**

Technopor is a wholly-owned private company participating in the petrochemical sector which sells products to the regional agricultural markets of Brazil, Paraguay and Bolivia. Registered with Dunn and Bradstreet,Technopor is also involved in the construction and plastics industries.

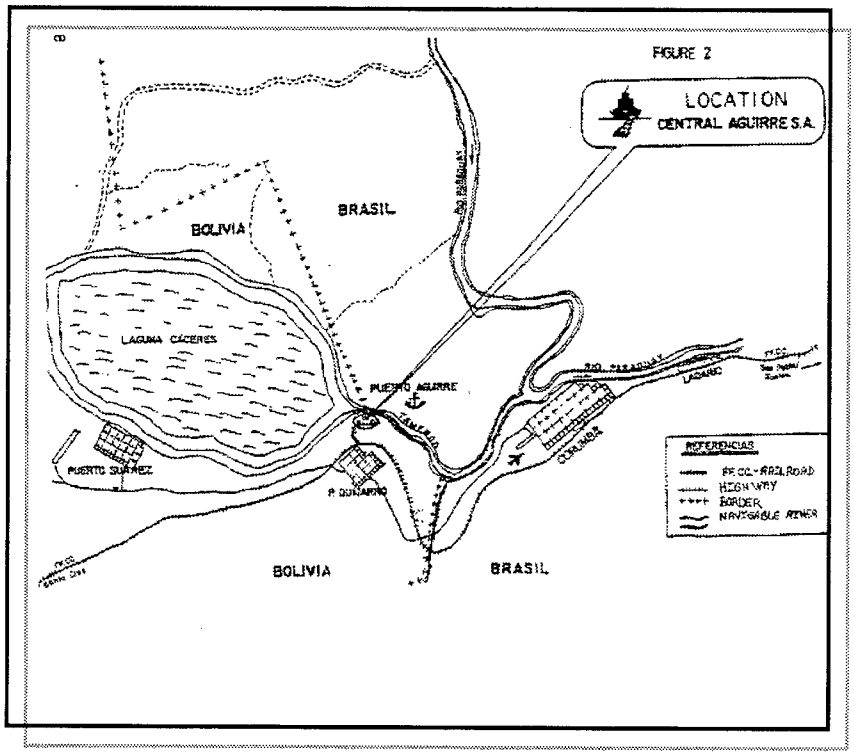
Technical Description

Technopor plans to construct a natural gas-based ammonia-urea complex of large capacity by international standards (1,000 TPD Ammonia, 1500 TPD urea). The plant will use natural gas to produce a syntheses gas which will ultimately be converted to ammonia. Using large centrifuge compressors, the factory will produce 90% urea, 10% of which will be sold as ammonia.

Due to the high export potential of the products which the plant will generate, the project has substantial support at the local, regional and federal levels of government.

Site

Strategically located, the project will take advantage of nearby raw materials and road access. The proposed site of the urea plant is either on the grounds of the Central Aguirre S.A. port complex or at a nearby, comparable site on a navigable waterway that forms part of the Paraguay-Paraná river. The port provides an avenue from which to ship to Brazil and Paraguay. Both alternatives are viable and will be studied in the short-term to delineate their various advantages.



The location also provides avenues for export through rail networks, highways, waterways and airports. The position of the location will undoubtedly provide access to the hinterland of Mercosur.

Nature of Demand

The demand for nitrogenous fertilizers, and specifically for urea, is generated by the emphasis on agricultural production in Bolivia's eastern Region. In addition, it has been estimated that approximately 50 million acres of crops are harvested annually in Western Brazil, Bolivia, Paraguay, Uruguay and Argentina. The main crops of the region include soya, corn, cotton, rice, wheat, sugarcane and potatoes, all of which react favorably to urea fertilizers.

Additional demand for urea stems from cattle feeding and industrial applications such as urea resins. Although 2 ammonia-urea factories in eastern Brazil are functioning, they do not produce sufficient amounts to meet Brazil's demand, let alone that of the region. Ammonia demand is primarily generated through liquid fertilizer applications in the agricultural sector, as well as in various industrial applications. Current ammonia demand is satisfied by overseas imports.

Experiencing a growth of over 50% in some areas, agriculture will provide ample demand for the urea product. Bolivia for example is the fifth largest producer of soybeans today after entering into the business only five years ago. Other examples of such growth exist. It is estimated that by the year 2008, the total urea demand in the region will exceed 450-630 tons. Numbers have been derived through projections based on recent growth throughout the region. Please refer to the chart on the right for per country data.

Projected Demand for Year 2008 (ooo metric tons)

Brazil	250-300
Bolivia	100-150
Paraguay	50-80
Others (Chile, Peru, Argentina, Uruguay)	50-100
Total	**450-630**

Special Considerations

A major impetus for the project is the tremendous growth of the oil and gas industry in Bolivia, due in large part to the construction of the Bolivia-Brazil gas pipeline scheduled to be completed in December 1998. The plant is strategically located to take advantage of the gas and transform it into a value-added product for export. The induction of such an endeavor is therefore valuable in the following two ways: (1) It provides a value added product made from Bolivian natural resources and (2) It utilizes that product to Bolivia's comparative advantage in agriculture.

Project Status

Project feasibility studies will be conducted over the next six months, followed by the structuring of the corporation that will carry out the project.

Bidding will take place in September-October 1998, where upon a concession or joint venture agreement will be signed with the winning company. The project will begin implementation immediately afterwards, and is expected to take 15 months. Expected plant start-up is January 2000 or a bit sooner.

Financing

Established as a private initiative, the sponsors have received complete support from the government and have spoken to several multilateral institutions to obtain possible financing. Preliminary contacts have already been made with the IFC, OPIC, and the Andean Development Corporation. In the short-term, the company is planning to contact the IDB, the Overseas Economic Development Fund of Japan and other multilateral and bilateral agencies. The strategy has been to incorporate financial institutions as lenders and also as strong equity partners in the project.

Equipment and Service Procurement

It is estimated that 90% of all equipment will be imported from outside sources. All imports will be conducted through competitive bidding. Engineering and procurement services will be 100% imported, while construction services are expected to be 80% imported.

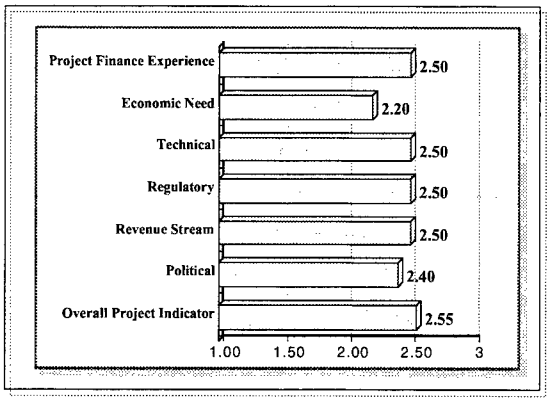
Equipment:

- Piping
- Measuring Equipment

Services:

- Basic Engineering
- Specialized Engineering
- Chemical Engineering

Critical Project Indicators



Key Decision Makers

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Industry / Brazil

Welding Metal Production Facility

Project Summary

Project No:	**IND-10**
Subsector:	**Metal**
Location:	**State of Maranhão, Brazil**
Project Cost:	**US$ 40.5 million**
Export Potential:	**US$ 15 million**
Type:	**Procurement/ Partnership**
Sponsor:	**Irmãos Ayres S.A.**

Irmãos Ayres is an established Minas Gerais based company which is expanding into the export of iron derivative products. The company was created in 1955 and is an important producer of machinery used in iron ore foundry, mining, automobile, and civil construction industries. Irmãos Ayres is located in Contagem, an industrial city adjacent to the capital of the state of Minas Gerais.

Technical Description

The project calls for the construction of a plant to produce high carbon iron- manganese (FeMnAc) and iron silicate-manganese (FeSiMn). The products are used for reduction in the production of iron alloy and as an element in the production of steel with manganese, as well as in foundry processes for welding metals.

The high carbon iron-manganese is the product of a continuous reduction process obtained through fusion , utilizing electric furnaces. Iron silicate-manganese is produced using a similar process, adding to it acid treatment.

The unit's capacity will be 50,000 tons of iron alloy per year.

At a later phase, the project requires a 70 MW hydro electric plant (25% of cost of the final product) for which a feasibility study will be required. Estimated investments for such a plant in the region are US $ 105 million.

The overall project also calls for the exploration of manganese in the nearby mining areas. The goal of the mining activities will be to produce 200,000 metric tons of manganese for supply to the plant. The estimated investment amount, including land, legal permits, and civil and mechanical construction is US$ 15 million.

Site

The factory will be located over a 600,000 square m area in the state of Maranhão, in the municipality of Bacabeira, 40 Km from the state capital, São Luiz. The plant's location is adjacent to the Carajás rail line and the BR 135 Federal highway. The industrial unit will use the Port of Itaqui linked through the Carajás - São Luiz rail road (35 Km).

Nature of Demand

The impetus for the project is high demand for iron alloy in China, Japan and Europe. The project has a competitive advantage over the southeastern region of Brazil, given the lower cost of production and transportation and the abundance of raw materials in the region.

Project Status

The land has been bought and completely leveled, drained and full water and waste water infrastructure is in place. Side roads connecting the facility to the principal highways have been paved with hexagonal tiles, and the electric transmission has been installed.

Two buildings of 750 square meters and 800 square meters respectively have been completed, with the final building for furnaces being finished by the first quarter of 1998.

The project's sponsors are analyzing the options of raising debt, or bringing on an equity partner to finish financing the project.

Financing

Project Costs
(in US$ thousands)

	Executed	To be Executed	TOTAL
Studies, Projects	1837	246	2083
Land	113	0	113
Civil Works, Installations	4492	11393	15885
Equpment	1271	13901	15172
Other	982	5758	6740
TOTAL	8695	31663	40358

Sudene, (Superintendência do Desenvolvimento do Nordeste) the federal agency created to foster development in the Northeast, is giving fiscal benefits as well as investing with the project sponsor to develop the region. Sudene is investing US$10 million (US$ 2 million of which has already been financed) and the facility has been granted an income tax exemption for a ten year period.

Total project cost is approximately US$ 40 million, and the sponsor is placing equity of approximately US$ 10 million, US$ 6 million of which has already been invested. The project's annual revenues are estimated at US$ 40 million.

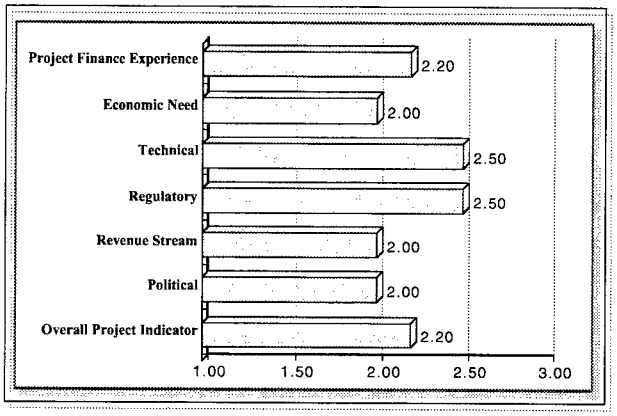
Equipment and Service Procurement

The project will require the following equipment:

- Industrial installations
- 2 Electric furnaces
- Electric installations
- Communications and control systems

No services are likely to be imported for this project.

Critical Project Indicators



Key Decision Makers

Company	Irmãos Ayres S.A. and Subsidiary Marlloy
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Industry / Peru

Ammonium Nitrate Plant

Project Summary

Project No:	**IND-11**
Subsector:	**Petrochemical**
Location:	**Peru**
Project Cost:	**US $96 million**
Export Potential:	**US $60 million**
Type:	**JV**
Sponsor:	**EXSA S.A.**

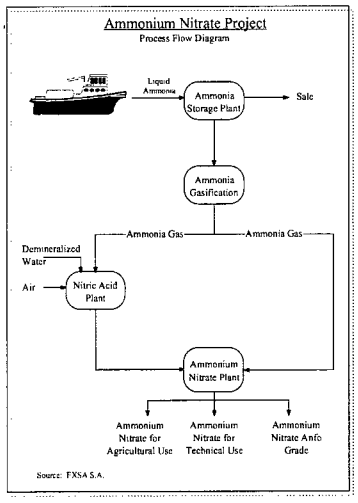
EXSA S.A, a leading company in the Peruvian explosives market, is principally-owned by Grupo Brescia, which is one of the country's principal economic groups.

Technical Description

EXSA plans to construct a 600-800 metric ton/day ammonium nitrate plant based on natural gas

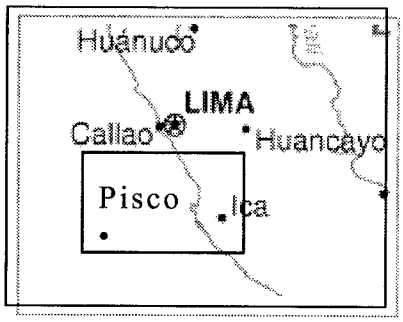
End Products:

- Ammonium Nitrate (for agricultural fertilizers)
- Ammonium Nitrate (for technical use)
- Ammonium Nitrate ANFO Grade



Site

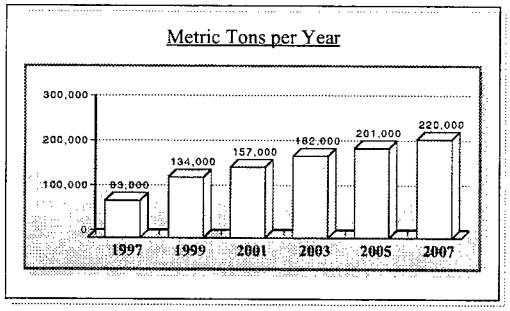
The plant location has not yet been defined. EXSA is considering three possible locations, Northern Lima, Southern Lima or Pisco, 250 Km south of Lima.

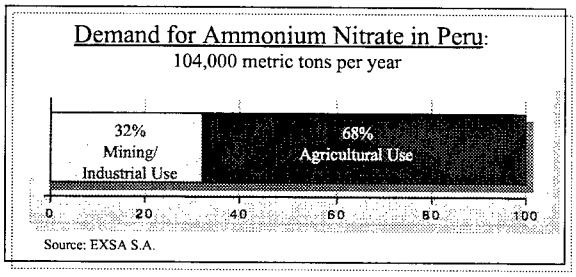


Final site determination will depend on the location of the gas pipeline that the Shell/Mobil Consortium intends to construct which will bring natural gas from the Peruvian rainforest to the coast (the Camisea project). EXSA plans to utilize natural gas as a primary raw material in the future for the production of Ammonium nitrate.

Nature of Demand

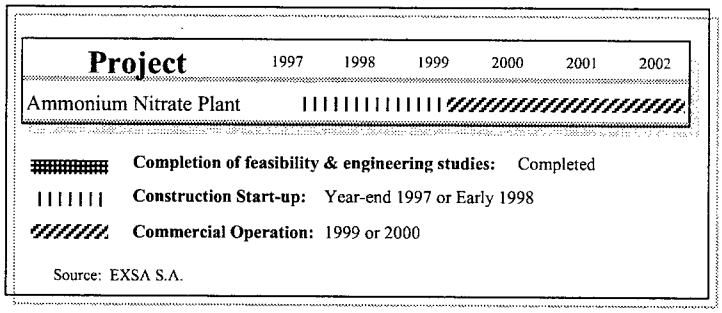
The execution of key mining projects in Peru, such as Quellaveco, Mantos Blancos, La Granja, Antamina, Pierina and Sipán, which will become operational in the short-term, is expected to significantly inflate domestic demand for ammonium nitrate. As the following graph illustrates, domestic demand for ammonium nitrate will increase from its current level of 83,000 metric tons per year to 157,000 metric tons in the year 2000 and 220,000 metric tons in 2009. Currently, only one company, Industrial Cachimayo S.A. and Fertilizantes Sintéticos S.A., produces ammonium nitrate locally.





Project Status

EXSA engineers have completed a technical feasibility study and the company plans to begin plant construction at year-end 1997 or during the first quarter of 1998. EXSA is currently seeking strategic partners interested in participating in the investment.



Plant construction will require 20-24 months, and commercial operation is expected by the year 2000.

Financing

The project's US $96 million total investment will be 100 percent financed by the private sector. EXSA (backed by Grupo Brescia) expects to internally finance 40-70 percent through loans and the remaining amount through strategic alliances.

EXSA estimates that the ammonium nitrate plant will yield a minimum gross income of US$ 58 million per year. At a 9 percent cost of capital, the company expects that this project will have an Internal Rate of Return (IRR) of 17.4 percent.

Equipment and Service Procurement

EXSA plans to import 90 percent of equipment and materials for this project

Equipment:

- Reactors
- Turbo-compressor
- Pumps, tanks
- Ventilators
- Dryers
- Conveyors
- Instrumentation
- Electric motors

Services:

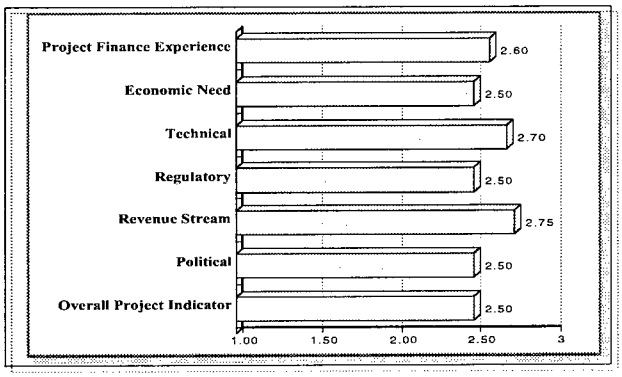
- Basic and design engineering for civil works, machinery, electric wiring and instrumentation.

EXSA intends to import liquid ammonia during the first 2 years of plant operation and is considering sourcing this raw material from Venezuela or Colombia, due to Peruvian trade agreements with these countries which would enable the product to be imported without tariffs.

Sales Opportunity:
Liquid Ammonia

EXSA would also consider the possibility of importing the product from the United States, provided that the US supplier is large enough to export large volumes of liquid ammonia. EXSA believes that ammonium production based on locally-sourced natural gas will not be available during the first 24 months of plant operation.

Critical Project Indicators



Key Decision Makers

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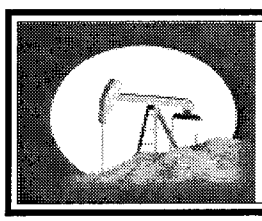


Industry / Venezuela

Jose Industrial Park

Project Summary

Project No:	**IND-12**
Subsector:	**Multi-Sectoral**
Location:	**Anzeoategui State, Venezuela**
Project Cost:	**US$ 715 million**
Export Potential:	**US$ 215 million**
Type:	**BOT Concession**
Sponsor:	**PDVSA**

PDVSA is Venezuela's state-owned oil industry. The company has aggressive investment plans for increasing its petroleum production as well as petrochemical output. PDVSA's three main Venezuelan oil companies: Corpoven, Lagoven and Maraven, are vertically integrated companies engaged in exploration, production, refining as well as national and international marketing.

Venezuela's resource base includes proven crude oil reserves in excess of 64 billion barrels, the largest outside the Middle East, and the sixth largest in the world.

PDVSA's total worldwide refining capacity, including access to jointly-owned refineries, stands at over 2.4 million barrels per day - the third largest among international oil companies. Greater and even more sophisticated refining capacity is being achieved by upgrading existing refineries or constructing new ones in Venezuela, as well as by acquiring equity in refineries abroad.

The Venezuelan oil industry is carrying out an opening process, which complements its overseas downstream investment strategy. According to the legal framework approved by the Venezuelan Government, PDVSA is promoting private participation in its business activities.

Private companies can assume strategic joint ventures in the area of exploration, as well as the construction and operation of plants and installations for the generation and distribution of electricity, steam, water, hydrogen, nitrogen, special products management and port services.

Technical Description

The Jose Industrial Park project is an important development in PDVSA's expansion program. PDVSA is modernizing and expanding the existing industrial complex (made up of a cryogenic plant and a refinery as well as a petrochemical complex). They are seeking a private sector firm to amplify and modernize the existing infrastructure in the Jose complex to meet the needs driven by the expansion of the industrial complex.

PDVSA is planning the following investments over the next three years:

Subsidiary Bitor:
- Expansion of warehousing and crude pumping to handle 500 MBPD (Millions of Barrels Per Day) of orimulsion.

Subsidiary: Corpoven:
- Expansion of Eastern Cryogenic unit, to expand natural gas handling capacity to 150 MBPD from the current 100 MBPD.
- Construction of the Warehousing and loading terminal.
- Construction of an ethane plant
- Studying possibility of implementing a heavy crude upgrading unit.

Subsidiary: Maraven:
- Construction of a 102 MBPD capacity heavy crude upgrading plant with SINCOR.

Subsidiary Lagoven:
- Construction of a heavy crude upgrading facility with capacity of 180 MBPD with Mobil-Veba Oels.

Subsidiary Pequiven
- Expansion of 2 methanol plants by 730 Million Metric Tons/Year (MMTY) and 750 MMTY respectively.
- Construction of four fertilizer plants to achieve a total production capacity of 2,660 MMTY of fertilizers.
- Joint construction with Mobil of an ethylene plant, two polyethylene plants, and an ethylene-glycol plant, totaling a capacity of 2,200 MMTY of olefins.

The Jose industrial complex will also include the creation and expansion of the existing infrastructure. These components of the project are encompassed into separate concessions for the construction, operation and maintenance of the complex as a whole for 35 years.

Site

The Jose Industrial Complex is located in Eastern Venezuela, in the state of Anzuategui, between the urban centers of Piritu and the Barcelona. The complex covers 47,000 hectares for which 3,500 has will be allocated to industrial installations.

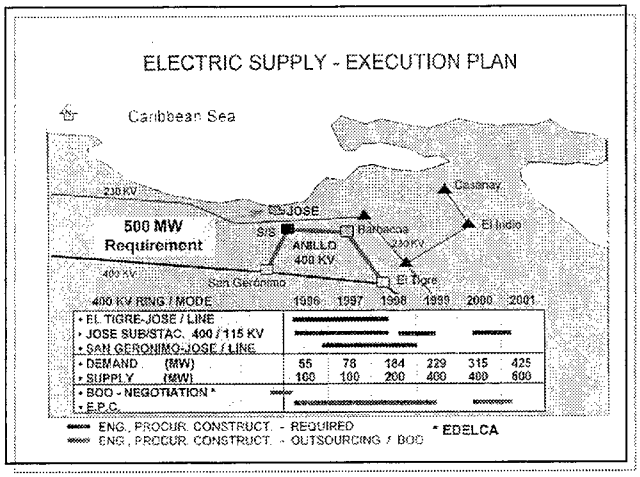
Nature of Demand

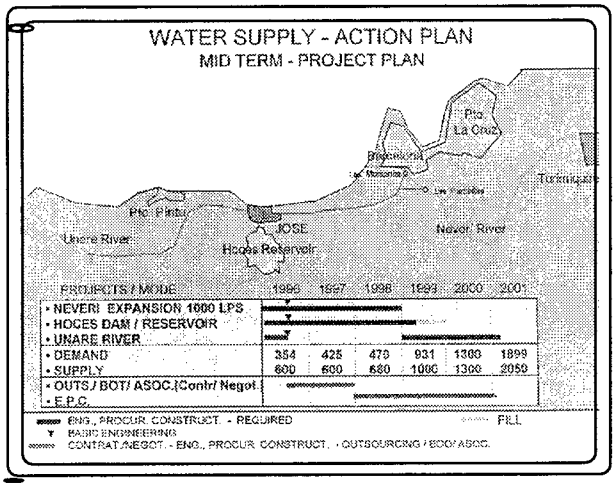
PDVSA's overall investment plans call for spending US$ 60 billion over the next ten years. The company is expanding its production capacity in response to a federal mandate and rising international prices. The company is the second largest oil producer in the world, with a competitive advantage to supply to the United States, through partnerships with US companies investing in production in Venezuela.

The Jose industrial complex is integral to PDVSA's global investment plans and has been deemed a national priority by the Federal government.

Project Status

The Industrial Complex is currently being expanded (started in 1996), and it is expected that most of the facilities will be operational by the end of 1999. PDVSA has concluded 15 percent of the basic engineering project for the overall industrial complex.





Financing

PDVSA is Venezuela's largest company and poses little risk to companies interested in developing a commercial relationship. A 35 year concession is financeable based on PDVSA's strong export earnings.

The project will move forward and has been prioritized at the federal level. US equipment and service suppliers have excellent opportunities directly associated with the physical infrastructure creation in the Jose Industrial park, as well as procurement opportunities with PDVSA's expansions and modernization.

