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Environmental in Chile

1. Name of Industry and Description

Environmental Products and Services

2. List of Countries included in “Region” if applicable

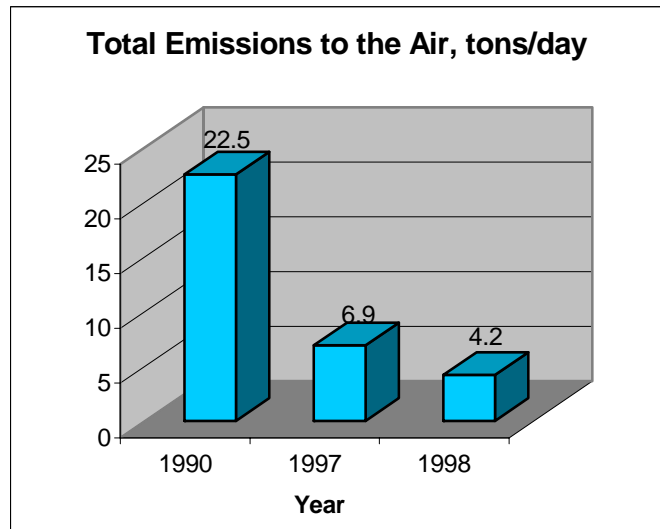
Chile

3. Overview of Industry

Currently, Chile is facing an important progress in connection with environmental protection. The challenge is to achieve a clean and controlled production process in every industry, especially in the Metropolitan Region, where contamination is most concentrated. Even though there has been progress in some industries changing its systems from petrol to natural gas and the definition/separation of special industrial areas, there is still a lot to be done. Many of the most polluted areas, besides Santiago, are located in the southern territory due to the use of wood and presence of processing plants.

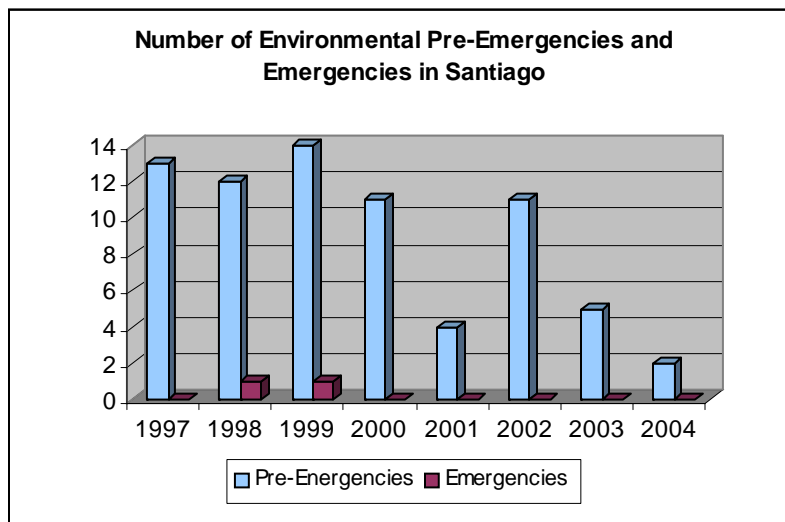
Since 1992, the Chilean industrial sector has been putting a lot of efforts to reduce contamination and pollution in many regions of the country, while other specific sources have been increasing their emissions without any kind of control. In the 1997-2000 period, the industrial sector reduced their Particulate Matter (*PM10*) emissions by 63%, Nitrogen Oxide (*NOx*) by 33%, and Sulfur Oxide (*SOx*) by 71%, while the mobile sources emissions increased by 16%, 15% and 29%, respectively. Studies showed that 85% of the *PM10* emissions come from the streets, as well as 87% of *NOx*, 35% of *SOx* and 93% of *CO*.

Contamination rates have been moving upwards due to the constant growth of every industrial sector and their greater demand for petrol and natural gas. However, during the 90's, the use of natural gas has been efficient and different sectors reached their lower pollution rates. Achieving the Decontamination Program goals in the stated deadlines is a challenge. This program stated in 1997 that by the year 2007, all the existing sources had to reduce their *NOx* emission by 33%, and by 50% at the end of year 2010.



According to official reports from CONAMA (the Chilean Environment Protection Agency), the management and control of air pollution for the 2000-2005 period has been deficient. The Air Quality Index (ICAP) is a system that defines different state of emergencies depending on the air quality containing breathable PM.

