

## MARKET OPPORTUNITIES CHILE AND THE ENVIRONMENT

### WORKING DOCUMENT

#### 1. INTRODUCTION

Since the enactment of its Environmental Framework Law in 1994, Chile has embarked on a very ambitious environmental agenda. For the last 5 years, the Government has been implementing an exhaustive plan to strengthen its institutional and regulatory capacity. So far the Government's main accomplishments can be described as follows:

- The creation of the National Environmental Commission (CONAMA), responsible for the development and implementation of programmes and policies and their co-ordination
- The creation of a Cleaner Production Secretariat in 1998. Taking into account the recommendations of Agenda 21 at the Rio Summit, the Government of Chile decided to promote a cleaner production policy. Also, Chile is signatory of several bilateral Trade Agreements and its economy highly depends on exports, the Government and the private sector recognise the need to introduce cleaner production technologies in order to secure Asian, European and North American markets. Recently, the Ministry of economy, responsible for Cleaner Production, decided to privatize the Cleaner Production Centre. Several organizations presented an offer further to the call for bids.
- The approval of a decontamination plan for Santiago (1998). This plan is being audited by the Government further to the criticism expressed by the Medical Doctor's Association and Green Party
- The implementation of the Environmental Impact Assessment regulation started in 1997. Further to the criticism received from Chile's private sector and NGO's, the Environmental Impact Assessment regulation is under review
- CONAMA is currently streamlining/revising norms and regulations in order to enable authorities to administer and enforce the environmental law adequately. Effective July 1999, Chile's Environmental Regulation is liable under the Canada-Chile Cooperation agreement for the Environment (article 44.2).
- The Government has undertaken a privatisation programme of the 13 CORFO (State holding) owned water utilities.

#### 2. MARKET OVERVIEW

With a population of 14.8 million and a per capita Gross Domestic Product averaging US\$ 5,300, Chile's market is small compared to neighbouring Argentina and Brazil. It is Chile's commitment and seriousness towards its environmental agenda that converts this market into an interesting one for Canadian providers. It is very difficult to estimate Chile's environmental market. Unfortunately, there are few statistics to rely on. According to a report from the Commerce Department of the United States, the environmental market reached US\$ 740 million in 1998. These figures vary considerably from one year to another and are largely influenced by the state of the economy, privatisation programmes and the effective enforcement of environmental norms and regulations. With regards to the state of the Chilean economy, we cannot deny that it has slowed down considerably in 1998 (1998 GDP growth down to 3.3% from 7% in 1997) and that the first half of 1999 shows negative growth. Mining and construction are the most hard hit sectors. The price of Copper was very low in 1998 while 1999 prices have increased slightly. In 1998 interest rates, reached 14.5% plus inflation for a period of approximately two months (November, December). Now, the interest rate is lower at 5% plus inflation (+ or - 4%) and this should enable the private sector to catch up with planned investments. Despite all this bad news, Chile is holding on strong and steady and the economy is expected to pick up in the last quarter of 1999. There is no doubt that some environmental equipment investments have been postponed but it is still a timely moment to enter the market. Chilean authorities have demonstrated much continuity in their sustained effort to improve the environment. This does not mean that enforcement is perfect and that the industry is fully driven by environmental compliance. In Chile, as in any other country, there are problems with enforcement, mainly because of lack of resources. That said, there has been a marked improvement in Chile's regulatory capacity over the past 5 years. Pending the results of elections this December, we believe this trend will continue.

Market Segment	Market Estimate ( US\$ million) 1998
Municipal Water Supply and Wastewater Treatment	250
Industrial Wastewater Treatment	55

Air Pollution Control	295
Solid Waste Management	70
Hazardous and Medical Waste Management	15
Consulting, Monitoring, and Laboratory Services	55
<b>TOTAL</b>	<b>740</b>