Equipment & Service Procurement

Specifically, the Jose Industrial complex will need the following equipment and services which will all be contracted out:

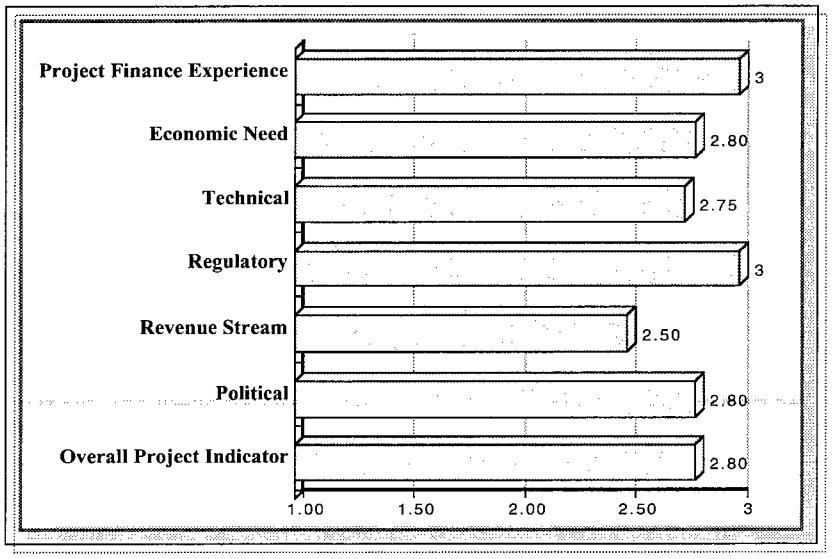
Equipment:

- Warehousing of petrochemicals, cryogenic products, and unrefined petroleum products
- Fire safety systems
- Communications systems
- Port terminals
- Highway infrastructure
- Piping infrastructure
- Urbanization – construction of buildings and plants
- Hydrogen, nitrogen and oxygen supply

Services:

- Wastewater treatment (includes industrial effluents) of $3m^3$/second
- Hazardous waste treatment
- Commuter Transport Services
- Medical Services / Security Systems

Critical Project Indicators



Key Decision Makers

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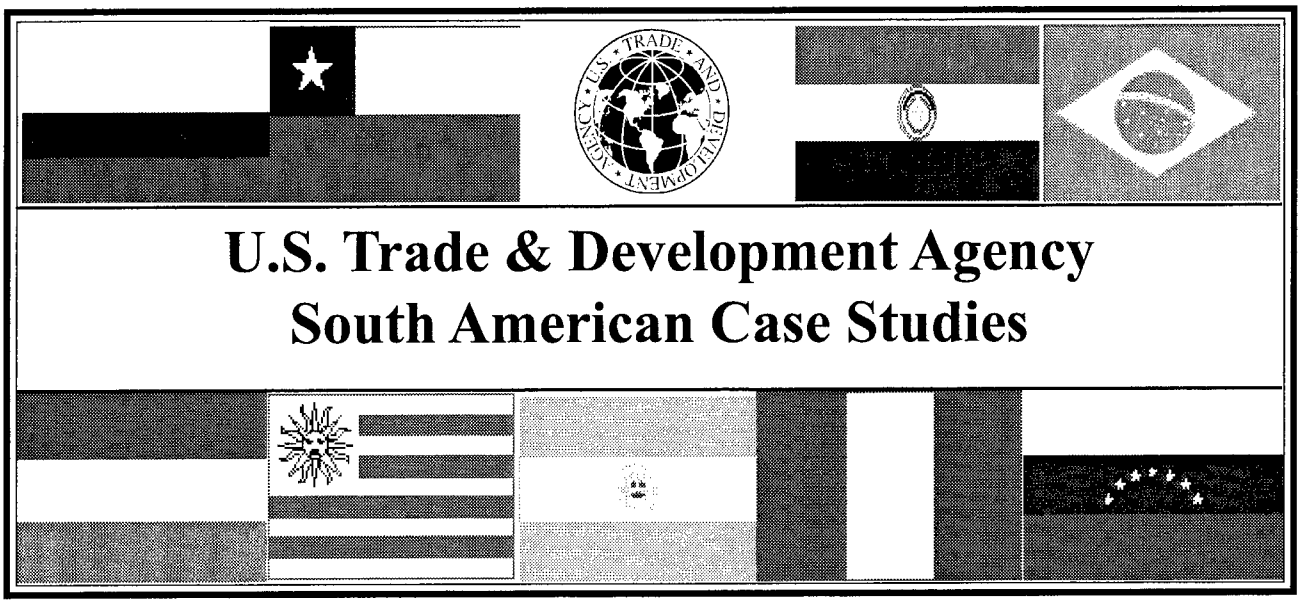

The US Trade and Development Agency assists in the creation of jobs for Americans by helping US companies pursue overseas business opportunities. Through the funding of Feasibility Studies, Orientation Visits, specialized training grants, business workshops, and various forms of technical assistance, TDA enables US businesses to compete for infrastructure and industrial projects in middle-income and developing countries.

Feasibility Studies

Feasibility Studies evaluate the technical, legal, economic, and financial aspects of a development project in the concept stage and are TDA's most important funding activity. Since these project plans are required by financial institutions to assess the creditworthiness of a project before it can go forward, they provide US firms the opportunity to get in on the "ground floor" of a project. Feasibility studies typically include procurement plans, contact information, technical data, financial information, and market studies.

TDA-funded feasibility studies also advise project sponsors about the availability of specific US equipment and services and advice that leads to the use of US goods and services in the project's implementation.

Definitional Missions

Definitional Missions are teams of technical specialists contracted for a short-term visit to a host country to gather additional information to analyze whether to proceed with a feasibility study. Definitional Missions, which are carried out exclusively by small and minority-owned businesses, also provide US small businesses with an opportunity to establish working relationships with foreign officials.

Desk Studies

Desk Studies are used by TDA when there is sufficient project information available, and an overseas visit is not necessary. In these situations, TDA hires a technical specialist to perform a review of the proposed project and to answer specific questions.

The case studies highlighted are examples of Definitional Missions and Feasibility Grants funded by TDA in South America. All five case studies illustrate TDA's swift actions and illustrate the range of projects which TDA funds, in order to sponsor job creation in the US and infrastructure improvements in South America.

Case Study No. 1: Traffic Management Project
Argentina, 1995

TDA funded a Definitional Mission which established the need for a traffic management system in the city of Buenos Aires, Argentina. The project offers opportunities for US technology providers and software developers, as it consists of implementing an intelligent computerized traffic monitoring, and enforcement system. The project also improves the quality of life in the Buenos Aires metropolitan region.

Case Study No. 2: Wide Area Network
Peru, 1996

TDA funded a Feasibility Study to analyze the use of information technology to solve operational inefficiencies in the Peruvian government. The technology will facilitate secure and reliable information sharing within various Peruvian ministries, and offers excellent technology procurement opportunities for US firms involved in software and network design and implementation.

Furthermore, the project is replicable for other governments in South America.

Case Study No. 3: Railroad Expansion and Improvement Project
Uruguay, 1995

TDA funded a Feasibility Study to analyze expansion options for the Uruguayan railroad network. The purpose of the study was to determine how best to structure expansion plans to accommodate 1) future demand trends 2) private sector participation in financing and operating rail projects in Uruguay. The Study helps guide both the Uruguayan government as well as the US private sector interested in rail projects in South America.

Case Study No. 4: Subway Ventilation for Metrovias
Argentina, 1997

TDA is funding a Feasibility Study for this Metrovias project which will provide a ventilation system in the Buenos Aires Subway. The project offers excellent procurement opportunities for US ventilation equipment environmental and technical engineering and consulting services.

Case Study No. 5: Curitiba Water Loss Reduction
Brazil, 1997

TDA is funding a Feasibility Study for the reduction of physical and non-physical losses in the Curitiba water distribution network. The study serves a social purpose of improving potable water service in the South of Brazil's largest city, as well as providing opportunities for US equipment vendors of flow meters and pressure valves.

TDA in South America

TDA actively markets its programs in eight countries of the region: Argentina, Bolivia, Brazil, Chile, Ecuador, Peru, Uruguay and Venezuela. TDA also considers projects in other countries (Colombia and Cuba are currently not eligible), as well as projects that fall under the auspices of the Inter-American Development Bank or the World Bank and/or their private sector affiliates.

Over the past two years, TDA activities in South America have increased dramatically. A comprehensive list of TDA funded projects follows.

ARGENTINA

Environmental Management Projects -TDA funded a Definitional Mission to investigate environmental projects in Argentina. Tech International conducted the DM. (FY 95)

Dock Sud Environmental Remediation Project - TDA funded ($750,000) a feasibility study for the Dock Sud environmental remediation and pollution project in the province of Buenos Aires. Brown and Caldwell conducted the study. (FY 95)

Energy Sector Projects - TDA funded a definitional mission to evaluate two electric power generation projects in Argentina. Boston Pacific Company, Inc. conducted the DM. (FY 95)

Comodoro Rivadavia Power Plant Project - TDA funded ($343,219) a feasibility study on a gas-fired power plant and wind-power station in Comodoro Rivadavia. Advanced International Group conducted the study. (FY 95)

Civil Aviation Facilities Concession - TDA funded ($20,000) an orientation visit for civil aviation

officials from Argentina. AAROTEC Educational Foundation coordinated the visit, which took place in May 1997. (FY 96)

Port of Rosario - TDA funded ($17,172) an orientation visit for officials from the Ente Administrador Puerto Rosario to present the terms of the upcoming terminal concession to US port and terminal operators and to gain exposure to US firms' capabilities in the port sector. Management for Meetings coordinated the visit, which took place in February 1997. (FY 96)

Copper Smelter Project - TDA has approved funding ($484,700) for a feasibility study on a copper smelter project in Argentina. Contractor selection is underway. Midland Standard, Inc. conducted the Definitional Mission. (FY 97)

PCS Orientation Visit - TDA funded an orientation visit for officials from the National Communications Commission (CNC) to present the upcoming PCS concession and to meet with interested U.S. firms. Teleconsult organized the visit which took place in June 1997. (FY 97)

Argentina Mountain Pass Project - TDA is providing funding ($695,400) through its Evergreen Fund of the IDB for a feasibility study on the Andean Highway Pass Project. Contractor selection by the IDB is underway. (FY 97) Tera conducted the desk study.

Mining Projects in Argentina - TDA is providing technical assistance ($60,000) for the development of small and medium scale mining projects in Argentina. (FY 97)

BOLIVIA

1994 Economic and Trade Summit - TDA partially funded a conference entitled "Bolivia Leads the Way: 1994 Economic & Trade Summit." The Inter American Chamber of Commerce of Houston coordinated the conference. (FY 95)

Bolivia Mass Transit Project - TDA funded ($25,000) a Definitional Mission to investigate a mass transit project. (FY 95)

Mining and Smelting Capitalization Project - TDA partially funded ($399,000) a study for a private sector smelting plant capitalization and expansion project. The study was conducted by Western States Engineering. (FY 95)

Bolivia Air Traffic Control Modernization - TDA funded ($400,000) a feasibility study on the proposed airport modernization and air traffic control systems upgrade project in Bolivia. Raytheon recently completed the study. (FY 95)

Santa Cruz Traffic Management - TDA has approved funding ($16,000) for a $32,000 technical assistance effort for the city of Santa Cruz to develop a traffic management program. Traffic Engineers, Inc. has been selected to carry out the assistance. (FY 97)

BRAZIL

Power Cogeneration Definitional Mission - TDA funded ($24,967) a definitional mission to Brazil to identify and analyze other possible cogeneration and power projects in the country. The DM was conducted by Commonwealth Power Corporation. (FY 96)

Urban Mass Transit Projects Definitional Mission - TDA funded ($24,805) a definitional mission to Brazil to evaluate ongoing urban mass transit projects and to identify potential projects for TDA funding. Raul Bravo & Associates conducted the mission. (FY 96)

Long Distance Cargo Rail Projects Definitional Mission - TDA funded ($24,973) a definitional mission to Brazil to evaluate and identify potential cargo rail infrastructure projects feasibility studies for TDA funding. TERA conducted the mission. (FY 96)

Port Improvement Projects - TDA funded ($25,000) a definitional mission to evaluate potential port projects in Brazil. Montgomery Consulting Group conducted the mission. (FY 96)

Agricultural Finance Facilities - TDA funded a $23,400 grant for technical assistance for the Pernambuco Rural Agricultural Finance Facilities. The World Bank conducted the assistance. (FY 96)

São Paulo Commuter Rail Modernization - TDA funded ($563,300) a grant for a feasibility study on the modernization of the Sao Paulo commuter rail system. (FY 96)

São Paulo METRO Line Financial Analysis - TDA funded a $362,600 grant for technical assistance for a financial analysis of the São Paulo METRO Line 4. (FY 96)

Coal-Fired Power Environmental Concerns - TDA funded a $40,000 orientation visit for officials from Minas Gerais interested in Coal-Fired Power Environmental issues. The U.S. Energy Association coordinated the visit. (FY 96)

São Paulo Metropolitan Water System Modernization -TDA funded ($2,500) a desk study on the modernization of the Sao Paulo Metropolitan water system. Millennium Science & Engineering conducted the study. (FY 96)

São Paulo State Water Systems - TDA funded a $250,000 grant for technical assistance for the Sao Paulo State water system. Contractor selection is underway. Millennium Science & Engineering conducted a definitional mission for the project. (FY 96)

ADTP Private Sector Fossil Fuel Power Plant - TDA has approved funding for a feasibility study on a private sector fossil fuel plant for the Association for the Development of the Tiete-Paraná. The plant will be located near São Paulo. (FY 96)

São Paulo Road Concessions - TDA funded ($130,000) a grant for technical assistance to São Paulo for

its road concession program. A desk study was conducted by Sheldon Rowitz & Associates. The feasibility study is being conducted by Apogee Research. (FY 96)

Rio de Janeiro Port Management Information Systems- TDA funded a $200,000 for a management system for the Port of Rio de Janeiro. (FY 96)

CDRJ Ports Financial Planning - TDA funded a $55,000 grant for technical assistance to the Companhia Docas do Rio de Janeiro for port modernization financing options. (FY 96)

Bagasse Cogeneration Power Plant - TDA is funding a feasibility study for a private sector bagasse cogeneration power plant. (FY 97)

Sao Paulo Hazardous Waste Study - TDA has approved funding for a feasibility study on a hazardous waste tracking system for CETESB and identification of hazardous waste management options for the state industry association, FIESP. (FY 97)

Water Systems Upgrade - TDA is funding ($22,855) a definitional mission to evaluate a series of water system projects in Minas Gerais and Paraná. Millennium Science Engineering conducted the study. (FY 97)

Aviation Sector Projects - TDA is funding ($25,000) a definitional mission to evaluate aviation projects in central and southern Brazil, including a cargo airport. Montgomery Consulting Group, Inc. is conducting the study. (FY 97)

Privatization Projects - TDA funded a desk study on strategies for privatization projects in Brazil. The Linkage Group is conducting the study. (FY 97)

US-Brazil Environmental Matchmaking Program - TDA funded support for a environmental matchmaking program which will bring U.S. companies together with their Brazilian counterparts. (FY 97)

Brazilian Mining Sector Definitional Mission - TDA funded a definitional mission ($25,000) to assess opportunities for TDA involvement in the Brazilian mining sector. (FY 97)

CHILE

Chile Mass Transit Project - TDA funded ($25,000) a definitional mission to investigate a mass transit project. (FY 95)

Chile-Argentine Private Sector Pipeline - TDA funded ($250,000) a feasibility study for developing a natural gas pipeline project from Argentina to Chile. Gasoducto Transandino contracted with several US firms to carry out the study. (FY 95)

Chile Transportation Projects - TDA funded a definitional mission to evaluate a commuter rail project and urban mass transit project. Raul V. Bravo & Associates conducted the DM. (FY 96)

Natural Gas Vehicle Conversion Project - TDA funded a desk study to evaluate a natural gas vehicle conversion project in Santiago. Danilo J. Santini conducted the study. (FY 96)

Inverhart Sawmill/Wood Processing Facility - TDA partially funded ($179,413) a feasibility study for a sawmill / wood processing facility in Chile. The Beck Group is conducting the study. (FY 96)

Santiago Air Decontamination Plan - TDA provided a $200,000 grant for technical assistance to the National Environmental Commission - Metropolitan Region of Santiago for technical assistance. The assistance will address air pollution control regulations, emission reduction options, and technology. Radian International was selected to perform the TA. (FY 96)

Commuter Train System - TDA funded ($323,800) a feasibility study for the integration of three individual commuter rail lines and the development of a Systems Integration and Implementation Plan for the Suburban Train Company. Parsons Brinckerhoff is conducting the study. (FY 96)

Tinguiririca River Hydroelectric Plant -TDA is funding ($10,000) an expanded desk study to investigate a proposed 150 MW hydroelectric power plant in the upper Tinguiririca River Basin of Chile. Commonwealth Power Corporation is conducting the study. (FY 97)

Environmental Project Identification and Development - TDA is funding ($40,000) a definitional mission to identify various environmental projects in Chile. This is in preparation for a visit to the U.S. by Chilean officials in September 1997. (FY 97)

ECUADOR

Paramo Grande Wind Power - TDA funded a feasibility study on a private wind power project. The Thompson Company has completed the study, and grant funding for Phase II is now under consideration. (FY 95)

Power Rehabilitation - TDA funded a desk study on the Guayaquil and Esmiraldes power rehabilitation project. Commonwealth Power Corporation conducted the study. (FY 95)

Wastewater Treatment - TDA funded ($320,000) a feasibility study on the Ambato-Latacunga wastewater treatment project. The study was conducted by Consulta Solutions, Inc. Juan Alfaro executed the desk study. (FY 95)

Hydroelectric Power - TDA funded ($24,815) a definitional mission on waste treatment and management projects in Ecuador. Cook & Molan International conducted the mission. (FY 96)

ESPE Teaching Hospital - TDA funded ($24,343) a definitional mission to investigate the ESPE teach-

ing hospital in Quito. Sterling International Group, Inc. conducted the study. (FY 97)

Cuenca Wastewater Treatment -TDA approved IDB Evergreen Funding ($380,000) for a wastewater treatment feasibility study for the Municipal Telephone, Potable Water, and Sewerage Agency (ETAPA) in the city of Cuenca. URS Greiner is conducting the study. (FY 97)

Loja Potable Water Pipeline - TDA approved funding ($2,500) for a desk study of a proposed feasibility study for a potable water pipeline in the city of Loja. Millenium Science & Engineering conducted the study. (FY 97)

Paramo Grande 32 MW Wind-power - Phase II - TDA is funding a desk study ($1,000) to evaluate a funding request for Phase II of the Paramo Grande 32 MW wind power project. Commonwealth Power Corporation is conducting the evaluation. (FY 97)

PARAGUAY

Oriented Strand Board Plant - TDA approved partial funding ($247,500) for an oriented strand board plant. Wallace Industrial Constructors is carrying out the study. (FY 96)

PERU

Fishing Industry - TDA funded an orientation visit for officials from the Peruvian fishing industry to examine US commercial fishing vessels used by groundfish and sea scallop fisheries. The OV was organized by the New England Fisheries Development Association. (FY 95)

Airport Modernization - TDA funded ($430,000) a feasibility study on the proposed airport modernization and air traffic control systems upgrade project in Peru for the Jorge Chavez International Airport. Birk Hillman conducted the study. (FY 95)

Road Rehabilitation and Maintenance - TDA funded ($40,000) a grant for technical assistance for road rehabilitation and maintenance equipment. The Inter-American Development Bank coordinated the assistance. (FY 96)

Marketing/ Operations Plan - TDA funded a $14,000 grant for technical assistance for the National Institute for the Defense of Market Competition & Protection of Intellectual Property Operations Plan. The Inter-American Development Bank conducted the technical assistance. (FY 96)

Traffic Management Project - TDA funded ($459,147) a feasibility study for a comprehensive traffic management and signaling project in Lima. Enterprise Development International, Inc. was selected to conduct the study. A definitional mission was conducted by S. Rowitz & Associates. (FY 96)

Information Technology Products - TDA funded a $24,736 definitional mission to evaluate three information technology projects. CORE International conducted the mission. (FY 96)

Paijan Sugar Mill - TDA approved funding ($120,000) for a feasibility study on a sugar mill in Peru. Wallace Industrial Constructors will carry out the study. A desk study was done by the GIC Group in 1996. (FY 97)

Cemento Yura Plant Expansion - TDA funded ($190,000) a feasibility study on the expansion of the Yura cement plant. Penta Engineering is conducting the study. A desk study was conducted by McKittrick & Associates. (FY 96)

National Registry and ID Card - TDA funded a $300,000 feasibility study on the development of a national registry and identification card system. The International Foundation for Election Systems was selected to conduct the study. (FY 96)

Water and Wastewater Projects - TDA approved funding ($25,000) for a definitional mission to evaluate the request for feasibility studies funding submitted by the Special project for the National Water and Sewage Program (PRONAP) within Peru's Ministry of the Presidency. (FY 97)

URUGUAY

Rice Hull Fueled Power Plant Project - TDA provided a grant for technical assistance ($125,625) for a rice hull-fueled power plant in Uruguay. Agrilectric, Inc. is providing the technical assistance. (FY 95)

Railroad Expansion and Modernization - TDA funded ($424,000) a feasibility study on the Uruguayan cargo rail expansion and modernization project, which includes the development of a plan for the transportation of forestry products. Mercer Management was selected to carry out the study. (FY 95)

Wood Biomass Fueled Power Projects - TDA funded a definitional mission to evaluate the potential for wood biomass fueled power projects in Uruguay. Commonwealth Power Corporation conducted the DM in April 1996. (FY 96)

VENEZUELA

Air Quality Monitoring Project - TDA funded a feasibility study ($210,000) on the modernization of the MARNR air quality monitoring system. The study will be awarded in 1996. A desk study was completed on the project by Powers Engineering. (FY 95)

Antimano Corridor Transportation Project - TDA funded a feasibility study ($469,000) to design traffic management alternatives for the Antimano Corridor in Caracas. DM was completed by TERA, Inc. Enterprise Development International has completed the feasibility study. (FY 95)

CORPOVEN Environmental Projects - TDA funded a $200,000 feasibility study to CORPOVEN for refinery wastewater treatment projects. Contractor selection is underway. A definitional mission was carried out by International Environment Federation. (FY 96)

Tuy River Cleanup System - TDA funded a $2,500 desk study on the Tuy River cleanup project. The study was conducted by Millennium Science & Engineering. (FY 96)

MARAVEN Environmental Projects - TDA funded ($23,400) a definitional mission on industrial waste environmental projects. Global Environmental Operations, Inc. conducted the mission. (FY 96)

Puerto Cabello Port Facilities Expansion - TDA funded ($460,000) a feasibility study on a port facilities expansion project at Puerto Cabello. (FY 96)

MARNR Remote mapping Project - TDA funded ($600,000) a feasibility study on a CVG/Tecmin remote mapping project. Raytheon is conducting the feasibility study. Pacific Meridian conducted a desk study. (FY 96)

Jose Offshore Terminal - TDA funded a $400,000 feasibility study on the Jose Offshore Dry Bulk Terminal. Lockwood Greene was selected and is completing the study. (FY 96)

El Palito and Puerto La Cruz Industrial Wastewater Projects - TDA funded ($200,000) a feasibility study on industrial wastewater projects at El Palito and Puerto La Cruz. (FY 95)

Isla Margarita Potable Water System - TDA funded ($125,000) a feasibility study on the upgrade of the potable water system at Isla Margarita. (FY 96)

MARAVEN Gas Recovery - TDA is funding ($375,000) a feasibility study on the recovery of low pressure natural gas and hydrocarbon vapors at MARAVEN oil fields. (FY 97)

Oil Pit and Waste Storage Cleanup - TDA is funding ($540,000) a feasibility study to investigate cleanup of a number of large waste oil pits and lagoons located near MARAVEN facilities. (FY 97)

Hazardous Waste Management - TDA is funding ($101,500) a feasibility study to evaluate a comprehensive hazardous waste management system and equipment at MARAVEN oil fields. (FY 97)

Venezuelan Oil Spill Response Orientation Visit - TDA funded ($55,000) for an Orientation visit to the U.S. for four Venezuelan oil spill response procurement officials and one U.S. Embassy environmental sector FSN. (FY 97)

REGIONAL

South American Major Projects Conference - TDA funded ($447,000) a conference on opportunities for US firms in major infrastructure projects in South America. The research on the projects was conducted by CG/LA Infrastructure, and the World Trade Center of New Orleans coordinated the conference. A comprehensive resource guide for projects highlighted at the conference, as well as privatization and regulation trends in the region, is available from NTIS (#PB95-230082). (FY 95)

Conference on Surface Transportation Opportunities - TDA funded ($367,999) a conference on surface transportation opportunities in Latin America. CG/LA conducted research on the projects presented at the conference, and the American Road & Transportation Builders Association coordinated the conference. The US Department of Transportation was a co-sponsor. A comprehensive guidebook on the surface transportation market is available from NTIS (#PB96-119953). (FY 95)

US-Andean Environmental Matchmaker Conference - TDA funded a $25,000 orientation visit for a US-Andean Matchmaker Conference in the environmental sector. The World Trade Center of Pittsburgh coordinated the conference. (FY 96)

Miami Civil Aviation Conference - TDA provided funding ($111,500) for the Americas Conference on Aviation in Miami, FL. The conference was co-sponsored by the FAA and coordinated by the Metro-Dade Aviation Department. Montgomery Consulting Group conducted research on aviation projects in Latin America that were presented at the conference. (FY 96)

Water Projects Briefing - TDA funded ($135,335) a briefing on water projects in Brazil and Argentina. The briefing was coordinated by the Institute of the Americas and took place in Philadelphia in October 1996. (FY 96)

GIS Technology - TDA funded ($68,877) an orientation visit for 10 Latin American officials and two African officials interested in Geographic Information Systems technology. The visit was coordinated by the Institute for Public-Private Partnerships and took place in November 1996. A report is available in the library. (FY 96)

World Congress on Intelligent Transportation - TDA funded ($10,000) an orientation visit for the World Congress on Intelligent Transportation Systems. ITS American conducted the visit. (FY 97)

Telecommunications Projects - TDA is funding ($16,108) a definitional mission to evaluate proposed telecommunications projects in Paraguay and Argentina. Telematics Engineering conducted the mission, and a report is available in the library. (FY 97)

For More Information

For more information on any of the above projects or on other TDA programs in South America, contact Albert W. Angulo, Regional Director, Nathan Younge (Brazil, and Venezuela), Anne McKinney (Argentina, Paraguay and Uruguay), or Gabriella Rigg (Bolivia, Chile and Ecuador).

