

# Santiago de Chile





# Santiago de Chile

## Water Supply, Sanitation and Water Treatment in Santiago de Chile: a fully privatized System

---

**Laws and rules concerning privatization of urban services -in particular water supply and sanitation- have been implemented in Chile in the last decades. In Santiago, a total privatization was thus set up (Aguas Andinas concession), even though the water supply system was largely effective. Today, companies have to set up and/or improve the sanitation and water treatment system. Analysis of this fully privatized system with regard to affordability and environmental and social sustainability.**

Chair: **Dr. Jing-sen Chang**, Vice-chairman, The Council for Economic Planning and Development, Chinese Taipei

Discussant: **Assoc. Prof. Lye Lin Heng**, Deputy Director, Asia Pacific Centre for Environmental Law, Faculty of Law, National University of Singapore  
evidence on the environmental dimension of urban services as developed in the Hong Kong seminar.

**Mr. Edmundo Dupre E.**, Consultant, IGN, Chile  
Private participation in the water works facilities in Chile. Institutional arrangements that have been necessary to travel from state production to new production models in which private companies are expected to meet not only productive goals but also social promotion objectives. Future challenges.

**Mr. Carlos Mladinic Alonso**, President, Sistema de Empresas Publicas, representing the National Authorities  
Institutional background: roles of the Ministerio de Obras Publica, the Superintendencia de Servicios Sanitarios (regulator) and the CORFO (Public Institution in charge of promoting the private sector). Legal background in the field of water

supply and sanitation, of PPPs: laws and rules (1989, 1998-99...). How does this Public Institution manage the different forms of PPPs?

**Mr. Laurent Brunet**, C.O.O., Aguas Andinas,  
Analysis of the present situation: water supply, sanitation and watertreatment/social equity, /environmental sustainability and /economic sustainability. How the company deals with the governmental rules and with the regulatory institution. Lessons learnt and objectives for the future. Financial analyses.

**Mr. Juan Eduardo Saldivia**, Superintendente, Superintendencia de Servicios Sanitarios, representing the Regulatory Authority

How did the regulatory authority negotiate the concessions? How does it fix the tariffs and reevaluate them? How does it define the quality norms and how does it manage their implementation? How does it regulate all the different interests? How does it integrate social and environmental sustainability?

**Mr. Alejandro Jadresic**, Executive Director, Jadresic Consultores Ltda

Evaluation of the processes set up for water supply and sanitation with a focus on their institutional and legal efficiency (risk management, social sustainability).

**Ms. Maria De La Luz Domper**, Investigadora Programa Económico, Instituto Libertad y Desarrollo  
Evaluation of the processes set up for water supply and sanitation with a focus on public policies and their economic sustainability (affordability for all...)

**Discussion**





# Introductory Speech

**Dr. Jing-sen Chang**

Vice-Chairman, The Council for  
Economic Planning and Development, Chinese Taipei

---

Good morning ladies and gentlemen. I am honoured to attend this second seminar on Sustainable Urban Services in Santiago Chile, and have the opportunity to say a few words before the seminar starts. According to the PECC package for the 2001 - 2003 period, there are four important seminars that will be convened on the topic of sustainable urban services.

The first seminar was convened in Hong Kong on November 23 and 24, 2001, and gave us an opportunity to get together to share the urban development experiences in different cities, such as Hong Kong, Jakarta, Manila and Bangkok. The actual urban needs and different methods of solutions have been highly addressed and discussed. The urban services include the water supply, sewage and solid waste disposal.

This morning, this panel will be based on the topic of water supply and sanitation and water treatment in Santiago. Many papers will be presented and further discussed in this session and we have one participant from Singapore, Dr. Lye and six speakers from Chile. So before their speeches, I would like to talk a little more on the law of urban services on sustainable growth.

Urban growth or economic growth cannot be sustainable without effective supporting of urban service systems. In the Hong Kong seminar we were informed that different cities, Jakarta, Manila, Hong Kong and Bangkok, are struggling to restructure their urban service providing system to make it more efficient, so that they can support people's daily life and make the cities work. Urban services from the economic point of view are a kind of corrective consumption, which traditionally has been provided by public bodies like the municipalities or directly by the State.

In the early stage of growth, some states, some countries, successfully deal with the growth of the cities' needs, but unfortunately most cities cannot even provide adequate urban service systems. The urban service system itself cannot be sustainable due to insufficient investment, poor management and finally collapsed by financial crisis. Their restructuring process focuses on efficient providing systems and effective regulatory systems. But there is still a question, different institutional and legal frameworks make different urban service systems and with different impact on the sustainable growth of cities.

In Hong Kong's case we see that solid waste disposal cannot be solved by only incineration on the landfill. So how to set a new policy framework for the operation of this new providing system depends on what we think the goal of this providing system should be.

Corrective consumption is not equal to mass consumption. Otherwise it will lead to unsustainable growth. In Hong Kong's case we see that incineration in the landfill is not the answer to waste disposal. Reducing, reusing and recycling are a more important sustainable way for the city's growth. Also in Tai Pei's case, due to the success of a new waste reduction policy, waste produced has been cut by 40% within four years and one of the three incineration plants will be closed.

Water supply and wastewater treatment should reflect their real cost so that people can be aware of the conservation of resources and not overexploit the natural resources and the environment. That is very important when we discuss the restructuring of that kind of providing systems. I hope this seminar will be very successful and blessings upon you all. ■





# The Environmental Dimension of Urban Services (as developed in the Hong Kong seminar)

**Assoc. Prof. Lye Lin Heng**

Deputy Director,

Asia-Pacific Centre for Environmental Law (APCEL)  
Faculty of Law, National University of Singapore

---

This paper reviews the proceedings of the last PECC meeting in Hong Kong (23-24 November 2001), from the perspective of the environmental dimension of urban services in the context of the supply of water and the management of waste. The meeting focused firstly on the provision of water, looking at the experience of two capital cities, namely Jakarta and Manila. It then examined the management of waste in the cities of Hong Kong and Bangkok.

## **The Provision of Water - Perspectives from 2 Cities, Jakarta and Manila**

---

The experience of Jakarta was first discussed. The 25 year contract with Ondeo to supply water to West Jakarta was examined in some detail, from the perspectives of the authorities, the private sector and a third party.

### **Sustainability of Water Resources**

From the environmental perspective, it was clear that firstly, there is a need to examine the sustainability of water resources. The increasing con-

tamination of water sources from human and industrial activities upstream, was identified as a major problem. For Jakarta, its main water source comes from rivers upstream. It was estimated that 70% of the pollution comes from domestic waste water. Housing development projects upstream add to the contamination, and reduce the water downstream. This is compounded by industries which discharge effluent directly into the rivers. Another problem is the illegal tapping of ground water, which is also increasingly contaminated by sewage, sillage and metals from industrial activities. The unauthorized tapping of ground water results in subsidence, which in turn, leads to floods.

Due to the destruction of watersheds upstream, there is a constant fear of a water crisis in Jakarta. But the government in Jakarta cannot control activities upstream, as they are under the control of the local government, who are quite unconcerned about the impact of their activities downstream. This is aggravated by the recent moves to decentralize, leaving many matters including water resources in the hands of local governments. This has led to a shortage of water in some cities because the new management for water



resources raises charges for water, and cities downstream are not always able to pay these increased charges. In addition, the increased contamination of water sources raises the cost of water treatment, making it more and more difficult for the private operator, and reducing its profits.

These issues though raised, were not adequately addressed in the HK seminar, due to the lack of time. But they warrant further examination, as the problems are common to many cities.

How can the sources of contamination upstream be removed? This requires a careful consideration of the problem. For example, villagers living along the river banks must be re-settled and provided with proper sanitation facilities; highly polluting industries must be re-located to areas which have proper treatment facilities; laws must be passed to prohibit pollutive discharges into the waters and must be enforced. It is essential that the infrastructure be built to deal with wastes from domestic and industrial sources. But who makes these decisions? Is it the local government or the central government? Should water be a State or a Federal matter?

Another question that was raised was how can these programs (re-settlement/re-location and the building of the environmental infrastructure) be financed? How can we make the people pay for this? How can the fees be collected? The point was made that while the public are willing to pay for water, they are reluctant to pay for sewage treatment and waste disposal. They are particularly resistant to the building of sewerage infrastructure as this is more costly, takes more time and is more disruptive. It is clear that these projects will need the support of the community to succeed. There is thus a need to involve, educate and convince the community so that there is a PPP partnership : Public (government), Private (private sector) and People (the community) partnership. A possible way to ensure that sewerage fees are paid is to link the sewerage fees to charges for water.

It was agreed that while Privatization is one solution to improve performance and solve the problem of lack of capital, it needs a well prepared regulatory framework plus the political will to see it through. Good laws and a reliable legal system are essential to attract private enterprises to invest in building a country's environmental infrastructure.

### **Water for the Poor**

The second point that emerged from the Hong Kong meeting in relation to water is that it is very important that the poor have access to water. A ready supply of clean water will improve the health and quality of life of the people, and lead in turn to a better environment for all.

A major problem is that the poor do not have any legal title to the lands that they occupy, thus making it difficult to effect connections to the water supply. This was a major problem in Jakarta, but notable efforts were made in Manila to overcome this.

In Manila, the authorities waived these technical requirements and allowed the construction of connections to the water supply system, even though recipients did not have title to land. In addition, the poor were allowed to pay for the connections in installments ranging from 3 months to 24 months. Even with the payment for installation charges, the poorest 20% paid 3 times less for water than what they used to pay. There were also different levels of connections - point source, communal faucets, individual household connections etc. To facilitate individual connections, pipes were sometimes laid above ground to lower costs and provide for cheaper maintenance. However, the pricing of water according to usage resulted in the poor who use communal taps having to pay more for water.

It was established that the benefits of providing ready access to water are numerous, and include the following :

- (a) Poverty alleviation - the savings in time from not having to queue for water enable the poor to earn more income thus helping to alleviate poverty.
- (b) Improvements in health - the extra income earned also enable the poor to buy and consume more food, thus improving their health.
- (c) Improvements in productivity - the improvement in water quality and food intake also improves their health which in turn enables them to be more productive. Examples were given of the sprouting of small or micro enterprises following a ready supply of clean water.
- (d) Raises self esteem and encouraged improvements in the standard of living - examples were given of persons who, after receiving water connections, changed their house structure to a more permanent structure, and took better care of their environment.

## Waste

---

Moving on to the case of waste management, the meeting in Hong Kong focused on the experiences of Hong Kong and Bangkok, but discussions also brought forth the experiences of Singapore and Manila.

It was agreed at the outset that all cities should reduce, re-use and recycle.

Looking first at the experience in Bangkok, it was clear that it differed from that of the more developed cities of Hong Kong or Singapore. A large role is played by the informal sector in Bangkok and in other less developed economies. This included :

- (a) persons who collect waste for a living, buy waste from houses and stores and re-sell in 3-wheeled vehicles ('sa-leng');
- (b) scavengers and families living in or near the dump site - when the collection trucks arrive at the transfer site, they are first unloaded onto the pavement and the scavengers start picking. Only after that would the rest of the

- waste be loaded onto the large trucks;
- (c) licensed stores that buy waste or used products (there are over 1,000 in Bangkok), and many others that are not licensed.

There is a clear need to inform and educate this informal sector on the safe handling of waste. It should be recognized that these are private enterprises; indeed, they are small businesses. The privatization of waste collection by a large corporation would deprive this community of much needed income, cause hardship and lead to great resentment. There is thus a need for the private sector to involve these persons, to establish a dialogue with them, and to try to involve them as partners in recycling. The private sector should also try to get non-governmental organizations (NGOs) to work with them. Some examples of the Bangkok experience were :

1. A project by the Thai Environment Institute and the Department of Environmental Quality and Promotion which produce manuals on waste management and information on health and safety.
2. The Community Waste Bank - this has been established by an NGO in Bangkok. It buys waste from the community for recycling, thus enabling the community to earn income from recycling. The focus is on the young - each child will be given a savings book with this Bank, and when the waste is brought to be sold to the Bank, they will receive money into their accounts which can be withdrawn. However, this project needs funding to continue.

In the Philippines, NGOs also help waste pickers to be more useful. An example was given where waste pickers were taught to do simple electronic repairs, English as well as sewing, and a one room school was built for their children.

The problem of powerful NGOs obstructing the building of incinerators and preventing landfills in Manila was highlighted. These

protests have led to passing of laws that ban incinerators. This has created major problems for waste disposal in Manila. So where does the waste go? If incinerators are banned, how then can toxic, hazardous and bio-hazardous waste be disposed of? Toxic wastes in developing countries are a major problem. Bangkok, for example, only has one incinerator for toxic waste. It is unclear whether it meets the required standards, whether it is releasing toxic substances.

The meeting next focused on waste management in Hong Kong. It is a city that has very high consumption of materials and goods. While most of its goods are imported, the wastes remain in Hong Kong. There are great quantities of construction waste. The infrastructure for waste disposal includes: a chemical treatment plant, 3 mega landfills off-shore, and a network of 8 transfer stations. Waste is delivered to the transfer stations where they are compacted and transported to the landfills, mainly by sea. There are 13 old landfills which have been closed. There are plans to restore all 13 for temporary use, such as for parks or for golf driving ranges. There is a clear need to reduce waste. A ten year Waste Avoidance Programme has been instituted. Recycling is inadequate - the bins for the segregation of waste are often contaminated by the wrong types of waste thus creating more difficulties for disposal.

The problems include :

1. Lack of awareness of the general public.
2. No sustained public education - campaigns are shortlived.
3. Costs for collection and disposal are not linked directly with the quantity of waste, therefore there is no incentive for waste generators to reduce waste to avoid disposal cost.
4. There are no charges on the polluter - a landfill charge was proposed but not implemented.
5. The small sizes of the apartment dwellings make it difficult to separate and store waste.
6. High land and labour costs.

Much of these problems also apply to Singapore, a densely populated city with almost 6,000 persons per square kilometre. Ninety-two percent of Singaporeans live in high rise apartments, of which 86% are public housing purchased on 99 year leases. One of the unique features of high-rise apartments in Singapore is that each apartment is designed with a garbage disposal chute in the apartment's utility area or kitchen. While this provides great convenience to residents in terms of waste disposal, it is a grave drawback to the efforts at recycling. Most residents do not bother to separate the waste. All waste is simply dumped down the chute. The law requires that they be wrapped first, but it is impossible to enforce such laws as the act is done in the privacy of their own homes. New public housing now provides a common garbage chute but waste separation is still not done nor is it required by law.

In both Hong Kong and Singapore, the real or true environmental costs are not worked out or considered.

On the question whether governments should subsidise the recycling industry, the answer from the governments of both countries is that it cannot be seen to be subsidising any particular industry. Instead, the governments in both countries help by providing cheap land for the set up of recycling businesses.

On the question of the need to charge for waste (the 'polluter pays' principle), this has failed in Hong Kong due to the blockade of waste haulers at landfills and transfer stations. In Singapore, waste is not charged by weight, but each household has to pay for the collection. However, the collector has to pay a dumping fee based on weight. So if the quantum of waste is reduced, this will result in greater profits for the private sector collector. A major problem that is still not adequately addressed in both Hong Kong and Singapore is that both cities have large quantities of construction waste. There is a need for greater research into alternative uses for such waste.

## General Comments & Conclusion

---

1. There is a need to look at water and waste in an integrated manner, as part of the overall system of providing a sound environmental management system (EMS). It is clear that they are integrated - the source and quality of water depends on many environmental factors, including whether the rivers upstream are clean or contaminated. The issue of clean water is linked to the containment of pollution from industrial and domestic sources. There is a need to build the infrastructure to ensure that the environment is not blighted by man's activities. In particular, there is a need to provide the infrastructure to treat trade effluent, sewage and sullage from these sources. There is a need to re-use and recycle water. We should also consider using water that is not treated to its best (Class B water) - such water, though unsuitable for consumption, can still be useful for other activities, such as for the flushing of toilets, irrigation and the washing of cars.
2. Cities must make firm efforts to reduce waste to be sustainable. Cities face major problems in regard to waste disposal, particularly with opposition from the increasingly vocal public and NGOs. While the public is wary of incinerators, these are necessary (particularly for toxic waste) and modern technology can ensure that they are not harmful to the environment. Landfills are not the solution - they use up valuable land and have to be carefully constructed to ensure that there are no leakages. There are problems in regard to the siting of the landfills. Additionally, all landfills have a finite lifespan but this can be prolonged if waste is reduced. Incineration reduces the volume of waste by 90%, and cleaner waste (ash) is deposited in landfill.
3. There is a need to consider other alternatives to waste disposal, such as Composting and Methanation.

4. There is a need for Environmental Management Systems (EMS) across the different sectors of a country. It was emphasized that while EMS is often thought of in the context of a company that seeks ISO 14001 certification; the fact is that every country, city, state, municipality and village needs an EMS. To be sustainable, each city needs to look at its environment in an integrated manner, examining its air, water supply, waste management, how it deals with toxic and hazardous substances, etc. It needs to look at its planning policies, its administrative and legal infrastructure, its physical and environmental infrastructure. Laws are only a part of this big picture - many countries today have good environmental laws, but do not have the capacity to enforce them. Or, the laws may be there, but the environmental infrastructure is lacking. The example was given of a country that has laws prescribing effluent standards but does not have laboratories to test whether discharges from factories violate these standards.