**a. Water Supply and Wastewater**

Chile's potable water supply system is extensive. Approximately 98.9% of the population has access to potable water in urban areas and 75% in rural zones. Reliability is subject to climatic conditions and sporadic shortages are experienced in periods of drought. Despite this weak point, it is the collection and treatment of wastewater that require urgent attention. Nation wide, only 19% of wastewater is treated. The Government aims at 70% by year 2005. This plan requires major water utilities to invest US\$1.8 billion during the period 1998-2002. While US\$1.04 billion can be raised by the State owned companies, there is a shortage of US\$ 820 million or 46%. After many years of debate, the Government approved, on November 17, 1997 a Decree authorising the privatisation of State water and sanitation companies. ESVAL was the first company to be acquired by the private sector. Anglian Water and Enersis won the bid. The Government plans to privatise 4 water utilities in 1999. One of them being the largest one, EMOS, Santiago's metropolitan area water utility. EMOS was purchased by Aguas Barcelonas and Suez-Lyonnaise des Eaux. This consortium paid US\$964 million for 42% of the shares. EMOS' investment plan contemplates raising its water treatment capacity from 3% to 25% by year 2005. 100% treatment is planned for year 2015 but will require an additional investment of US\$2 billion (El Diario, 21/04/98). As the water utility privatisation process evolves the municipal water and wastewater market will change. Canadian companies interested in Chile's municipal water sanitation market would be well advised to team with a solid local partner and aim at sub-contracting to European water utilities who will most likely win the bulk of these privatisation calls. The other niche is found with smaller municipal water sanitation projects between 10,000 to 100,000 inhabitants. It is common for these small municipalities to require local bidding companies to associate with a foreign partner experienced in municipal water treatment.

Apart from CORFO's subsidiaries, many private companies have been undertaking water supply projects. Industrial parks are analysing common water treatment plants to obtain economy of scales for their industry members. Country Life Housing complexes outside Santiago are obliged to incorporate treatment plants in their land use designs as well as tourism projects. This has generated a US\$ 58 million market in 1997 (Estrategia, 20 de enero).

Table 1 20 most important water utilities

COMPANY	NAME	OWNERSHIP PRIVATIZATION
ESSAT (1st region)	Empresa de Servicios Sanitarios de Tarapaca	May 1997 Construction of Reverse osmosis plant 11 year BOOT
ESSAN (2nd region)	Empresa de Servicios Sanitarios de Antofagasta	30 year concession to BAYESA
EMSATT (3rd region)	Empresa de Servicios Sanitarios de Atacama	CORFO
ESSCO (4th region)	Empresa de Servicios Sanitarios de Coquimbo	CORFO
ESVAL (5th region)	Empresa de obras Sanitarias de Valparaiso	Privatized Dec. 98
EMOS (metropolitan)	Empresa Metropolitana de Obras Sanitarias	Privatized to Agbar and Suez. 2 Billion \$ investment plan for the next 15 years
ESSEL (6th region)	Empresa de Servicios Sanitarios del Libertador	Initiation privatization process April 99
ESSAM (7th region)	Empresa de Servicios Sanitarios del Maule	CORFO
ESSBIO (8th region)	Empresa de Servicios Sanitarios del Bio-Bio	Initiation privatization process April 99
ESSAR (9th region)	Empresa de Servicios Sanitarios de la Araucania	CORFO
ESSAL (10th region)	Empresa de servicios Sanitarios de los Lagos	Privatized to Iberdrola Investment plan of 120 million for next 10 years
EMSSA (11th region)	Empresa de Servicios Sanitarios de Aysén	CORFO
ESMAG (12th region)	Empresa de Servicios Sanitarios de Magallanes	CORFO
A.CORDILLERA	Aguas Cordillera S.A.	Private
A.DECIMA	Aguas Décima S.A.	Private-AGBAR
COOPAGUA		Private
MANQUEHUE		Private
LOS DOMINICOS		Private

MAIPU	Private
SERVICOMUNAL	Private

## b. Industrial Wastewater Treatment

New regulations for discharges into the sewerage system were enacted on July 20, 1998. The new standards prohibit the release of radioactive, corrosive, infectious, inflammable, poisonous and explosive substances. Dilution processes are not permitted. Solid waste resulting from water treatment processes must be disposed of in accordance with the solid waste regulations. This new regulation also sets maximum parameters of allowable minerals, metals and organic waste components in wastewater evacuated in the sewerage system. This new regulation must be implemented for all new projects. In the case of existing industries if they are located in an area where water sanitation services are available they will have one year to comply with the new levels and can choose to install their own treatment system or contract the service with the water sanitation company for the following three organic components. If a company operates in an area where water sanitation services are not available, they will be given two years to comply. Government estimates suggest that the industrial sector will have to invest close to US\$ 4 billion in wastewater prevention and control to comply with these standards by 2003. Key industrial sectors requiring water treatment equipment in the short to medium term are: mining, fish processing, pulp and paper, food processing (mainly milk base products). Canadian suppliers of water treatment equipment would be well advised to team with a local company. Contracts can only be obtained further to extensive direct marketing and technology demonstrations and thorough follow-up with clients. Excellent after sales service is essential and financing is a definite plus. Now, 40% of water treatment equipment is imported from in the U.S.A. while 30% comes from Europe and Asia. This market should be very promising unless water sanitation companies are allowed to offer treatment for other waste components. For now, it would seem that this will not be permitted.