For information on current TDA Definitional Mission consultancy opportunities, please call the "TDA Definitional Mission Hotline" at (703) 875-7447.

For instructions on how to order a Definitional Mission Report or Feasibility Study from our library call Jim Thayer at (703) 875-5578.

Mailing Address: US Trade and Development Agency
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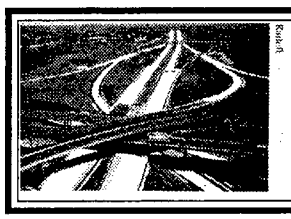
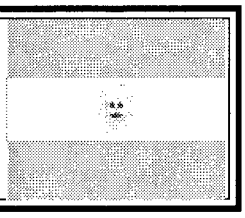


Traffic Management Project

Case N° 01



Due to serious traffic congestion in the Buenos Aires Metropolitan Area, the Government of Argentina established The National Commission for the Metropolitan Area of Buenos Aires (CONAMBA) to coordinate policies in traffic management aimed at improving quality of life for the 11 million inhabitants (estimated to reach 13 million by the end of the century). CONAMBA determined the need for a review and assessment of the existing and future traffic operations within the Buenos Aires Metropolitan Area. The Government of Argentina has placed high national developmental priority on the Traffic Management project.

Project Summary

Sector	Transporation
Location	Buenos Aires
Estimated Project Cost	US$ 100 m
Export Potential	US$ 40 m
Contractor	Louis Berger International
Result	Feasibility Study

TDA Involvement

In November 1995, CONAMBA petitioned TDA for a feasibility study of the Buenos Aires Metropolitan Area Traffic Management Project. The Definitional Mission Report, conducted by Hernan Peña, outlined the large need and opportunity in the Buenos Aires Metropolitan area for advanced computer/software and electronic technologies to cover a braod range of transportation needs. This type of technology includes computerized traffic systems, automated enforcement systems and intelligent transportation systems.

Project Findings

Traffic flow and traffic safety form the two main traffic concerns in and around Buenos Aires. The lack of a systematized way to deal with these problems is visible in increased traffic-related deaths, heightened congestion, mounting parking problems and growing traffic violations and driver disobedience. The traffic management project is first charged with addressing the excessive number of traffic- related fatalities per year, which totaled more than 10,000 in 1995. Second level priorities are to deal with the interrelated issues of increased traffic congestion and growing driver disobedience.

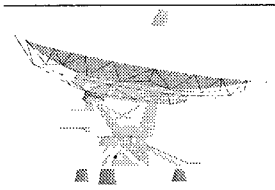
Advanced Traffic Management

The system currently recommended by Louis Berger International, an engineering consulting group, is for an Advanced Traffic Management (ATM) system. ATM is considered the most advanced traffic management system in the Americas. ATM operates on concessionaire system in which there are three main focuses:

- increased safety
- more advanced and accessible driver information
- a method to collect revenue from traffic offenders

This last element of ATM will allow for a self-sustaining system.

ATM sets up full sensor stations on the major highways to monitor drivers' speed, provide advanced information to drivers about road conditions and act as a visual surveillance and quick response system to emergency situations. Future considerations would be to construct "smart highways" to increase modernization of the roadways. The ATM system could serve as a model for South American road systems throughout the 21st century. (See Project TRAN-07 in the project profiles)



Wide Area Network

Case N° 02

Currently, the Government of Peru has no backbone communications system to allow governmental agencies to expeditiously and efficiently share data and information. Multiple computer equipment and network systems have been purchaed which are not compatible. Additionally, identical information is often recorded and stored in many different databases throughout the country, increasing costs and decreasing productivity.

Project Summary

Sector	Telecommunications
Location	Peru
Type	Investment
Estimated Project Cost	US$ 60 m
Export Potential	US$ 54 m
Contractor	Teleconsult
Result	In-process Feasibility Study

TDA Involvement

In April 1996, TDA funded an orientation visit of high level Peruvian officials to the United States to introduce them to high-tech solutions for the problems facing federal government operations. Following the visit, the National Development Corporation of Peru (CONADE) requested TDA to fund a feasibility study for a Wide Area Network (WAN) to interconnect and synchronize various government ministries' information systems. TDA hired CORE International to conduct a Definition Mission. The Definition Mission recommended a Feasibility Study, which was subsequently funded by TDA. Teleconsult is currently conducting the Feasibility Study.

WAN Project Proposal

The primary objective of the WAN is to modernize the computer systems of the Peruvian government in order to facilitate secure and reliable information sharing within the various ministries and to connect some of the outlying government areas to the information network. Cost reduction will be a direct result of implementing a WAN system, as well as the reduction of duplicate information, equipment and other more expensive and unreliable forms of information exchange (mail, courier). The WAN system will also reduce the cost of telecommunications interchange through the national carrier (Telefónica del Peru).

Next Steps

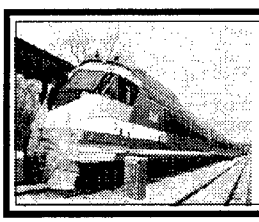
Teleconsult is conducting a Feasibility Study to determine the exact options available for the government to implement the WAN. Variables under consideration include what form of technology to implement (fiber optics vs. satellite) and whether to lease lines from Telefónica de Peru or to set up separate transmission facilities. Initially, they are conducting a survey to determine the dimensions of volume capacity needed by the government, maintenance issues, and procurement of needed applications to implement the WAN. Additionally, some key issues have yet to be determined within the government system, such as who will operate the system and which government agency's budget will pay for the network.

Funding

Due to the benefits of the WAN to the Peruvian government, the World Bank will determine whether this project falls under the World Bank's Public Sector Reform Loan. Alternative forms of financing being considered in the feasibility study include private financial institutions, debt financing from commercial capital markets, joint ventures and other contractual arrangements.

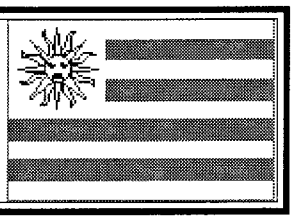
Future Opportunities

The Peruvian government has placed high priority on the implementation of this project. The WAN could eventually serve as a model for the future applications in other countries around the Hemisphere. The import potential for foreign suppliers is ranked at 90% due to the technical nature of the equipment needed, while in-country resources will be responsible for the implementation and maintenance of the system.



Railroad Expansion & Improvement Project

Case N° 03



In 1989, Uruguay implemented the Forestry Development Plan to cultivate planted forests for the production of exportable forestry products. Presently, Uruguay lacks appropriate capacity on its railroad system to carry forestry products from its Western provinces to ports for delievery for domestic and international markets. An efficient rail system with extended lines would have a positive developmental impact on Uruguay's economy.

Project Summary

Sector	Transportation
Location	Uruguay
Type	Procurement
Estimated Project Cost	US$ 600 m
Export Potential	US$ 300 m
Contractor	Mercer Management
Result	Feasibility Study

TDA Involvement

The Uruguayan State Railroad Association (AFE) requested that TDA sponsor a Feasibility Study to modernize and expand the western portion of its state railroad system. The project consists of modernizing the Cordon Litoral, reopening the Linea Rocha and extending the Nuevas Palmira track. The expressed interest of these new and expanded lines is to facilitate the transport of forestry products from these regions. In light of the strong commitment of the Uruguayan Government to the success of the project, Mercer Management Consulting recommended that improving the railroad system would increase economic activity for Uruguay and allow the foreign railroad industry opportunities to supply equipment and technology to restructure the entire railroad system.

Project Findings

In the Feasibility Study, Mercer Management Consulting did a diagnostic review of the existing rail system and customer's needs. They highlighted that restructuring the railroad system would make the railroad more appealing to private investors, make the transport of forestry products more competitive in the world market and create additional private and public sector jobs. The project centers around:

- reviewing the existing AFE Railroad,
- estimating future requirements,
- developing comprehensive plans for track expansion and modification.

Large capital investment will be needed to cover expenses for specialized wagons to carry the forestry products, extensive track equipment for the expansion of the lines and new and improved signalling and braking components. The Government will need to determine the best method to operate the railraod restructuring to transport the forestry products. In order to improve productivity, a franchise/ concessionary operating system is being recommended by the consultants.

One of the main challenges for the project is to change the railroad into a commercially-oriented system with a resturctured cost-structure. The current pricing structure is not market responsive. Rapid implementation of the restructured railroad system was recommended by Mercer Management for AFE to take advantage of the window of opportunity to be the premier carrier of forestry products.

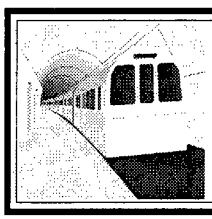
AFE plans to designate staff and resources for the project to speed its implementation.

Financing

The Definitional Mission report conducted by CORE International Inc. determined that the economic and financial aspects of the project were positive. The Government of Uruguay has access to many sources of public and private financing which could be available. Additionally, once the project is approved by the Government other forms of bilateral, multilateral and private sector grants/loans could be attained from places like US EX-IM bank, the European Union, Japan International Cooperation Agency, and supplier credits.

Opportunities

The modernization plan permits the direct involvement of private industries in a once heavily subsidized government industry allowing for more cost-efficient methods for modernization. The Government is reviewing the recommendations of the consultants and seems very positive about private sector involvement yet has made no official decision. US companies' opportunities could range from supplying railroad and loading equipment to being selected to operate the entire proposed system.



Subway Ventilation for Metrovías

Case N° 04

Metrovias S.A., a private consortium, won a 20-year concession for the operation of the Buenos Aires subways and Ferrocarril General Urquiza commuter rail system and is now faced with upgrading the safety and efficiency of the system. One of the main priorities is the revamping of the ventilation system, which currently does not work properly in the Buenos Aires Subway, and is a major part of the Metrovias concession arrangement. The project has full on-going support of the Argentine government and is of the highest concern due to the potential dangers in fire and other hazards it represents to public safety.

Project Summary

Sector	Transporation
Location	Buenos Aires
Estimated Project Cost	US$ 7.5 m
Export Potential	US$ 5.25 m
Contractor	Parsons Brinckerhoff International
Result	Feasibility Study

TDA Involvement

TDA was asked by Metrovias to do a comprehensive study of the ventilation system in the Buenos Aires Subway. The initial desk study completed by Montgomery Consulting Group recommended that a computer-simulated conceptual study for the development of a new subway ventilation system for the Buenos Aires subway be funded by TDA to increase the safety and efficiency of the current system. Parsons Brinckerhoff International is currently conducting the feasibility study on the ventilation system.

Project Proposal

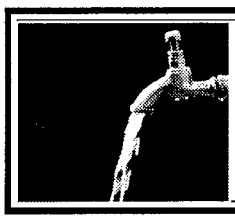
Parsons Brinckerhoff International is developing computer models that test segments of the subway system which measures heat, airflow and gas emissions for the purpose of developing a cost-effective approach to the investment in a new ventilation system. The analysis takes into account the effects of the existing trains while also looking at the effects of the "air-conditioned" cars that Metrovias is contemplating buying. The study will evaluate various ventilation alternatives for the removal of heat during normal subway train operations and the removal of hot gases and smoke during an emergency. The scope of the study involves establishing a Subway Environmental Simulation in which models are drawn on air velocity, temperature and emergency situations. The project will include aiding in the selection of appropriate ventilation concepts and equipment that meets international standards.

Opportunities

There is substantial opportunity for U.S. firms to supply equipment, products and services for the development of the new ventilation system in the Buenos Aires subway. The investment potential has been roughly estimated at US $7.5 million.

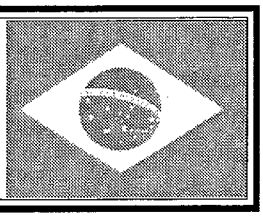
Since Metrovias is a private company, World Bank funding is not available. Financing sources for the project includes bilateral arrangements, private bank lenders and possibly the Private Sector Department of the IDB. Additionally, during the years of the concession, Metrovias is qualified to receive direct government subsidies.

An important consideration of the project is the positive environmental impact the improved ventilation system would have on air quality and safety for the subways users and workers.



Curitiba Water Loss Reduction

Case Nº 05



Curitiba, the capital city of the Brazilian state Paraná, has a population of 1.5 million inhabitants. Paraná is a major agricultural and newly established manufacturing center. The growth of the urban population and industrial community has led to increased environmental stresses on water supply, deteriorating the water quality. The state sanitation company, Companhia de Saneamento do Paraná (SANEPAR), is responsible for wastewater treatment and supply of potable water to the community. SANEPAR's priority is to increase the percentage of treated sewage water and to reduce the amount of water lost in the system.

Project Summary

Sector	Environment
Location	Curitiba, Brazil
Type	Procurement
Estimated Project Cost	US$ 14 m
Export Potential	US$ 10 m
Contractor	Millennium Science & Engineering
Result	Definitional Mission Report 6/97

TDA Involvement

SANEPAR approached TDA for assistance in assessing some of the major concerns in the water management system. SANEPAR estimates that 45% of the water that produced is not accounted for in revenue collection. Of this amount, 25% is lost by physical leakage. In the Definitional Mission Report completed in June 1997 by Millennium Science and Engineering, it was recommended that TDA consider immediate funding of a feasibility study to better understand the water supply system in Curitiba, design improvements to the system, and prepare a bid package for the implementation of a water loss system.

Project Findings

To address the water loss in Curitiba, Millennium Science Engineering determined that the following areas needed to be addressed:

- testing for water leakages
- rehabilitation of pipes
- dealing with illegal connections
- replacing faulty or inoperable meters

In order to avoid major excavation work in congested urban areas, pipe rehabilitation would likely be performed using trenchless technologies.

Financing

SANEPAR has a reasonably strong revenue base and appears to be in a position to obtain financing for the projects. Financing is most likely from US Export Import Bank or Brazilian banks.

Opportunities

Investment in water loss projects in Paraná is more favorable than in other larger states such a Rio de Janiero and São Paulo, where competition is greater. The project is expected to offer many opportunities for US-manufactured equipment and technology. Requests for Proposals (RFPs) for the feasibility study on the Curitiba Water Loss project are currently being requested from TDA. Interested U.S. firms should submit bids to the Grantee in Curitiba by November 14, 1997.

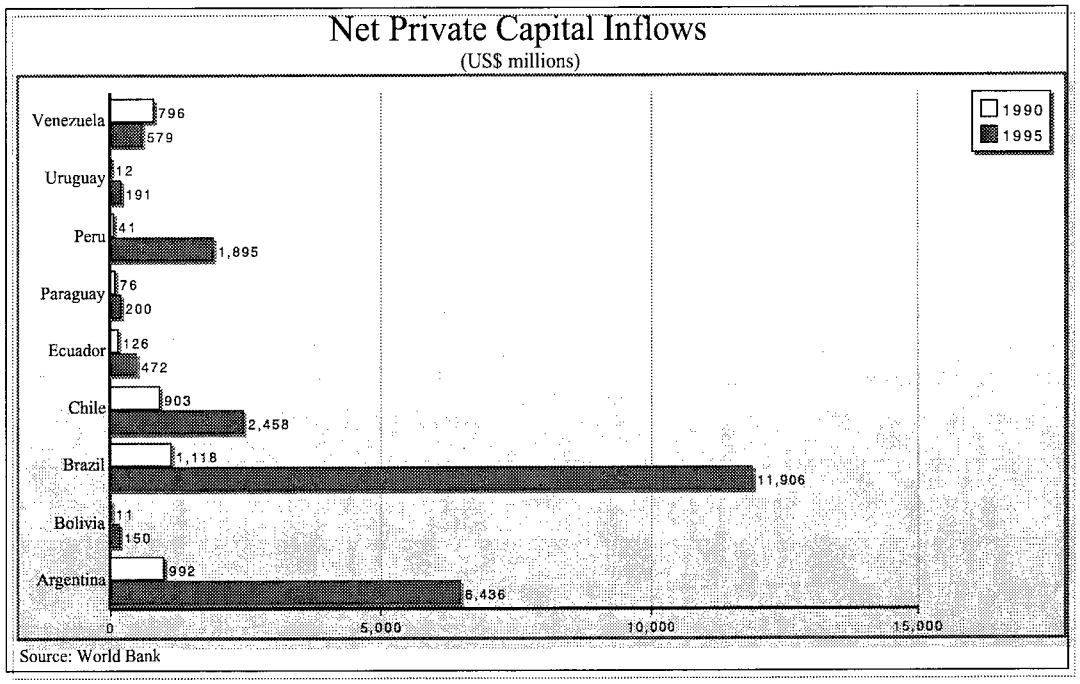
Financing Infrastructure Projects in South America

The past two years have produced a huge increase in Latin American infrastructure projects and in the means and methods by which these projects are financed. South American infrastructure projects a) are profitable for financiers and suppliers, and b) require private capital to be executed. The region's needs are being met with foreign capital inflows in the form of direct foreign investments and equity positions as well as through the more effective application of domestic savings.

The Financing Context

Large scale public infrastructure projects are giving way to smaller, more targeted projects This trend is being driven by three factors: 1) decentralization of decision-making authority, 2) the end of the overbearing role of multilateral development banks, and 3) new leadership in the private sector.

Projects are now being financed and executed with private capital, with multilateral and public finance, acting as a *catalyst* only. This reduction by the public sector has been offset with the increase in net foreign private capital flows into the region, both in the form of foreign direct investment (which grew by 78 percent into the region as a whole from 1995 to 1996) and portfolio investments.



Private capital drives the need to structure viable projects sustained with user fees and private operators. This new model is being tried and adjusted and the likely result will be a model in which multilateral and federal capital is employed towards establishing a support mechanism for private sector capital as opposed to traditional public financing of projects.

Building Blocks for Project Financing

Successful project financing in South America hinges on four basic issues.

I Revenue Streams

One fundamental criterion for financing any private infrastructure project is the quality, strength, and durability of the revenue stream originating from the project. Since private investment in this area is relatively new, these streams, lacking a track record are perceived to be risky. Each country needs solid cases of successfully financed projects to bring in additional capital.

II Credit Enhancements

The task of South American governments is to build a portfolio of successful projects jointly with the private sector. Until this is achieved, projects will require credit enhancement mechanisms. This has created a vacuum which will be filled by multilateral moneys and federal guarantee structure. The example of the World Bank's loan to Argentina in order to provide subsidies to concessionaires of provincial water privatization is an example which will likely be replicated throughout the region.

III Improving Financial Transparency

International financial institutions and equity investors are accustomed to a level of financial transparency that is new to South America. This lack of transparency results in revenue streams being perceived as risky. The situation is improving as South American institutions become more familiar with the financial reporting requirements of international investors, and as international investors become more familiar with South American business and accounting practices.

IV Attractive Rates of Return

End- user fees born by the market and chronic inefficiencies in collection and billing structures hinder financial performance of projects in several infrastructure sectors. The inherent economics in projects such as wastewater treatment plants and several types of urban mass transit systems are not conducive to private sector financing. Latin governments are stepping up to the challenge and are increasingly offering equity participation in projects in order to make them attractive to the private sector. These projects with inadequate rates of return, were only traditionally financed by companies with dual revenue collecting ability, such as equipment suppliers or system operators.

Institutional Infrastructure

The building blocks for an increasingly dynamic private sector role are being created and implemented at a decentralized level. This is a challenge to both the sovereign governments and to the sub national entities because of lack of appropriate experience and management infrastructure at the sub-national levels Achieving "investment grade" rating by international rating organizations such as Moodys is an essential piece of future financing success..

Sub-National Finance

While the decision-making process on infrastructure projects is gradually being decentralized in South America, local and state jurisdictions still have very limited control over revenue sources. This lack of control precludes these local institutions from collateralizing revenue streams and developing their own credit ratings. States and municipalities in a number of South American countries have very limited tax or revenue-raising authority and have no bonding authority.

Two notable exceptions are Brazil and Argentina, whose sub-national units have been given wide — some would say too wide — latitude in contracting outside debt and issuing bonds. In spite of the peso crisis, global investors are showing a growing interest in municipal bond issues. Perhaps the most spectacular surprise was the City of Rio de Janeiro's US$125 million Eurobond issue in early 1996. Once known for its complex political system and poor management of city services, Rio cleaned itself up, opened its books to international auditors, and polished its image sufficiently to attract major investment capital. Since the early 1990's, Argentina, has placed a series of successful issues. The heavily industrial province of Buenos Aires has also launched a series of successful bond floats.

Sub national units in Brazil and Argentina alone have raised in excess of US$ 1.2 billion in international capital markets. Nevertheless, financing thus far has required collateralizing assets or setting up a form of an escrow account with federal revenues or hard currency earnings tied to the as was the case with "Sequestration Mechanisms" in the Argentine province of Tucuman and collateralizing oil revenues by the province of Mendoza also in Argentina.

Precedence has been established, and markets have responded favorably, opening the path to new issues by sub-national units in the region. Despite not having access to uncollateralized capital, sub-national units are undergoing two important changes in the process of raising finance in capital markets, changes critical for sustained infrastructure development:

1 Sub-national units are creating an asset base of sound management in order to administrate private finance and are cleaning up their internal finances. This is an important milestone, after the mismanagement prevalent over the past two decades and is being followed with scrutiny by international financial markets.

2 Sub national units are reducing their interest rate burden by swapping junk bond debt with lower interest-bearing bond issues. The average annual interest rate being commanded by sub- national units on a medium term (five to seven years) bond issue is between 9 and 9.5 percent.

Utility Finance

Furthermore, state and municipally-owned companies are attempting to raise capital in foreign markets, for which there have been notable successes. The state water company of São Paulo, Sabesp, for example has been able to raise close to US$ 450 million in balance sheet debt through issuance of Eurobonds and commercial paper inside the Brazilian financial systems.

The challenge which South American governments face is to institutionalize this and make the "Sabesp Model" replicable to other state owned utilities. The eventual result can only be positive as this model opens a new venue and hence alternatives for pure project finance.

End User Fees

One of the keys to developing a strong institutional infrastructure, is ensuring sustainable user fees which ultimately finance projects. This poses regulatory, economic and social issues which are all political in nature, since they require developing the necessary consensus for charging the true cost for services. Few investors will place long-term money in a sector that is still in the center of political debate, as is the case with the Brazilian water and sanitation sector.

The public sector must guarantee a fee-based model in all sectors, since this will enable project financiers to pursue projects for perceived rates of return, as opposed to projects which are structured with a "bail out" mechanism by the public sector. The project then becomes fully private: private sector driving private sector projects.

Private Sources of Finance

Pension Funds

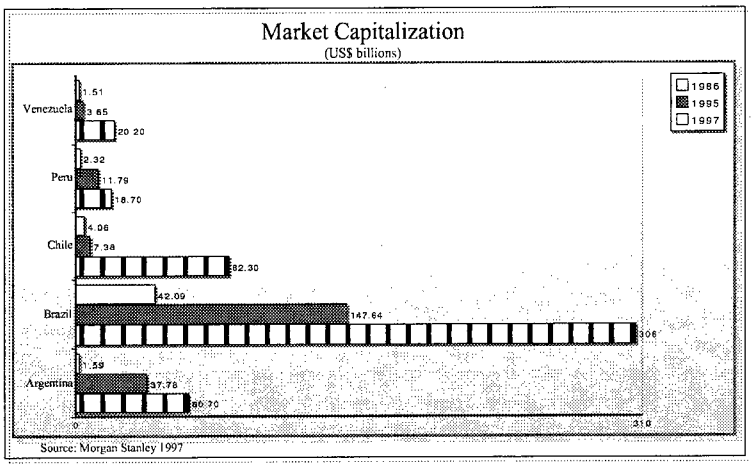
Perhaps the most important inertia in infrastructure finance in Latin America is being created by the explosive growth of privately managed Latin American pension funds. As pension systems are revamped throughout the region, following Chile's example, it is estimated that US$ 600 billion will be made available for funds under management within fifteen years, from the current US$108 billion today.