An example was given of a simple Environmental Management System that was set up in 2 villages in Malabon City, Philippines by Médecins sans Frontières-Switzerland. Villagers were helped in the construction and repair of the drainage system; families were given legal access to potable water, training on health and sanitation, leadership in waste management, canal maintenance. The result was that there was no litter. The alleys and main roads were kept clean, the people were happier and began improving their homes, using materials that were more permanent. They took pride in their new environment and this has resulted in an overall improvement for the village.

5. The central government must take the lead in formulating the country's environmental policy, because it sees (or should see) the big picture. It must provide the overall guidance and direction, so that this policy can then

filter down to the states, cities, counties, villages etc. Each state, city, county, village should then work out its environmental policy and what it needs in terms of infrastructure (administrative, legal, physical etc) and then take steps to see how this can be achieved. It should start with sound planning laws and policies so that all activities can be controlled and properly channeled, eg. Highly pollutive industries should be located away from residential and commercial areas, where they can be provided with the infrastructure to deal with their wastes (see chapter «Building a Sustainable Environment for Shanghai» in Cities of the Pacific Rim - Diversity and Sustainability, PECC proceedings of the Bangkok meeting, 2000; and paper «Singapore - Long Term Environmental Policies» in the same publication).

There is a need to look at the laws and ensure they are enforced; to ensure that there is institutional capacity to manage the environment. Where necessary, the government should help persons who face legal difficulties, as in the case of the poor who do not have title to land. In such cases the authorities should

help facilitate the installation of water connections to the poor despite their lack of legal title.

6. Lack of finance should no longer be a barrier to the provision of sound environmental services, particularly as the private sector is prepared to invest in a country to provide these services. Funding can also come from international agencies, eg World Bank, Asian Development Bank. However, the country must provide some measure of stability, security and the rule of law to entice the private investor to invest.
7. Finally, it is essential to involve the public & NGOs as far as possible. They should be included in the formulation of policies as well as provided with information and education so they understand what the government is trying to do and will support instead of obstruct/hinder. This is the new Public- Private- People partnership (PPP). Agenda 21 and the recent Aarhus Convention were mentioned, both emphasizing the importance of public participation, as well as transparency and accountability in governments. ■

# The Chilean Public-Private-Partnership Solution for the Water & Wastewater Sector

**Mr. Edmundo Dupré E.**

Consultant, IGN

---

## Introduction

---

Institutional requirements necessary to change drinking water and sewer production service management, from the public scope to the private sector are outlined herein below.

These requirements allow for institutional arrangements which, on one hand, are related to socially desirable production and socially acceptable costs and, on the other hand, arrangements treating issues concerning equity and equal access to what public opinion considers - maybe erroneously - a «public good»; therefore, access shall be guaranteed by the State.

In view of these institutional requirements, we will review the Chilean particular solutions to drinking water and sewer service production. It shall be recognized this experience is essentially an urban reality not necessarily shared by many other countries in Latin America.

The Chilean reality has characteristics that have allowed particular institutional arrangements that are necessary to travel from state production of these services to this new production model, in which private companies, are expected to meet not only productive goals, but also social promotion objectives.

Conditions needed to legitimate monopoly private production are the existence of economies of scale, existence of transparent financial allocation mechanisms to express demand of poorest for such services, existence of agreements, and institutional arrangements preventing «information asymmetries» and «capture» of agents of public interest or its representatives, and finally a both transparent and objective tariff calculation method, flexible enough to respond to technological and reality changes in sanitary monopoly production conditions.

## Key Aspects

---

### State Duty

The twentieth century has witnessed a changing conception of the role of the State in economy from the liberal or dispensable approach, early this century, to an active State, involved in the market, until evolving (coming back?), since the eighties crisis, to a regulatory rather than producer State approach. The above has significantly affected sanitary service supply.

Since the 30s crisis, the idea of taking advantage of economies of scale of a natural monopoly was spread among Latin American relevant actors in



economic management related matters, in addition to the then increasing perception that the State was the only one able to guarantee equal access to assets considered as «basic» or «primary» at socially desired prices, as well as a null private corporate capacity and experience to provide these services. Other factors, such as, local economy upturns and development of emerging industry and engineering, explain the many reasons why production of these services was then awarded to companies under direct or indirect State control and budget, and that covered this service supply through national companies and institutions, centralised in urban zones and decentralised or municipal in rural areas, since the beginning of the XXTH century and until the eighties.

Significant sanitary investments were implemented in most of Latin American countries in the 30s and the 60s, which were not always successful from the social profitability point of view, since they did not benefit poorest urban sectors and rural locations. Since the 70s, and specially after the oil shock, previously implemented works were merely managed, without investing significant amounts in this service maintenance or facilities expansion, resulting therefore in provision impairment, leading to rationing and bad quality of water supplied, not to mention waste water related environmental issues. This impairment process was often accompanied by an always increasing current expenses (not investment) by the State owned companies which had, in turn, lower incomes by reason of inorganically subsidised tariffs and high delinquency levels, all of it in the middle of decreasing productivity, corruption, and inefficiency. Thus, public perception that state services are inefficient and corrupt took root, depriving its actions from legitimacy<sup>1</sup>.

Since mid 80s, and from the Latin American economic and social crisis scenario, international financing organisations and multilateral agencies promoted privatisations, among other structural adjustments, as a way to encourage

local economies, while closing deep fiscal deficit gaps. The latter was then the main variable explaining recession with inflation. On the other hand, European deregulation and privatisation experiences, in the same decade, with the creation of large private consortiums dedicated to this industry, benefited development of theoretical and institutional arrangements exercising powerful demonstration effect, making these privatising policies feasible.

Delegitimization of public service production, on one hand, and positive demonstration effect of privatisation policies, on the other hand, benefited adoption of policies transferring the sanitary service producer function to the private sector. However, this did not contribute to change public perception of sanitary services as a «basic» good into a «scarce» asset with price in a regulated market. This conviction will constitute one of most relevant political factors that, if not properly solved, may lead, in turn, to delegitimization of sanitary service privatisation, as a kind of drinking water, sewer and waste water treatment supply public economic policy.

We must combine a universal access guarantee to the basic sanitary service with effective payment of costs and efficient investments for the provision of such service. Given that in an efficient economic policy «who consumes, pays», financing must be provided to guarantee a minimum basic consumption to poor groups. This institutional arrangement must be objective and transparent in its origin and effectively destined to poorer groups; otherwise, its improper application may end up threatening private system survival, whether by insufficient incomes or delegitimization of a non-solidary system.

### **Institutionality**

Drinking water, sewer, and waste water treatment service supply, whether provided by the State or the private sector, requires an institu-

<sup>1</sup>/We have verified that although this is a generalised criticism, people often forget that generations of skilled engineers, truly devoted to public service, were developed under the protection of such institutions, allowing later these States to correct impairment processes through accurate diagnosis, applied to local particular situations, including now the private sector. In addition, the state company-university relationship allowed to encourage more than one true public sense vocation and to provide skilled labour required by our countries. But this topic will be discussed at another moment.

tional agreement between the principal (State or municipality) and the agent (company or concessionaire), clearly establishing rights and obligations of the parties, quick settlement of conflict methods, and sanction structures as per infringement nature, all of it with enough independence and treatment equity guarantees for the parties. On the contrary, the principal will receive the service with the quality and volume agreed in time for assigning the right to collect and receive tariffs for the so provided services.

This agreement may be given by a set of laws or decrees or an ad hoc agreement, that may be amended by law or through governmental decree. The higher legal status, the less immovable, the more inflexible, but more transcendent to vicissitudes of the occasion. On the contrary, the more private, the more flexible, but more subject to short term considerations for a basically long term activity.

In the Chilean case, ex Ante Agreement shall mean the legal regulatory framework. It is expected to express that such arrangement is independent from the governing administration and from the concessionaire company in charge thereof. Thus, this regulatory framework should strictly operate both for state and private producer companies, since it is independent from the origin of its capital and affects them as entities with a juridically independent nature.

Unfortunately, both experience and theory indicate that this is not so. On one hand, we have experienced, in the practice, that the State - represented by the Government - when faced to the conflict with consumers or workers of these companies, acts in accordance with its main objective: maintenance of social order and calm, sacrificing efficiency and self-financing objectives of these companies, with the already known consequences, incidentally providing evidences of improper behaviours in administration thereof. The framework then becomes «dead letter» when principal and agent are one and same person or institution.

On the other hand, we know that the cost of producing complex agreements (considering all current and future possible events) is unlimited. There is an optimised cost-benefit ratio for the number of variables to be controlled, depending on the particular situation of each company under discussion. Principal and agent, when represented by the State and the private sector, face then the need of agreeing upon contractual conditions under information asymmetries, that is, where one of them has better information than the other with respect to certain current and future variables.

Finally, this agreement between principal and agent has to make sure that the principal will act as a «consumer representative», looking for consumers' interests and not its own corporate interests. When the latter does not apply, we will talk about «capture» of the principal or regulatory entity.

Accrued experience and theory indicate minimum criteria to be taken into consideration in order to harmonically structure considerations of these agreements. As long as these considerations are present, the ex ante regulatory framework will allow to provide incentive enough to the sanitary sector to lead natural monopoly to «socially optimum» service supply levels, reflected in a maximum tariff structure, efficiently allotting resources available now and in the future.

### **Tariffs**

General criteria are given by this regulatory framework or ex ante agreement. Such criteria comprise tariffs, which shall allow natural monopoly to produce at socially desirable levels. In order to make this estimation, the principal shall have a specialised entity that is able to independently process all the information on the production function of the monopolist or concessionaire, and verify that its costs correspond to such of an efficient company. If not, it shall be allowed to obtain incomes only required to cover costs of such efficient company. Thus, it is encouraged to focus on such model company.



Calculation methodologies and information to be processed will vary from period to period depending on the company under discussion and available technology and technologic progress. Therefore, they are essentially dynamic and may change in time in accordance with permanent game rules, e.g., the concessionaire shall provide a thorough layout of its company per production stages and geographic zones or basins, although required at the beginning in the form of flow diagrams and, then, through GIS systems, on an aggregate basis, to start, and with a thorough level of detail in the future.

Such information will be used to elaborate a set of service quality parameters, such as, customer service, quality of drinking water and waste water effluents to be discharged into other water streams, chemical consumption indicators per drinking water production levels, in sum, all what is called company «benchmarking» to be exceeded period after period, as per the state of the art. This is the ex post agreement.

This agreement shall, in turn, be in accordance with the provisions contained in the ex ante agreement, which has previously established not only the negotiation methodology and this «benchmarking» determination with the regulatory entity, but also sanctions when goals are not fulfilled.

## The Chilean Case

During the last ten years, there has been a quick transformation of the institutional schedule regulating these services in Chile.

In the 80's decade, sanitary services throughout the country were entrusted to a state entity located in Santiago, which operated and constructed practically all the facilities of the country.

The State provided the funds required to carry out investments. Tariffs were determined based on crossed subsidies from regions with higher scale

economy and lower costs with respect to the rest of the regions of the country in order to satisfy the needs of the population regardless the real economic cost of rendering the supply.

In the years 1988 and 1990, this situation changes by defining a regulatory framework (contract ex ante) for the sector in 1988, eliminating the centralised state organism in May 1990 - which administered the service in regional companies (SENDOS) -, and being replaced for 13 regional companies distributed along the thirteen regions of the country under the form of joint stock companies, where the main partner is Corporación de Fomento de la Producción (CORFO), Fiscal owned development agency.

Autonomous nature of CORFO and the legal nature of the joint stock company favoured the autonomy and flexibility to administer companies. At the beginning, many executives and directors of these companies were former public officers of the Ministry of Public Works or from other regional public offices, which in the practice resulted in the fact that all the companies still operate with a high centralisation level through ad hoc entities created by the same executives and co-ordinated by the former Superintendent of Sanitary Services and the deputy manager of sanitary services from CORFO. Nevertheless, in 1993, there were a series of changes in the executive personnel (hiring them through public bid called by specialised companies of the field) and also in its members in the board, introducing new actors to the companies, who favoured the change and major autonomy thereof as these new hired people did. Finally, at the beginning of 1994, with the arrival of the government of Eduardo Frei, CORFO undertook important changes inside its own organisation in terms of reducing their size and modify their function or strategic targets, which implied to encourage the participation of the private sector a lot more in sanitary companies as a financing mechanism of the investment projects. This was a new signal for directors and executives of the companies with respect to the autonomy and responsibility of their charges. In fact, CORFO began to

manage companies as economic holdings, setting goals to directors and executives essentially related to investment returns on assets and equity capital, as well as a financial policy of investments and dividends payments. It was also motivated the access to private resources and capital markets.

Notwithstanding the above mentioned, the fact that the property was still owned by the State, was subject to and stimulated pressures of political parties and, on the other hand, the outcome of this management was part of the «public sector» fiscal results item with all the pertinent implications from a macroeconomic point of view. In turn, the need to finance wastewater treatment projects throughout Chile demanded resources amounting to US\$ 2 billions between 1995 and 2000, which cannot be satisfied due to macroeconomic restrains. All this encouraged the Government to set a tight schedule for private capital incorporation for different sanitarian companies.

The effective regulatory framework on that time was comprised by three properly sanitary laws in addition to their regulations plus two complementary laws: one Subsidy Law for consumers of poor resources and rural drinking water and the General Law of the Environment which sets forth the regulatory framework controlling these subjects and their relation with sanitary companies.

The first of these properly sanitary laws is the Decree with Law Power (DFL) 382, that provides the sanitary concession areas of the companies having indefinite expiration date; the form to obtain the terms used by the authority to reply and the forms to deliver said concession are regulated, as well as the conflicts, terms and resolution forms and the rescission of the concession<sup>1</sup>. The DL 70 sets forth tariff principles that will affect the concessionaire and it is completed by its regulation<sup>2</sup> that states the tariff calculation formulae that will be applied both by the concessionaire and the regulating entity. The Law N° 18,902 dated January 1990 originates the autonomy of the regulating entity or Superintendent of

Sanitary Services, establishes its function plant, the origin of its budget, its powers and role.

In order to have access to the private finance through stocks subscription, it would be necessary to implement legal modifications to companies' incorporation. Taking this objective into consideration, in year 1995 the Government submitted for the Parliament's approval the proposed law that strengthen the sanitary regulatory framework and enables the incorporation of private capital. As counterpart, the members of the parliament limited the Executive the maximum of private property to companies, impeding the Chilean State - through CORFO - to have less than 35% of the equity capital of each of said companies. This law (Law N° 19,549 dated February, 1998) was put into force at the beginning of 1998.

- The regime of sanctions applicable to sanitary companies is modified for not complying with the regulations in force. The maximum penalty is raised from one thousand monthly Unidades Tributarias [taxable units] to ten thousand Unidades Tributarias yearly.
- Consistency is provided between the limits of the concession area and the urban extension areas as defined in the corresponding territorial planning instrument.
- The Law is incorporated with a title referred to quality in users attention and service rendering of drinking water and sewage.
- Special regulations for the segment of large consumers is determined in order to generate drinking water offer or waste water treatment service competence thereof.
- Restrains to property of sanitary companies are set forth:
  - It prohibits that one same investor or operator participates in property of a number of companies higher than 49% of the total number of companies per group (large, middle or small).
  - It prohibits that one same investor or operator participates in property of a number of companies which total of customers for drinking water and sewage is over 50% of the total customers in the country.

1/Its regulation is put into force through the Supreme Decree DS N° 121 of the Ministry of Public Works.  
2/Its regulation is put into force through the DS N° 453 of the Ministry of Economy, Development and Reconstruction.

- It prohibits that individuals or group of individuals who are under the control or have decisive influence on the administration of utilities concessionaires that are natural monopolies of local electric or telephony distribution - which number of customers exceeds 50% of the total users in one or more of these services in the areas under the concession of the sanitary services company - participate in the property of said sanitary company.
- In regards to tariff system;
- It increases methodology accuracy, clarity and transparency and related to procedures to calculate and determine tariffs. It decreases asymmetry of information with the service render establishing the exchange of tariff analysis, improvement of procedures to solve discrepancies all of which determined a dichotomy verdict of the experts' commission.
- Simplification to calculate the capital cost rate.
- Eliminate two of the three previously existing fixed charges.
- Higher transparency and involvement in pricing process, making public the process backgrounds, the analysis exchange act, the expert's agreement or verdict act, as well as to enable public involvement in the observations made to the conditions of tariff analysis.

This tariff system in force prevents the sanitary company, regardless its public or private ownership, to collect tariffs not corresponding to the efficient real cost of providing the service. Such a system shall allow recovering the profitability consistent with the invested capital.

The 13 sanitary companies show scale economies in spite the fact they were originated in a more administrative rather than technical segmentation. Nevertheless, those economies could be improved by regrouping some of them, whose limits are given by the costs related to diseconomies of concentration. It is likely that with the incorporation of the private sector, those regroupments will anyway be implemented considering the obvious advantages implied.