ICAP	Category ICAP	PM10 ug/m3 (24 hrs.)	Level	State
0-100 Good	0	0	0	-
101-200 Regular	100	150	0	-
201-300 Bad	200	195	1	Alert
301-400 Critic	300	240	2	Pre-emergency
401-500 Dangerous	400	285	2	Pre-emergency
>501 Exceeds	400	330	3	Emergency



Various analysts say that the Decontamination Program did not fail. The problem emerges due to the lack of authority and commitment to comply with the regulations and standards. The Carbon Bonds Project is on-hold since June of 2003, Vehicle's NOx restriction is also on-hold at the Ministry of Transportation, the adaptation of filters for the public transportation has not started yet, and other projects have been postponed for next year.

It is important to mention that the industrial activity does not pollute only the air, but also the water bodies and soil. Studies have concluded that 100% of Santiago's streams are contaminated at some level with industrial wastewater and sewage. Until 1999 only 20% of urban sewage was being treated, but different sanitary projects started to make the particular source responsible for all negative environmental externalities to foster positive action. Two important regulations are being developed: Water Quality Primary Regulations, intended to protect the people; and Water Quality Secondary Regulations, aimed at preserving biodiversity and natural resources.

The Chilean government has set a policy that all industrial wastewater must be treated by year 2006. Recent court rulings affecting large-scale corporations on environmental compliance have sent a powerful signal that is likely to increase the industrial demand for solutions in the treatment and disposal of industrial residues. Since 1997, with the validity of the Environmental Impact Assessment System (EIA), all projects that somehow need residues treatment have to comply with these new standards before their completion is approved.

In 2005 the government also developed the Solid Waste Integral Management Policy and other relevant environmental regulations to continue moving forward in this matter. According to the role that Chile is playing in international markets, all the standards and legislation to protect the environment and the life quality of the people enables the region to gain international competitiveness, which represents a differentiating element in Latin America. Some projects have been discussed for a decade, and have been finally approved.

However, one main problem is the capability of the SMEs to adapt to these changes, even though some of the big organizations have not been able to implement 100% of the specific stages. Studies and analysis determine that out of 500 companies, primarily big and medium-sized enterprises emitting above 12 tons per year of pollutants, only 178 have presented their environmental compliance programs, despite that the deadline expired in December 2005.

On the other hand, some companies prefer not to risk a conflict with the authorities and already started to invest in solid and wastewater treatment projects. Companies need a special storage facility, which usually demands an investment of US\$ 200,000, plus the transportation cost of US\$270 per ton. Big companies are obligated to install sanitary landfills that cost around US\$ 2-3 million each.

The results after the first semester of 2006 are encouraging, since 77 companies invested US\$ 231 million in environmental projects, duplicating the amount observed in the same period of 2005. Projects related to wastewater treatment are the most relevant. However, companies also lean to new technologies that not only increase capacity and reduce cost, but make the whole process more environment- friendly.

4. New Standards and Legislation

Carbon Bonds

The Carbon Bonds System is a mechanism fostered by the Kyoto Protocol that states that all developed countries have to reduce their Green House Effect emissions. To achieve their goals, developed countries can finance various projects to reduce these types of emission in other nations and attribute the positive results as if they were their own.

This means Chilean companies that reduce their emissions can sell the difference to other companies, either in an international market or in the local market generating both economic and environmental benefits. The Carbon market has been developing since 1996, but is not until the last couple of years that gained strength and importance in Chile: during 2002 the bond trading reached the 70 million tons and studies show that transactions can reach US\$ 350 million per

year. The Chilean industrial sectors will keep benefiting from new businesses and foreign investment in plants and environmental technologies.

Quality Standards

There are two types of Quality Standards:

- Primary Quality Norms: intended to protect people's health and quality of life.
- Secondary Quality Norms: aimed at reverting or stopping the negative environmental impact and protect the ecosystems and natural resources.

At the moment, the Water Quality Secondary Standards program is being implemented in major rivers across the country to assure their protection and sustainable use.

Emission Standards

These norms establish limits to all the industrial emissions that pollute either the air or water. The objective is to maintain a low level of contamination, or reduce it, in case of emergency by stopping the production activities.

Environmental Impact Assessment System (EIA)

The SEIA is a practical tool developed to prevent negative environmental effects by forecasting the future negative or positive environmental impacts, thus enabling the possibility to maximize benefits and minimize undesirable results. The most important point is that with this system, projects or activities that have unacceptable impacts would not be approved.