Pension funds will directly impact the building of Latin American capital markets, and contribute to an acceleration in savings rates in the region. The results for infrastructure investments are two-fold: higher per capita incomes foster end-user fees bearing more of infrastructure project costs; and capital employed in infrastructure development will be more readily available and more efficiently employed as private-sector pension fund managers seek higher yields.

Equity Instruments

South America has experienced an explosive growth in equity markets, which has given a boost to new private sector investment and infrastructure creation. The driving force behind projects is the attractive rates of return throughout South America.

Private equity funds capitalized by major institutional players and high net worth individuals are multiplying in the US. Many of these funds are targeted toward equity investments in infrastructure projects in developing countries. Such funds include the Emerging Markets Partnership Fund, and the Scudder Latin America Power Fund, among others.



Debt Instruments

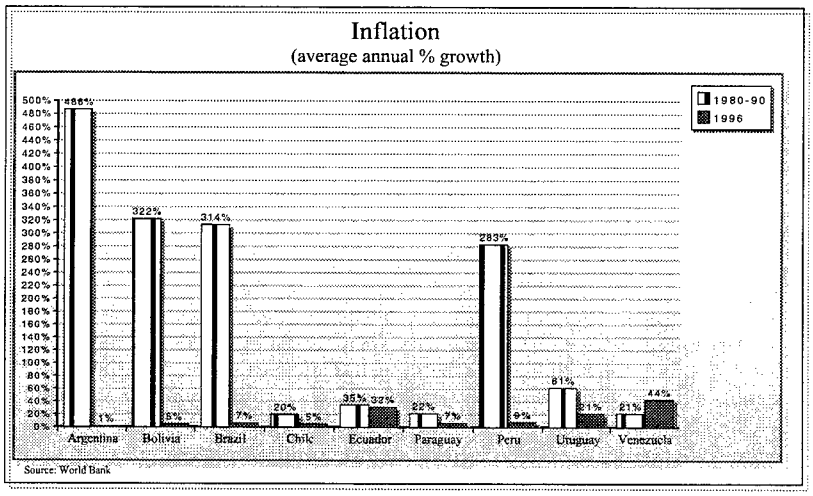
Debt is still the easiest and most accessible financing instrument for South American projects. Loans made available, by insurance companies and commercial banks, to projects and individual borrowers are a strong source of finance. Projects in this case are financed through balance sheet financing as opposed to a pure project financing structure.

Commercial Banks

Globalization has placed significant pressures on the banking community to aggressively pursue opportunities in all sectors of Latin America. The region's economic stability, coupled with high rates of return, bearing projects, have resulted in a mass migration of first tier commercial banks to the region. The banking industry in South America will likely continue to consolidate with the entry of new players, primarily through mergers.

The region's economic stability is portrayed by the dramatic reduction of inflation, as governments revamp their deficitary monetary and fiscal systems.

Commercial lending for infrastructure projects in the region has yet to realize its potential, which should evolve as governments provide stronger guarantee mechanisms, and perceived risks on projects are mitigated with the participation of a greater number of international participants.



Public Sources of Finance

Public financial sources are key elements in infrastructure financing throughout South America. Financing is available for projects, as well as to US companies selling into projects, and these sources are easily accessible.

U.S. GOVERNMENT SOURCES

U.S. Trade and Development Agency (TDA)

Point of Contact:

Mr. Albert W. Angulo,
Regional Director, Latin America and the Caribbean,
Ph: (703) 875-4357, Fax: (703) 875-4009

The U.S. Trade and Development Agency (TDA), is an independent agency of the United States Government. TDA provides effective assistance to the US private sector facing international competition for major capital infrastructure projects in developing and middle-income countries. TDA is the primary US Government agency responsible for funding feasibility studies.

Potential projects come to TDA's attention from several sources. A foreign government agency may approach TDA with a funding request directly or through a US Embassy, consulate or trade center. TDA may also be approached by the international agencies such as the World Bank or Inter-American Development Bank. The agency is increasingly being approached directly by foreign or US private sector firms soliciting assistance in developing a project as a project sponsor and/or investor. Initially, most TDA projects were public sector projects, planned by government ministries or agencies. Increasingly developing countries, including many in the LA&C region, have been privatizing major sectors. As a result, infrastructure and industrial projects sponsored by private sector parties are being considered by TDA on an increasing basis.

TDA provides funding, on a grant basis, for both public and private sector projects by commissioning studies to determine the technical, economic, and financial feasibility of proposed projects, and to provide detailed data for making decisions on how to proceed with project finance and implementation. In addition, TDA provides funding for technical seminars, technical assistance and conferences that present US technology and equipment capabilities for a particular sector.

General information can be found through TDA's internet address at http://www.tda.gov

US Export-Import Bank - (Ex-Im Bank)

Point of Contact:

Mr. Steven W. Howlett
Senior Loan Officer
Ph:(202) 565-3492, Fax:(202) 565-3931

The US Export-Import Bank (Ex-Im Bank) has seen an upswing its Latin American lending activity over the past four years.

In response to the movement away from sovereign-guaranteed lending, Ex-Im established a Project Finance Division in June 1994 providing loans and guarantees on the basis of expected project revenue stream. Ex-Im offers considerable flexibility in structuring projects. For example, there is no upper or lower size limitation to projects nor a predetermined debt-equity proportion and virtually any combination of risk insurance and loans may be utilized.

In order to receive Ex-Im project financing, it is imperative to have long-term contracts from creditworthy entities for the purchase of the projects output and supply of its inputs. Such contracts should usually extend beyond the period of requested Ex-Im financing.

Loan and Guarantee Program

The loan and guarantee program offers medium- and long-term support for environmental projects. The program also allows capitalization of interest during construction as part of the financial package

provided by Ex-Im.

Small Business "Environmental Exports Program"

Ex-Im has recently focused on assisting the export efforts of small businesses. In September 1994 it blended its working capital loan program with that of the Small Business Administration (SBA). More important for smaller US environmental technology exporting to South America is the *"Environmental Exports Program."* The key to qualifying for this program is that the equipment and services exported must be instrumental in having a positive impact on the environment. They must aid in the abatement, control or prevention of air, water and ground water contamination or pollution, or provide protection in handling toxic substances.

One of the main features is the Environmental Export Insurance Policy, which offers enhanced short-term, multi-buyer and single-buyer insurance with 95 percent coverage against commercial losses and 100 percent coverage against political risk, with no deductible. The US content for goods must be at least 51 percent, while for services it must be 100 percent.

General information can be found through Ex-Im's internet address at http://www.exim.gov

Overseas Private Investment Corporation (OPIC)

Point of Contact:

Mr. Richard Greenberg
Senior Credit Officer
Ph:(202) 336-8616, Fax:(202) 408-9866

OPIC is an agency of the US Government which provides loans, loan guarantees and risk insurance in cases where commercial lenders may be unwilling to step in. It is essentially a project finance institution, in that its commitments are destined for private sectors sponsored projects. " Many OPIC commitments are undertaken in conjunction with other institutions.

One of OPIC's characteristics is its willingness to customize and devise solutions to various financing problems in cooperation with private banks, investment funds, multilateral agencies or other agencies of the US government, such as the US Export-Import Bank.

Loan Guarantees and Direct Loans

For larger projects, both new ventures and expansions, OPIC primarily offers loan guarantees ranging from US$ 10 million to US$ 200 million.

Direct loans are reserved for projects involving US small businesses and cooperatives, and range from US$ 2 million to US$ 30 million. OPIC will usually participate up to a level equaling 50% of the total cost of a new venture and up to 75% when the project involves the expansion of an already successful business.

Risk Insurance

One of the major problems facing an investor in Latin America is the problem of political and economic country risk. OPIC's economic and political risk insurance enables project sponsors to seek debt financing in investment grade capital markets. In fact, OPIC support often acts as a signal of quality to other investors.

OPIC insurance offers coverage against the following risks:

- currency inconvertibility
- expropriation
- political violence

Coverage is available for parent company and third party loans and loan guarantees, technical assistance agreements, cross-border leases, and other forms of investment exposure. OPIC also insures contractors, exporters, and financial institutions. Moreover, coverage is also available for equity investments in new ventures or expansions.

OPIC-Supported Direct Investment Funds

OPIC provides financing to US companies pursuing private-sector projects through several private OPIC-supported direct investment funds.

Some funds are exclusively dedicated to sector-specific projects. For example, one fund solely invests in environmental projects while another exclusive works with small businesses. Generally, OPIC-supported funds invest 5 to 40% of the equity capital of each of their portfolio companies. Each portfolio company must have a significant business connection with the US economy. The fund man-

Multilateral Funding Sources

Bidding and Winning
DFI's ATTACK Program
• Assess upcoming MDB projects for needed expertise and/or equipment
• Target early; track progress; offer credible solutions
• Team with reliable and reputable local and international partners
• Aggressively market and sell to the country project sponsors
• Comply with all bid terms and keep careful tabs on bid evaluations
• Know and use all financing options to strengthen postion and expand = project scope

Source: DFI, Inc. Discipline ATTACK the MDB Market and Win, Diane M. Willkens

ager is usually active in guiding the portfolio company, especially in strategic planning and maintaining effective access to capital markets needed for growth.

General information can be found through OPIC's internet address at http://www.opic.gov

World Bank

Point of Contact:

Francisco Wulff,
Operational Officer
Ph:(202) 473-9553, Fax:(202)522-2115

The World Bank has been a major financing source for infrastructure projects in Latin America. Bank loans are disbursed both for institutional development and strengthening of government bodies as well as for financing actual projects.

The International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) together form the World Bank. Only developing middle-income countries can borrow from the Bank. Under the Bank's Articles of Agreement, the Bank can only lend to a member government or under a member government's guarantee.

General information can be found through World Bank's internet address at http://www.worldbank.org

IBRD Guarantee Program

The IBRD mainly lends to governments and government agencies, but it also makes loans to the private sector backed by the host government's counter-guarantee. The IBRD can also provide guarantees to commercial lenders for public and private sector projects. The Bank's guarantee is intended to act as a catalyst for private financing in developing countries. According to this, the Bank offers only partial guarantees, and risks are clearly shared between the Bank and private lenders. The Bank offers two types of guarantees:

The partial risk guarantee. It covers specified risks arising form nonperformance of sovereign contractual obligations, such as maintaining agreed tariff formulas and an agreed regulatory framework. It also would compensate for delays and interruptions due to government action or political force majeure events. Partial risk guarantees do no cover commercial risks.

The partial credit guarantee. It extends maturities beyond what private creditors could otherwise provide. They are typically not used for public projects involving sovereign borrowing.

The Multilateral Investment Guarantee Agency - MIGA

MIGA was established in 1988 as the newest member of the World Bank Group. Its purpose is to encourage the flow of foreign direct investment into developing member countries for economic development. As a means to accomplish this goal, MIGA provides insurance to private investors against political risks: currency transfer, expropriation, and war and civil disturbance.

MIGA has 141 member countries and an authorized capital over $1 billion. Twenty-eight Latin American countries are currently members of MIGA. Up to mid-1995, MIGA had provided insurance to private infrastructure investors close to $150 million in Latin America and the Caribbean. About 25% of MIGA's active applications for guarantees are for projects in Latin America, including more than 100 infrastructure projects.

International Finance Corporation (IFC)

Point of Contact:

Assaad Jabre
Director
Infrastructure Department
Ph:(202)473-0735, Fax:(202)974-4701

The IFC is a financially independent member of the World Bank Group. Its role is to assist the economic development of developing countries by promoting growth in the private sector of their economies and helping to mobilize domestic and foreign capital for this purpose.

Infrastructure projects have become a primary focus of IFC activity and in 1996 accounted for nearly 25 percent of all investments and for cumulative investments of $2.5 billion in more than 100 projects totaling more than US$18 billion in 36 countries.

IFC has supported projects in water and sanitation, transportation, power and telecommunications in Argentina, Chile, Colombia, Venezuela, Mexico, Guatemala, Jamaica, Costa Rica and El Salvador.

IFC's project financing activities in Latin America and the Caribbean have doubled over the last five years, from $1,250 million in fiscal 1992 to $2,780 million in fiscal 1996. In 1996, IFC provided $3,628 million in financing 63 companies in 14 countries in Latin America and the Caribbean.
The IFC provides financing to private sector projects as a lender or equity investor. The IFC is limited to 25 percent of the total project cost for the initial financing, and up to 40 percent for secondary financing. In addition to lending to the project, it may also take an equity stake in the project company and thereby play the role of catalyst for other investors from the private sector.

Inter-American Development Bank (IDB)

Point of Contact:

Mr. Juan Luna-Kesler
Senior Operational Specialist, Env.
Ph:(202)623-1678, Fax:(202)623-1417

The IDB is the largest source of public financing for development projects in Latin America. It lends between US$ 6 - 7 billion per year to the region. Over the last two decades, the IDB committed an annual average of US$ 1.8 billion for infrastructure projects. It is expected that *annual* infrastructure lending will be around US$ 3 billion during the next five years. In the water and sanitation sector the IDB committed an annual average of US$ 300 million over the 1971-93 period.

The IDB offers five types of lending instruments from its ordinary capital:

Fixed rate and variable rate loans: denominated in a pool of currencies and are sovereign obligations

Dollar Window loans: LIBOR based or fixed rate loans, to financial institutions, denominated and disbursed only in US dollars to be on-lent to private sector borrowers, which carry a government guarantee

Single Currency Facility loans: sovereign obligation loans denominated and disbursed in German marks, Japanese yen, Swiss francs or United States dollars

Loans to finance private sector operations, which since 1995 do not require a government guarantee, and *Sovereign local currency loans.*

Guarantee Program

The IDB is attempting to mobilize private sector resources for infrastructure creation through the implementation of a loan and risk guarantee facility directed mainly at private infrastructure projects. IDB's guarantee program aims to mitigate selected risks of commercial banks and institutional investors. The Bank has established two guarantee structures, namely, partial risk guarantees and partial credit guarantees.

Partial Risk Guarantees: Designed to cover performance of certain sovereign contractual obligations like transfer risks, non-delivery of inputs, nonperformance of off-take agreements or other public backed contracts, changes in the regulatory environment, etc. May cover up to 100% of a loan for these specific political risks. These guarantees require a government counter-guarantee.

Partial Credit Guarantees: The Bank's guarantees turn medium-term finance into a longer-term arrangement. Up to 50% of a loan can be guaranteed, with or without a government counter-guarantee.

The aim is to reduce the commercial risk of public sector entities baining to meet on their contractual obligations. For example, in the case of a private wastewater plant selling its treatment services to the municipal government, the IDB would offer guarantees of payment. These risk guarantees may provide up to 100% coverage in the case of a government's inability to perform specific contractual obligations.

IDB Private Sector Lending

In September 1994, the IDB formed a new department charged with allocating five percent of the Bank's lending portfolio to private infrastructure projects without government guarantees. Up to US$ 350 million will be set aside for the program per year. Bank participation may not exceed US$ 75 million per project or 25 percent of the total financing. Though pricing follows commercial terms, these loans can have up to 20-year maturity. Private sector infrastructure projects eligible for financing include those in transportation, power, telecommunications, and water and sanitation.

In 1994 the IDB launched a new publication, IDB Projects, specifically designed to provide information for businesses seeking procurement opportunities on Bank financed projects.

This publication includes key information on new projects as well as those in the Bank's pipeline, contract award information, and calls for bids.

Inter-American Investment Corporation (IIC)
Point of Contact: John Beckham, (202) 623-3984

The IIC was set up by the IDB in 1989 to provide financing for private sector projects. The Inter-American Investment Corporation is a separate institution from the IDB. It is funded with US$ 200

million in authorized capital, and almost US$ 900 million in borrowing capacity.

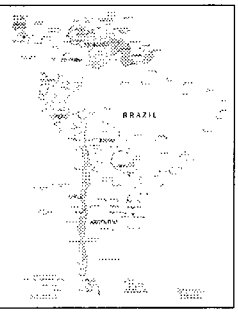
Its activities are directed at small and medium enterprises in the private sector of Latin America and the Caribbean. Therefore, of the IDB's 46 member countries are members of the IIC. The IIC makes loans between $2 - 10 million directly to project companies and indirectly through financial intermediaries that make sub-loans which are smaller than those the IIC could provide directly. The maximum loan term is 12 years, with a grace period not to exceed five years. The IIC does not require government guarantees for its loans.

Multilateral Investment Fund - MIF

The Multilateral Investment Fund is the third member of the IDB Group. The MIF has a very specific mission to implement strategies that will encourage private sector activities, for which it has its own funding and management. The MIF makes grants for technical assistance and invests, principally with equity, in intermediate institutions that support small enterprises. Almost all borrowing countries are eligible to receive MIF funds, and beneficiaries can be both public and private sector entities.

By January 1997 the MIF had approved 24 grants for infrastructure reform, privatization and/or regulatory framework development, since 1994 for a total of US$ 24 million, 17% of which have been channeled to the water sector.

Strategies for Equipment Sales and Financing in South America



"Why South America?"

The overall market for infrastructure in South America is estimated at US$ 200 billion during the next five years. The 128 projects profiled in this publication represent over US$ 40 billion in potential investment and over US$ 20 billion in potential US equipment and services exports.

Foreign investment into South American infrastructure creation is picking up pace. Several large-scale projects have been undertaken by US entities, as equity investors, as is the case with the privatization of Brazilian mining giant, Companhia Vale do Rio Doce (CVRD) and with the joint ventures of Mobil and Petróleos de Venezuela (PDVSA) in Venezuela. Equipment exporters must be aware of this trend. The direct implications mean that projects are a) more transparent, and b) more easily accessible to equipment suppliers, where often procurement schedules are administered by US based engineering and construction firms.

In order to take advantage of these opportunities, there are a number of factors which American companies must bear in mind when trying to sell in the region:

I Market Intelligence Gathering

South American market research is a combination of science and art. Information exists, nevertheless skill and savvy are required to collect and sift through the information in order to create knowledge.

The Knowledge Revolution

Exporters should all be knowledge seekers. Reliable information produces short-term results; however, understanding the key market drivers and predicting trends will keep an exporting company on the crest of the learning curve over the long term. The key to understanding and competing in South American markets is keeping abreast of the ever-changing market dynamics and strategizing for the long term, while keeping a flexible base.

Focus and Strategy: Establish One!

Market knowledge is critical for creating export and business strategies. South American markets are complex, and it is hence advisable to 1) become knowledgeable about your market, 2) set a focus, and 3) develop a strategy to pursue it.

Most of the time and effort spent by business developers and marketers attempting to tap South American markets are wasted on non-value-added activities, while performing tasks which are not conducive to a coherent strategy.

Keep Learning

Complete and constant market research is crucial before, during and following undertaking export initiatives. Companies that have been exporting into a specific country or region for months, even years, must establish and/or maintain a robust intelligence gathering mechanism which allows them to keep up with the on-going changes taking place throughout the region.

II Integrated Packages

A distinct source of competitive advantage readily available to US equipment suppliers is marketing your products as an integrated package which includes:

- Medium/ long- term (relatively inexpensive) financing using Export Credit Agencies' Coverage
- Logistics Handling
- After Sales Service

South American purchasers are seeking all of the above, and there is a shared feeling by South American project sponsors, particularly on the part of public entities, that foreign equipment suppliers are not providing integrated packages.

Exporters must bear two issues in mind when considering providing integrated packages to South American buyers: 1) The South American capital goods manufacturing base is competitive, and growing in volume and efficiency. This means that competition exists, and that it is getting stronger; and 2) Financing options and risk mitigation techniques are readily available to US-based exporters.

Logistics: The Details sell!

Attention to detail is imperative for the exporter. US equipment exporters must go beyond regular trade practices. It does not suffice to secure timely merchandise delivery and simply provide Bill of Lading Documentation; US exporters must ensure that the logistical process from dispatch to transshipments, through to importing and clearing merchandise through customs runs smoothly. The following is a list of a number of the steps taken from client decision to buy through delivery.

Process	Managed By
Quote Request	Potential Client
Quotation/Proforma	Supplier Sales Department - usually in conjunction with freight forwarder
Purchase Order	Client
Purchase Order Processing	Supplier Sales Department/Operations/ Distribution
Financing/Letter of Credit Insurance	Supplier/Client/Issuing Bank/ Confirming Bank
Shipping	Supplier Shipping Department
Inland Shipping	Frieght Forwarder/ Trucking or Rail
Ocean Shipping	Freight Forwarder/ Shipping Line
Product Nationalization	Customs Agent/Customs
Delivery	Customs Agent/Trucking or Rail
Execution of Letter of Credit	Client/Customs Agent/Issuing Bank/ Confirming Bank

Generally the freight forwarder is the expert in moving product from origin to destination. However responsibility for the shipment is managed by so many middle-men that close follow-up by the supplier can help to ensure timely delivery and repeat business. Attention to these details can also, very importantly, help to expedite payment to the supplier.

When exporting equipment to Latin America, it is critical to have a complete understanding of import regulations in the buyer's country. Invoices, packing lists and shipping documentation must be carefully managed to avoid delays in customs and ensure on-time payment against documentation.

"Services: The US Source of Added Value"

US exporters, must pride themselves as service providers. The US is a recognized leader in providing oustanding service at all levels, and is being emulated by competitors.

The potential to add value in the service component of the sale should not be undermined. US equipment manufacturers must not only provide quality guarantees, but be able to work on short lead times, and be able to guarantee service and parts provision into even the most remote areas in the region.

III The Culture of Sales in Latin America

Cultural abstractions aside, South America shares different business protocol and culture than those prevalent in the US. A few simple guidelines are useful in navigating through some of the "Latin cultural paradigms".

Establish Local Presence

Many US equipment companies have distributors or agents to represent their marketing interests in South America. Often these local companies will cover an entire national territory, maintain inventory, and provide sales service to the clients. Other international sales arrangements common in South America, which allow you to leverage off local pre-existing expertise include partnerships, local incorporations and staffing, franchising and licensing agreements. A distributor / agent relationship is usually considered to be the least complicated due to the fact that the US firm avoids the need to contract local staff, nevertheless they can be limiting to a long term strategy in the region.

Spending time in country is essential, and among the best uses of an exporter's time. This allows you to familiarize yourself with the market dynamics first hand, and be able to increase "face time" with your South American stake-holders.

Charisma takes you a long way

Business must benefit all parties involved to be successful and sustainable. This basic premise is void for the US exporter who does not develop a relationship with the South American counterpart. Selling in South America occurs on a series of different levels, the most abstract of which occurs at the social level. The majority of South American companies are family- owned or patriarchal in nature, albeit becoming increasingly more professional. This results in discretion by purchasers who make decisions based also on personal relationships and a general comfort level with their business associates. Do not neglect these relationships – they are critical for success.

Learn the Language and Culture

Being effective in selling into South America includes having a varied set of skills. Exporters are encouraged to learn the language of the host country, and keep abreast of all major economic, political and social values predominant in the region (LA news papers are accessible daily via the internet). Familiarizing yourself with news and local culture will only benefit your sales pitch, and add a dimension to your relationship with South American counterparts.

Business Protocol – Do your homework

Learning and adopting all business rules, from formal legal documentation to simple courtesy and credit negotiation techniques is an added bonus for the US exporter breaking into the South American infrastructure equipment markets. Prior to engaging in discussions, it is helpful to understand that business agendas differ from those in the US It helps to understand the project drivers, and the political and social implications the project in question shares. This will make your negotiation process a lot more interactive. For example, it is essential to understand the needs driving a new port terminal as opposed to myopically focusing on the sale.

IV Flexibility, Reputation and Knowledge Sources

Reputation in South America is particularly important due to the lack of an effective business and financial credit reporting system. It is therefore advisable that you guard your reputation very carefully, and ensure that due diligence is effectively carried out (subtly) on all business associates.

Despite the region's recent stability, US exporters must be prepared to be agile in dealings with South American buyers. The business community in South America is very fast paced, and decisions are made often times over one meeting. This dynamism requires that US companies be able to respond with the same speed. This factor makes being prepared with market intelligence even more important, and US companies should take advantage of key government information sources:

- *The US Trade and Development Agency* is an independent federal agency that assists in the creation of jobs for Americans by helping US companies pursue overseas business opportunities. TDA provides American firms with market entry, exposure and information through the funding of feasibility studies, technical assistance, reverse trade missions, and conferences. These efforts help American businesses establish a position in newly emerging economies. For more information call 1-703-875-4357.

- *The US Commercial Service (USCS)* is a strong ally for American firms looking to increase their business abroad. With more than 70 offices in the United States and 130 offices all overseas, the USCS is one of the best sources for market information, distributor sourcing, product and service promotion, information on financing options, etc. For more information call 1-800-USA-TRADE.

- *Private consulting firms* provide specialized knowledge on international markets and management strategy for market development. International consulting firms will provide a greater level of detail and guidance in identifying a market penetration strategy. For equipment sales into Latin America, information on specific infrastructure projects with specific procurement requirements may be identified and suggestions made as to where marketing opportunities are most viable for the client.

The final thought every exporter should leave with is ensuring that knowledge products be used *to your advantage* and that these are built on continuously.