Subsidy law guarantees that in the case of families in poverty conditions, between 20 and 80 percent of their invoice is directly paid by the municipality until reaching a maximum consumption per month of 20 M3.<sup>1</sup> Likewise, the rules subsidising the tariffs in the Rural Drinking Water sector are determined.

The regulatory framework described is addressed to balance «asymmetric of information» and prevent the «capture» of public agents by empowering transparency upon disclosing basic information in pertinent terms in order to calculate tariffs structure.

In general terms, the information should state if service production levels supplied are socially approved and if they were delivered with the quality and opportunity levels as set forth during the tariff approval process. The problems with this regulatory framework arise in what we call «fine tuning».

It is relatively easy for the authority to expropriate flows from companies transferring them to users through the use of a «target or model company» which is not possible to reach in reasonable periods.

In order to prevent the above there is a three experts' commission that judge discrepancies between the parties. In general, the determining party is the third expert or the commonly agreed expert. He usually seeks a «third technical way» (equal distance between the firm and authority proposal), which has been strongly criticised as an improper incentive to over or understate the real tariff value.

Within the experts commission there are alternative technical solutions proposed to the company whose discussion in global terms is sufficient due to their low tariff gravitation nature. Nevertheless, discussion in the commission is often concentrated in those solutions whose result is very relevant in relation to the final tariff (basins, conductions and distributions stations).

<sup>1</sup>/From the end of the 70's decade, the government undertakes an annual survey through the National Planning Ministry according to the Municipalities of the country and it is intended to identify families in poverty or extreme poverty conditions. With this information the Municipality requests the funds to the Sub-Secretariat of Regional Development in order to cancel the invoice of drinking water and sewage for the target groups. In turn, the Treasury Department in the Annual Nation's Budget assigns resources destined to the Sub-Secretariat of Regional Development for these purposes. Thus, the proper implementation of this mechanism depends on the efficiency of the mayors and the organisational skills of the beneficiaries to claim it.

After determining the optimised technical solutions and real unit prices to which they could be implemented, the application of the tariff calculation is trivial and well defined.

Nevertheless, there are still important disagreements between the company and the authority with respect to the levels and periods where marginal economies of scale and productivity peaks implied in the calculation model are achieved. Thus, in spite of agreements reached in the experts commission related with company's optimum lay-out, the parameters used by authorities and firms in final computations will still differ, driving into further differences with respect to final optimum tariff.

In sum, all these regulatory and operational breaches resulting from the regulatory framework impose high risk levels to the company and also to the authority,<sup>1</sup> leading both to valuate the search of a tariff agreement entered into before solving discrepancies in the experts' commission, where the calculation model and its procedures could just be a justification to reach the tariff previously agreed, but whose practical result has no economic meaning or rationality and in consequence, no statistical utility either for future comparison purposes. This could happen in compliance with the current Chilean legislation and modus operandi in force. ■

<sup>1</sup>/The main risk for the authority is that in the expert's commission and through the calculation model, it obtains a tariff without possible public presentation with mayor political consequences. This is particularly true in the current situation where the result of the tariff negotiation will be seen by the public opinion as the direct effect of the private capital incorporation policy, originating thus a demonstration effect in front of any eventual similar policy encouraged by the Government.



# Appendix

## Changing Management Control from Public to Private Sector

---

### Starting Point

- Changing management control from Public to Private sector requires previous minimum institutional arrangements.
- These arrangements deal with (i) attaining socially desirable production at socially acceptable costs and (ii) having equality and non discriminating access to what public opinion considers a «public good».

### Water Monopoly in Private Hands?

- This is the first institutional and political challenge to be address.
- Its very same existence is justified as long as there exists:
  1. Economies of scale in w & w distribution,
  2. Transparent financial allocation mechanism to express poorest demand for W&W services,
  3. Existence of an institutional framework preventing «information asymmetries» and «capture» of agents of public interests or its representatives and,
  4. Transparent and objective tariff calculations method flexible enough to adjust to technological and «reality» changes.

### The Regulation of Monopolies in W & W

- The Chilean regulated monopolistic w & w industry is an urban reality in water distribution only; it does not deal with rural areas nor with water production or wastewater disposal.
- Water rights in production and the right to operate a water distribution concession in urban areas belong to the Chilean state. A set of rules with law status established the conditions for

granting and withdraw both rights by the water and concession authorities.

- Tariff structure are set according to optimum (social) marginal costs of production of the company.
- These tariffs have further adjustments as to allow self-financing «sunk costs» of the firm. Its the long term medium costs (CTLP) of the company.
- Procedures have been set forth as to avoid «asymmetric information» (accountability) and «capture» (SISS budget & authority allocation system).

### W & W Industry is Competitive with respect to Inputs

- Framework grants competition at potable water supply and production as well as for sewerage disposal or treatment
- Also grants competition when firms demand civil works construction, outsourcing services or else in order to fulfill SISS required maintenance, capital program or improvements in operational productivity
- Regulatory framework has divided w & w companies as «large», «medium» and «small». No individual group can have direct or indirect control in more than half of the companies in one of these branches
- No individual group are allowed to control more than half of Chilean total urban customers
- Thus new facilities and input prices competition has facilitated collection of a statistically significant prices «benchmarking» allowing the regulator to optimize its cost control and tariff regulation of water distribution monopolies

## W & W Industry is heavily regulated with respect to Output

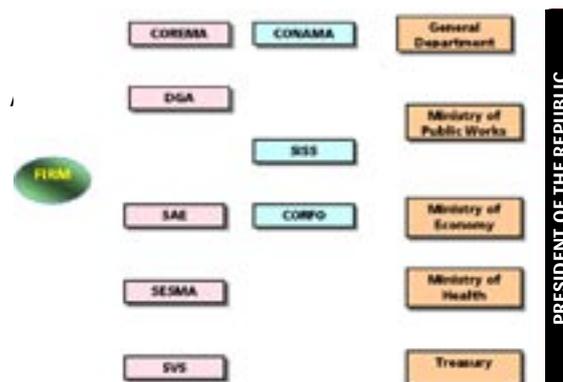
- Regulator has budget and administrative autonomy to control output parameters related to water and sewerage quality, customers services, refundable loans granted by developers, water losses and environmental rulings related with wastewater disposal.
- Water and wastewater quality: sampling numbers per month and places
- Customers services: subsidies allocation, call center quality, filing and recording calls, emergency calls, answering control systems and timely return of calls, billing system, tariff information, micro-metering precision, operations links, etc.
- Financial forms returning Refundable Financial Loans (AFR) made by developers to w & w companies: files control, financial terms and conditions.
- Water Losses: pressures in the network and supply continuity. Burst and failures control.
- Environmental Control: w & w companies are responsible for proper disposal of industrial liquids (RILES) as well as for sludge disposal from wastewater treatment plants.

## Subsidies insure equal and non discriminating demand

- MIDEPLAN, Planning and Development Ministry, performs a periodical survey targeting poorest groups per Municipalities across the country (Encuesta CASEN).
- With identified poor families (ficha CAS), water subsidies between 35 to 70% percent of their consumption are allocated according to their social condition.
- W&W companies coordinated with Municipalities subtract the subsidized portion from poorest customers invoices.

## Regulation

Simplified Scheme of the Entities that Regulate the Sanitary Sector



## Ex ante & ex post Institutional Framework in Chile

- This Chilean regulatory framework allowed private participation in monopolistic distribution of W & W companies granting social desirable production as well as non discriminating and equal access to these services
- Transparent and duly marketed international open bidding for selling a controlling package of shares in these companies created competition that strengthened and obtained payment of a social desirable yield over these state owned assets
- Water shortages, over-consumption and contamination have been stopped by the application economically efficient tariffs optimizing the use of renewable but scarce water resources.

## PPP : its Impact in Governmental Budget and Customers Account

### Direct Economic Benefits to the State resulting from Privatisation

#### Amounts Paid per Operator Investor

Privatised Companies	% Strategic Partner	Date	Amount Paid par value U\$ m
Esval	40.6	April 1999	190
Aguas Andinas	51.2	September 1999	1,147
Essal	51.0	November 1999	94
Essel	51.0	March 2000	128
Essbio	42.0	November 2000	283
Essam	Concession	May 2001	146
<b>Total</b>			<b>1,988</b>

Note: The amounts paid include capital increase.

#### Relevant Indicators

Company	Total Value Company (*) (par value U\$ m)	Company / Ebitda A Value (times)	Company / Capital Equity Value (times)
Aguas Andinas	2,240.8	26.71	4.33
Essal	183.34	25.25	2.65
Essel	250.00	29.20	3.74
Esval	466.98	18.56	1.96
Essbio	672.79	29.26	6.19
Essam (*)	145.69	6.9	2.06

(\*) Calculated on a basis at paid price per strategic partner

(\*\*) Concession

EBITDA. Incomes before taxes, depreciation and provisions.

#### Sale performance

- Resources amounting to US\$1,988 millions were obtained for the sale of companies.
- The price paid ranged between two and six times the equity capital of the companies.

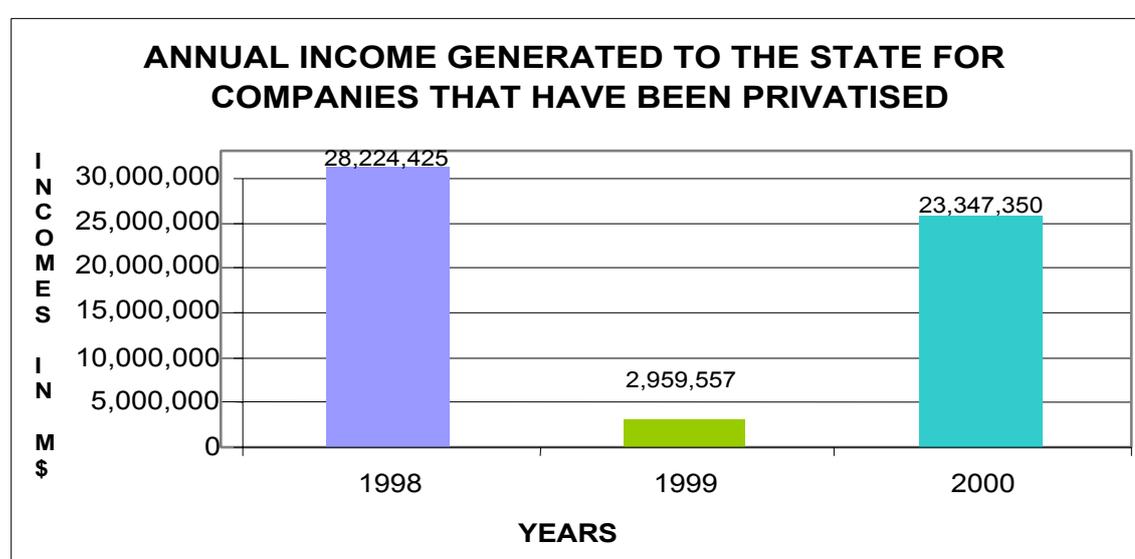
EBITDA concept is how much in value is the capacity to generate the cash flow of a company after paying its direct operation expenses, namely, how much resources are available as product of the operation (operational result) in order to face the payment of debt, taxes, dividends to shareholders, etc.

As it could be observed in the above described chart, said number of times amounted to about 27 times for privatisations and 7 times for concessions.

Conclusion: Purchasers pay more for one company if it is provided with the shares. Actually, FOUR TIMES MORE.

### Operational Results after Privatisation

Privatised Companies	Incomes Generated For the State ( ch\$ th )		
	1998	1999	2000
Esval	-7,026,474	-5,563,582	3,433,334
Aguas Andinas	24,859,997	6,248,582	18,262,284
Essal	1,447,799	-3,814,220	618,790
Essel	2,014,045	-1,024,432	996,698
Essbio	6,929,058	7,113,209	36,244
Essam			
<b>Total</b>	<b>28,224,425</b>	<b>2,959,557</b>	<b>23,347,350</b>



With 50% of the companies' property it is observed that incomes are practically the same as those generated with 100%.

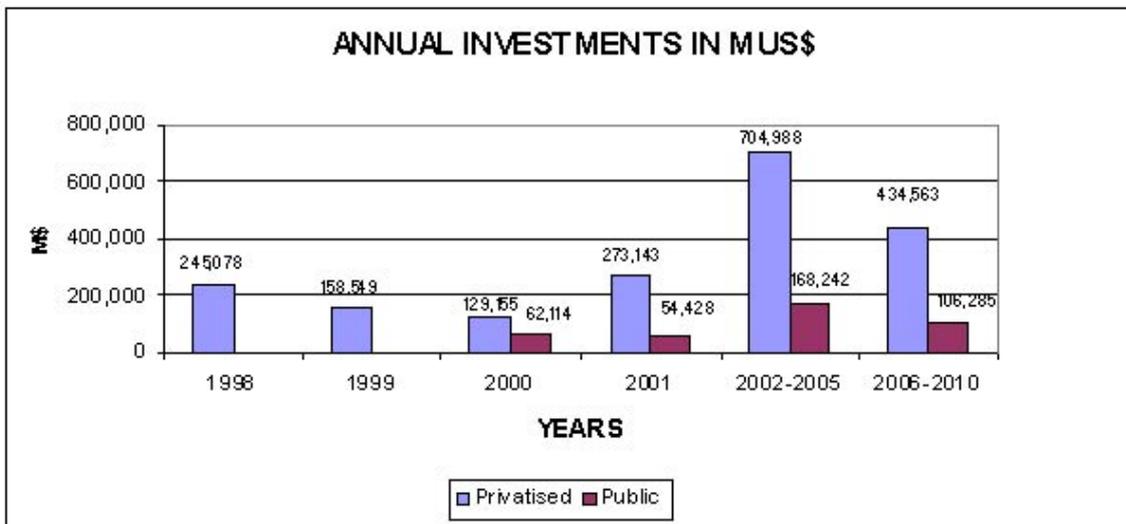
### Investments of W & W Companies

#### Evolution of total investments in public and privatised companies

##### Investments in Thousands of US\$

	1998	1999	2000	2001	2002-2005	2006-2010
Privatised			129,155	273,143	704,988	434,563
Public			62,114	54,428	168,242	106,285

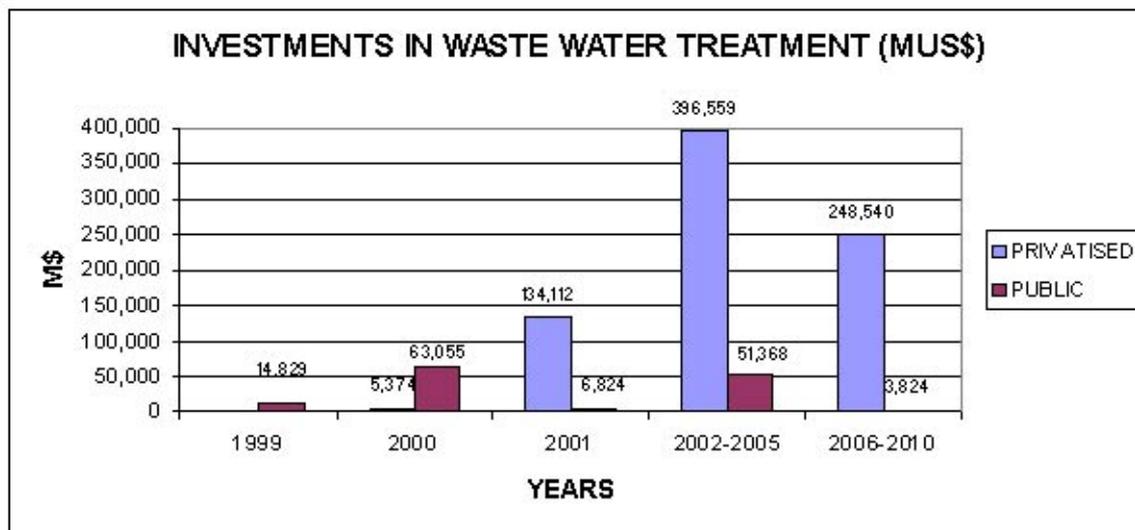
note: dollars in each years value.