Solid Waste Integral Management Policy (Approved in January, 2005)

The general objective is to minimize the risk and assure the protection of people's health and the environment during solid waste treatment. Currently, only 8% of all domestic solid waste is been recycled. By 2010, the government plans to recycle around 20%. There are seven objectives: (1) Minimize sanitary and environmental risk in the handling of these residues; (2) Foster efficient public services; (3) Foster a regional vision for the treatment of these materials; (4) Achieve an efficient and dynamic market for these residues; (5) Foster environmental education and awareness; (6) Implement information systems; (7) Achieve an efficient and modern Enforcement Agency.

Hazardous Waste Management Project

Since the April 24, 2006, important changes have been made in relation to hazardous waste treatment and more than 1,000 companies are subject to the enforcement capabilities of the authorities, which has been deficient. During the 1999-2004 period, only 29% of the 5,534 projects approved by the SEIA have been monitored.

According to the authorities, this will not be permitted any more and some companies already paid the financial consequences. Investments for the new legislation are variable, but studies concluded that companies should spend around US\$ 300,000 as a minimum for residue treatment. The main problem is that in the local market there are not approved companies for the analysis of these industrial waste and determine the best way to handle it. Hidronor Chile S.A. (www.hidronor.cl), Coactiva (www.coactiva.cl) and BMS Technologies (www.bmstechnologies.cl) provide these services only to their own clients.

Vehicle's Restrictions

All non-catalytic vehicles, private and public, will have circulation restrictions from Monday to Friday, depending on the vehicle's plate number. The transportation sector continues being the principal responsible for air pollution.

The strategies are:

- Reduce the emission per vehicle (improve the requirements for new cars; improve the control, the use of better fuels).
- Establish standards for public and cargo transportation (reduce the emissions of this transportation systems).

5. Best potential Sectors and Projects for PA Exports:

Environmental technologies and services:

Depending on the particular industry and process involved, solutions for the problems need to be developed and completed with specific high technology and systems.

☞ Suggested products: water treatment technologies and equipment, engineering services, decontamination technologies, filters, clean-production technologies, management of solid waste, bio-fuel technology and plants.

Relevant Industries

The recovery of air quality has been a priority for the government during the last 15 years. Several diagnosis and inventories have been made and estimated in relevant regions of the country to be able to manage solutions for the problems detected, such as the wood combustion and industrial activity emissions.

One of the main concerns for the government is the decontamination and controlling processes in the mining sector to recover air quality in this environment. Chile is the biggest supplier of copper in the world. Since the 90's the copper production has been increasing at a rate of 7% annually, this is the reason why the government wants to control the contamination and pollution from these sources and improve the operational environment inside the mines and its chemical residues. Companies like Molymet, SQM, Codelco, CAP and Escondida are leaders in this regard.

One of the most regulated industries is the forestry sector. This industry has experienced an exceptional growth during the last 15 years in the southern region of Chile. It is important that its growth also incorporates environmental programs. Due to export environmental certifications, these industrial processes have a good reason to reduce their contamination and environmental damages to a minimum. 100% of the big sawn-wood and panel plants, and only 57% of the wood pulp mills comply with international standards. Currently, this sector has the highest participation in total environmental investments with CMPC S.A. as the most relevant company in this area.

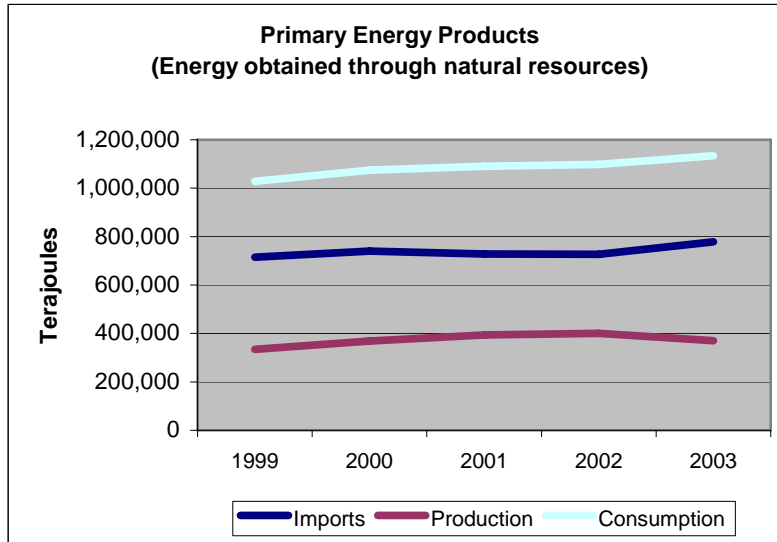
The industrial and transportation sector is facing a need to invest in a variety of filters and technologies that will reduce their emissions. In the industrial sector a variety of clean-production technologies are being considered due to the environmental legislations and the need to comply with export standards and maintain their competitiveness in international markets. In this sector, Soprole, Carozzi, Embotelladora Andina and Viña Concha y Toro are the companies with the largest investments.