Financing Infrastructure Projects

While project finance is given continuously more attention, equipment finance remains among the key issues in structuring a successful infrastructure projects. Technological advances and increased supply and hence competition, have induced suppliers to look for ways in which to make their products more accessible to South American purchasers. Cheaper finance is an issue which an increasing number of international suppliers are exploring in order to re-pass this cost savings to the ultimate client. The disparity between international interest rates and those generally practiced in South America is significant enough to drive the importance of financing to the forefront of the sales pitch.

In cases where local equipment manufacturers are cost competitive, attractive financing is the primary advantage US firms may offer, which is especially the case in highly industrialized countries such as Brazil and Argentina.

The equipment component of a project can account for up to 80 percent of the overall project cost excluding the costs of civil works. Hence, the weight played by the financing costs of this is a significant determinant in structuring projects.

BankBoston is a global leader in commercial banking and international trade finance. As a sponsor to the conference, BankBoston has compiled the following document for the benefit of US equipment

Financing and Risk Mitigation Techniques

exporters:
When selling capital equipment into Latin America, the ability to offer competitive trade terms to foreign buyers is often as important as the quality and price of your products. By using a full range of traditional and innovative financing techniques, you can structure trade terms that minimize risk and maximize liquidity to enhance your overall competitiveness in the international marketplace.

These financing and risk mitigation services are available through your local trade bank or private insurance provider. The Export-Import Bank of the U.S. (Ex-Im Bank), an independent federal agency responsible for encouraging the expansion of U.S. exports, also offers a series of export financing programs covering non-military, U.S. manufactured products with at least 50% U.S. content.

As an exporter, you may need short, medium, and long term solutions. The following are several preferred financing and risk mitigation methods.

Short Term (up to 180 days) Financing Solutions:
- Banker's Acceptances
- Time Letters of Credit
- Ex-Im Bank Working Capital Guarantees

Banker's Acceptances

Banker's acceptances (B/As) are a convenient and often lower-cost financing option for transactions associated with imports, exports, domestic shipments, or goods in storage. The ability to convert goods into cash provides the primary source of repayment. The B/A is a negotiable short-term instrument (draft) payable at a specified future date, drawn upon and "accepted" by a bank. The drawer of the draft receives discounted proceeds of the draft up-front.

To be eligible for B/A financing, a transaction must result from a trade involving the sale or purchase of product. The acceptance normally must be created within 30 days from shipment, and the terms of the B/A financing must not exceed six months (180 days).

Exporters who sell under letters of credit can particularly take advantage of acceptance financing to structure extended payment terms for their customers and then benefit from the ability to discount the time drafts once the drafts are accepted by the issuing bank. The B/A's fixed rate enables the borrower to better determine the cost of financing.

Time Letters of Credit

Letters of credit (L/Cs) can be payable at "sight" or on a deferred basis using a time draft payable, for example, "X days from sight." These instruments are bankers acceptances as discussed above. With time L/Cs, the exporter can extend payment terms to the buyer up to 180 days and in some cases beyond. The advantage to the buyer is that his account won't be debited by his bank until maturity of the time draft. If the foreign bank that issued the L/C is deemed creditworthy in the eyes of the domestic advising bank, the exporter can discount the time draft and receive the proceeds, net of discount charges, shortly after his shipping documents are presented and accepted. Therefore, the exporter doesn't have to wait until maturity to get paid. The cost of the discount is usually below prime and can be passed on to the buyer if so stated in the terms of the L/C. The exporter does not need to disclose financial statements or be pre-approved by the advising bank because the financing is done on a non-recourse basis to the exporter and is based on the credit-worthiness of the issuing bank and the negotiability of the draft.

Ex-Im Bank Working Capital Guarantee Program

Ex-Im Bank's Working Capital Guarantee Program provides exporters with short-term (up to one year) pre-export financial assistance. It has been designed to support small and medium sized businesses by encouraging commercial lenders to extend loans to companies that have exporting potential but need additional funds to be able to produce or market the goods for export. It does this by guaranteeing up to 90% of both principal and interest on commercial loans to creditworthy exporters.

There are no restrictions on the loan amount for this program, however, the company must have been in business for at least one year and be in a solvent financial condition.

Medium and LongTerm Financing Solutions
- Forfaiting
- Ex-Im Bank Medium Term Foreign Buyer Financing

Forfaiting

Forfaiting is the discounting of trade paper (time drafts or promissory notes) without recourse to the seller/exporter. It is often the most flexible and easiest to document means of financing medium-term transactions. Once the trade paper is purchased/discounted, the forfaiter assumes all credit risks. Forfaiting is a good alternative to financing through government-backed export credit agencies (ECAs) as it can be faster, simpler, and less restrictive.

How does forfaiting work?
An importer requiring trade credit and the exporter agree that payment for a transaction will be made in stages evidenced by a series of promissory notes or accepted bills of exchange, e.g. 10 bills maturing semi-annually. The importer arranges a guarantee from a bank acceptable to the forfaiter — usually an aval, an endorsement written directly on the notes or bills, or separate letter of guarantee. In either case, it must be unconditional and irrevocable. The exporter then sells the notes or bills to the forfaiter at an agreed discount rate. This rate is best agreed upon before the exporter quotes a price to his buyer so that the exporter can build the cost of financing into his quotation. The forfaiter pays the discounted proceeds to the exporter immediately and collects the face amounts of the notes or bills at their maturity dates for his own account. This is a non-recourse transaction for the exporter in that the forfaiter accepts all risks including political, payment, foreign exchange, and interest rate risk.

Ex-Im Bank Medium-Term Foreign Buyer Financing Program

This Ex-Im Bank program provides repayment protection on private-sector loans extended to foreign buyers of US exports. These programs have been developed to help US exporters compete more aggressively against foreign suppliers offering subsidized-financing, as well as to encourage private export financing by absorbing credit risks that the private sector will not accept. Guarantees are available to assist exports of capital equipment, construction or engineering projects and related services that require medium or long-term financing.

Borrowers must be credit worthy and located in a country where Ex-Im Bank is open for coverage, as indicated in its Country Limitation Schedule. There is no restriction to the amount of the loan under this program, but the foreign buyer must make at least a 15% cash down-payment. The repayment terms vary depending on the size and type of transaction and there is a fixed or floating interest rate option.

Export Credit Insurance Program

A variety of export credit insurance programs are available through private insurers and Ex-Im Bank, all of which protect exporters against the risk of non-payment by their foreign buyers for commercial or political reasons. They can allow exporters to offer open account terms, thereby being more competitive in the marketplace and they may reduce the need for confirmations of letters of credit.

These programs offer both short and medium term coverage. The policies have risk-based premium rates which vary depending on length of repayment terms, countries involved, and type of buyer (private/sovereign).

Selling capital equipment to the Latin American market can provide a tremendous opportunity for growth. The understanding and application of various financing and risk mitigation techniques can help you maximize these opportunities through careful control of risk and cash flow.

Point fo Contact:

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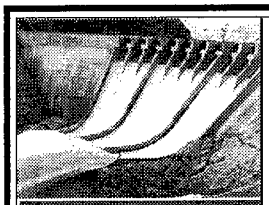
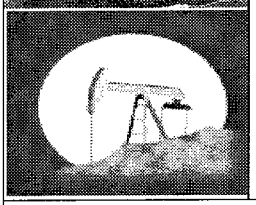
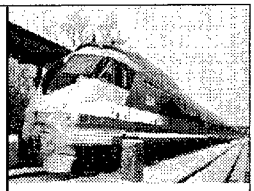
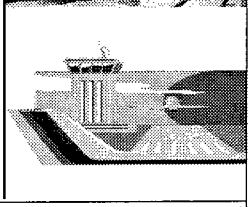




Equipment Database

Infrastructure Opportunities in South America II





Equipment / Projects Identification List

Following is a list of categories of equipment identifying those projects which are known to need them.

Aerators
ENV-18, ENV-22

Air Conditioning Equipment
TRAN-09, TRAN-47

Air Pollution Equipment
ENE-21

Antenna Technologies
TEL-03, TEL-05

Aqueduct
ENV-02, EVN-13, ENV-15, ENV-16, ENV-23

Automated Teller Machine Networks (ATM)
TEL-02

Balance
TRAN-04

Ballast
TRAN-14

Barriers
TRAN-10

Batteries
ENE-03

Belt Conveyors
TRAN-09, TRAN-18, TRAN-19, TRAN-21, TRAN-22, TRAN-23 TRAN-37, TRAN-38, TRAN-47, IND-05, IND-11

Breakers, Switches 7 Arresters
ENE-05, ENE-09, ENE-10, ENE-25, ENE-26

Bridges Air
TRAN-09

Bridges Fixed
TRAN-09

Buses
TRAN-07, TRAN-33, TRAN-42

Cables - Conductor & Normal
ENE-08, ENE-09, ENE-11, ENE-25, ENE-26, ENE-29, TRAN-08, TRAN-11 TRAN-42

Capacitors
ENE-09,ENE-10, ENE-11, ENE-25, ENE-26

Carbon Monoxide Boiler
ENV-22

Cellular Telephony
TEL-01, TEL-03, TEL-04, TEL-06

Centrifugal Pumping Engines & Separators
ENV-09, ENV-2, IND-01, IND-04

Chasis
TRAN-05, TRAN-39

Chlorination and Dechlorination Equipment
ENV-09, ENV-01, ENV-03, ENV-20, ENV-03

Circuit Breakers
ENE-01, ENE-02, ENE-13, ENE-15, ENE-16, ENE-17

Cleaning Grids
ENV-04, ENV-09, ENV-10, ENV-20

Communications Equipment (General)
ENE-05, ENE-11, ENE-26, TRAN-01, TRAN-03, TRAN-05, TRAN-06,

TRAN-07, TRAN-08, TRAN-09, TRAN-11, TRAN-12, TRAN-13, TRAN-14, TRAN-15, TRAN-16, TRAN-17, TRAN-18, TRAN-21, TRAN-22, TRAN-23, TRAN-24, TRAN-26, TRAN-28, TRAN-29, TRAN-29, TRAN-31, TRAN-33 TRAN-34, TRAN-35, TRAN,36 TRAN-37, TRAN-39, TRAN-41 TRAN-42,TRAN-44, TRAN-45 TRAN-48, TRAN-49, TRAN-50 TRAN-51, TEL-06, IND-01, IND-05, IND-06, IND-07, IND-10, IND-12

Compression Equipment
ENE-22,ENE-23, ENE-24, ENE-26, ENE-27, ENE-29, ENE-30, ENE-31, ENE-32, IND-11

Collector Mains
ENV-12

Condenser
ENE-06, ENE-07, ENE-19, ENE-27

Connectors
ENV-01, ENV-03, ENV-22, IND-03

Construction Equipment
ENE-23, TRAN-01, TRAN-10, TRAN-11, TRAN-29, TRAN-32, TRAN-33 TRAN-43, TRAN-44, TRAN45, ENV-05

Containerization Terminals
TRAN-05,

Control Panels & Systems
ENE-01, ENE-02, ENE-07, ENE-08, ENE-11, ENE-13, ENE-15, ENE-16, ENE-17, ENE-29, TRAN-08, TRAN-43 TRAN-32, TRAN-42, TRAN-50, ENV-02, ENV-06, ENV-08, ENV-13, ENV-15, ENV-16, ENV-21, ENV-23 ENV-24, IND-09, IND-10, IND-11

Cranes
TRAN-04, TRAN-05, TRAN-11, TRAN-12, TRAN-17, TRAN-18, TRAN-19, TRAN-20, TRAN-21, TRAN-22, TRAN-29, TRAN-35, TRAN-36, TRAN-37, TRAN-38 TRAN-39, TRAN-48

Cryogenic Products
IND-12

Cropping Machines
ENE-18

Decontamination Equipment
ENV-08

Diffuser System
ENV-21

Divestures
ENV-04, ENV-09, ENV-10, ENV-20

Digital Networks
TEL-02

Distillation Units
ENE-33

Distribution Rings
ENV-07

Earth Moving Equipment
ENE-01, ENE-18, ENE-23, TRAN-10, TRAN-11, TRAN-12, TRAN-26, TRAN-29, TRAN-30, TRAN-35 TRAN-36, TRAN-40, TRAN-46, ENV-05, IND-06, IND-07

Effluent Treatment
ENE-28

Electricostatic Precipitator
ENV-22

Electric Drainage Equipment
ENE-27

Elevation Stations
ENV-01, ENV-03

Elevators
TRAN-04, TRAN-06, TRAN-25, TRAN-26, TRAN-38, TRAN-46 TRAN-50

Emergency Medical Vehicles
TRAN-09, TRAN-41

Energy Meters
ENE-01, ENE-02, ENE-03, ENE-05, ENE-06, ENE-07, ENE-08, ENE-09, ENE-10, ENE-11, ENE-12, ENE-13, ENE-14, ENE-15, ENE-16, ENE-17, ENE-19, ENE-26,

Escalators
TRAN-01, TRAN-05, TRAN-25, TRAN-26, TRAN-46, IND-02

Fax Equipment
TRAN-01

Fiber Optic Telephone Lines & Networks
TEL-01, TEL-02

Filtration Equipment & Systems
ENE-30, ENV-04, ENV-09, ENV-20

Fire Prevention / Detection Equipment
ENE-06, ENE-08, ENE-19, ENE-28, ENE-29, TRAN-01, TRAN-06, TRAN-09, TRAN-25, TRAN-41, IND-12

Flooding Control Equipment
ENE-01,ENE-02, ENE18

Flow Station Equipment & Meters
ENE-04, ENE-22, ENE-23, ENE-24, ENE-29, ENE-30, ENE-31, ENV-04, ENV-10, ENV-14, ENV-15, ENV-16, ENV-23

Flowerets
ENV-09

Fork Lift Trucks
TRAN-05, TRAN-20, TRAN-39

Frequency Conversion Stations
ENE-26

Fumigation Equipment
ENE-18

Equilibrium Chimney
ENE-17

Fractionation Equipment
ENE-21

Gas Systems
ENE-08, ENE-23, ENE-23, ENE-24, ENE-27, ENE-28, ENE-30,ENE-31, ENE-32,

Generators
ENE-02, ENE-06 (Vapor), ENE-13, ENE-14, ENE-15, ENE-17, ENE-19, ENE-28, ENE-29, TRAN-09, TRAN-11, TRAN-25, TRAN-30, TRAN-35, TRAN-38, TRAN-46, ENV-05, ENV-13 IND-04, IND-06

Gravitational Separators
IND-01

Hoppers
TRAN-21, TRAN-22, TRAN-37

Hydroelectric Units
ENE-01

Hydroneumatic Equipment
ENE-01, ENE-13, ENE-15, ENE-17, TRAN-46

Hydraulic Equipment
ENE-05, TRAN-29, IND-02

Incinerators & Refusion Equipment
ENV-08

Infrared Sensors
ENV-08

Information Systems / Computer Equipment
ENE-08, ENE-23, ENE-28, TRAN-05, TRAN-07, TRAN-15, TRAN-18, TRAN-19, TRAN-21, TRAN-23, TRAN-27, TRAN-31, TRAN-34, TRAN-35, TRAN-37, TRAN-39, TRAN-48, TRAN-49, TRAN-50, TEL-01, TEL-02, ENV-24, IND-05

Interceptors
ENV-14, ENV-15, ENV-16, ENV-18, ENV-23, ENV-24, INV-03

Irrigation Equipment
IND-02

Lift Stations
ENV-12

Lighting
TRAN-06, TRAN-10, TRAN-17, TRAN-23, TRAN-25, TRAN-31, TRAN-35, TRAN-36, TRAN-42 TRAN-44, TRAN-47, TRAN-32

Loaders & Unloaders (Ship)
TRAN-17, TRAN-18, TRAN-19, TRAN-21, TRAN-22, TRAN-23, TRAN-38, TRAN-50,

Locomotives
TRAN-03, TRAN-15, TRAN-34

Luggage Inspection X-ray Systems
TRAN-09, TRAN-46, TRAN-47

Luggage Sorters (Circular)
TRAN-09, TRAN47

Microwave Systems
TEL-05

Mineral Processing Equipment
IND-01

Monitoring Equipment / Systems
ENE-05, ENE-22,ENE-23, ENE-24, ENE-30, TRAN-29, TRAN-30 TRAN-40, TEL-05, ENE-01,

ENV-03, ENV-10, ENV-04, ENV-05, ENV-08, ENV-09, ENV-10, ENV-14, ENV-15, ENV-17, ENV-18, ENV-19, ENV-24, IND-01, IND-03, IND-09

Network Saftey Systems
TEL-02

Oxidation Ditches & Systems
ENV-09, ENV-17, ENV-20

PVC Tubbing
ENV-01, ENV-03, ENV-04, ENV-09, ENV-10, IND-03

Palitization Plant
IND-07

Piping
ENE-04, ENE-21, ENE-22, ENE-23, ENE-24, ENE-27, ENE-30, ENE-31, ENE-33, TRAN-19, TRAN-37, ENV-05, ENV-06, ENV-20, ENV-22, IND-09, IND-12

Pollution Control Equipment
ENE-21, TRAN-42,

Potabilization Systems
ENV-01, EN-03

Pumping Equipment & Stations
TRAN-01, TRAN-06, TRAN-18, TRAN-21, TRAN-22, TRAN-22, TRAN-37, TRAN-38 TRAN-25 TRAN-50, ENV-01, ENV-02, ENV-03, ENE-04, ENV-06, ENV-14, ENV-16, ENV-19, ENV-20, ENV-22, ENV-23, ENV-24, IND-02, INV-03

Pumping Well
ENV-02, ENV-09, ENV-10, ENV-20

Pressure Control Units & Systems
ENE-04, ENE-18, ENV-04

Radar Equipment
TRAN-11, TRAN-12, TRAN-17, TRAN-29, TRAN-30, TRAN-31 TRAN-40

Radial Digital Equipment (Multi Access)
TEL-04

Radio Based Stations
TEL-03

Regulators
ENE-03

Rolling Stock (New & Refurbished)
TRAN-01, TRAN-02, TRAN-03, TRAN-06, TRAN-13, TRAN-14, TRAN-16, TRAN-24, TRAN-25, TRAN-26, TRAN-28, TRAN-28, TRAN-34, TRAN-39, TRAN-48 TRAN-49, TRAN-51

Sand Removers & Filters
ENV-04, ENV-07, ENV-08, ENV-10, ENV-20

Separation Technologies
ENV-07

Security Equipment
TRAN-05, TRAN-17, TRAN-18, TRAN-19, TRAN-20, TRAN-25, TRAN-26, TRAN-35, TRAN-41, TRAN-46, TRAN-47, TRAN-48

Signaling Systems
TRAN-01, TRAN-03, TRAN-05, TRAN-08, TRAN-11, TRAN-13, TRAN-14, TRAN-15, TRAN-16, TRAN-24, TRAN-26, TRAN-28, TRAN-29, TRAN-34, TRAN-40 TRAN-42, TRAN-48, TRAN-49

Scrubbers
ENE-21

Ships
TRAN-30

Silos
TRAN-18, TRAN-21, TRAN-22, TRAN-37, TRAN-38, TRAN-50

Sludge Compacting Equipment
ENV-02, ENV-09, ENV-10, ENV-12, ENV-20

Sludege Drying Unit
ENV-12

Software Development
TEL-02, TEL06

Solar Panels
ENE-03, ENV-13

Sound System Solutions
TEL-02

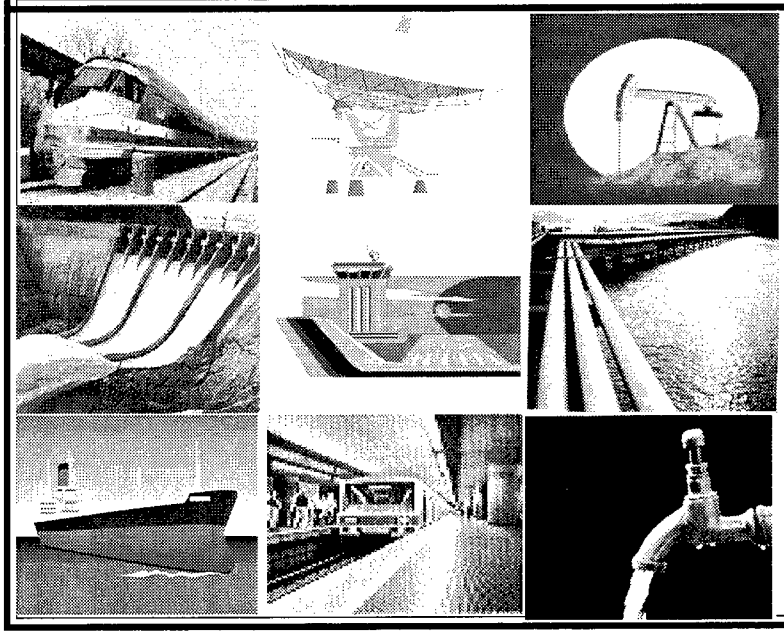
Stirring & Flocculation Equipment
ENV-09, ENV-10, ENV-20

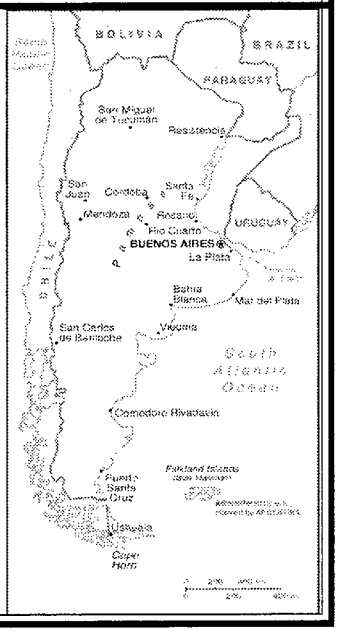
Sub Stations
ENE-01, ENE-05, ENE-08, ENE-10, ENE-11, ENE-14, ENE-25, TRAN-01, TRAN-05, TRAN-25, TRAN-28, ENV-05

Sewage Collection System
ENV-12
Sweepers (Mobile)
TRAN-29, TRAN-46
Switches
ENE-05,
Switching Equipment
TRAN-21, TRAN-22, TRAN-34, TRAN-50
Switching Systems (Telephone)
TEL-04, TEL-05
Tanks
ENE-33, ENV-02, ENV-03, ENV-07, ENV-09, ENV-10, ENV-13, ENV-15, ENV-16, ENV-20, ENV-21, ENV-22, ENV-23, ENV-24
Ticket Collection Equipment
TRAN-06, TRAN-24, TRAN-25,
Tolling Equipment
TRAN-10, TRAN-11, TRAN-12, TRAN-17, TRAN-33, TRAN-43, TRAN-44, TRAN-45, TRAN-32
Ties (Railroad)
TRAN-02, TRAN-14
Track
TRAN-01, TRAN-04, TRAN-14, TRAN-21, TRAN-25, TRAN-26, TRAN-34, TRAN-38, TRAN-47, TRAN-48, TRAN-50
Track Renovation Equipment
TRAN-08, TRAN-48
Tractor Trailers
TRAN-11, TRAN-12, TRAN-46
Transfer Terminals
TRAN-10
Transformers
ENE-02, ENE-05, ENE-06, ENE-08, ENE-13, ENE-15, ENE-16, ENE-26, ENE-27, TRAN-01, TRAN-05, TRAN-34, ENV-04, ENV-07, ENV-10, ENV-20
Transmission Lines
ENE-01, ENE-06, ENE-08, ENE-09, ENE-10, ENE-11, ENE-14, ENE-25, ENE-26, ENE-28, ENE-29, TRAN-21, TRAN-22, TRAN-25, TRAN-23, TRAN-38, TRAN-50, ENV-05, IND-02
IND-06
Transmission Systems (Telephone)
TEL-04, TEL-05
Tubing
ENE-11, ENE-17, ENE-21, ENE-27, ENE-32, ENV-02, ENV-07, ENV-13, ENV-14, ENV-15, ENV-16, ENV-18, ENV-23, ENV-24, INV-02
Turbines
ENE-02, ENE-05, ENE-06, ENE-07, ENE-08, ENE-12, ENE-13, ENE-15, ENE-16, ENE-19, ENE-28
Upgrader
ENE-33
Valves
ENE-04, ENE-21, ENE-22, ENE-23, ENE-24, ENE-27, ENE-29, ENE-31 ENV-01, ENV-05, ENV-22, ENV-02,
Vapor Turbines
ENE-06, ENE-07
Vehicles
ENE-01, ENE-18, ENE-23, TRAN-04, TRAN-05, TRAN-07, TRAN-09, TRAN-11, TRAN-12, TRAN-21, TRAN-39, TRAN-46, TEL-06, IND-01, IND-02, IND-07
Ventilation Equipment
ENE-05, TRAN-01, TRAN-06, TRAN-25, TRAN-26, IND-05, IND-11
Video Conferenceing Equipment
TEL-01, TEL-02
Water Demineralization
ENE-28
Water Mains
ENV-07
Wastewater Treatment
ENE-28, TRAN-22, ENV-06, ENV-07
Water Cooling Equipment
ENE-08, ENE-06, ENE-19, ENE-27
Water Supplier-Industrial
ENE-08, ENE-27, TRAN-22
Wave Breakers
TRAN-39
Weigh Stations
TRAN-05, TRAN-11, TRAN-12
TRAN-37

Market Makers

Argentina





Techint Group of Companies

Traditional Business: Manufacturing, engineering, construction, trading, and services

The Techint Group has more than 100 companies throughout Latin America, the United States, and Europe. These companies have different shareholders, operate autonomously, and report annual aggregate sales of US$ 5 billion.