#### Evolution of investments in waste water treatment in public and privatised companies

Investments in Thousands of US\$					
	1999	2000	2001	2002-2005	2006-2010
Privatised Companies	14,829	63,055	6,824	51,368	3,824
Public Companies		5,374	134,112	396,559	248,540

note: dollars, march 2001

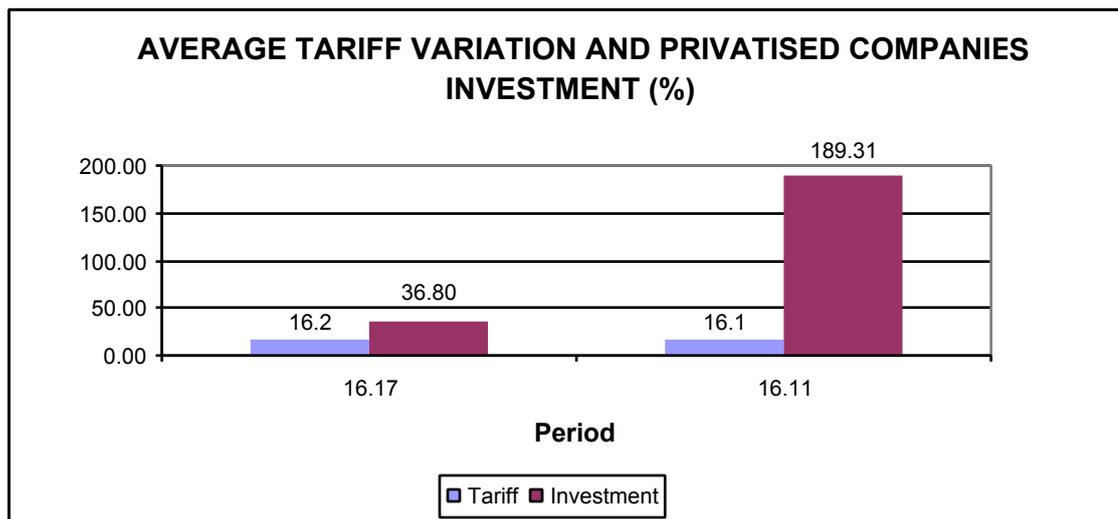


One of the objectives of privatisation is accomplished. The investment in waste water treatment during the years 2000 - 2001 for privatised companies reached up to 197.2 MMUS\$. Projections for the period comprised between 2002 and 2010 of these companies amount to 645 MMUS\$.

## Ratio between Annual Investments and Annual Incomes

	Annual Investment / Annual Income ratio			
	1998	1999	2000	2001
Privatised Companies			0,364	0,768
Public Companies			0.483	0,420

During 1999 all the companies of the sector are considered.



Source: Years, 1998, 1999, 2000 and investments 2001: SISS Annual Management Report  
Incomes Year 2001, projected considering an increase of 6%.

Note: For the Year 2001 incomes of Aguas Andinas consider the tariff application for El Trebal during all the year.

- The investment / income ratio is notably increased in the year 2001 in privatised companies.
- Between the year 1999 and the year 2000, privatised companies carried out the projects of the works, which began to be materialised from the year 2001. During the year 2000, some of these works are initiated.
- In the year 2001 privatised companies executed investments for a value amounting to 63% of incomes.

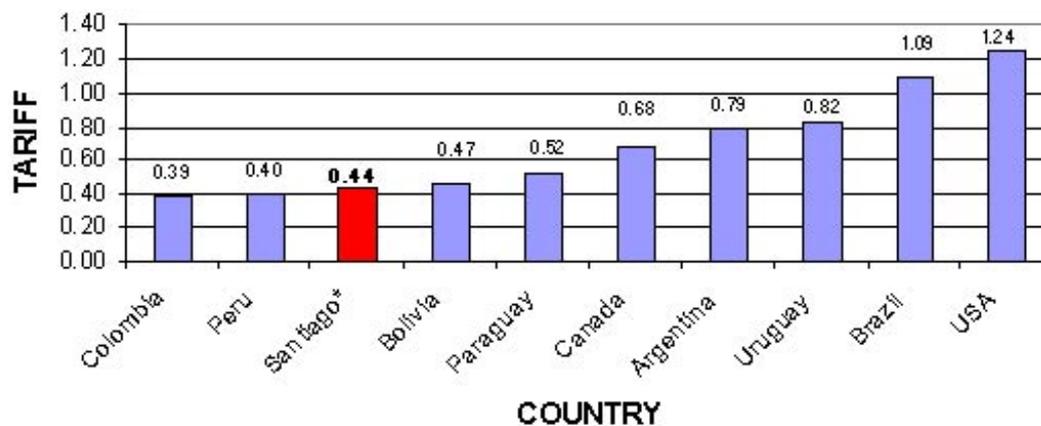
## Tariffs

### Tariff comparison at an American level, year 2000

Countries of America	Tariff US\$ / M <sub>3</sub>	Countries of America	Tariff US\$ / M <sub>3</sub>
Colombia	0.39	Canada	0.68
Peru	0.4	Argentina	0.79
Santiago*	0.44	Uruguay	0.82
Bolivia	0.47	Brazil	1.09
Paraguay	0.52	USA	1.24

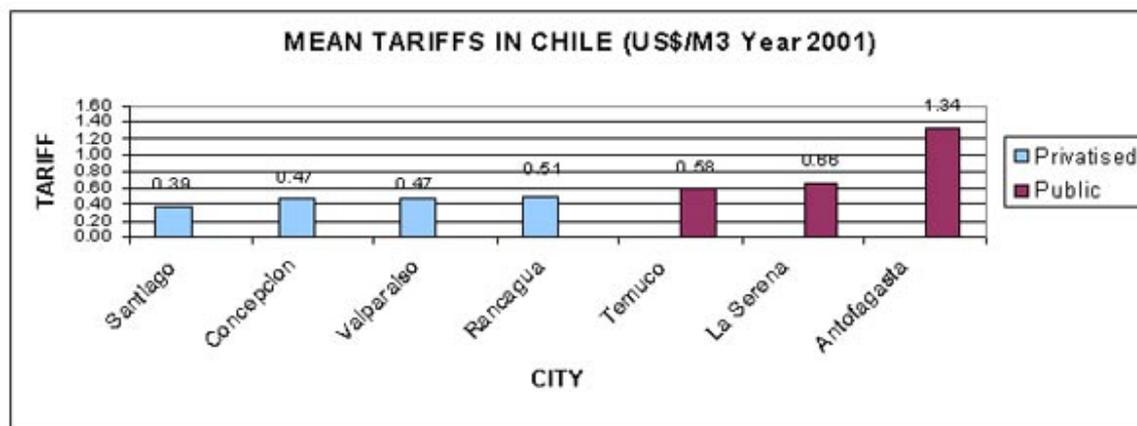
\* Source: OMS - OPS - CEPIS Evaluation 2000

## SANITARY TARIFFS IN AMERICA (US\$/M3 Year 2000)



### Tariff Comparison in Chile

Chilean Cities	Mean Tariffs US\$/M3 Year 2001	Chilean Cities	Mean Tariffs US\$/M3 Year 2001
Santiago	0.39	Temuco	0.58
Concepción	0.47	La Serena	0.66
Valparaíso	0.47	Antofagasta	1.34
Rancagua	0.51		

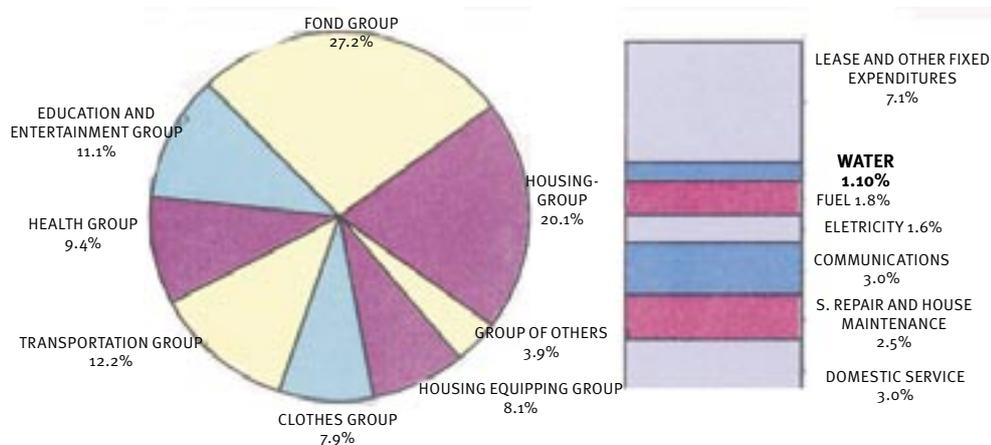


Source: Santiago: Aguas Andinas; Other Cities: Trade Chamber of Antofagasta

## Impact of the account of sanitary services within the family budget.

### IPC [Consumer Price Index] Basket Composition

Group	PERCENTAGE (%)		
Food Group	27.2%		
Group of Others	3.9%		
Housing Equipping Group	8.1%		
Clothes Group	7.9%		
Transportation Group	12.2%		
Health Group	9.4%		
Education and entertainment Group	11.1%		
	Lease and Other Fixed Expenditures	7.1%	
	Water	1.1%	
	Fuel	1.8%	
Housing Group	20.2%	Electricity	1.6%
	Communications	3.0%	
	S. Repair and House Maintenance	2.5%	
	Domestic service	3.0%	



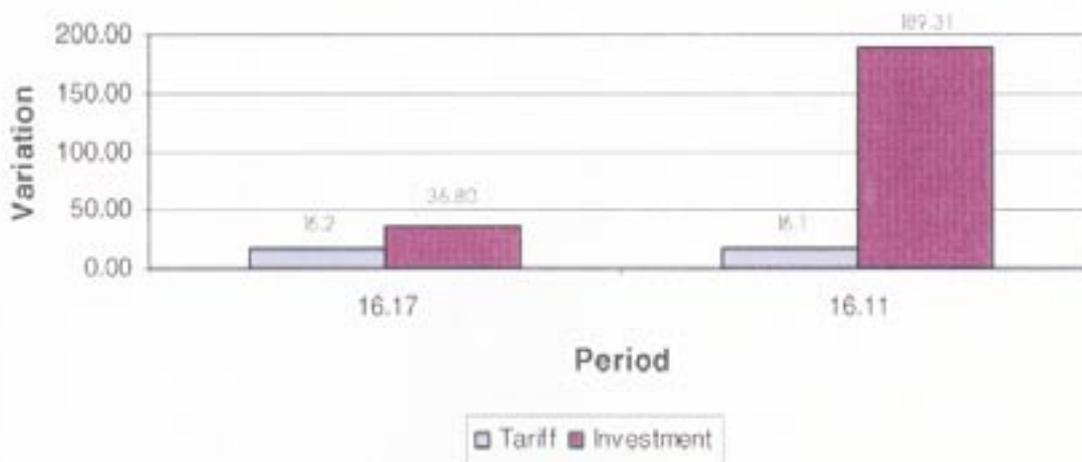
Monthly estimation per capita income 475,000 Chilean Pesos

Average monthly account per month 4,904 Chilean Pesos

### Ratio between increased tariffs / increased investments in privatised companies

AVERAGE TARIFF VARIATION AND PRIVATISED COMPANY INVESTMENT (%)		
PERIODS	TARIFFS	INVESTMENT
1999-2000	16.17	36.80
1999-2001	16.11	189.31

## AVERAGE TARIFF VARIATION AND PRIVATISED COMPANIES INVESTMENT (%)



Within the 1999 - 2001 period, average projected tariff in privatised companies increased in 16.1%, while investment increased in 189.3%.

A poor family, from the first income quintile, does not spend more than 20 cubic metres/month, while a high income family may reach 15 to 20 times this amounts, especially during summer. Therefore, subsidies channelised through tariffs will leave better off richer as compared to poorest income groups.

Conclusion: a low tariff is REGRESSIVE from the income distribution point of view.

«Tariff shall be as high as necessary to cover operating and investment return costs required to provide the service». «THE POOREST SHALL BE GRANTED A DIRECT SUBSIDY PAYING ALL OR PART OF THE CONSUMPTION.»

Thus, the party using the service will pay the corresponding price, and the State will efficiently protect poorest people through a direct subsidy.

### Tariff Evolution

#### → First Tariff Process: 1990

- Medium increase 75.7%
- Maximum increase 469.0%
- Minimum increase 7.3%

#### → Second Tariff process: 1995

- Medium increase 6.9%
- Maximum increase 24.0%
- Minimum increase -1.2%

#### → Third Tariff Process: between 1999 and 2001 (Provisional figures)

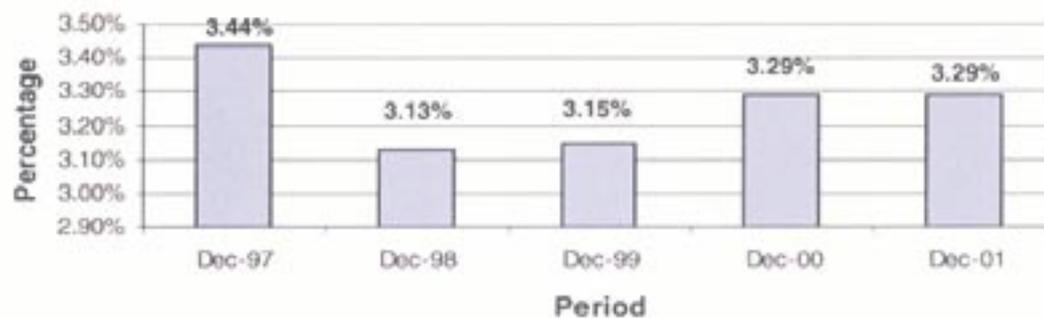
- Medium increase 19.5%
- Maximum increase 43.5%
- Minimum increase 1.3%
- Increase for treatment addition
- Of 17 companies, an Experts' Commission was summoned in 4 (EMOS, ESVAL, ESSAL, and ESSAM).

## Bad Debts Evolution.

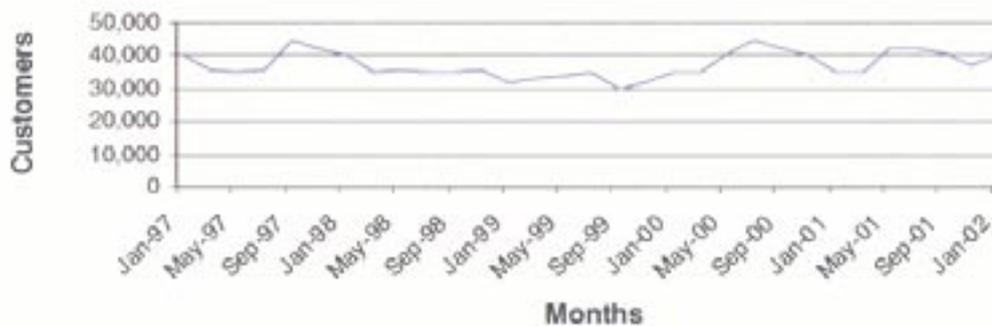
Evolution of bad debts by Aguas Andinas' customers

PERIODS	PERCENTAGE OF DELINQUENT CUSTOMERS > 3 MONTHS
Dec-97	3.44%
Dec-98	3.13%
Dec-99	3.15%
Dec-00	3.29%
Dec-01	3.29%

**PERCENTAGE OF BAD DEBT CUSTOMERS >3 MONTHS**



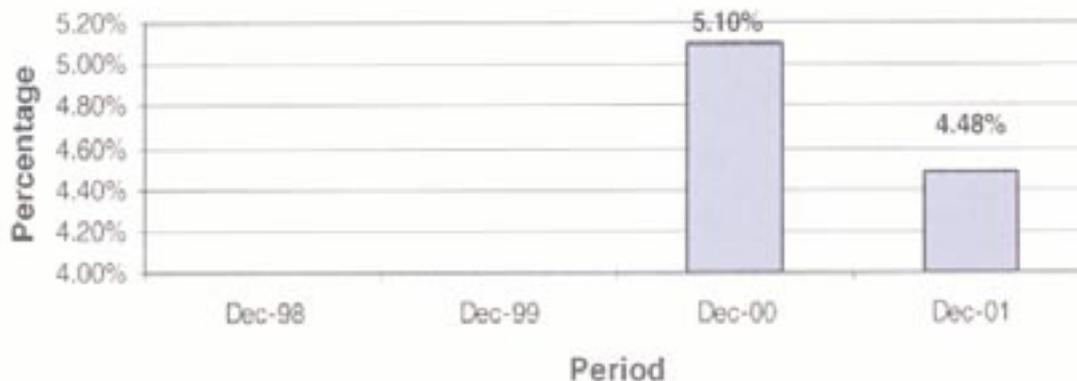
**PERCENTAGE OF BAD DEBT CUSTOMERS >3 MONTHS**