Alternative Energy

In Chile, a diverse number of energy projects are being developed to meet future demand. Various projects like a hydro-electrical plant in the Metropolitan Region or a carbon thermo-electrical plant in the V Region that will generate 250 MW each have shown positive results. However, the production, transportation and consumption of energy produce negative impacts on the environment and, currently, companies have their eyes on clean and renewable energy.

The Empresa Nacional de Petroleo (National Petrol Company, ENAP) and Iansa S.A. have successfully concluded all the studies to determine the feasibility of producing bio-fuel in the country. The results obviously depend on the legal framework that will regulate the production, distribution, quality and taxes estimated for this product. The positive impact has great dimensions and strategic planning will help to diversify the energetic matrix and reduce the green house effect.

Bio-fuels also generate sub-products, such as ethanol and bio-diesel, elements that could be mixed with gasoline or diesel, respectively, reducing imported hydrocarbons. Europe is the primary producer of bio-diesel and Brazil is leading the production of ethanol.



Chilean companies are also developing projects for wind power fields in different areas of the country, such as the Parque Eolico Señora Gabriela in the III Region, which would generate 138 MW and other projects of this kind.

Considering this trend in the energy sector, Pennsylvania's natural resources technologies (wind and solar power, bio-diesel and ethanol, and clean coal technology) are attractive for the Chilean market.

Water (Sewage and Wastewater) and Solid Industrial Waste Treatment

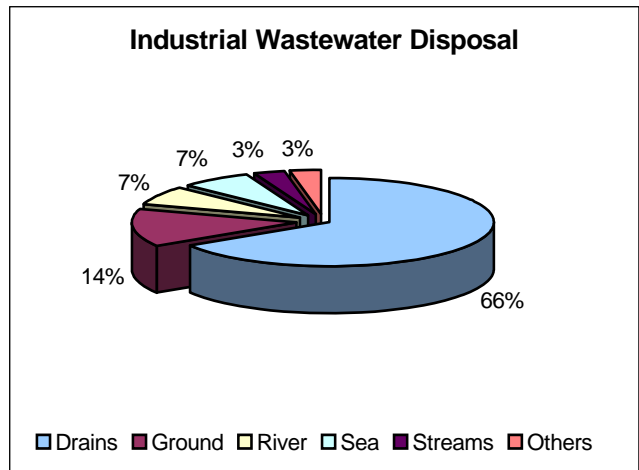
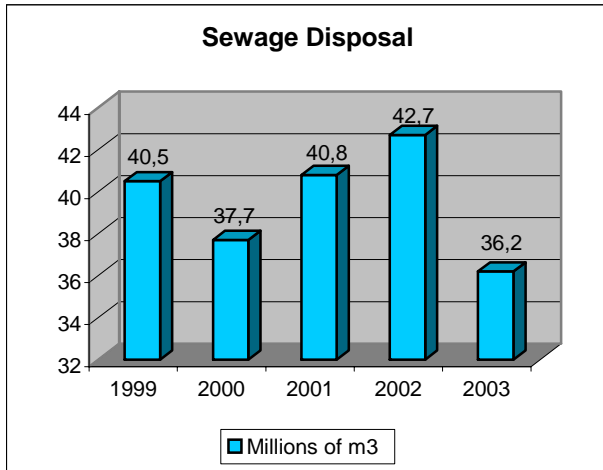
On this matter, Chile is a leader in Latin America. All industries have to invest in wastewater treatment technologies and equipment, despite the fact that some companies have to redesign their processes to comply with new legislations and norms. Since 2005 and during this year the government is working in the respective controlling projects for production plants in the Aconcagua, Cachapoal, Aysén, Biobío, Elqui, Loa, Maipo and Cruces Rivers; as well as the Llanquihue Lake and in the Region of Aysén.