## c. Air pollution control

Air pollution is of great concern in Santiago's metropolitan area. According to a World bank survey, Santiago has the sixth worst particulate emissions problem in the world. CONAMA will be working at several air emission standards in 1999. Those are:

1. Nitrogen Oxide (Nox), Organic Volatile Compounds, Carbon Monoxide (CO) produced by the cement, glass, steel industries and, burners and turbines in the Metropolitan Area.
2. Nitrogen Oxide levels to be approved for cars equipped with catalytic converters in the Metropolitan Area.
3. Emission norms for motorcycles in the Metropolitan Area.

Further to extreme levels of air pollution registered in 1996 Santiago was declared "saturated zone" for Ozone (O3), Carbon Monoxide (CO), Total Suspended Particulates (TSP), and PM10. When a region is declared saturated the Environmental Framework Law requires to develop a decontamination plan. The decontamination plan outlines 261 measures that must be adopted during the period 1997-2005, requiring an investment of US\$ 60 million by the Government and an additional US\$ 120 million by the private sector.

The Chilean market for air pollution prevention and control equipment was estimated at US\$295 million in 1998. The target markets are in those areas that have been declared "saturated zones" where measures and targets have been set under the plan.

The time table for emissions reduction in Santiago is the following:

**Timetable Emissions Reduction  
Santiago  
(Tons/Year)**

YEAR	PM10	CO	NOx	VOC	SO2
1997	41,782	244,921	43,828	62,221	21,169
2000	38,648	226,552	40,541	57,554	19,581
2005	29,137	183,691	32,871	46,666	15,877
2011	20,891	97,968	21,914	31,110	10,585

With regards to particulate emissions, stationary sources that reduce emissions to levels below the new standard can sell their emissions rights to other companies that cannot cost-effectively meet the standard. This programme provides an incentive for companies to curb emissions. For now the programme applies to particulates only but there are plans to extend it to other pollutants.

Best market prospects include:

- **Monitoring equipment:** this niche has mainly been funded by the Japanese and Swedish Government's this gives a competitive edge to their companies.
- **Prevention and Control Equipment:** Particularly for copper smelters; fishmeal plants; steel, and pulp and paper (for odors)
- **Process and Control Equipment for particulates:** This is to address the more stringent PM10 standards.
- **Natural Gas related equipment:** The introduction of natural gas in 1997 has contributed considerably in reducing emission levels. Industry retrofitting should continue for several more years but it is the public transportation area that should bring newer opportunities. The Government is looking at possible incentives to promote the use of natural gas in public transportation (buses and taxis). Important decisions have yet to be taken. At this point in time though, we do not know if the Government will allow the conversion of diesel buses to Natural Gas or if the results of the measurement studies that are being conducted will lead them to authorize original NG buses only (this would be a very costly programme). The same uncertainty applies to taxis as well. The central government has been very slow in taking a stand on this issue and very reluctant in considering the implementation special measures such as tax credits to promote the use of natural gas.

Most air pollution control equipment produced in Chile focuses on low-tech, end-of-pipe solutions. Canadian companies should concentrate on pollution prevention solutions.

#### d. Solid waste

##### i. Municipal waste

Chile faces many challenges in the domestic, industrial and toxic waste management areas. The country generates 2.9 million metric tons of municipal waste per year and approximately 1.7 million tons of solid waste from industrial sources excluding mining, construction and agricultural waste. There is a shortage of landfills across the country and the problem is acute in the metropolitan area. The Intendant of the Metropolitan Area is leading a Committee called "Comisión Regional de Residuos Sólidos de la Región Metropolitana". This Commission is formed by MIDEPLAN (the Ministry of Cooperation and planning) and the Association of Municipalities. They are working on a management plan for domestic waste in the Metropolitan Area. A land use cadastre will be approved and will identify appropriate sites for the construction of landfills and domestic waste transfer plants. Any future projects to be proposed will have to abide by this plan. Plans for Antofagasta, Valparaíso, Viña del Mar, Concepción, Penco, Talcahuano and Puerto Montt have been completed and studies are under way for 20 more cities. Informal recycling of cardboard boxes, aluminium, paper and glass is taking place as street collectors scavenge through residential garbage to extract these types of waste for resale. Municipalities are responsible for waste management and recycling initiatives are under their responsibility. According to the information we have been able to gather on the to be approved Domestic Waste Management plan for the Metropolitan Area, recycling would be included as part of the management programme. Toxic waste management is on the Government's agenda and this is an area where Canadian know-how and technology could find a niche.