Evolution of delay in payments by ESSEL's Customers

PERIODS	PERCENTAGE OF DELINQUENT CUSTOMERS > 3 BALANCES
Dec-98	S/I
Dec-99	S/I
Dec-00	5.10%
Dec-01	4.48%

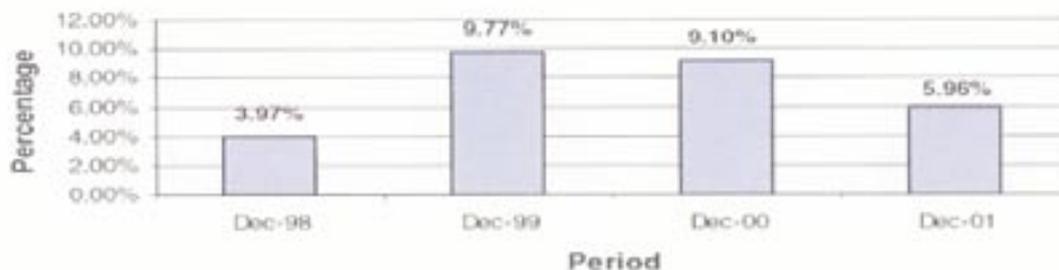
**PERCENTAGE OF BAD DEBT CUSTOMERS >3**



Evolution of delay in payments by ESSBIO's Customers

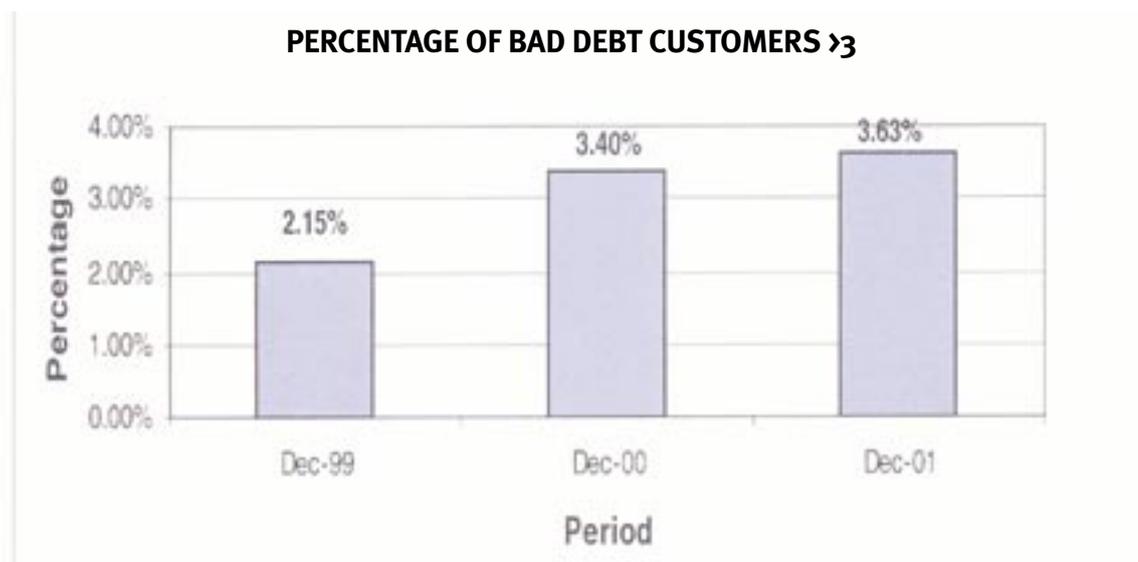
PERIODS	PERCENTAGE OF DELINQUENT CUSTOMERS > 3 BALANCES
Dec-98	3.97%
Dec-99	9.77%
Dec-00	9.10%
Dec-01	5.96%

**PERCENTAGE OF BAD DEBT CUSTOMERS >3 MONTHS**



## Evolution of delay in payments by ESVAL's Customers

PERIODS	PERCENTAGE OF DELINQUENT CUSTOMERS > 3 BALANCES
Dec-99	2.15%
Dec-00	3.40%
Dec-01	3.63%

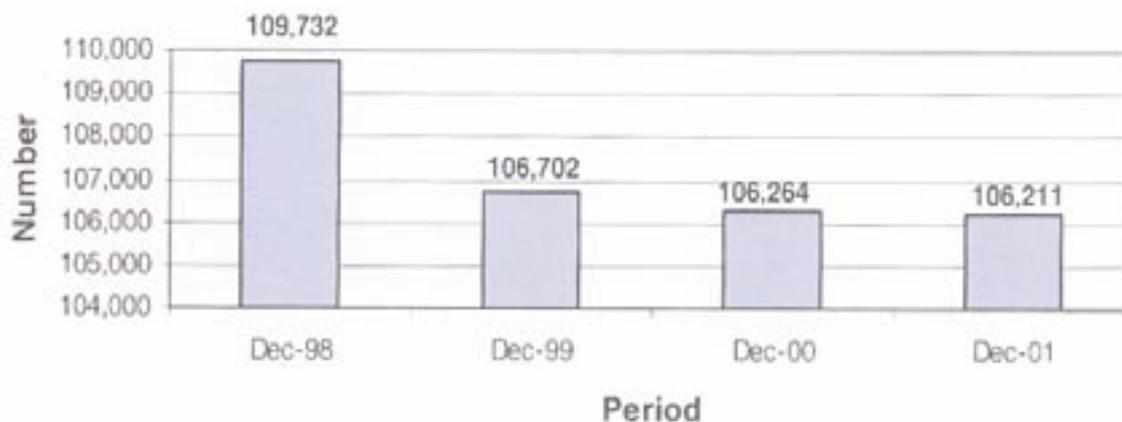


## Subsidies

### Historic Evolution of the Existing Subsidies

PERIODS	NUMBER OF THE EXISTING SUBSIDIES (AGUAS ANDINAS)
Dec. 98	109,732
Dec. 99	106,702
Dec. 2000	106,264
Dec. 2001	106,211

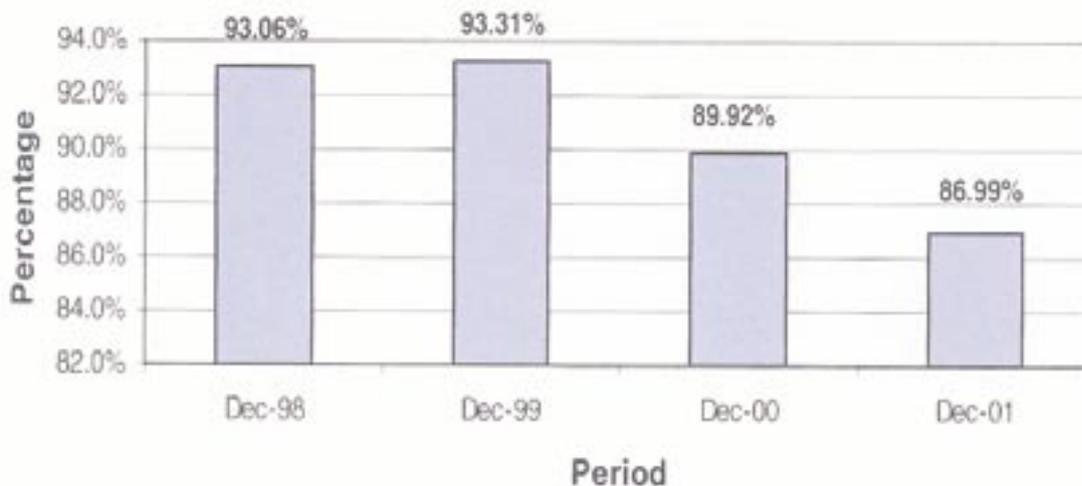
## NUMBER OF THE EXISTING SUBSIDIES



### Percentage of use of subsidies in Aguas Andinas

PERIODS	% OF USE OF SUBSIDIES IN A. A.
Dec. 98	93.06%
Dec. 99	93.31%
Dec. 2000	89.92%
Dec. 2001	86.99%

## PERCENTAGE OF USE OF SUBSIDIES IN AGUAS ANDINAS



## Number of Subsidies and use percentage of ESSEL, ESSBIO, ESSVAL

	Year	Quota Available	% OF UTILIZATION
ESSBIO	1998	69,970	0.97
	1999	69,970	0.99
	2000	71,470	0.98
	2001	71,470	0.99
ESSEL	1998	S/I	
	1999	17,816	0.97
	2000	17,816	0.92
	2001	17,816	0.95
ESVAL	2000	69970	89%
	2001	69940	94%

## Conclusions

1. The state has released resources that it would have had to spend in the sector, in addition to receiving resources from private parties (stock sales) to allot them to other uses in the last three years, amounting to over \$ 2,500 million dollars.

This is equivalent to four years of full budget of the Ministry of Housing, or 1.6 years of health full budget, or 1.2 years of full education budget.

2. In 5 years, the country will be able to meet international environmental standards that are unavoidable to obtain free trade agreements.

3. Subsidies is a guarantee of no discrimination in consumption. Thus State contribution will be focused on the poorest, who are not the biggest consumers.

4. State ownership keeps a significant share in W & W companies, which has increased its value after privatisation. In addition, it currently receives the same dividend as when it owned 100%

5. The superintendence shall be strengthened, since its total budget has been cut-off.

1998	UF 182,000
1999	UF 198,000
2000	UF 211,000
2001	UF 200,000
2002	UF 198,000

Total budget contained in the budget law for each year.

6. Consumers have had a similar tariff increment as compared to previous periods (1990-1998) in exchange for more and better services. ■



# Water and Sanitation Utilities in Santiago: a Privatized System

**Mr. Carlos Mladinic**

President, Sistema de Empresas Publicas

---

## Background

---

Before the recent modernization of the sanitation system between 1989 and 1990 -which gave rise to the current legal framework- water and sanitation was supplied by the State through the National Service of Sanitation Works, «SENDOS» (Servicio Nacional de Obras Sanitarias), ESVAL (Region V) and EMOS (Metropolitan Region).

This process separated the State's regulatory and corporate functions and SENDOS was divided into state-owned stock corporations. Regulatory actions were then assumed by the Superintendency of Sanitation Services (SISS, Superintendencia de Servicios Sanitarios).

Act No. 18,777 authorized the State to render services in Santiago through EMOS and through ESVAL in the urban areas of region V. Likewise, Act No. 18,885 authorized the creation of other eleven companies, one for each of the country's regions, corresponding to the former regional SENDOSs. Pursuant to Act No. 18,885, CORFO would own 99% of the water and sanitation companies and the Chilean State would own the remaining 1%. Under Act No. 18,877, 35% of ESVAL and EMOS would be owned by the State and 65% by CORFO. These acts prevented the privatization of the regional sanitation companies, as they required the State to keep at least 51% of the shares.

On the other hand, the Development Plans for the sanitation companies involved considerable investments which amounted to approximately US\$ 1,548 million for the 1999-2003 period. Of

such amount, only US\$ 792 would be allocated to sewage treatment works. Hence, the issue at stake was how to finance such investments without diverting resources from other areas with higher-social returns.

The former Frei Administration set forth an Action Plan which involved water, sewerage and, sewage treatment goals. Such Plan made the sanitation companies accountable for the compliance of their investment plans and the Government's policy. At that moment, the Government was preventing the allocation of financial resources to sanitation, in order to prioritize investments with higher social returns: such as education and health. Consequently, sanitation companies would have to finance such investments with resources coming from the depreciation of their own fixed assets and the alienation of their dispensable assets. Therefore, the State decided to restrain from providing fiscal resources to those companies, to restrain from reducing its 100% annual earnings' dividend distribution policy, as well as to restrain from authorizing any indebtedness by such companies, as that would involve public indebtedness. It should be reminded that public enterprises' debts have an implicit or explicit State warranty, since from a conceptual point of view, there isn't much difference from the State's collateral that secure bank deposits. In other words, it involves an overall fiscal commitment and therefore has an impact upon resource allocation and social priorities in terms of expenditures. On the other hand, it was evident that investors would not be willing to invest in any company controlled by the State.

Therefore, the participation of the private sector in any company wanting to fund its investment plan with private capital could not be less than 51% of its equity.

In 1995, and after five years of experience with the new institutional framework, the regulatory framework required to be strengthened as to allow for private sector participation in the ownership of sanitation companies. Thus, this regulatory framework was strengthened by the amendment to Act No. 19,549 enacted in February, 1998, which provided an aggregate ownership of at least 35% by the State and CORFO in the thirteen companies, except by ownership dilution due to capital increases not underwritten by the State and/or CORFO. This enabled the privatization of such companies.

## Regulation of the Sanitation Sector

---

The Chilean Sanitation Sector is regulated by the Superintendency of Sanitation Services (SISS), a public agency established in 1988 through Act No. 18,902, the purpose of which is to supervise drinking water and wastewater sewage utilities and enforce the regulations of such activities. The SISS is a decentralized agency with independent funding, which depends on the President of the Republic through the Ministry of Public Works. Its tasks are as follows:

- To analyze, qualify, and manage applications for concessions;
- To periodically review price levels (pricing);
- To enforce the application of technical and regulatory standards associated with drinking water quality, pressure, and service continuity, and sewage service continuity;
- To enforce the compliance of technical and regulatory standards referred to the quality of wastewater and industrial liquid waste (RILES, in its Spanish acronym) effluents into the receiving bodies;
- To enforce the compliance of technical and regulatory standards referred to service connections

and public drinking water and sewage utilities applicable to the compliance of the commitments of sanitation companies;

- To enforce the proper application of prices and collection procedures;
- To enforce the fulfillment of the Development Plan;
- To enforce the compliance of legal and regulatory standards regarding the use of the Reimbursable Contribution and Price Indexation System;
- To carry out selective and multidisciplinary field enforcement programs; and
- To impose penalties to companies pursuant to law.

In Chile, the State grants unlimited-term concessions for the construction and operation of sanitation systems in a specific area. Concessions are free of charge for the applicant company, provided that specific requirements are met, such as: i) being a stock corporation only devoted to the drinking water and wastewater sewage business; and ii) that a development plan is implemented for the concession area. The concessions granted by the State are safeguarded by the Property Rights honored in the Chilean Constitution. Water and sanitation companies or concessionaires are responsible for maintaining the quality level in customer service and supply, as well as for the maintenance of the water and sanitation system up to the customers' premises. The concessionaire is also obliged to provide the service to anyone who requests it within the concession area. The SISS can request the interconnection of different concessionaires' services, in order to preserve the technical conditions of the supplies and to guarantee the system's overall efficiency.

### **Empresa Metropolitana de Obras Sanitarias, EMOS S.A. (Metropolitan Sanitation Works Utility)**

---

EMOS was established in 1977 as the result of a merger between Empresa de Agua Potable de

Santiago (EAPS), Servicios Sanitarios Santiago Norte, and Administración de Alcantarillado de Santiago.

In 1999 (when it was privatized), EMOS was the largest Chilean sanitation company, with annual earnings by US\$ 159,5 million in 1998. The company served 1.12 million drinking water customers and 1.09 million sewage customers. Its domestic market share was above 35%. EMOS' concession area covered most of the Metropolitan Region, including Santiago -the country's largest city and its capital- and its adjacent districts. Within this concession area, the company served an overall population of more than 5 million inhabitants.

EMOS owns the four types of existing concessions in the sanitation service sector, i.e., drinking water production and distribution, and wastewater collection and disposal.

At the moment of its privatization, EMOS's coverage for drinking water was 99.8 %, 97.3 % for sewage, and 3% for wastewater treatment.

In 1998, EMOS made investments by US\$60.3 million, a figure which represents a 29% increase related to 1997. However, the Development Plan for 1999-2009 foresees investments by approximately US\$ 1,600 million. A large share of this amount will be devoted to wastewater treatment works, which are foreseen to be completed by 2009, covering 100% of wastewater treatment in the Metropolitan Region.

## Capital Investments in the Sanitation Sector

---

As mentioned above, Act No. 19.549 enacted on February, 1988, amended the regulatory framework, setting forth an aggregate ownership of the State and CORFO of at least 35% in the thirteen companies, except due to ownership dilution from capital increases not underwritten by the State and/or CORFO.

The amendment of the regulatory framework had the following purpose:

- To create similar level competition by limiting the horizontal integration of sanitation companies;

- To regulate operations among related companies
- To restrict and penalize real-estate speculation
- To restrict the concessions of different utilities within the same geographical area;
- To improve the price-fixing system;
- To improve the rules that govern infringements and the possibility to forfeit concessions;
- To strengthen the SISS.
- To establish arbitration procedures for dispute-resolution; and
- To protect the interests of the consumers.

The Chilean Government established the incorporation of private capitals in the Chilean sanitation companies. This policy was aimed at relying on the contribution of private resources and know-how to fulfill the Investment Plan, specifically in terms of wastewater treatment.

Public-private partnerships were designed by the Council of the Chilean Economic Development Agency -CORFO- based on a case by case study of the most appropriate way to incorporate private capital, depending on each of the company's characteristics.

During the former Frei Administration, a schedule was approved for the incorporation of private capitals in those five sanitation companies with the largest financing deficit in their development plans. The list was headed by ESVAL and followed by EMOS, ESSAL, ESSEL, and ESSBIO, in that order.

The model for the incorporation of private capitals in the sanitation companies consisted on the sale of a block of shares that would transfer the administrative control to the operator-investor; a sale of up to 10% ownership to the companies' workers; and another 10% of shares in a public offering at the stock exchange targeted to both institutional and natural investors.

## EMOS S.A. Capital Incorporation Process and General Background

---

The state-owned agency Sistema Administrador de Empresas - SAE-, a CORFO Committee in charge

of managing the companies where CORFO has participation, was the entity responsible for the bidding process called to incorporate private capital in sanitation companies. For the case of EMOS S.A., SAE hired the following advisory services:

- i) Investment Banks: Bice Chile Consult, N M Rothschild & Sons, and Abn Amro. Their task was to act as selling agents, assessing de company's value, supporting the development of the bidding conditions, and the company's due diligence processes.
- ii) General Counsels: Law firm Morales Besa y Noriega in charge of developing the bidding conditions, sales contract, shareholders' agreement, and the assessment of the legal background of pre-qualified bidders, among others.
- iii) Technical certification of EMOS assets: Consorcio Halcrow (English engineering company), ICSA (Chilean sanitation engineering company). Their work was to issue an independent opinion on the quality, condition, and operation of the company's infrastructure.