Steel Production and Manufacturing

The Techint Group owns steel plants in Mexico, Italy and Argentina which concentrate on the production of steel pipes, coils, and sheets. Together, these plants produce 4 million tons of steel products annually. In 1995-96, the Techint Group acquired a controlling share of Dalmine, an Italian steel producer with a yearly production capacity of 900,000 tons of finished products.

Engineering and Construction

Techint's engineering and construction companies concentrate on pipelines. Recent projects include the Gas Andes pipeline started in 1995, extending from La Mora, Argentina to Santiago, Chile.

Industrial Machinery and Equipment

Techint's industrial activities consist of various specialized companies. Among these are: Intersteel Technology (Charlotte, NC), Pomini (Castellanza, Italy), and Cometarsa (Campana, Argentina).

Oil and Gas

The company's involvement in this sector is through its oil and gas company Tepetrol, and the gas transportation company TGN. Tepetrol operates more than 15 oil and gas fields in Argentina and Venezuela. TGN, operating since the privatization of Gas del Estado in 1992, controls the two main pipelines in the northern and western regions of Argentina.

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Benito Roggio e Hijos S.A.

Roggio S.A., founded in 1908, has continued to play a key role in the Argentine business scene. Made up by more than 40 companies, Roggio's two main focus are on services and infrastructure. Headquartered in Argentina, it has maintained an active role in the privatization process, and has a significant presence throughout Latin America.

Roggio S.A. has consolidated its strategic business in the following areas: construction industry, environmental engineering, transportation (subways & tolls), banking services and public utilities. It is a high flexible business group aiming at becoming an operator specialized in public services.

Bunge y Born

Bunge y Born was established in Argentina in 1884. Traditionally involved in the grain export business, it later entered the industrial food market through the production of wheat flour. Today Bunge y Born's largest company, Molinos Río de la Plata S.A. , is one of the principal producers of edible oils and flour in Argentina. Molinos' other products include pasta, baked goods, beverages, rice, and frozen fruits and meats.

Molinos Río de la Plata operates 15 industrial plants and 4 distribution centers, and produces over 800,000 tons a year in the domestic market.

Net Sales:	US $1.3 trillion
Net Assets:	US $1.04 trillion

Molinos Río also has operations in Chile and Uruguay.

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The Fortabat Group

Traditional Business: Cement, railroads, media, gas transportation, ranches, cattle, grains, fruits.

Annual sales: US $448.8 million (1994)
US $454.1 million (1995)

The Fortabat Group, through its subsidiary Loma Negra, is the major manufacturer of cement in Argentina with a yield of 3.8 million tons annually. Loma Negra accounts for 55% of total cement production in Argentina.

The Group's activities also include cargo railway transportation, agriculture-livestock exploitation, the operation of an industrial waste recycling industry, and a share in natural gas distribution services providing 29% of Argentina's natural gas consumption.

The majority of stock belongs to Mrs. Amalia Lacroze de Fortabat who presides over the Group and actively participates in the managerial decisions for the operations of the diversified companies.

Banco de Galicía y Buenos Aires S.A.

In terms of assets, deposits, and branch network size. Galicia provides a complete range of banking services through more than 170 branches. Galicia also conducts significant global banking activities through its branches in New York and representative offices in Brazil and Chile, as well as a vast correspondent banking network covering the world's major financial centers.

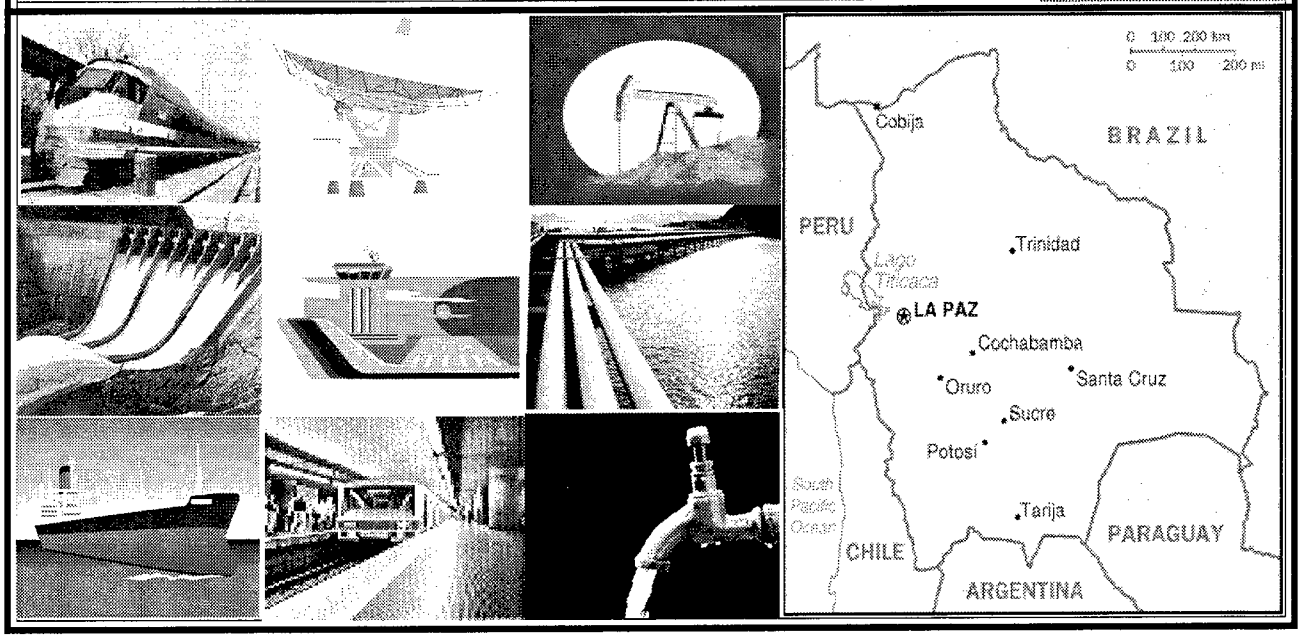
Galicia holds 7.7% of Aguas Argentinas. Galicia's shares are listed in the Buenos Aires Stock Exchange and in the NASDAQ System. As of June 1995, Galicia had a net worth of US$ 551 million.

Net Sales: US$ 895 million (1996)

Assets: US$ 7,895 million (1996)

Market Makers

Bolivia



Leon Prado Group

The Leon Prado Group is a diversified conglomerate and one of the most important in Bolivia. The holding company owns Grupo Banco Bisa, Bisa Seguros y Reaseguros, Bisa Leasing, Raisa Almacenes Internacionales, Bisa Agente de Bolsa, Bisa Factoring, and ICE Ingenieros.

ICE Ingenieros (Engineers) is one of the most respected infrastructure construction companies in Bolivia and in the region as a whole. The company was established in 1964 in Lima-Perú where it later moved to house its offices in Bolivia, 1969. At that point, the group build the Thermal Electric Plant of Santa Cruz, which currently supply's electricity to one of the most important cities in the country. Within the interconnected system, the Leon Prado Group has constructed 1,200 Km of transition cable and more than 20 electricity substations.

ICE Engineers has also constructed 10 gas turbines for the generation of electricity while at the same time elaborating works for rural electrification in the cities of Cochabamba and Santa Cruz. In doing so, they have installed more than 40,000 posts. The projects represents one of the most extensive projects till today in Bolivia.

In addition to electrification projects, the company has developed important civil engineering works that include 12,200 meters of tunnel for the transversal of water from the Rio Málaga to the Corani Dam, and the new airstrip of 3,800 meters for the Cochabamba Airport. Other projects include road

construction throughout the country. Such Roads as, 57 Km between Confital and Caihausi, Oruro-Vinto-Machamarca, Machamarca-Pazna, Quillacollo-Confital and Cochabamba-Paracaya.

Other works developed by the group include:

- The rehabilitation of Canal Ravelo and the construction of Túnel Ruffo within the system of potable water of Sucre.
- Road construction of 66 Km from the Road Camairi to Boyuibe.
- Construction of the Túnel de Huaji.

Works outside of Bolivia include:

- The Túnel of Huangush, consisting of the second of such a work is constructed at 4,500 meters of a height of 40 meters with a sustained water pressure and the tunnel of Jachacuesta 7.1 Km long at 4,400 meters above sea level. The third tunnel is an 8.8 Km rail tunnel for Southern Perú Copper Corporation.

- The Hydroelectric project of Mantaro in Perú consists of 435 Km of transmission. These lines according to their engineering characteristics are amongst the most difficult in the world to construct.

- ICE has also build transmission lines in Nicaragua, Panamá and Costa Rica.

Throughout the companies history, the group has built 260 works with a value of over US$ 700 million in which the company along with its labor force and equipment has contributed drastically to the development of Bolivia.

Currently, the company is looking to bid on the Misicuni project that consists of potable water and electricity generation for the city of Cochabamba.

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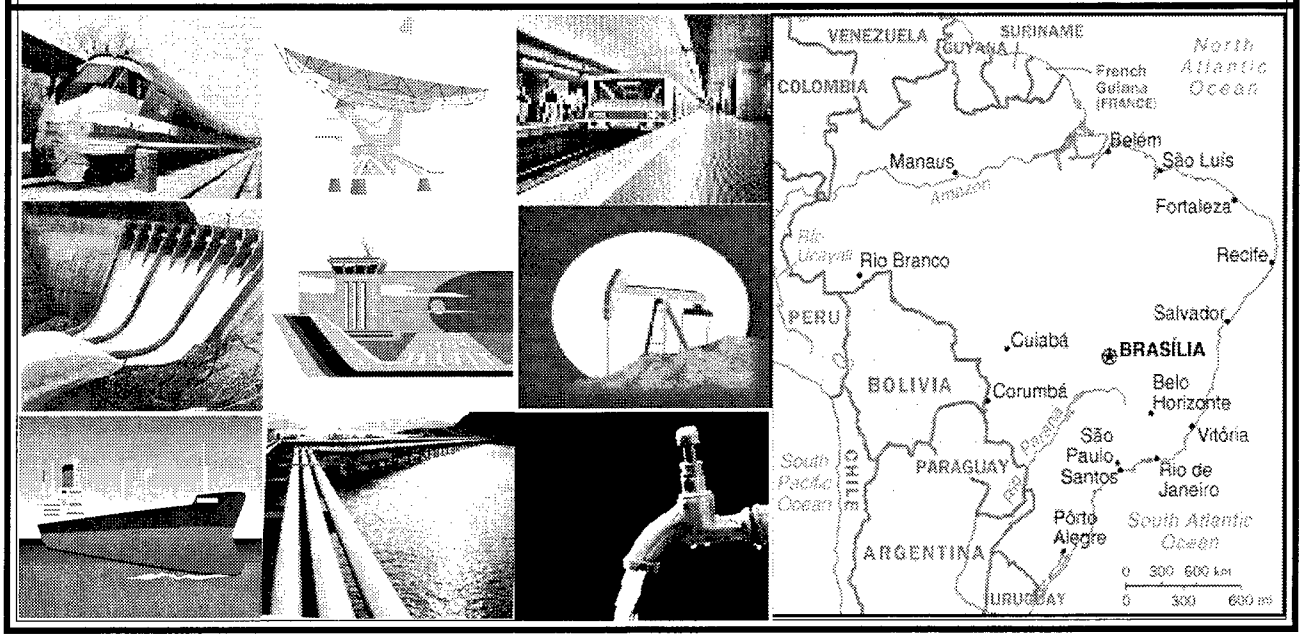
Market Makers

Brazil



Of the top 100 publicly traded companies in Latin America, Brazilian companies account for 49 of these. While enormous investments are on-going in the country, major groups remain family controlled, and responsible for infrastructure creation in Brazil.

Brazilian companies are in the process of restructuring in order to remain competitive in world markets, and are generally very aggressive in terms of the expansion policies over the next five years. Access to cheaper capital and increasing competition are fostering investments, which include significant infrastructure opportunities.

Companhia Siderurgica Nacional (CSN)

Founded in 1941 and privatized in April 1993, CSN is Brazil's leading steel-maker, responsible for more than 17% of the nation's production of crude steel, which was 25.2 million tons in 1996. CSN, President Vargas' steel mill and Latin America's largest integrated steel works, is located in Volta Redonda, southern Rio de Janeiro state 145 Km from the city of Rio de Janeiro.

The mill's annual production capacity is 4.6 million tons of molten steel. Its main products are hot-rolled coils and sheet, thin cold-rolled coils and sheet, galvanized coils and sheet and non-coated sheet for the automotive, appliance and civil construction industries. Besides these products, CSN also produces tin plate and chrome plated steel destined, mainly, for the packaging industry. The Company is Brazil's only producer of tin plate and chrome plated steel and is the largest single-mill producer of tin plate in the world: annual production of this product exceeds one million tons. The two blast furnaces currently in operation at CSN jointly turn out 13,500 tons of pig iron a day. The other main production units at the steelworks are the coking plant, sintering plants, BOF shop, continuous casting plant, hot and cold rolling mills, galvanizing, tin-free plating and electrolytic tinning mills.

CSN is a major player in Brazilian infrastructure markets, primarily to meet its own needs as it vertically integrates to increase efficiencies. Among CSN's principal infrastructure investments are:

President Vargas Thermoelectric Plant

CSN signed a letter of intention in June 1997 with Siemens AG of Germany for the construction of a thermoelectric plant within the President Vargas Steel Mill grounds. Using gases deriving from steel manufacturing operations as fuel, this plant will produce some 230 MW of electric energy. The cost of the plant is budgeted at US$ 250 million and is to begin operations as of the second half of 1999 and will be responsible for generating approximately 50% of the steel mill's future electric energy requirements.

Itú Hydroelectric Plant

CSN, together with Cimentos Itambé (Votorantim Group), Poliolefinos and OPP Petroquímica (Odebrecht Group) and Eletrosul, is participating in the re initiation of construction of the Itú· hydroelectric dam. This project is located on the Uruguay River between the states of Rio Grande do Sul and Santa Catarina and will have installed capacity of 1,450 MW. CSN has a 29.77% participation in the project, whose overall value is estimated at US$ 1.1 billion. The first turbine is scheduled to enter into operation in the year 2000.

Igarapava Hydroelectric Plant

CSN has a 7.5% share of the consortium that will build and operate the Igarapava hydroelectric plant in Minas Gerais state. Other members of the consortium include Companhia Vale do Rio Doce, Companhia Mineira de Metais, CEMIG, Mineração Morro Velho and Eletrosílex. The project's estimated cost is US$ 244 million, with installed capacity of 210 MW. This plant is scheduled to begin operating at full

Light

CSN participated in the consortium (7.25%) that obtained shareholder control of Light Serviços de Electricidade S.A. during the privatization auction held on May 21, 1997. Light distributes electric energy in the state of Rio de Janeiro, and CSN consumes 11% of all of the electric energy distributed by Light.

Center-Eastern Rail Network and Southeast Rail Network

CSN is part of the consortium that won the concession to operate the Center-Eastern rail network belonging to the Rede Ferrovi·ria Federal S.A. on June 14, 1996 The concession area covers 7,080 kms of track, in the states of Sergipe, Bahia, Espìrito Santo, Minas Gerais, Goi·s and Rio de Janeiro and the Federal District. The rail line transports limestone and dolomite from CSN's mines at Arcos (MG) to the steel mill in Volta Redonda and carries products destined for export from the mill to the ports of Angra dos Reis and Rio de Janeiro.

MRS Logística

CSN also is a member of the consortium that on Sept. 20, 1996 acquired the government concession to operate the Southeast railway network. This network possesses 1,633 kms of track and operates in São Paulo, Rio de Janeiro and Minas Gerais states. It is responsible for transporting the iron ore that is extracted from CSN's Casa de Pedra (MG) mine to the steel mill in Volta Redonda, as well as transport of coal and coke from the port of Sepetiba to the mill. The volume of materials transported on behalf of CSN corresponds to approximately 20% of the railroad's total transport volume. The Company has a 33% participation in the consortium (20% of its voting capital). The price of the concession was R$ 889 million, with 30% being a down payment and the rest to be paid over the life of the concession.

On April 28, 1997 CSN obtained the concession to operate the Port of Sepetiba coal terminal belonging to Companhia Docas do Rio de Janeiro (CDRJ).

The concession period is 25 years and the cost to the Company was R$ 37 million. CSN imports all of the coal and part of the coke needed for its steel mill through this port, and these materials represent 95% of the movement at Sepetiba.

CSN also is interested in leasing the port of Angra dos Reis, whose privatization date has not yet been set by the federal government. CSN embarks approximately one-third of its exports through this port.

CSN is one of the members of the consortium that acquired control of Companhia Vale do Rio Doce (CVRD) on May 6, 1997. CVRD is the world's third largest mining company as well as one of the world's major iron ore producers. CSN paid R$ 1.05 billion for 8.47% of CVRD's total capital and 13.17% of its voting shares. CSN obtained third-party funding totaling R$836 million in order to carry out this investment, using its own resources for the outstanding balance.

CVRD is the world's largest exporter of iron ore and pellets with sales of 103.2 million tons and exports of about 60.2 million tons in 1996. Besides its iron ore and pellet production, CVRD also is active in the following sectors:

Gold, manganese and bauxite mining; Maritime and rail transport; Paper and pulp; Investments in steel and ferroalloy producers in Brazil, Argentina, France and the U.S..

The Company believes that significant synergism can be generated through the acquisition of CVRD, principally in the areas of iron ore production and logistics (rail transport and port operations).

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Companhia Vale do Rio Doce CVRD

CVRD is the world's third largest mining company as well as the world's largest producer and exporter of iron ore. The company's operations include mining of gold, bauxite, manganese, kaolin and potassium; the production of aluminum, steel and alloys, and pulp and paper. CVRD also operates its own marine terminals, railroads and bulk-carrier fleet.

CVRD was privatized in May, 1997 and offers significant joint venture opportunities as the company revamps its operations and institutional structures. The company's gross revenues in 1996 were US$ 2.87 billion, with net profits of US$608.3 million.

CVRD's infrastructure investments are primarily in the transportation sector, as the company has traditionally been a vertically integrated company. CVRD currently operates the two railroads in the country: the Vit—ria- Minas Railroad (Estrada de Ferro Vit—ria a Minas - EFVM) and the Carajás Railroad (Estrada de Ferro Carajás - EFC). CVRD also operates the Port Complex of Tubarão in Espirito Santos and a fleet of 18 vessels and 8 tug boats.

Among the major new infrastructure acquisitions the company has made, are:

Center-East Rail Network

CVRD acquired the concession to operate the Center-East rail network, formerly part of the Rede Ferrov'aria Federal S.A. - RFFSA (the Brazilian Federal Railroad) on June 14, 1996, for a period of thirty years. The network comprises 7,080 kilometers of railway, extending over seven states: Sergipe, Bahia, Esp'rito Santo, Minas Gerais, Goiás, Rio de Janeiro and the Federal District.

In order to operate the railroad for the next 30 years, CVRD will invest R$ 1.3 billion for repair and replacement of track, and purchase of equipment, locomotives and rail cars. The objective is to aug-

Andrade Gutierrez

Traditional Business: Construction (All Infrastructure Sectors), Chemical, Mining

New Business: Public Concessions

With a net asset base of US$2.32 billion, the Andrade Gutierrez group is one of the groups that has the largest private capital in South America. The group is active in the engineering and construction of projects in all sectors of infrastructure development and is the third largest construction company in terms of revenues in Brazil. The group is headquartered in Belo Horizonte, Minas Gerais and posted revenues of US$ 714.8 million in 1996. Andrade Gutierez has 11,835 employees and earned a profit of US$98.8 million in 1996.

The group is active in the following sectors: civil works, telecommunications, water and wastewater concessions aircraft maintenance, chemical industry, mining and granite. Andrade Gutierez has participated and executed hydroelectric, highways, railroad, metro, airport, ports, irrigation, gas distribution, industrial and wastewater projects in Brazil and in various other countries including USA, Portugal, Germany, Chile, Bolivia, Argentina, Peru, Ecuador, Colombia, China, Mexico and Cameroon.

The Odebrecht Group

Traditional Business: Construction (All Infrastructure Sectors), Petrochemical

New Business: Public Concessions

The Odebrecht group owns two of the six largest construction firms in Brazil, responsible for the development of major infrastructure projects in all sectors.

Construtora Norberto Odebrecht S.A. (CNO)

Founded in Salvador, Bahia, in 1945, CNO provides heavy construction and special technology services and operates in most Brazilian states. CNO has 12,100 employees, 5,500 in Brazil and 6,600 in other countries and posted revenues of US$696.9 million in 1996.

CNO is Brazil's fourth largest construction company, and a major player in infrastructure development in the country in all sectors. CNO has helped build a number of major projects, including Rio de Janeiro International Airport (RJ);the Angra dos Reis Nuclear Power Plant (RJ), the Carajás Railroad in the Amazon, the Pedra do Cavalo Complex in Bahia (to supply water and prevent the flooding of the Paraguaçu River), sanitation projects in Belém, Salvador and Belo Horizonte, and the Recife Metro.

Companhia Brasileira de Projetos e Obras (CBPO)

A heavy construction and special technology company, CBPO was founded in São Paulo in 1931 and joined the Odebrecht Group in 1980. CBPO is made up of about 6,100 people, 4,000 in Brazil and 2,100 in other countries and posted revenues of US$ 427.9 Million.

CBPO is the sixth largest construction company in the country and has participated in several major

Construcõese Comércio Camargo Corrêa S.A.

Traditional Business: Construction (All Infrastructure Sectors)

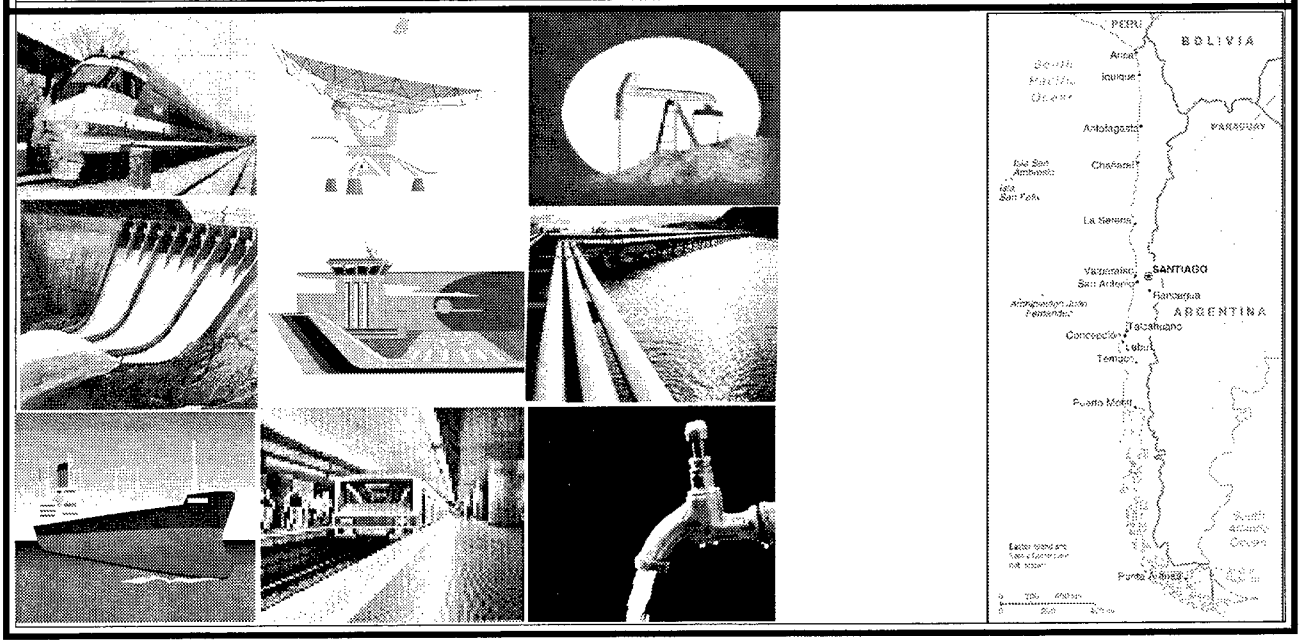
New Business: Public Concessions

Founded by the entrepreneur Sebastião Ferraz de Camargo Penteado, Camargo Corrêa conducts engineering services and construction in the heavy construction, infrastructure, industrial assembly and project management areas. With 6,600 employees, the company posted revenues of US$ 714.8 million and profits of US$142 million in 1996. Camargo Corrêa is Brazil's second largest construction company in terms of revenues.

The company is active in the construction of Hydroelectric Power Plants and Dams, Subway Systems, Airports, Highways, Railways in addition to Commercial and Industrial Buildings and Sanitation Projects. Camargo Corrêa conduct services of acquisition of materials and equipment, assembly, testing and pre-operation works as well as the construction of: Sewer Pipelines, Flood control works, Locks and Canals.