Santiago generates approximately three quarters of the solid waste in the country and there are only two landfills for the entire area. The average price per ton is US\$10.00. One of these sites, LEPANTO, should have been shut down several months ago but given the lack of a replacement site the Government authorities have given LEPANTO operators a 2 year extension. This decision is being challenged by the Metropolitan Health Service. The Court of Appeals decided that LEPANTO will have to submit an Environmental Impact Assessment for the proposed extension. We have yet to see where waste from the Southern part of the Metropolitan area will be disposed of. Three landfill projects were presented in 1998 but none of them were approved. Lack of consensus on urban planning has been the major impediment. While solving domestic waste disposal problems requires urgent attention, it will not be economically recommendable for the private sector to develop any proposal until local authorities reach a consensus on a landfill positioning plan. As stated above, the Metropolitan Intendency is now coordinating a land use plan for landfill location. Also, local authorities must make an effort to ensure that decision makers are technically capable of evaluating landfill environmental impact studies. Lack of technically prepared decision makers has also been a barrier.

##### ii. Industrial and hazardous waste

Industrial waste and hazardous waste is difficult to quantify. According to a study done by CONAMA, regions V, VIII, and IX (the most populated of the country) generate approximately 0.8 million tons of industrial waste per year, 5 percent of which is considered hazardous. A second study performed by the Japanese International Cooperation Agency for the greater Santiago area estimated that annual industrial waste generation will increase to 1.8 million metric tons by year 2010 and that its management will cost approximately US\$ 41.7 million per year.

In Chile, there is still much to be done in industrial and hazardous waste management. The area is not systematically regulated. Companies are responsible for their own waste disposal and generally contract with private waste haulers. Unfortunately, a large quantity of this waste is disposed of in clandestine dumps.

The first hazardous waste treatment plant was inaugurated in 1997. It is owned and operated by a Spanish company called Hidronor and can process up to 50,000 tons or approximately 60% of the hazardous waste generated in the metropolitan area. Santiago is the only city with a manifest system to track the hazardous waste. Although this system has been in place for years, compliance is still weak. New regulations on hazardous waste should be approved in 1999. These regulations will outline sanitary guidelines and minimum protection for the storage, collection, transport, commercialization, treatment and final disposition.

#### **e. Services**

Chile's market for Environmental Services is estimated at US\$ 55 million and should grow considerably. More than 130 companies offer environmental services and sell equipment in Chile. Most companies pair consulting services with equipment sales in order to be profitable. Major international companies such as Fluor Daniel, Bechtel and Dames and Moore have offices in Santiago. Opportunities can be found in the Environmental Impact Assessment field, Certification Programmes, Laboratory Monitoring and Pollution Prevention Consulting services:

##### Environmental Impact Assessments

The EIA regulation is in full effect since April 1997. All new projects must submit an Environmental Impact Declaration (EID) (minor impact) or Assessment (EIA) depending on the impact the project will have on the environment. This market is highly related to the state of the economy as the more projects are undertaken, the more Declarations or Assessments must be prepared. There is a demand for quality EIAs, specially for large-scale, high-tech projects. Due to shortage of qualified staff, CONAMA will often sub-contract technical reviews of EIAs. The EIA market was US\$ 7.4 million in 1996, before the enactment of the regulation. This figure probably doubled in 1998. This regulation has been extensively criticized by the private sector and is now under review.

##### Certification

Certification of exportable products is gaining popularity and becoming part of Chile's international business strategy. Fundación Chile, a private not-for-profit research foundation, developed a certification programme for fish and shellfish. Fundación Chile recently created an environmental division and one of its goals is to expand product certification to other types of exportable products.

Chile's National Standardization Institute is responsible for the establishment of standards in the country. They have not yet established an accreditation process for ISO 14000. Most consulting services on ISO are provided by foreign consultant firms.

##### Laboratories

The Superintendency of Sanitary Services (SSS) certifies laboratories. There are approximately 50 laboratories and most of them specialize in water monitoring and analysis. Very few laboratories are certified to determine toxicity of waste and sludge or particulate matter (PM10). With the new regulations on water and air, more and more monitoring will be required and we expect there will be a shortage of certified laboratories equipped to monitor and analyse industrial emissions.

##### Other

Pollution Prevention, Industrial waste and Environmental Liability Insurance are areas where the demand for consulting services will increase.

#### **f. Summary**

In summary, Chile is a maturing market where steady growth is expected. As in any other markets, enforcement and the state of the economy are determining factors. The Government's environmental agenda is ambitious. If its projected work plan is timely implemented and, if the economy picks-up we anticipate the demand for environmental products and services will be on the rise especially in the fields of:

- Potable water and water sanitation
- Environmental Impact Assessments
- Cleaner production/pollution prevention
- Air Pollution control
- Solid waste

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