### **A) Strategic and Dispensable Assets**

- 1) Assets considered as strategic were not included in the bidding process, such as: Laguna Negra, the El Yeso reservoir, Quebrada de Ramón, and Rural Drinking Water Systems, in addition to other dispensable assets not related with the operation of the concession.
- 2) EMOS had earnings amounting to approximately US\$ 120 million, which were withdrawn by its shareholders: CORFO and the State, before the bidding process. Part of this amount was used for the acquisition of the aforementioned assets by CORFO from EMOS.

### **B) Workers**

In 1997, when the Bill providing for the incorporation of the private sector in sanitation companies was being discussed, CORFO entered into a Framework Agreement with the Federation of Sanitation Workers, FENATRAOS, establishing the benefits incumbent on each company's

workers upon its privatization. The Framework Agreement is a summary of the agreements reached by the Government's negotiating commissions -represented by the SAE Committee-, on the one hand, and FENATRAOS, on the other, in representation of sanitation company workers affiliated to the Federations' member unions. This Agreement was a satisfactory solution both for the Government and for the workers represented by FENATRAOS, and the culmination of a negotiation characterized by mutual confidence, good faith, and the commitment that the incorporation of private capital in sanitary companies would be completed with full protection of the workers' rights.

The main aspects of the Framework Agreement are as follows:

#### **1. Eligible beneficiaries:**

- a) Workers who at the moment of the applicable privatization choose to liquidate their seniority in terms of their severance pay, keeping all their remaining labor rights;
- b) Workers being permanently separated at the moment of or after the privatization, with the express statement that they would not be hired again.

#### **2. Labor Rights Protection**

Upon privatization, workers would keep all their individual and collective rights pursuant to the Chilean Labor Law. (Labor Code Art. 4th).

All workers would have the right to receive an additional compensation for the time performed in the company and their antecessors, that is not covered by the contractual compensation.

Payment of an additional compensation due to higher vulnerability to those workers that would be permanently separated from the company during the privatization process or within the specified terms. Vulnerability involves the following: service years; old age but not old enough for retirement; health; working disability; labor market problems; and number of children.

### 3. Workers' Compensation

EMOS workers were entitled to receive their applicable severance payment, with no seniority ceiling and with no 90 Unidades de Fomento (Chilean price level restatement unit) ceiling as established in the Chilean labor laws. Concurrently, they were entitled to an additional compensation equivalent to 12.5 days for each service year. Workers separated from the company after its privatization were entitled to receive an additional compensation equivalent to 12.9% of their severance pay due to vulnerability reasons. Workers that did not choose to acquire company shares were entitled to an additional 50% compensation.

### 4. Sale of Shares to Workers

Pursuant to Act No. 19,549, workers are entitled to acquire shares for up to 10% of their own company's equity, with the proceeds of their severance pay and a credit granted by CORFO.

EMOS workers were entitled to choose either:

- i) To acquire shares in cash with the proceeds of an advanced payment of their severance pay, at a price equal to approx. 60% of the Controller's tender value (\$109.7/share).
- ii) To acquire shares with a CORFO credit at a price equal to 70% of the value paid by the Controller (\$129.9/share). The CORFO credit was awarded under the following terms:
  - Term: 18 years.
  - Final payment of the commitment: At the end of the term.
  - Adjustability in Unidad de Fomento.
  - Interest: 5% annually, with an annual maturity matching the dividend payment term.
  - Guaranty: Collateral on behalf of CORFO.
  - Abrogation: Option to abrogate the acquisition by workers during the first five years.

This credit awarded by CORFO meant that, in average, workers were entitled to buy shares on credit for up to 7 times their cash acquisition. However, in the aggregate, EMOS workers only bought 3.4% of the company's shareholding.

### C) Mechanisms Used in the Sale of EMOS S.A. Shares

- 1) Sale of the «Strategic Participation» consisting of CORFO shares in EMOS.
- 2) Capital increase underwritten by the controlling partner;
- 3) Shareholders' agreement securing control and imposing restrictions on the operator-investor;
- 4) Sale -at the Stock Exchange- of a percentage of existing shares to institutional investors and the general public, at a minimum price equal to 80% of the price paid to acquire the control;
- 5) Alternatively, the controlling partner commits itself to acquire the shares required for the company to stop being a state-owned company, at the same price of the Stock Exchange offer;
- 6) Overall, the Controlling Partner acquired existing shares belonging to CORFO and capital-increase shares for approximately 42%, and additionally, a share «put» not sold at the Stock Exchange that finally amounted to 9%, which adds up 51 % of the company's equity.
- 7) A 10% share offering to the company's workers, pursuant to the provisions of Act No. 19,549

### D) Values Involved in the Process

The process resulted in the following:

CORFO -GOVERNMENT Earnings	EMOS US\$ million
Bid for the controlling share block	515.7
Sale of shares at the Stock Exchange	19.4
Additional acquisition by the controller	209.3
Sale of shares to workers	77.4
Total	821.8
Capital increase	445.8

Thus, the shareholding is now the following:

Ownership	%
Inversiones Aguas Metropolitana	51.2
CORFO	44.2
AFP's	1.29
Others	3.31
Total	100.0

## **EMOS Controlled by Inversiones Aguas Metropolitana.**

---

The consortium Aguas Metropolitana, which belongs in equal parts to Aguas de Barcelona and Suez Lyonnaise des Eaux, became awarded with 51.2% of the EMOS shareholding, taking over its control on September 14, 1999. The challenge of the new EMOS controller was to continue the Sanitation Plan, allowing for: a) pollution abatement of wastewater and effluents of the Metropolitan Area of Santiago, returning clean waters to their natural streams or using them for any other application, such as irrigation of 130,000 hectares devoted to agricultural crops with clean water thereby fulfilling environmental standards; b) a positive change of the environment, improving the quality of living of the population; c) social and economic savings due to improved health conditions of the population and its environment; d) lower risk of enteric and endemic diseases resulting from the consumption of vegetables irrigated with wastewaters; and 2) positioning the city of Santiago at the level of other large cities of the world in terms of water decontamination.

Currently, important steps have been taken in terms of pollution abatement of the Metropolitan Santiago valley, for instance with the commissioning of the El Trebal Wastewater Treatment Plant, with an overall investment amounting to US\$ 150 million. EMOS' Development Plan foresees the treatment of 100% of the city's wastewaters up to 2009.

The company has decided to advance its investment program, which amounts to a total of US\$ 781 million for the 2000-2005 period. Approximately 62% of this flow, i.e., US\$ 483 million, will be devoted to fund wastewater treatment. Thus, it is estimated that 70% of the Capital city's waste water will be treated on 2004, benefiting a population of almost 5 million people both in social and economic terms.

The construction of the La Farfana Wastewater Treatment Plant was awarded in February 2001,

with investments by US\$ 315 million. This will be among the world's five largest plants.

On the other hand and as part of this large scale project, the construction of the San José de Maipo Wastewater Treatment Plant is progressing in the Maipo area, as well as the applicable Buin Oriente, Alto Jahuel, Linderos, and Paine system.

As a result of this decision to advance investments for the construction of sanitation works, 70% of Santiago's wastewaters will be treated as from the beginning of 2004, and 100% before the year 2009. Such decision involves resources for almost US\$ 483 million, benefiting a population of close to 7 million people before 2010.

## **Operational Management from the Point of View of CORFO as a Shareholder.**

---

The capital increase by US\$ 445,8 million supplied considerable resources to the company, allowing it to acquire -in 2000- a 50% ownership of Agua Manquehue and 100% of Aguas Cordillera, as well as the public water utility Villa Los Dominicos. This placed the company in a privileged service position in one of the areas with the highest urban growth potential in the valley of Santiago, and positively impacted its non-operating results.

The company's consolidated profitability has been preserved, increasing from 10.12% in 1988 to 10.39% in 2001.

Fiscal year 1999 is not an adequate year for comparisons, since due to the company's ownership transfer there were many expenditures that negatively impacted the year's earnings. In fact, EMOS assumed the costs of the special staff severance payments, all of which resulted in a 3.2% return on equity which is not representative of the company's actual potential.

The evolution of net earnings has been outstanding:

### Income Statement

Item	1998	1999	2000	2001
	Million \$	Million \$	Million \$	Million \$
Operating Income	83,445	80,108	100,907	107,077
Operating Costs	-52,121	-57,544	-61,410	-67,279
Operating Results	31,324	22,484	43,543	48,099
Earnings of Related Companies			4,498	7,609
Earnings	27,655	14,297	42,600	47,638
Return on Equity	10.12%	3.21%	9.35%	10.39%

As shown, earnings in 1998 -which are representative for the company's normal management before privatization- amounted to \$27,655 million, which compare with earnings in 2001 amounting to \$47,638 million. This means a 72% increase. This dramatic increment results from a price increase after the last negotiation with the SISS, and reductions in operating expenditures due to an efficient management.

From the point of view of CORFO, the owner of

44.17% of the company, the results for 2001 imply dividends amounting to approximately \$21,000 million, which positively compares with the \$27,655 million that it received by the way of dividends for 1998 earnings, when its ownership amounted to 100% of the company.

In addition, there are two events that took place during fiscal year 2001 and which are worth of mention: the modification of the company's corporate image and the creation of AGUAS ANDINAS on October 25. ■





# The Waste Water Disposal Plan in the Santiago Basin

## The Aguas Andinas vision

**Mr. Laurent Brunet**

C.O.O. Aguas Andinas

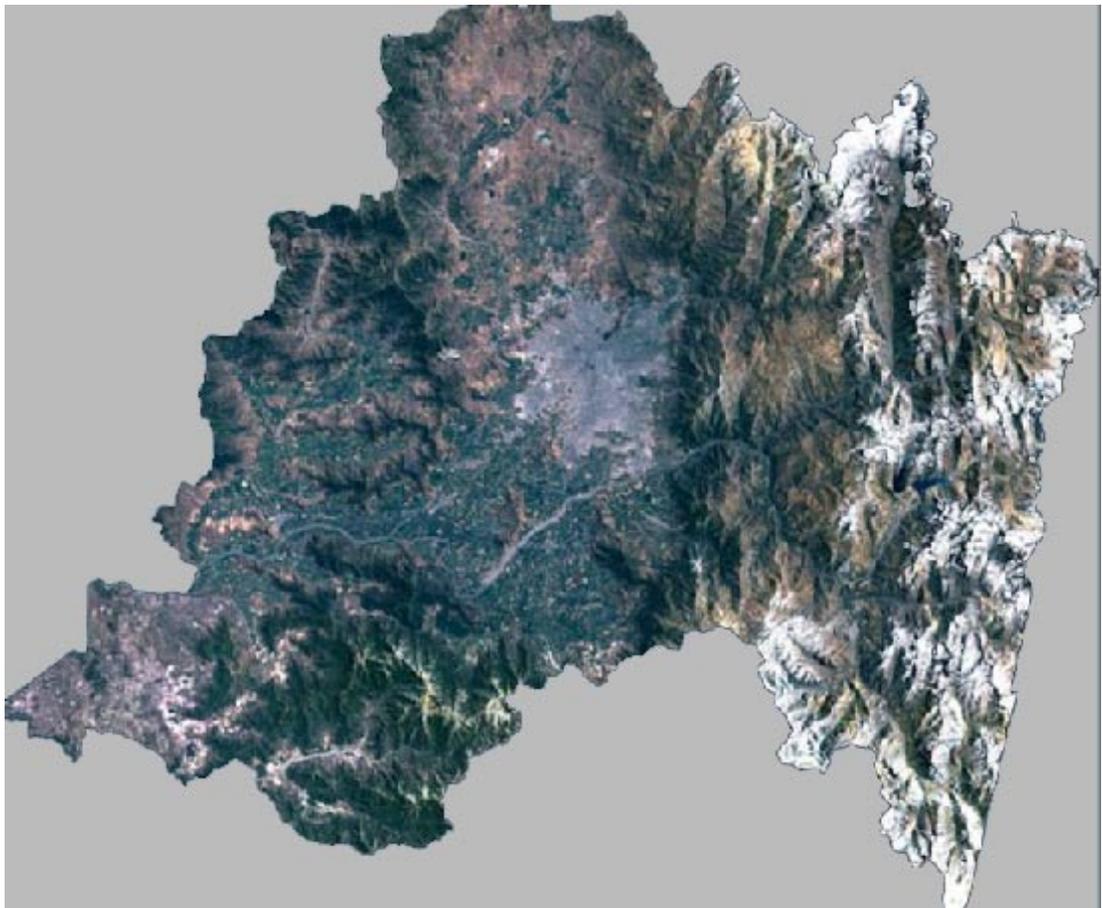
---

### General Background

---

In the Santiago Basin, located in an intermediate hollow in Central Chile limited to the north by the

Cuesta de Chacabuco escarpment and to the south by the Angostura de Paine Pass, and crossed by the Mapocho and Maipo rivers, Aguas Andinas operates to serve a population of some 6 million, distributed in Greater Santiago and its outskirts.



Both the Mapocho and the Maipo rivers have a low pollution level upstream from the city. However, after crossing town, they receive the direct outflow of waste water produced by its inhabitants. As the flow of these rivers is very low during the dry season, the degree of pollution downstream from the city is very high.

Downstream from urban areas there are large spreads of cultivated fields which have traditionally been irrigated by canals fed with waters from the aforementioned rivers. The health risk produced by this context is a matter of deep concern.

This critical public health problem was met until the early nineties, essentially due to the high investment required to solve it. The breakout of a cholera epidemic at that time generated the awareness that the problem could not be postponed any longer.

To meet and solve this problem, the State decided to privatize the sanitary utilities, trusting that the private sector would have the necessary financial resources and technical expertise for the pertinent investment plans. The State set as a goal that the problem should be solved, with 100% of the country's household waste water treated, by 2010.

is reference shareholder. The rest of the stock is held by CORFO (Development State Agency) (44.2%), company employees (3.4%) and minority shareholders (1.3%).



Two years after privatization -without considering the waste water disposal plan, which will be mentioned further on- we may say that, in gross lines, the main objectives and first achievements of the privatized company have been met.

Aguas Andinas defined its mission as «providing a full life for inhabitants of the Santiago Basin», and to this purpose started its Vita Plan in 2000, with the goal of re-energizing the organization, strengthening customer service, contributing to improve the environment in the Santiago Basin and strengthening company efficiency, as symbolized by a «Triangle



## Privatization and Vita Plan

In September 1999, after an international bid, Aguas Andinas (EMOS at that time), the main franchisee of sanitary services in the Metropolitan Region, was privatized, with control of the company going to Sociedad de Inversiones Metropolitanas Ltda. (51.2%) -a company owned 50% by Ondeo, of the French Suez Group, and 50% by Aguas de Barcelona, wherein the Suez Group

of Commitment» with its clients, shareholders and employees.

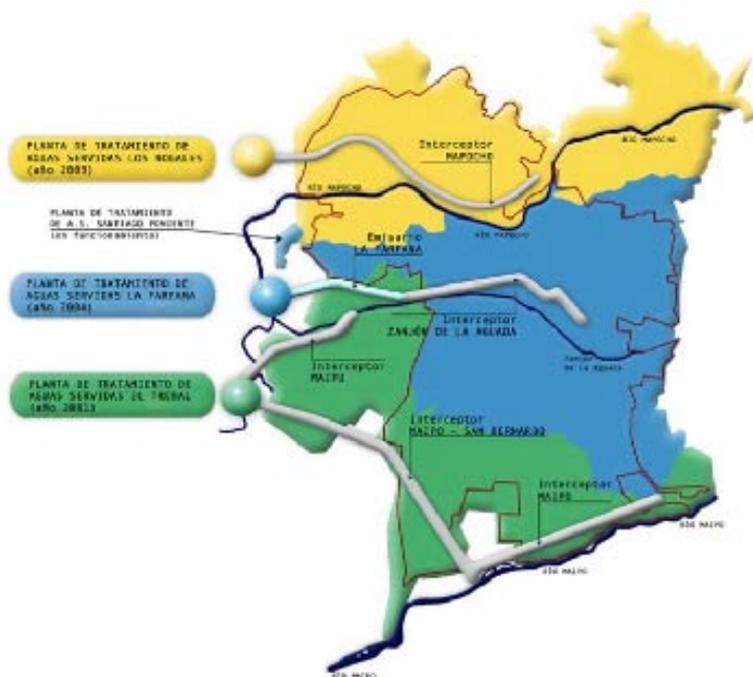
The first results attained by the Vita Plan are as follows:

- Decentralization of the operation and breakup of Santiago into four Zones, plus a fifth Zone that serves outskirts areas, thus reflecting the company's commitment to have an organization that is closer to the client.
- Each Zone is responsible for its commercial and technical aspects, and has the challenge of improving company profitability in each of these, while providing timely, efficient customer service.
- In this sense there is a great commitment with company personnel insofar as to provide them with the necessary training to adapt to this new vision and to use the technological tools brought in by the company, and to strengthen the development of their capabilities.
- This creation of Zones and provision of new technology has resulted in better client

service, reducing by 75% the average time required to solve a claim (in drinking water, from 2 days down to half a day, and in waste water, from 3 days down to half a day).