Market Makers

Chile



In general, major economic groups in Chile are conservative and tend to operate in sectors in which the group already has familiarity before participating in foreign enterprises.

Enersis S.A.

Traditional Business: Energy Generation, Real Estate, Informatics

New Business: Sanitary Works and Airports

ENERSIS is a Chilean holding company which participates in the electricity distribution, transmission and generation businesses, as well as related service enterprises, in Chile, Argentina, Peru, Colombia and Brazil. The company operates in a decentralized manner through subsidiaries and related companies. With over 5 million customers, ENERSIS is one of the largest privately-owned companies in Latin America.

In 1996, ENERSIS subsidiaries and related companies sold approximately 25,000 Gwh of energy and its generation facilities had an installed capacity of 6,900 MW.

ENERSIS bases its development strategy on taking advantage of investment opportunities in areas in which it has previous experience and solid competitive advantages. These areas include: energy and public utility services in Latin America.

Aggessive international expansion policies have enable ENERSIS to grow substantially in recent years. Increasing levels of electric consumption in Latin America, as well as privatization and regional integration, will provide substantial multi-sectoral business opportunities for ENERSIS and its subsidiaries over the next decade.

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Grupo Angelini

Traditional Businesses: Forestry, Fishing, Energy Distribution, Fuel, Insurance and Pension Funds

New Business: Energy Generation

The Angelini Group strives to gain a competitive edge through the combined know-how of its holdings and to diversify through new business development.

Traditional businesses of the Angelini Group include: forestry, energy distribution, fishing, fuel, insurance and pension funds. In the forestry sector, the Angelini Group holds full management powers and shares 60 % joint ownership with International Paper over Celulosa Arauco, a commodity exporter trading in pulp, sawn wood and wood panels.

Division of Income:

SECTOR	PERCENTAGE
Cellulose	35%
Fishing	22%
Fuel	15%
Elecricity	12%
Mining	9%
Timber	7%

In energy generation, Angelini has held a 9.4 percent interest in Chilgener since 1992 and plans to acquire enough shares to reach a 20 percent position. The Angelini Group's primary objective with regards to new business is to diversify its holdings and reduce reliance on traditional sectors such as forestry and fishing, which produce a more cyclical income.

The Angelini group concentrates its investments in two enterprises: Inversiones Socoroma (COPEC) and the Compania Sudamericana de Vapores. As part of the Group's process of financial reorganization in which it aims to consolidate its insurance companies into one partnership, the Angelini Group merged with Inversiones Litani S.A in May 1997.

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Luksic

Traditional Business: Banking, telecommunications, mining, food processing, beverages, tourism, forestry, manufacturing, and railways.

New Business: Pensions funds and insurance

Assets: US $2.2 trillion (1996)
Sales: US $ 952 million (1996)

Luksic is the most diversified holding company in Chile. As part of its new involvement in pension funds, in November 1997 it will purchase 50.1% of AFP Qualitas with the option to purchase up to 67%. On the insurance side of its operations, the O'Higgins Central Hispano holding group (one of Luksic's companies) is pursuing the acquisition of an insurance company and another life insurance firm. Neither of these alternatives will be completed before the beginning of 1998.

The Luksic group is the majority owner of telecommunications company VTR, and is pursuing a merger with the Compa–'a de Telecomunicaciones de Chile (CTC). CTC and VTR consitutie the two most important telecommunications companies in Chile. Luksic recently formalized an agreement with Japanese investors to sell 40% of the vast Los Pelambres copper project, located 200 kilometers north of Santiago.

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O'Higgins Holding - Luksic Group
Teatinos 280
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Matte Group

Traditional Business: Forestry, paper and cellulose, energy, ports, finance, and inustries in general

New Business: Infrastructure, and energy

The Matte Group was recently awarded the bid for the acquisition of Minera Valparaiso; thus, it is now positioned to compete with Endesa and Chilgener in energy generation. The group also has extensive experience in infrastructure projects. Through its Puerto de Lirquen subsidiary, Matte Group has port services background and knowledge, and is planning on extending its involvement into airport and sanitary concessions.

The Matte Group's most important traditional enterprise is paper. CMPC (Compa–ia Manufacturera de Papeles y Cartones) is a leader in South America. Matte owns tissue plants in both Argentina and Uruguay, and is now in the process of building a cardboard and corrugated paper plant. This plant, expected to be completed by the end of 1997, will have a capacity of 130,00 tons and is valued at US $204 million.

Key Contact:

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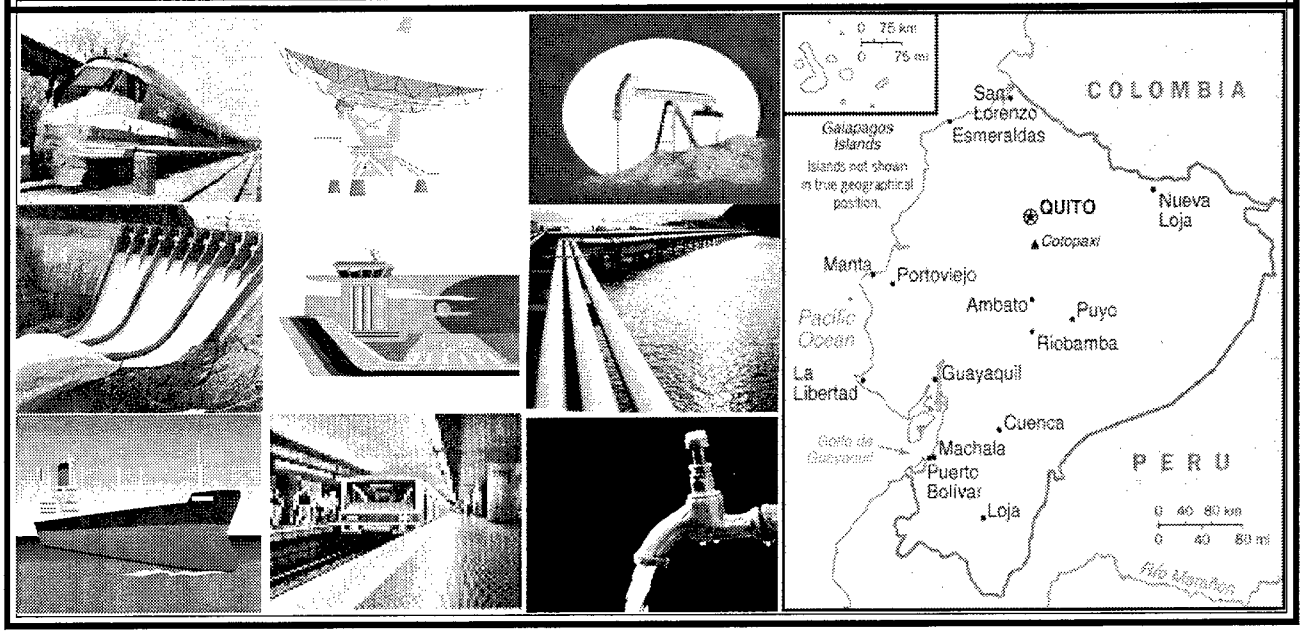
Market Makers

Ecuador



Grupo Noboa

The Noboa group is considered by far the largest economic consortium of companies in Ecuador responsible for approximately 5% of the country's GDP. Luis Noboa Naranjo founded the group in 1946 with Exportadora Bananera Noboa (Banana Exporting Company) during the banana boom. The group was initially a marketing intermediary for the United Fruit Company, and became one of the "Banana Republics." Later, the company expanded operations as an independent producer and exporter of bananas. As business grew, the company expanded into packaging materials, and transportation and shipping. Noboa became a fully integrated company with two cardboard plants, a few land transportation companies, and a shipping company. Later, the group diversified its production into sugar, coffee, cocoa, and flour. Locally, the country entered the soft drink business.

The group's holding companies include: Core Investments Limited, European and American Trading Companies and Pacific Fruit Limited. By 1992, the Noboa group owned 87 companies, expanding into television in Mexico and other industries.

With the recent passing of Luis Noboa, the group has split into two large companies . His son, Alvaro Noboa is the current head of the larger group.

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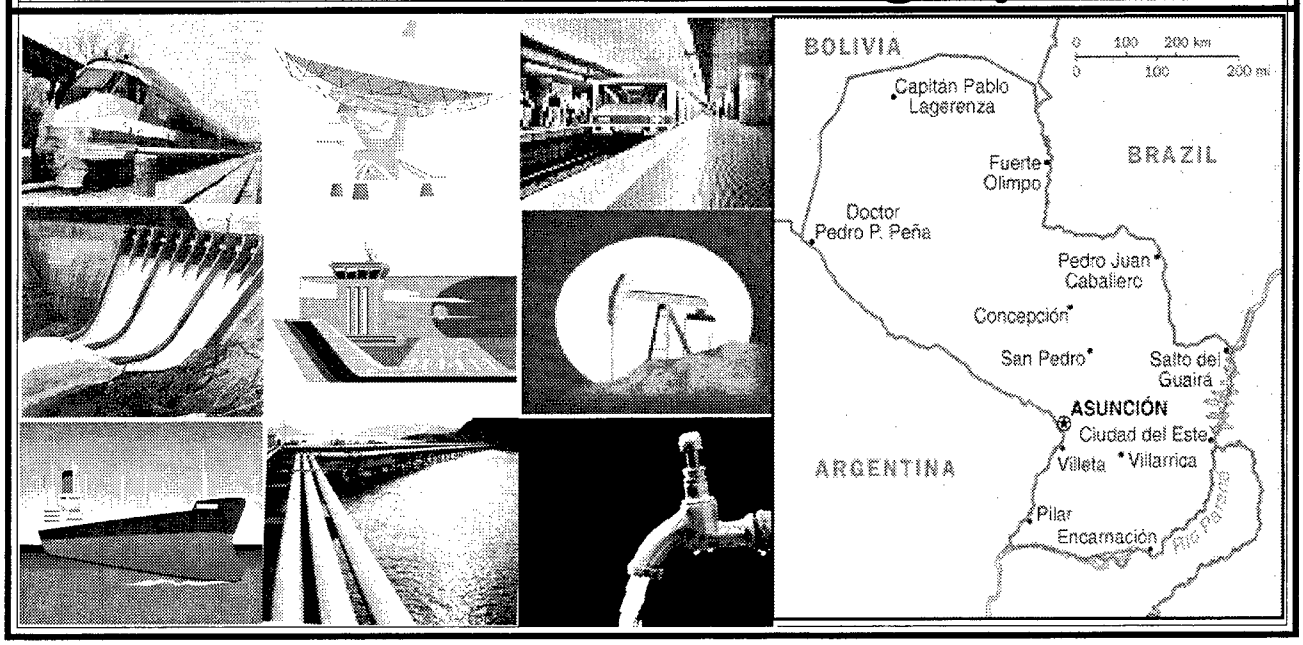
Market Makers

Paraguay



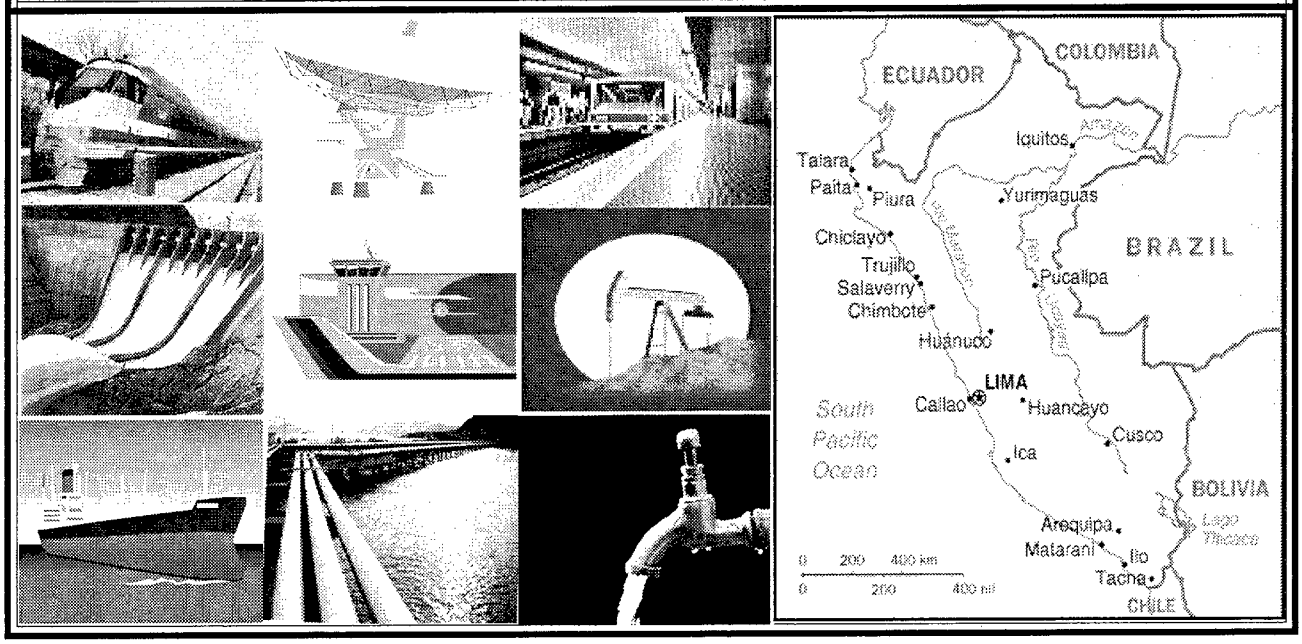
Electromon

As the leading enginering consulting firm in Paraguay, Electromon focuses on the environmental sector. The former president of the firm is now the President of Paraguay - Juan Carlos Wasmosy. Electromon was the lead contractor on the Itaipu Hydroelectric dam.

Itaipu Hydroelectric dam is the largest hydroelectric facility in the world. Electromon is very active in all areas of Paraguayan infrastructure development. The current president of the firm is Manzoni.

Market Makers

Peru



Banco Wiese Limited

Banco Wiese was founded in 1943 and is the second largest of the twenty-three commercial banks in Peru, in terms of deposits and assets. With a deposit base of US$ 2.12 billion and assets of US$ 3.2 billion, Banco Weise has 19.4% of market share on the commercial banking side of the operation and 19.7% in the loans market place. The bank also operates the fourth largest branch network among commercial banks, consisting of 81 offices in the Lima area and 19 offices located in the other major Peruvian cities. Throughout this network, Banco Wiese represents over 95% of the national market for banking services, measured in terms of deposits. The Bank also provides international banking services to its domestic and international clients.

Managed Growth

The bank's strategy is to grow and increase profits by expanding lending activities with a broad range of corporate and individual customers. Banco Wiese expects strong growth in loans from corporate clients, which remain the most important borrowers of the company. In addition, part of this expansion is expected to result from the implementation of a strategic plan which includes greater emphasis on middle market and personal loans. The bank also plans to target loan portfolio growth at those customers that provide the Bank with substantial fee income through their use of the Bank's non-loan products.

Investment Banking Services in Infrastructure

To capitalize on its long-standing relationships with existing corporate clients and creating new ones, the bank has expanded its services to include loans and other credit transactions.

. Services such as securities underwriting and placements, advisory services and corporate finance. In the capitol markets, the bank structured the first commercial paper program in Peru for Telefonica del Perú for US$ 180 million. It also structured and placed bonds for the same company Pasquera Austral in the amount of US$ 55 million and for Graña y Montero in the amount of US$ 15 million. The bank has substantial loan assets in agriculture, cattle raising and fishing in addition to construction, transportation and communications, tourism, mining, petroleum and electricity.

Banco Wiese Limitado is registered under the Securities and Exchange Commission of the United States of America, Washington DC 20549. The company does not have common shares, but does have listing in connection with the registration of American Depository Shares, pursuant to the requirements of the New York Stock Exchange. All information covered in this report is public information and may be retrieved at the US securities and exchange commission under Form 20 Fl.

Key Contacts

Guillermo Wiese de Oshma (Chairman)
Augusto Felipe Wiese de Osma (Vice Chairman)
Gonzalo de la Puente y Lavalle (Director)

These three members of the Board of Directors are members of the Wiese Family. Mr. Guillermo Wiese de Oshma and Augusto Felipe Wiese de Osma are brothers and Mr. Gonzalo de la Puente y Lavalle is also a member of the family.

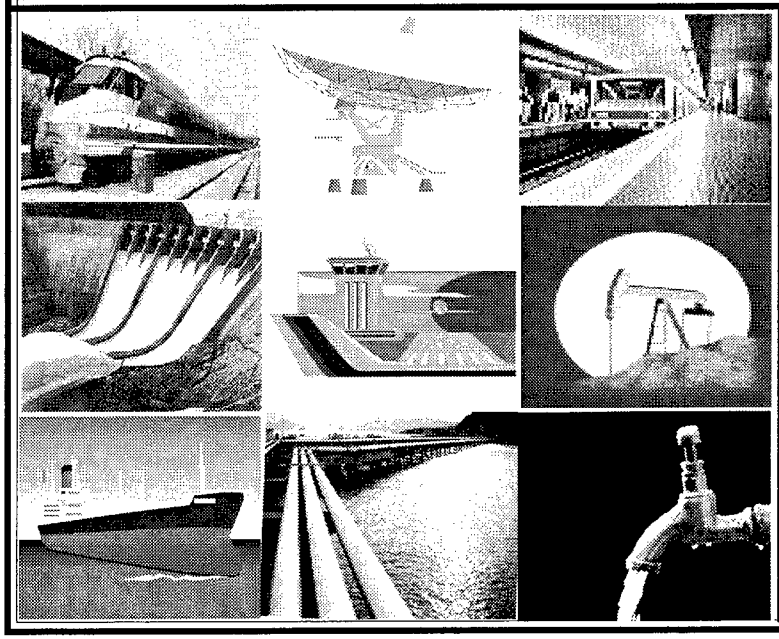
Graña y Montero

Graña y Montero S.A. is a 64-year-old firm, originally founded in the construction industry. Now it a conglomerate of 14 companies. From engineering services to information technology and informatics, the firm is considered the country's technological leader. The company provides services through the following companies:

Electriomechanical Management Services (Montaje Electromecánico) GMA
Dedicated Services for Petroleum and Well Drilling (Servicios Petroleros y Perforación de Pozos) GMP
Computing Services (Empressa de Servicios de Computación) GMD
Promotional Real Estate Company (Compañia de Promociones Inmobilarias) GME
Engineering Consultants (Consultores Ingenieros) GMI
Original Construction Company (Graña y Montero) GyM

Market Makers

Uruguay



Uruguay XXI

Uruguay XXI was officially created as a "non-state public entity" in January 5, 1996. The entity is funded by the government but is managed as a private company.

Structure

Day-to-day operations for Uruguay XXI are run by an executive council. Additionally, it is presided by the Minister of the Economy and Finance, a representative of the Ministry of Foreign Affairs, the Executive Director and three representatives of the chambers of industry, farming and services. The board subsequently represents the interests of the entire country through the governmental public sector and the economic private sector of the country.

Mission

As a business catalyst Uruguay XXI provides an avenue in which local companies are introduced to foreign investors. In addition, the institution provides the knowledge and expertise to assist the public sector in privatizations and concessions. In doing so, Uruguay XXI is committed to attracting foreign investment and to encourage Uruguayan exports.

Strategy

- Create new relationships between the private and public sector.
- Assist in the development of comparative-competitive advantages in the World Economy.

- Assist Uruguayan entrepreneurs in mobilizing themselves for international business
- Define state and countrywide offers for privatizations and concessions
- Articulate a permanent cooperative process in the development of opportunities for the country as a whole

The following presents some projects in which Uruguay is involved:

Eje Vial del Cono Sur

The Eje Vial del Cono Sur is a highway system designed to unite the eastern Mercosur countries of South America. The 1,000 Km road is expected to flow directly through Uruguay uniting Porto Alegre, Brazil, Buenos Aires Argentina.

The project includes the development of new roads while refurbishing existing roads will also be included. When finished the international road will shorten by 250 Km, making way for more efficient cargo shipments between the two countries.

The project is currently undegoing feasibility studies by BCOEM de France under the Organismo/ Autoridad de Competencia - Ministerio de Transporte y Obras Públicas, Comisión Nacional del Eje Vial del Cono Sur. Total investment is expected to reach US$ 240 million.

Key Contact

Directora Lilian Arbiza
Director Uruguay XXI
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Ind. Eng. Alvaro Kosec
Area Director

Sr. Alvaro Santos
Area Director

Pintos Risso

Founded in 1946, Pintos Risso is Uruguay's largest construction company, with annual revenues of US$ 70 million in 1996. The company is active in designing and construction, and has been Uruguay's key player in the development of the tourist coastal communities on the Montevideo – Punta del Este corridor.

Pintos Risso retains approximately 60% of the Uruguayan construction market, and has executed projects in all of the Mercosul countries.

Key Contact

Diego Nessi,
Director
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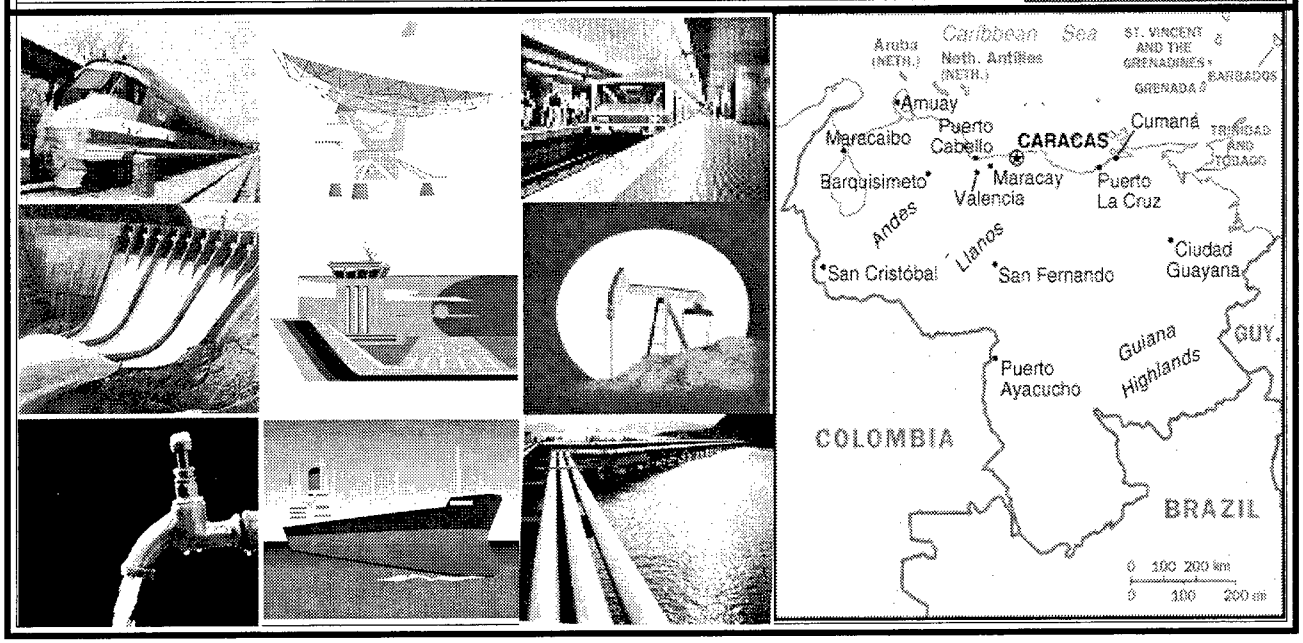
Internet Site: www.jwt.com.uy/pintos

Market Makers

Venezuela



An intiative in 1995 allowed for the creation of a Petroleum Investment Fund, through which private individuals will be able to invest in Venezuela's oil sector for the first time in the nation's history.

The corporation is currently restructuring , whereby the main subsidiaries will be dissolved, and exploration, manufacturing and petrochemical divisions will be created. After this restructuring is completed in January 1998, PDVSA will be applying for ISO 14,000 certification.

PDVSA (Petróleos de Venezuela)

Created from Venezuela's oil industry nationalization in 1976, PDVSA is controlled by "Ley Orgánica que Reserva al Estado la Industria y Comerica de los Hidrocarburos". Under this law, the state holds the right to all activities relating to the exploitation, manufacturing, refining, and domestic and international marketing of crude oil and refined products.

Revenue (Millions of US$)	
1993	21,275
1994	22,157
1995	26,041

Refinement

PDVSA, Venezuela's refining system which is comprised of 6 refineries in Venezuela and 16 abroad, processed an average of 2.26 million barrels daily in 1995. Its refinement capacity is the third largest among international oil companies. During the first quarter of 1996, the corporation undertook the Cardón Refinery Upgrading Project (PARC) which will enable the current refinery to convert approximately 90,000 barrels of residuals per day into white products.

Coal

Total coal production was 4 million 42,000 tons, with exports totalling 4.2 million metric tons.

Oil and Gas

Total production reached 3.2 million barrels per day in 1995, of which 2.5 million barrels per day were exported, 195,000 barrels over the 1994 daily average.