At the moment, 78% of domestic sewage is being treated and by 2009 the government expects to achieve the 97% coverage.

The management of solid waste is more complex, since the society intervenes directly. Since 2004, 60% of all domestic solid waste goes to treatment plants. Additionally, various materials like paper, boxes, glass or plastics go to a stable recycle market. The problem is that the recycle plants are too atomized in the central region of Chile and transportation costs are too high. The main steps involved consist in extraction, collection, transportation and final disposal. The basic elements needed are public containers, the vehicles for transportation, but the most important part is to have an appropriate final disposal area that complies with the standards and has the adequate treatment technology. The general idea is to extend the life of these sanitary land fills, reduce the impact on their surface, reduce transportation costs and foster recycle processes. The

problem is that the regional government offices responsible have a tight budget. Regions like Talca, Puerto Montt and Temuco are on top of the list for these types of projects.

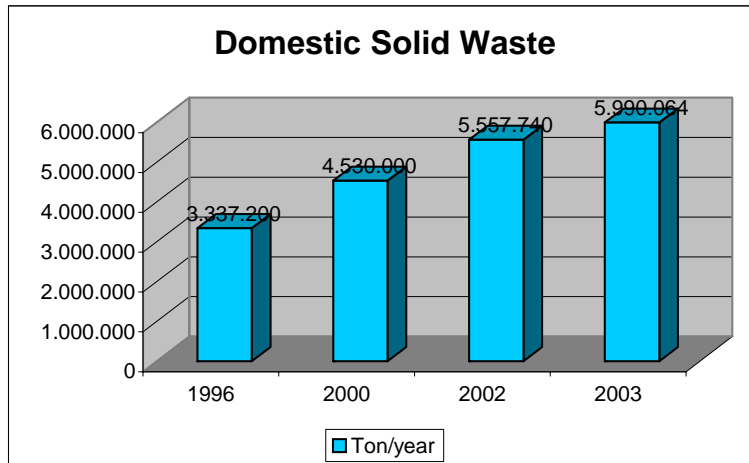
An important niche is the one related to hospital waste. According to experts in the field, there are absolutely no legislations or standards for the treatment of these residues. Currently, they are been treated as domestic residues, which is not adequate. In Chile there are only three incinerators, two in Santiago and one in Concepcion.



6. Most significant competitors

Competition in the local market is closely related to the country of origin of the investment in the given industry and Free Trade Agreements. Most times, the origin of the investment will indicate the origin of their preferred suppliers. In general terms we can highlight competition from:

- Spain: Water and Domestic Residues Treatment, Sanitation
- Germany: Renewable Energy and Hazardous Waste Treatment
- France: Wine Clean Production Processes, Local Environment Protection Management
- Canada: Investment in project development according the Environment Cooperation Agreement



For the last 10 years, U.S. companies have strong presence in the Laboratory Analysis and Industrial Wastewater Treatment sectors. Because of the overall international market competitiveness, PA exporters must seriously consider the use of commercial policies that mix adequate prices, flexibility on credit and post sales support. It is essential to consider that the US-Chile Free Trade Agreement (FTA) is the first agreement that included a section related specifically to environmental cooperation.

7. Barriers to importation

The US-Chile FTA that entered into force in 2004 eliminated all import tariffs for US manufactured consumer and capital goods. The mining sector has been one of the most benefited sectors with trade liberalization. However, this trend makes the market more competitive, since in October 2006 a China-Chile FTA will enter into force, too. The general situation is that any company that starts doing business in Chile faces a global market.

Due to the characteristics of the products and services, U.S. is competing against Europe and already has an advantage with the FTA. On the other hand, the reputation of European countries on this matter is considerable.

8. Sources

- Interview with Fernando Avila: Executive Director – Chilean Environmental Association (AEPA)
- Sanitary Services Offices: www.siss.cl ; Annual Report 2003
- National Environment Commission: www.conama.cl
- National Energy Commission: www.cne.cl
- National Forestry Corporation: www.conaf.cl
- Diario Financiero: Friday Edition, Sept. 22
- Indu-Ambiente Magazine: Industrial Decontamination, May-June 2006
www.induambiente.cl

Pennsylvania companies seeking additional export information or assistance should consult their Regional Export Network Partner. Visit www.newPA.org/trade for additional information.

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