- Likewise, as to the commitment with employees, in the organization we are developing a culture of safety, which is vitally important to a service company.
- All this internal change reflects in a new corporate image that is apparent both inside and outside the organization. The essence of this identity involves recreating the link with the Santiago Basin inhabitants and environment.

## The waste water disposal plan



The waste water disposal plan for the Santiago Basin considers building three large treatment plants.

El Trebal Plant, with a 4.4 m<sup>3</sup>/sec. capacity, is to treat the waste water from the city's southern zone; Farfana Plant, that from the central zone; and Nogales Plant, that from the northern zone.

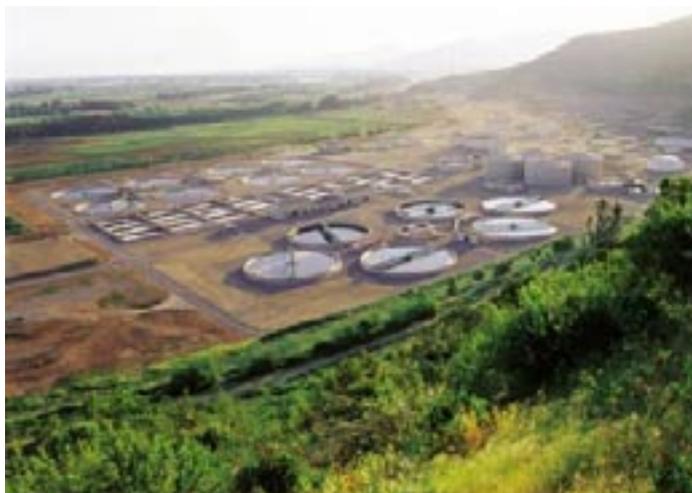
Besides these three plants, thirteen additional plants will treat the waste water of Metropolitan Region outskirts locations.



As a result of the Company's decision to advance the construction of La Farfana Plant (in one stage rather than in two, as originally planned), 70% of the waste water of Greater Santiago will be treated in 2004.

Two years after it started, the waste water disposal plan shows remarkable progress.

El Trebal Plant began operating two months ahead of schedule, thus warranting the purification of 23% of the Greater Santiago waste water.





Up to 3.000 people were employed to work at the site. As is usually acknowledged, every direct working position translates into 3 positions in total (including building material suppliers, sundry services such as transportation, etc.), so it may be said that this project has generated some 10.000 job positions throughout several months.

Farfana Plant, which will treat 8.8 m<sup>3</sup>/sec. and

will be the largest plant in Latin America and one of the 5 largest in the world, is now under full construction.

Two of the thirteen plants in outskirts locations, San José de Maipo and Paine, are already operating, thus contributing to the goal that by early 2007 one hundred percent of the waste water of outskirts locations will be treated.



## Conditions for the success of the Waste water disposal plan

Up to this time, the execution of the Waste water disposal plan has been positive, as the commitments as to start-up of waste water treatment plants have been excelled.

Among the elements that have contributed to this positive balance the following stand out:

### A stable legal framework for the Sanitary Sector

At the time of undertaking substantial investments, this is a basic requirement as it determines their profitability.

Concessions are not granted by contract, as there is a legally established framework approved by the Congress. There are four legal bodies that support said framework: the Sanitary Services Superintendence Act, which lists the functions, rights and obligations of this organization; the Sanitary Services General Act, which regulates the Concession System and the Service Quality; the Fee Act, which groups the fee calculation methods, formulas and administrative procedures; and the Subsidization of Demand Act. This legal framework provides great strength to the Chilean Sanitary System, as well as a high degree of confidence to the several parties operating under it.

Such a framework also becomes essential when the Company has to address financial markets in order to obtain financing, as the risk premium demanded by said markets depends, of course, on the Company's stability and, therefore, on the framework under which it operates.

Thus we may say that in the financial area Aguas Andinas has attained an excellent standing and investor confidence, as shown by the AA+ rating

granted by Feller Rate and Humphreys to the two bond series issued by the Company this year for US\$30 million and US\$45 million, with paying-off periods of five and twenty one years, in each case.

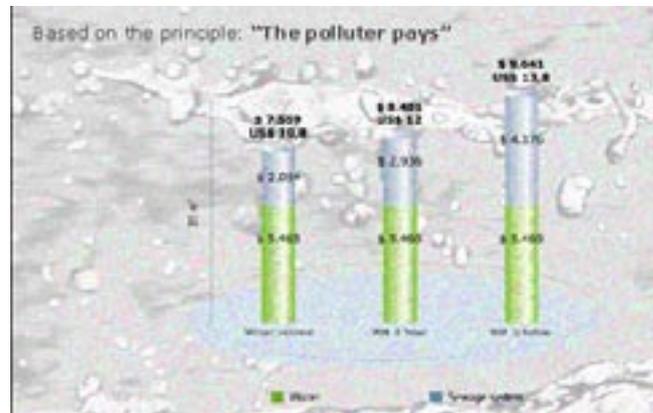
### Experience of Strategic Partner

This experience has made it possible to provide the pertinent drainage projects, in a very short period, with all the necessary know-how and technology for them to be as efficient as possible, as well as with large-project management experience for their materialization in remarkably short periods.

But the final success of the Waste water disposal plan as a whole is more than just the technical-financial success of the investment projects. This Plan is a reflection at company level of a National Project resulting from the political decision to solve in a given period the problem originated by non-treated waste water in several income sectors. Global success does not depend only on private enterprise, but rather on a strong cooperation between the public sector and the private sector in social, environmental and economic aspects.

### Social Aspect

The waste water decontamination system is based on the principle of «Who pollutes pays». Therefore, since each Water & Sewer Utility Service user is a «polluter» because of the waste water he/she drains, it is his/her responsibility to pay for the



cost of decontaminating said water. In short, this translates into an increase in water service fees when the treatment plants start operating.

TRATAMIENTO DE AGUAS SERVIDAS  
(PRE-BOCA/PIÑAS)

m <sup>3</sup> /usuario	\$/MES			
	CUENTA ACTUAL	P. EL TREBAL (ENERO 2002)	P. LA FARFANA (ENERO 2006)	TICAN
10	3.289	336	495	4.121
15	4.712	505	745	5.962
25	7.559	842	1.240	9.641
40	11.829	1.347	1.985	15.161

Actualizado a 30 de mayo 2007 - precios en  
Línea de costo real de los servicios.

Though we may point out that said increase is moderate, it is necessary that it be accepted by the community in general. Otherwise, the feelings for having to pay more for a recently privatized utility may be exploited politically and turn into a loss of credibility in the Company, resulting in negative consequences in the three sides of the «Triangle of Commitment»:

Clients: Wary of Company behavior

Shareholders: Reluctant to consider new investments

Personnel: Unmotivated in their daily work.

Such an acceptance involves several angles:

- **Communication:** This means explaining the need to solve a problem that has severe consequences, as well as the way in which it will be solved. To this purpose, Aguas Andinas developed a strong communication plan prior to the start-up of El Trebal. But such a campaign is not enough unless it is complemented with a visible communication policy by the State in support of the project as a whole, stressing that it is an important part of the National Project and that it is being carried out as a result of a political decision and not simply of a private initiative.

- **Control function of the State:** It is necessary that the community feel protected before a Company that operates within what said law defines as a «Natural Monopoly». Thus, the Sanitary Services Superintendence is the agency responsible for maintaining a balance between the interests of consumers and those of private enterprises. In this sense, the efficiency of the regulatory system is considered a key element for the success of this large scale project. As for attaining efficiency in this system, the State should pursue steps to avoid bureaucracy and politicized decisions, and to attain a balance between the requirements of quality and service, versus the fees that companies are allowed to charge.

- **National Solidarity:** But the State also performs a solidary role with the poorest people, by means of state subsidies distributed by the Municipalities, which are used to pay part of the water bill of said beneficiary clients. Therefore, it is necessary that great attention be devoted to the optimal use of such subsidies. Likewise, at the time of adding new services, it would be desirable that the State also increase the amount of subsidies, proportionately.

### Environmental Aspect

For the existence of waste water treatment plants to become a long-term, sustainable environmental improvement, there are some essential topics that must be considered and solved: Sludge or Bio-solids, and the Global Quality of catchment rivers and waterways.

Large-scale treatment plants such as El Trebal and La Farfana produce large amounts of sludge. Though the treatment process at said plants provides for the stabilization of this sludge, its final destiny is an important concern for the plant operator. In Chile, there are several ongoing programs developed jointly by Aguas Andinas and the Ministry of Agriculture, in order to study the possible use of said sludge as fertilizer or as farmland refill. The first results are positive; however, mass

use by farmers will require much cooperation from farming-related public agencies.

As for the global quality of rivers, the start-up of treatment plants should be considered as the first step in a global policy of protection/recovery of the quality of the country's waterways, as their decay is due to many reasons; pollution from household waste water is just one of these. In this sense, the National Environmental Commission (CONAMA) has declared that one of its priorities is to define the goals of river quality, as well as programs to attain these.

### **Economic Aspect**

Among the economic parties for whom the materialization of a waste water disposal plan may have important consequences we must point out Industry and Farming.

Industry has seen an increase in the requirements as to discharge of special industrial waste fluids (RILES) into the sewer networks. There is a mandatory schedule for RILES implementation in each company, that is related to the start-up of the different waste water treatment plants.

For the company that operates the waste water collection and treatment system, these regulations represent (insofar as they are respected by industry) an important warranty, as an uncontrolled discharge of liquid wastes may produce important failings in the (network/plant) treatment systems and may also compromise the quality of the sludge produced by the plant, thus also compromising sustainable uses as previously described.

For some industrial companies, this reflects in a need to face either investments or additional costs to be paid to the treatment company, should it be able to undertake the treatment of surplus loads emptied into the network. The State may cooperate with advisory and financial assistance in clean-production programs (aimed to incorporate less-polluting techniques into industrial processes), and the

company may provide advising and propose service contracts in order to treat all or part of the RILES.

A large part of the task of control and penalizing has been entrusted to the sanitary company, as it has the power to shut-off sewer service if the discharge standard is not respected. Though the sanitary company must apply this measure (which in many cases may mean that the industrial establishment has to shut down temporarily) with caution and much criteria, it is essential that the State agencies involved respect this authority, as any contrary «pressure» might be interpreted as a signal that is contradictory to the political will to decontaminate the Basin.

As for farmers, the benefits of the waste water disposal plan are basically related to the suspension of limitations as to the kind of crop that may be grown, which were established in order to limit the health risk resulting from irrigation with highly polluted water. This translates into an increase in the value and quality of farming production, and improves the image for international markets. This latter aspect is particularly important for a strongly exporting economic sector in view of recent free-trade agreements the country has entered. The materialization of this benefit requires a conversion of the type of crop, a change in irrigation technology, etc., for all of which an incentive policy would be highly beneficial.

### **Conclusion**

Fully in accordance with the mission of «providing a full life to the inhabitants of the Santiago Basin», the Company is intent on carrying out the Santiago Basin waste water disposal plan.

The benefits that will result from this plan are:

- \* Generation of employment, as previously mentioned;
- \* 130.000 hectares under treated-water irrigation;
- \* Dramatic decrease in health risk due to untreated water;

- \*Yearly savings of 30 to 80 million U.S. dollars, due to its effect on tourism, health and exports.
- \* A change in the environment that will improve the quality of life for all the population.
- \* Placing Santiago at a level with the great capital cities of the world.

Aguas Andinas is contributing its experience and financial capacity, which up to now have made possible a considerable progress of the pertinent investments.

But for this great National Project -which was defined in the early nineties- to be fully successful in all aspects: social, environmental and economic, and for its contribution to the community to have a maximum value, it is necessary that, besides the performance of sanitary companies, the State should actively participate on several fronts, and a close cooperation of the public and the private sectors, with a shared vision of sustainable development. ■





# Regulatory Authorities in the Chilean Water & Sewerage Sector

## **Mr. Juan Eduardo Saldivia Medina**

Superintendente de Servicios Sanitarios de Chile

---

## **Ms. Magaly Espinoza**

Superintendencia de Servicios Sanitarios

---

### **Introduction**

---

This presentation aims to give a very general view of the Chilean Water & Sewerage Sector in terms of which are the principal indicators that we may show today, and some of the general characteristics of the regulatory framework, and later on in a more specific manner the 2 main pillars of the regulatory framework: one, the system of concessions and second, the rate fixing system.

### **General Framework**

---

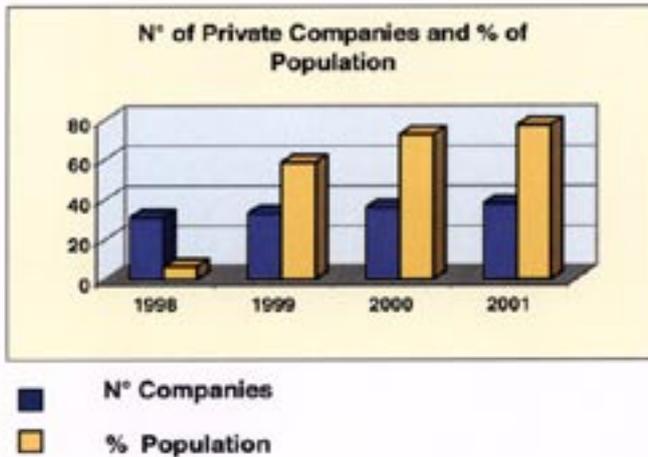
#### **Water and Sewerage Coverage**

As of 2001, the Chilean Water & Sewerage Sector served a total population of 15 million inhabitants. The country has a total of 15 million people, 13 million of which live in urban areas, and are served by water and sewerage companies with different characteristics. The companies may be State-owned compa-

nies with private shareholding or State-owned companies that have transferred the operation right to a private company. On the basis of the main indicator -coverage- the Chilean Water & Sewerage Sector has the following characteristics: the urban areas have a 99.7% drinking water coverage, being very near to 100% coverage in drinking water.

This percentage is slightly lower in sewerage service reaching only 93.8%. This coverage means that the percentage of wastewater collected, treated and returned to the watercourses in a compatible manner was 99,3% in 2001. The wastewater treatment index for 2001 rose significantly thereafter, because of the incorporation of the wastewater treatment plant El Trebal in the Santiago basin. Before 2001, Chile had low indices: only 20% of wastewater was treated. Projections for wastewater treatment coverage is 82% for 2005 and 95% for 2010.

Wastewater treatment in the Santiago basin plays an important role, but we also have to mention that the other regions of the country are also investing in wastewater treatment and to return clean water into the watercourses.



Private companies		
Date	N°	% of Customers
Dec-98	31	6,3
Dec-99	33	58,5
Dec-00	36	72,7
Dec-01	40 (*)	77,3
Total	47	

(\*): includes one township company and one cooperative

## Participation of the Private Sector

Another point worth noting in the Chilean Water & Sewerage Sector is the participation of the private sector and how this has evolved over the past few years. In 1998 6.3% of Chilean users were served by private companies or private operators. As of 1998, after the modification of the regulatory framework, which strengthened the regulating role of the State through the attributions of the Water & Sewerage Commission, a significant privatization process was started, rising private participation from 6% to 77% in December 2001. At present, of the total customers served, 77% are served by private operators. The number of water & sewerage companies involved is 36, who account for 72% of service.

This system is governed by a regulatory framework that includes several areas. Some of the most relevant areas are rate fixing, company surveillance and regulation of the relationships between concessionaires and users.

## The Concession System

The system in Chile basically grants the concession of the water & sewerage services to corporations for an indefinite period. With the change in the institutional framework in 1990, Chile transformed the state-owned services to corporations that are owned by the State, and are given the concession of water production, collection, and disposal. They were acknowledged their operating territory, where they were rendering the service, and they were transformed from a public service into a corporation with majority public shareholding. This kind of concession has certain characteristics like the possibility of increasing their concession areas, provided that they are defined within the urban area. In order to expand concession areas or materialize applications, the Water & Sewerage Commission calls for public bids. If a public bid is declared void, and only in that case, the Commission may force an operator that is already serving an area to take the concession area, after determining the relevant rates, because under no circumstance can the expansion of the

operating area may affect the operator's financial and economic situation.

#### **Four Kinds of Concessions: Water Production, Water Distribution, Wastewater Collection and Wastewater Disposal**

Another important characteristic is that there are four kinds of concessions: water production, water distribution, wastewater collection and wastewater disposal. In general, presently we have vertical integration and it is the same company or operator who holds the four concessions, but there is absolutely no restriction to hold only some of the concessions. Restrictions for new concessions are that a same operator must take the distribution and collection concessions, which are associated to a geographic territory. Whereas production is not associated to a territory, therefore, there may be a certain degree of competition if they were to have a contract with a distributor. This has not occurred in practice although it is established in the legislation. Another fundamental characteristic is that the concessions have an exclusive purpose. Only these companies are authorized to carry out operations related to water and sewerage services and other related services, which generate some disputes with regard to what are and what are not related services.