Crude Oil and Product Exports From Venezuela by Geographic Region

North America	62%
Central America/Caribbean/South America	27%
EU	9%
Others	2%
TOTAL	100%

Petrochemicals

PDVSA's subsidiary, Pequiven, is responsible for the petrochemical business through direct operations and joint ventures. Gross production of the Pequiven plants and joint ventures in 1995 was 4.56 million metric tons, a 25% increase from the previous year.

Alliances and Subsidiaries

PDVSA's three main Venezuelan oil companies: Corpoven, Lagoven, and Maraven, are vertically integrated companies engaged in exploration, production, refining as well as national and international marketing. These activities are complemented by refining companies throughout the United States, Europe, and the Caribbean.

Venezuelan subsidiaries include:

- Pequiven - Responsible for the petrochemical business.
- PDV Marina - Responsible for national and international marine transport operations.
- BITOR - Produces, transports and markets Orimulsión® with subsidiaries that market the product in the United States, Great Britain, and Japan.
- Carbozulia - Partner in Carbones del Guasare joint ventures, shares in the commercial development of the Guasare coal fields, in western Venezuela.
- CVP - In charge of coordinating and controlling activities related to PDVSA's risk exploration in new areas

Key Contacts:

Corpoven	Anibel Rosas	708-3252	708-3261
Lagoven	Hector Goodfellow	606-4116	606-3794
Maraven	Arecio Romero	908-2024	908-2723
Pequiven	Ramon Arias	201-3712	201-4591
PDV Marina	Humberto Mendoza	706-6547	706-6571
BITOR	Francisco Salata	909-5207	909-5273

* Area code (582)

Petróleos de Venezuela, S.A. Corporate Headquarters
Edificio Petróleos de Venezuela
Torre Este, Av. Libertador
La Campiña, Caracas
Venezuela
Tel: 582-708-4111
Fax: 582-708-4661/4662

Grupo Cisneros

Group Cisneros is a major holding company, concentrating on media, specifically television. The corporation owns Venevisión, which has 60% of the Venezuelan market. Venevisión is one the the largest producers of television series in the world, producing 15 soap operas annually shown in 36 countries. It owns 18 bottling companies in Venezuela, the Pueblo-Xtra supermarket chain, and more than 50 other diversified businesses ranging from telecommunications to mining. Its revenue reached US $3.2 billion in 1996.

Alliances and Subsidiaries

The Group Cisneros acquired 90% of Imagen Satelital, owner of 6 cable channels, in May 1997. Its other investments reach into the Caribbean and the United States. With Televisa, and Jerry Perenchio, The Group Cisneros co-owns Univisión, commanding 80% of the Spanish-speaking market in the United States.

Group Cisneros formed a joint venture with Coca-Cola in August 1996, breaking a 50-year alliance with Pepsi-Cola.

Growth Strategy

With the opening of the market and the subsequent increase in competition, Grupo Cisneros has decided to concentrate on 3 areas: telecommunications, entertainment, and bottling.

Key Contact:

Mariela Castro
Gerente de Relaciones Públicas
phone: 582-708-9242
fax: 582-708-9114

Corporación Venezolana de Guayana (CVG)

The Corporación Venezolana de Guayana is a state-owned industrial organization located in the Guayana region, which includes the Bolivar, Amazonas and Delta Amacuro States. It is responsible for the development and promotion of the zone.

CVG has 10 subsidiaries in charge of the iron and steel, aluminum, auriferous, energy, forestry, agro-industrial and services sector. Among the most important are:

Siderurgica del Orinoco C.A. (SIDOR)

SIDOR is a state-owned enterprise which produces and trades steel products. It has a production capacity of 3.6 million MT per year. The company is located within the urban perimeter of Puerto Ordaz, in the industrial area of Matanzas, Ciudad Guayana. Sidor is the milestone of ciudad Guayana's steel industry development. It makes use of huge quantities of iron ore handled by Ferrominera Orinoco as well as natural gas and hydroelectric power supplied by Edelca.

Ferrominera del Orinoco C.A. (FERROMINERA)

This CVG subsidiary is responsible for the exploitation and extraction of iron ore in Venezuela. Ferrominera was nationalized in December 1975 and began its activities on January 1, 1976. Ferrominera's mining activities are located in the El Pao and Piar Divisions in the Guayana Shield Region in the Southeastern part of Bolivar State.

Venezolana de Ferrosilicio C.A (FESILVEN)

A major metal company, Fesilven has a production capacity of 55,000 MT per year, out of which almost 90% is exported. The company plans on diversifying its production in order to attain an additional installed capacity of 25,000 MT per year of Ferrosilicon and 13,500 MT per year of Silicon metal.

Key Contact

Corporacion Venezolana de Guayana
Mr. Antonio Azpurua
Coordinator
Tel: (582) 902-38-62, 902-38-63
Fax: (582) 92-33-66

U.S. Trade and Development Agency

J. Joseph Grandmaison
Albert W. Angulo
Nathan Younge
Anne McKinney
Gabriella A. Rigg
Barbara Bradford
Nancy D. Frame

U. S. TRADE AND DEVELOPMENT AGENCY
Washington, D.C. 20523-1602

J. JOSEPH GRANDMAISON
Director

Mr. Grandmaison is the Director of the U.S. Trade and Development Agency (TDA). He was nominated for the position by President Clinton and confirmed by the Senate. He was sworn in on August 10, 1993.

Mr. Grandmaison's energy and leadership at TDA has been devoted to building on the strong reputation the agency enjoyed by broadening its outreach efforts, by aggressively supporting the desire by the professional staff to use its investments in a more focused and strategic sense, and in positioning the small, independent agency as a major player in the Trade Promotion Coordinating Committee (TPCC) along with the Department of Commerce, the Ex-Im Bank, and OPIC.

While TDA's principal product remains feasibility studies (business plans), TDA's role now includes consolidating activities such as business briefings, workshops on financing, conferences keyed to opening the market in a specific sector and/or nation, and an accelerated program of orientation visits of the United States by foreign decision-makers that in 1995 will average an amazing one per week.

Mr. Grandmaison has an extensive background in both business and government. Before coming to TDA, he was Vice President of Weil & Howe, a management consulting and project development company specializing in energy and environmental matters. He has also served as a consultant to both public and private sector clients, specializing in community and government relations, politics and economic development.

From 1977 to 1980 he served as the Federal Co-Chairman of the New England Regional Commission. The Commission conducted programs in the areas of transportation, energy, economic development, international trade, tourism promotion and hazardous waste management. He also served as Chairman of the Federal Regional Council, which is comprised of the major Federal officials in the region. The Council was responsible for streamlining and coordinating the delivery of Federal programs in New England.

Mr. Grandmaison was the Democratic nominee for Governor of New Hampshire in 1990. He served as Chairman of the New Hampshire Democratic Party from 1987 to 1990.

He has taught at Boston University's School of Public Communication and served as a Fellow at Harvard University's John F. Kennedy School of Government.

Mr. Grandmaison is a graduate of the Burdett College School of Business Administration. He attended the Senior Management Program at Harvard University's John F. Kennedy School of Government.

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ALBERT W. ANGULO
Regional Director

Albert W. Angulo serves as Regional Director for Latin America and the Caribbean. Prior to his present position, Mr. Angulo served as Deputy Director for the USAID sponsored PROFIT project.

In June 1989 Mr. Angulo was appointed Special Assistant to the Assistant Secretary of the Treasury for International Affairs where he dealt with Latin American and Caribbean development issues.

From January 1985 to June 1989, Mr. Angulo managed and owned Argent Consultants, an international management consulting firm that assisted small and medium size businesses in the development of strategic business plans, financing programs, acquisitions, international joint ventures and international organizations such as the World Bank.

Mr. Angulo began his international financial career in commercial banking in Philadelphia where he specialized in Latin America and Iberia. He moved to Houston in 1970 to become the Treasurer of a Fortune 500 multinational engineering, construction and financial services company, and President of its project finance subsidiary. Mr. Angulo has held senior management positions in engineering and construction companies serving the energy, agriculture, environment and natural resource development industries. He also provided financial management and arranged worldwide project finance, on behalf of private and public sector clients.

Mr. Angulo was born in Madrid, Spain and lived in France, Venezuela and Mexico prior to coming to the U.S. He has traveled extensively throughout the world and currently resides in Washington D.C. He has served as a member of the Budget and Fiscal Affairs Advisory Committee in Alexandria, VA. He earned his B.S. in Business Administration from Lehigh University in 1959, and his M.B.A. in International Business from Temple University in 1968, the same year that he attended the London Bankers Association's International Banking Summer School at Trinity College, Dublin. Mr. Angulo is married to the former Jeanne Oates. He has a son and daughter from a prior marriage, both residing in Houston, Texas.

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NATHAN YOUNGE
Country Manager

Nathan Younge is a Country Manager in the Latin America and the Caribbean region. He is responsible for TDA activities in Brazil, Venezuela and Panama.

Mr. Younge has worked exclusively in the field of international trade. He joined TDA in March 1994, and worked for three years as a Country Manager for Africa and the Middle East. Prior to joining TDA, Mr. Younge worked as an International Trade Analyst at the law firm of Ablondi, Foster & Sobin and Staff Assistant at the North American Free Trade Association. He also interned for one year at the Office of the U.S. Trade Representative.

Mr. Younge has a Master's Degree in International Studies from Old Dominion University, and undergraduate degrees in International Relations and Latin American Studies from the American University.

Mr. Younge has written two publications: co-author, *Guidelines for Trade and Investment in Mexico,* and author, *Expropriations in Latin America: The State Department Perspective.* He is fluent in Spanish and proficient in Portuguese.

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ANNE McKINNEY
Country Manager

Anne McKinney is a Country Manager in the Latin America and the Caribbean region. She is responsible for TDA projects in Argentina, Costa Rica, El Salvador and Uruguay.

Ms. McKinney joined TDA in April 1995. She has seven years of experience working on Latin American public policy issues. Most recently, she worked on environmental management projects in Mexican and U.S. cities in the border region for a local government association. She authored a report on Financing Water and Wastewater infrastructure in the "Colonias" in Texas and New Mexico. Ms. McKinney was the Program Coordinator for Latin American Studies at the Johns Hopkins University School of Advanced International Studies (SAIS). She managed SAIS programs on Mexico and Venezuela, was responsible for program development and fundraising for Latin American Studies and oversaw the publication of three books on US-Mexican relations.

Ms. McKinney has a Master's Degree in International Relations from Johns Hopkins University-SAIS with a concentration in International Economics and Latin America. She has a B.A. in International Studies from The American University and spent a summer studying in Bogotá, Colombia. Ms. McKinney holds a Certificate in Translation and is fluent in Spanish. She is a member of the Latin American Studies Association and Profmex (consortium for research on Mexico).

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GABRIELLA A. RIGG
Country Manager

Ms. Gabriella A. Rigg is a Country Manager in the Latin America and the Caribbean region. She is responsible for TDA projects for Bolivia, Chile, Ecuador, Peru, Paraguay, Guatemala, Honduras, Nicaragua and the Caribbean.

Ms. Rigg, a 1997 Presidential Management Intern, joined TDA in July 1997. Her previous experience includes research on Latin American regional trade initiatives at the Venezuelan Institute for Social and Political Studies in Caracas, and emerging market analysis for a Massachusetts firm creating business tools for companies interested in exporting abroad. She has also served as a Legislative Fellow for a U.S. House of Representatives Banking Subcommittee and as a Legislative Assistant for Massachusetts State Senator Mark C.W. Montigny.

Ms. Rigg received a Master's Degree from The Fletcher School of Law and Diplomacy at Tufts University where her fields of study were International Business and Economic Law and International Negotiation and Conflict Resolution, with a regional focus on Latin America. She received her B.A. from Northeastern University where she majored in Political Science and Latin American Studies. She holds a certificate from the Fletcher School in Leadership and Management and speaks fluent Spanish, as well as functional French and Portuguese.

U. S. TRADE AND DEVELOPMENT AGENCY
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BARBARA R. BRADFORD
Director of Special Projects

Ms. Barbara R. Bradford is the Director of Special Projects at the U.S. Trade and Development Agency (TDA). She has been at the TDA for the past 11 years.

Ms. Bradford has both a law degree and an MBA from Georgetown University. Before joining TDA, she was in private law practice on Wall Street and in Washington prior to joining the Office of General Council for the Agency for International Development (AID).

At TDA, Ms. Bradford manages the agency's trust funds at various Multilateral Development Banks and the major contact that handles TDA's conferences and Orientation Visit Program.

U. S. TRADE AND DEVELOPMENT AGENCY
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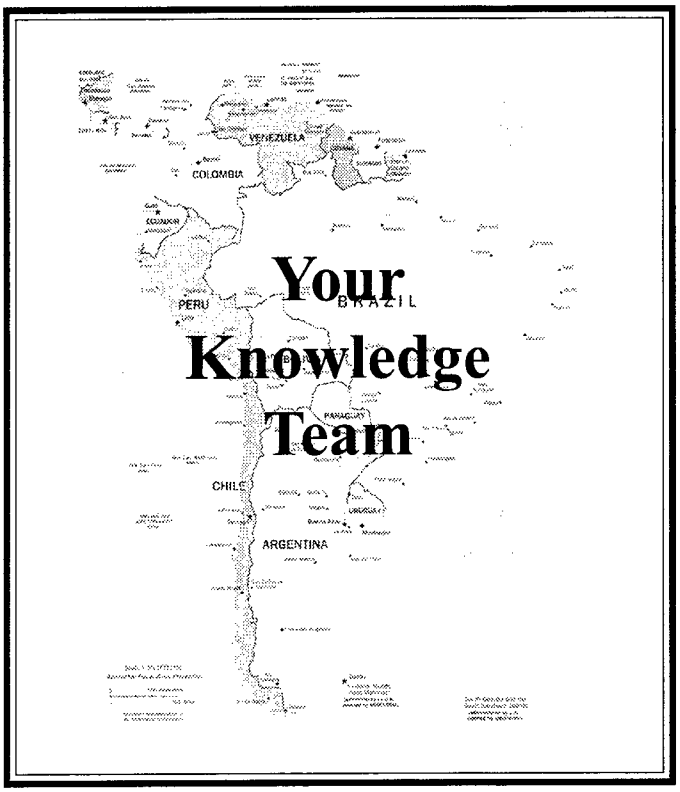
NANCY D. FRAME
Deputy Director

Nancy D. Frame joined the U.S. Trade and Development Agency (TDA) as Deputy Director in 1986. Prior to coming to TDA she was Assistant General Counsel for Management in the General Counsel's Office at the Agency for International Development (A.I.D.). Ms. Frame specialized in the areas of international commercial law and contracting. While at A.I.D. she co-authored an article on export promotion in the foreign assistance program for the International Trade Law Journal. In 1983 she received A.I.D.'s Superior Honor Award for outstanding service. In 1993 she received the Presidential Rank Award for Meritorious Senior Executive.

Ms. Frame received her J.D. from Georgetown University Law Center in 1976 where she was Editor of the American Criminal Law Review. She received her M.A. in International Relations from Georgetown University and her B.S. in Political Science and Foreign Languages from South Dakota University. Ms. Frame also studied at the Instut d'Etudes Politiques in Grenoble, France, on a Fulbright Fellowship.

C G / L A

INFRASTRUCTURE



Your Knowledge Team

NORMAN F. ANDERSON
THOMAS B. BOREIKO
LISA FELS
MARTIN ECHAVARRIA
ANAND HEMNANI
DAVID VOGHT
FERNANDO HANHAUSEN
VICTOR AGUILAR
LUIS DOMENECH

"The Best Information and Knowledge Available Anywhere on Latin American Infrastructure"

CG/LA Infrastructure

CG/LA Infrastructure is the leading American firm collecting, organizing and distributing in-depth information on Latin America Infrastructure projects. A Knowledge Revolution company, CG/LA combines substantive knowledge with information technology to make Latin America's infrastructure markets more efficient and productive.

The firm was established in 1987 by Norman F. Anderson and Thomas B. Boreiko, two graduates of the Kennedy School of Government, Harvard University. The firm maintains a strong relationship with Harvard, is highly multidisciplinary (combining economists, engineers, public policy professionals, entrepreneurs and business analysts), and works in a highly interactive way to turn information on paper (or in bytes) into knowledge in the minds of decision-makers. The firm — in knowledge terms — is an all-platform network, comfortable across infrastructure sectors, across cultures and across disciplines, working equally with the private and public sectors, and working easily between, for example, the municipal level and the fast-paced world of the high level global financier.

The Top Infrastructure Projects in Latin America. The US Trade & Development Agency (TDA) has selected CG/LA to identify, assess and promote Latin America's key infrastructure projects — through a detailed Briefing Book describing 125 major Latin American infrastructure projects. Working with TDA, CG/LA has created and promoted the following project lists over the last two years: Latin America's Top 125 Infrastructure Projects (1997); The Top Infrastructure Projects in Mexico (1996); The Top Transportation Infrastructure Projects in South America (1995) and the Top 125 Infrastructure Projects in South America (1995). CG/LA is a recognized leader in this area, starting with "Infrastructure Opportunities in the Tietê-Paraná Valley in 1993," and the 1994 publication of Infrastructure Development in Latin America for the Economist Intelligence Unit.

The Best Private Sector Companies. The second leg of CG/LA's core business is the provision of strategic knowledge to private sector firms, through a series of knowledge "products." The initial product is a "strategic study." For instance, on September 17th, 1997 the firm completed a Strategic Study of key Latin American water markets. This 900- page document was produced for, among others: ABB; Enron; Consolidated Edison (the power utility for New York City); Enron; Mitsubishi; SABESP; and Sumitomo. Addition CGLA strategic products include: (1) missions to visit decision-makers, (2) specific project assessments, and (3) project development. Seminars are held throughout the process. For this reason we know exactly what it is that private-sector investors seek.

The Latin America Infrastructure Exchange. A joint CGLA-World Bank Group project, the Infrastructure Exchange is the only site on the World Wide Web that provides up-to-date information about every major infrastructure project in Latin America. Combining cutting-edge technology with real life understanding of all facets of infrastructure projects, the Infrastructure Exchange addresses both financing and procurement issues through a push technology, life-cycle data base format. The LAIX unites every infrastructure player in the world into a common knowledge marketplace, focused on Latin infrastructure, using data, charts, maps, pictures, and full-blown two-way communications capabilities. Among the real targets for this knowledge marketplace are infrastructure originators in developing countries, who need inexpensive rapid access to successful experience, and a convenient method for advertising and promoting their procurement opportunities.

CG/LA Infrastructure

Norman F. Anderson

Norman Anderson is a Managing Director and founding principal of CG/LA, Inc. and CG/LA Infrastructure. Mr. Anderson focuses on Latin American infrastructure project prospecting and development, business-to-government relations, and business strategy development and problem-solving.

He specifically oversees CG/LA's client work in Brazil and South America, with a focus on the firm's rapidly growing business in the São Paulo regional market. There he has been active in the energy, telecommunications, transportation and water markets.

Mr. Anderson is leading CG/LA's knowledge revolution effort through a World Bank funded project called the Latin American Infrastructure Exchange. This initiative aims to fully integrate cutting-edge technology with first-hand, complete information about Latin infrastructure projects and the players who make them happen.

Mr. Anderson is a member of numerous project development groups, including the joint Brazil/US Commission for the development of the Tietê-Paraná basin. The Commission is developing policies and business opportunities in a five state area of Brazil, Paraguay and Bolivia. He is also the CG/LA project manager on the EEC Latin America Water Task Force — an active group of businesses and financial organizations that seek to "create all necessary conditions for long-term private investment in Latin American water projects."

Anderson is also a founder of the Brazil-Harvard Infrastructure Project. The project trains 250 Brazilian professionals, throughout the course of 1997, in all aspects of the facilitation of private investment in Brazilian infrastructure.

With more than sixteen years of experience working in Latin America, including five years living continuously in the region, Anderson served in the Peace Corps in Paraguay, where he also worked for a private foundation from 1979 to 1984.

Mr. Anderson has an undergraduate degree in history (with distinction) from the University of Virginia, and a master's degree in public administration (MPA-2) from Harvard University.

He is fluent in Spanish, Guarani, and Portuguese.

CG/LA Infrastructure

Thomas B. Boreiko

Thomas Boreiko is a Managing Director and founding principal of CG/LA, Inc. Mr. Boreiko is a professional economist who specializes in the assessment of Latin American economic and market trends, infrastructure project development and joint venture creation.

Mr. Boreiko has over 10 years experience advising leading international companies on business strategies in Latin America, primarily in Mexico. He oversees CG/LA's Mexico City office, which is charged with conducting market research and analysis, developing joint ventures and evaluating major project opportunities throughout Mexico.

Mr. Boreiko has worked to create, develop, and evaluate numerous joint venture and project opportunities for leading international firms. Among his successes was the 1994 closing of a joint venture between a top US environmental firm and the prestigious Mexican Petroleum Institute. Also in 1994, Mr. Boreiko was involved in developing a joint venture and long term concession for an industrial water re-use project in the State of Mexico.

An active player in the energy sector, Boreiko headed an effort in conjunction with a top five US utility and co-generation designer and constructor to develop and implement a market entry strategy for industrial co-generation projects in Mexico.

Boreiko has lecture and published extensively on Latin American issues, with a principal focus on economic trends and their impact on particular business sectors and strategies. He was the lead writer on CG/LA's Infrastructure Development in Latin America (June, 1994), published by the Economist Intelligence Unit. Most recently, he oversaw the production of CG/LA's first multi-client study, the *Strategic Water Study, Latin America - the Next Five Years.*

Mr. Boreiko has a degree in economics (summa cum laude) from the University of Massachusetts, and a master's degree in public administration (MPA-2) from Harvard University.

He is proficient in Spanish.

CG/LA Infrastructure

Lisa K. Fels

Lisa Fels is CG/LA's Director of Infrastructure Projects and Project Manager for the production of the *US TDA Infrastructure Opportunities in South America II* briefing book. Her responsibilities have included in-country project identification for Chile and Peru, in addition to overseeing project identification in Argentina, Brazil, Bolivia, Ecuador, Paraguay, Uruguay and Venezuela.

Previously, Ms. Fels worked in South America with the Corporación de Fomento de la Producción (CORFO) in Santiago, Chile, as CORFO's assistant representative for APEC and International Cooperation.

She has an undergraduate degree in business administration (with distinction) from St. Norbert College, and a master's degree in international management (with distinction) from Thunderbird, the American Graduate School of International Management. She has also studied at the Fundación de Ortega y Gasset in Toledo, Spain. She is fluent in Spanish.

Martin Echavarria

Mr. Echavarria was lead consultant on the U.S. TDA *Infrastructure Opportunities in South America II* project and was responsible for identifying viable infrastructure projects in Bolivia, Ecuador and Argentina .

As Director of Project Finance, Mr. Echavarria brings to the team an in-depth knowledge of South American markets, particularly relating to the industrial, telecommunications, and energy sectors of Colombia, Peru, and Chile. He also has a solid background in finance, having worked as a financial analyst with American Express and a Latin-bond trader with Zuho Finance.

Mr. Echavarria has a dual undergraduate degree in business administration and political science from Emory University, in addition to a master's degree in international management from Thunderbird, the American Graduate School of International Management (with Honors). He is fluent in Spanish.

CG/LA Infrastructure

Anand A. Hemnani

Anand Hemnani was responsible for project identification for the US TDA *Infrastructure Opportunities in South America II* project. He also contributed country overviews and major sections on finance and equipment sales strategy.

As Director of International Trade, Hemnani coordinates research and produces market assessments, develops entry strategies for US companies, and prepares competitive situation analysis through in-country interviews and data analysis. An area expert on Brazil, Mr. Hemnani conducted extensive field work and analysis in the Brazilian environment market, developing an Environment Export Market Plan for the US Department of Commerce and identifying several industrial and municipal water and waste water projects for a private US developer. Hemnani also co-managed the first of CG/LA's Strategic Knowledge studies, contributing the Brazil chapter of the "Latin American Strategic Water Study."

Mr. Hemnani is a graduate of Babson College (summa cum laude). A Brazilian citizen, he is fluent in Portuguese, Spanish and Hindi.

David T. Voght

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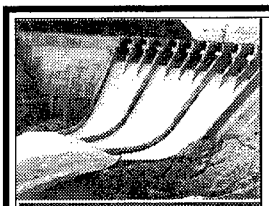
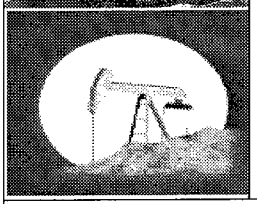
He has worked closely with a number of US manufacturers in the definition of viable projects and marketing strategies for the placement of industrial materials, equipment and engineering services within the Latin American petroleum and construction sectors.

Mr. Voght holds a political science degree from Boston College. He is an American citizen and a legal resident of Venezuela. He is fluent in Spanish and proficient in French.





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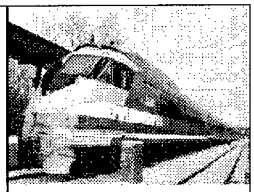

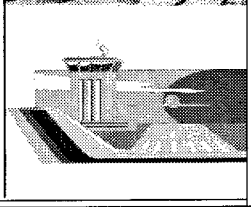

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