In turn, the concessions are associated to an investment program. That is also a very important aspect, because at the time a concession is granted or transferred, it has to be associated to a long-term investment program, which is a public program and is controlled by the Water & Sewerage Commission. The operation of the concessions also have several restrictions. One restriction is ownership concentration. Certain conditions are established so that there is more than one operator in certain segments. There are also size restrictions and overlapping with same sector companies and other public sector companies is not allowed. Some fundamental elements are required from

candidate companies. Regarding drinking water production, a concessionaire must hold the relevant water rights to guarantee supply to a determined area; distribution is associated to a determined operating territory; collection requires clearly identifying wastewater discharging points, and finally the disposal concession has to have identified the body that will receive the treated waters.

#### **Concession Obligations**

The concessionaires must guarantee service provision in urban areas, collect bills, cut supply, and they are obliged to deliver the service in the entire operating territory. They may only postpone the delivery of the service if there are technical time periods to carry out the investments. There is also the possibility of expanding the service outside the concession territory through a public bid system or establishing new concession areas. There are several of these cases in Chile but they are limited to very small areas and this means that practically 98% of users are served by 20 companies, which we rate as small, medium and large, and the remaining 2% is served by about 26 very small companies. The latter are subject to the same regulations in all of its areas, which is difficult to enforce and as Water & Sewerage Commission we are no authorized to discriminate.

The concession may be terminated when the development program is not complied with, when service conditions are not as promised and, in general, if restrictions about maximum ownership share and overlapping are not fulfilled.

#### **Rates & Subsidies**

The rate system is another fundamental pillar of the Chilean regulatory system. Rates for concessions are fixed every five years. The system applied is independent from the kind of public-private company and is based on an efficiency system, basically to apply the efficient model company.



## Model Company

This efficient model company is characterized by the fact that it is not closely related to the company's actual costs because the Regulator has the obligation of establishing a rate system with efficient costs for company model under the assumption that the company is started. The rates determined also have an adjustment factor to make self-financing possible, including a normal rate of return on assets, and it also tries to protect consumers with reasonable charges or rates. It also encourages innovation with the 5-year concession period because any improvement experimented by the company results in greater efficiency profits that it will enjoy for 5 years, but that after the rate period ends it will be transferred to the new rate-fixing and passed on to users.

## Administrative Procedure to Set the Rates

The Chilean Regulatory rate-fixing system guarantees a non-opportunist behavior by the Regulator, in the sense that there is an administrative procedure to set them, where the Regulator and the Company prepare together a study which is exchanged and then an agreement is made. If an agreement is not reached in this regard, the problem must be resolved by a commission of experts. The commission of experts is the one that finally determines the rate to be applied over the coming 5 years for each company.

A fundamental element for rate-fixing is the subsidy. The subsidy in Chile is to demand. Its main objective is to compensate the lower-income users without payment capacity, because when the rate is set the socio-economic situation of the user is irrelevant. The rate is fixed on the basis of the costs of each company and system, regardless of users' payment capacity. Although the model company, which is the fundamental element for rate fixing, is not related to the real company, it takes into consideration all of the restrictions that the real company faces in terms of environmental and technical regulations and

also in terms of the existing legal regulations and rules. To create this model company, a simplified company is simulated by identifying the complete productive system with all of its components and also identifying the operation, management, and maintenance functions. When calculating the rate, demand is projected or the company's annual capacity requirements are estimated for each system it serves.

Subsequently an engineering calculation is made for the 5-year rate period and each one of these assets is valued. This makes it possible to determine an expansion project and a replacement project. The expansion project is valuing the costs of the assets necessary to deliver the service during the next 15 years, and marginal costs are derived from there. Subsequently, a replacement project of the real company is determined to apply self-financing. Collection obtained at a marginal cost level is compared with self-financing expressed in the company's total costs. All this is absolutely regulated in the law and regulations through rate-fixing formulas with the purpose of determining self-financing rates that permit companies to generate sufficient income to cover all of their operating, maintenance and development costs for an efficient and sustainable operation. This system has permitted the water & sewerage sector's stability in investment that we can see today.

## Rate Fixing

The focus or analysis in rate fixing is done system by system and, therefore, incorporating crossed subsidies is avoided. Instead the system intends to obtain direct and efficient costs for service delivery, and does not use crossed subsidies for determining the rates of each system. The impact on the rate system of the population's payment capacity is alleviated with the subsidy on demand. The water & sewerage company is forced to deliver the service in the territory where the concession was granted. It has to guarantee the quality of the service and fulfillment of the development plan. It has to provide the regulator a performance bond. The system does not dis-

criminate among users, the rate is fixed on the basis of costs and rates cannot be differentiated for other reasons other than associated costs. This system intends to protect consumers by fixing rates that prevent monopolistic charges by the operators. The system is intended to be transparent by disseminating all of the information and studies taken into account to calculate the rate.

### **Citizen Participation**

There is no citizen participation in the current Chilean water & sewerage system. The Water & Sewerage Commission is in charge of representing the people's interests. However, there is a growing demand in the country to incorporate final users or consumers in a more direct and formal way so that they may also participate in the regulation process, specifically in rate fixing. This is not contemplated at present in the legislation but it is under study.

### **The Subsidy System**

---

The subsidy system is targeted at low-income domestic users. It is administrated by the Municipalities and covers up to 20 m<sup>3</sup> and up to 85% of the water bill. Subsidy beneficiaries have to fulfill certain requirements like certain socioeconomic conditions, not have any overdue bills and to be registered with the relevant Municipality. These requirements sometimes make it difficult to distribute 100% of the amount allocated to subsidies. Of total users in the country, at present 16% of them are subsidized but there is always a greater demand for subsidies than the offer available. There are many more users that would like to be benefited by the subsidy system. The elimination of some of the requirements mentioned above to have access to the subsidy is being studied in order to facilitate access to people who really need it.

Another element that I want to stress is that in order to have access to the subsidy the applicants must not have unpaid bills. I would like the water

& sewerage companies to cut supply when a bill is not paid after a certain period, that is regulated in the law. This has determined that the country has a good payment habit, because otherwise the service is cut and they have to pay a reconnection cost. Therefore the subsidy system must necessarily exist in the country because the rates in the country permit company self-funding, in other words, the large investments made in the sector are being funded with the collection from users. The government has established this subsidy system that compensates the lower-income sectors and permits the system's long-term viability.

### **Territorial and Environmental Sustainability**

---

There are some points that are worth mentioning with respect to territorial and environmental sustainability. It must be noted that the price signal in the country has made it possible to encourage a rational use of water. In general, people are quite aware of not wasting water. Also, there is 100% micro-measurement, therefore users must be careful to maintain their inside installations in good conditions, otherwise their bill will grow. There are also environmental regulations that regulate industrial wastewater discharge into the sewerage system. The water & sewerage company is responsible to detect this. There are also regulations related to the characteristics, quality and type of discharges allowed into water courses and bodies. These environmental regulations are being gradually applied in the country and they have established time limits for completing their application. ■



# Consumption Subsidies for Water Supply in Chile

**Mr. Alejandro Jadresic**

Executive Director, Jadresic Consuladores Ltda

## Introduction

This presentation focuses on subsidies for consumption of water in Chile and is based essentially on my experience working about 10 years ago in the Ministry of Economy in the initial implementation of the subsidy system, as well as in the rate-fixing system. I am familiarized with the reasons that led to the implementation of this type of subsidy and, although I am not longer working for the ministry, as an independent consultant I have seen things from the outside. For instance, I have had to deal with tariff and subsidy issues as an arbitrator in some controversies between the water companies and the Water & Sewerage Commission.

## Sector Reforms in the Public Utilities

The water subsidy is part of a more general subsidy system that the Chilean government created to help the poor. It is a subsidy system that gradually grew with the introduction of the structural reforms of the utilities.

Over the past 20 years, the power sector was reformed, in a process that started in 1982, which led to its complete privatization. A subsidy program was established in 1994, targeted at the rural sector.

The telecommunications sector was reformed in 1987. Here, as in the power sector, 100% of the companies were privatized and a subsidy system

was created in 1994, which is currently operating to promote access to telecommunications in rural and isolated areas.

In the case of the water sector, the reform started in 1989, with a new law, which the previous speakers have mentioned. At present 80% of consumers are served by private operators. Since 1990 a subsidy system was implemented to make the reform possible. In the other sectors the subsidy system was created after the initial reforms, but in the water sector it was introduced from the beginning, because it was considered that it was an essential element for the sector's structural reform.

### Sector reforms in the public utilities

Table 1. The reform process

Sector	New law	privatisation	% Private (2001)	Subsidy Program
Electricity	1982	1985-97	100%	1994
Telecom	1987	1985-90	100%	1994
Water Supply	1989-97	1988-2001	80%	1990

## Regulatory Principles

The general policy for all these sectors was to allow competition in those sectors where it was feasible, and introduce business objectives into companies. In the case of the water companies, competition is unlikely. Therefore It was necessary to introduce a price fixing system [which

Magaly Espinoza has explained in depth,]. The basic idea of the price system was that tariffs had to be set at a level that permits companies to cover their costs and operate efficiently. Another idea was that consumers should not pay any cross subsidies. The objective was that consumers should pay for the effective cost of getting the service, because it provides signals for efficiency. In such a way it was possible to prevent misuse in the case of extremely low rates or under consumption or the eventual disconnection of users from the system when rates are too high.

Although it promotes efficiency, this rate-fixing system creates the problem of how to serve the poor, those who are not able to pay the current rates. For this reason the targeted subsidy scheme was devised: the State would provide the funds to subsidize the poorer segments of the population. Because cross subsidies were not allowed, naturally that subsidy had to be provided by the State. In other words, [and answering a question made by Mr. Nickson] the idea was that higher-income consumers should support the lower-income segments not through differentiated rates but rather through subsidies covered by general taxes.

## Water Supply - Initial Conditions & Policy Decisions

---

218

The general conditions when the subsidy system was created in 1990 were the following: (i) high urban water supply coverage, (ii) practically no wastewater treatment facilities, (iii) prices were much lower than costs, typically less than half of the costs. In some cases barely 20% of the costs were covered in the long term. Therefore, the financial performance of the companies was extremely poor and the State had to cover a significant proportion of the companies' losses and investment needs and therefore to neglect other social obligations like health or education. Another problem was the low coverage level of water supply systems in rural areas.

One of the decisions that was adopted with the new laws approved in 1989-90, was to increase rates, bringing it closer to self-funding levels, within a 5-year period. This meant very sharp rate rises, in general, of more than 100% in a period of 5 years. Increases in Santiago were not as high, but still those who had insufficient payment capacity would be paying higher bills. It was then that the subsidy for water consumption was introduced in order to make it possible to increase rates so as to cover costs and investments, but permitting lower-income sectors to have access to a minimum consumption level. In rural areas, a different policy was adopted; in these cases the policy was that the State would invest in new infrastructure and facilities.

Let me make one comment about the decisions that were taken at the Ministry. Those were difficult decisions, both from the social and political standpoints, still sufficient support was obtained from the political parties to implement a reform that meant rising rates between 100 and 200%, because it allowed greater efficiency and fairness in the sector. The Ministry of Economy argued that it was not equitable for the country to be subsidizing the higher-income segments, who consume most of the water, with low tariffs. For example, in the desert areas in the North of the country where water is very scarce, rich people had pools and gardens, whereas the poorer people simply did not have access to drinking water or a very poor quality service. It was true that those that had the service would have to pay more but that meant they were going to get a better service, allow the poor to be connected and allow the State to allocate resources not to finance water infrastructure but to health and education.

## The Water Consumption Subsidy

---

We have already listened to some of the characteristics of the subsidies. The subsidy has changed in time. Initially it was going to be of 50% for the first 10 m<sup>3</sup> consumed each month. Over time reforms had to be introduced to increase both the

proportion and the subsidized consumption level, as it became apparent that the poorer had difficulties with the tariff hikes. At present, the government is allowed to subsidize up to 85% of the 20m3 per month of poor families. Typically, however subsidies are not greater than 75% of the monthly bills.

Poor families have to apply to the municipalities to get the subsidies. Based on clearly defined social parameters, the municipalities choose what families are eligible for the subsidy. Those that are benefited will be billed monthly by the water companies with the proper discounts. Subsidies are paid monthly to the companies, in an automatic way by the municipalities. The company gets a check from the municipality for the total amount of subsidies provided each month. The central government provides the funds and technical advice to the municipalities. A target was set in order to cover the poorer 20% of the population. This percentage was based on fulfilling a parameter recommended by the WHO in the sense that that nobody should allocate more than 5% of its income to pay for water.

## Actual Results

Some figures show that the subsidy gradually grew, slowly in the early years but more rapidly later on, reaching coverage of around 16-17% of the population, which is the level we have today. The State spent US\$ 35 millions in 2000 in water consumption subsidies. A quick calculation can be made. Water companies are getting an annual income of approximately 500 million dollars. If we had maintained the rates that existed 10 years ago, total income would be US\$ 250 millions. Therefore the sector has US\$ 250 millions in extra income. To achieve such a result the government is allocating US\$ 35 millions to help the poor pay their water bills. So if we look at the global figures, targeted State aid at a cost of US\$ 35 millions, has made it possible to collect additional US\$ 250 millions in income that comes

essentially from middle and higher-income families or industrial and commercial activities. These funds can now be allocated to finance new investments to expand the water system, to build wastewater treatment plants and to improve quality of service.

### Actual results

Year	Number of subsidies	Expenditure (US\$ million)	Average subsidy (US\$/month)	Coverage (% of population)
1990	21,842	0,01	0,54	0,1
1991	177,719	0,61	0,34	7,4
1992	315,901	4,29	1,36	13,0
1993	351,925	7,52	2,14	14,4
1994	389,712	9,79	2,51	15,7
1995	399,205	24,94	6,25	16,0
1996	442,524	29,41	6,65	17,5
1997	448,706	38,00	8,47	17,6
1998	448,806	34,78	7,75	17,4
1999	448,206	37,51	8,37	17,2

## Conclusions

I would like to state some conclusions regarding the subsidy system. The purpose of the system was to create a targeted subsidy to help the poor. The subsidy is directly connected to the output provided by the company and the subsidy is paid only after the user has received a discount in its bill. The company is simply compensated for the subsidy that it has already granted. Some of the characteristics of this subsidy are the following: (i) it is bottom-up, in the sense that it has to be requested by the user, (ii) it is granted with transparent processes, in fact a user who was not been granted the subsidy may appeal to the municipality, which has to give him a satisfactory answer, and (iii) it is sustainable, in the sense that the law has established the subsidy and the funds have to be included in the fiscal budget. The main benefit is that the subsidy harmonizes the economic efficiency objective embedded in

the Chilean regulatory system with the social objective to give access to the poor to basic levels of water consumption. The subsidy system has been extremely important to provide political legitimacy the reform of the water sector. In fact, without this subsidy system, it would have been very difficult to implement the reform that has made it possible to incorporate private operators to the water sector.

On the other hand, we have to acknowledge that the subsidy scheme has some problems. One of them is targeting the poor Chile has a quite sophisticated system to identify the poorer families, the CASEN survey, which is also used for housing subsidies, education subsidies, and unemployment benefits. However it makes some mistakes. In fact, a study conducted some time ago by a Chilean economist, Gómez Lobos, estimated that about 23% of the subsidies are not really reaching the poor, but rather families that belong to the upper half of the income level groups. This is frequently a problem that arise in subsidy systems.

Still, when there is a generalized subsidy with lower rates the problem is much more serious. Moreover, Gómez Lobos compared the Chilean case with the Colombian case, which is a cross subsidy system and found that in the Colombian case there is also a problem with targeting, since about 37% of the subsidies wherebenefiting families in the 50% upper half of income levels. This is a problem that is quite difficult to solve. At present the Chilean government is trying to improve the targeting mechanism. In fact at the beginning of the year an attempt to improve the criteria for allocating subsidies created a political problem because people in upper income segments were receiving subsidies and they obviously complained about its removal. But these are problems we will have to solve.

A second problem is administrative costs. Both the municipalities and the Central Government incur in administrative costs. However, the subsidy is relatively simple to administer level. What the municipalities do is to receive and allocate

the subsidies, but they have to do according to strict rules established by the central government. The municipalities also receive the funds and pay the checks to the water company. The study done by Gómez Lobos estimated that the administrative cost is about 9% of the total subsidy. Compared with other subsidy systems, he reaches the conclusion that it is a reasonable cost level.

A third problem is the political pressure to increase the subsidies. When water tariffs increase in Chile, the government typically has to go to Congress and face demands to raise the subsidy ceilings and allocate more State funds to subsidies. This is an understandable pressure. In fact it is possible that in certain cases more subsidies are being conferred than really needed, specially if we think that instead of going to drinking water resources could go be used in other social purposes like health or education. Still, US\$ 35 millions is not such a great amount. Even if it were increased it would not threaten the sustainability of the water sector.

The real problems would arise if the political pressure were aimed at reducing rates in general. Our mechanism allows the social and political pressures to focus upon the subsidy level and coverage. For example, if there is the need to raise tariffs to cover wastewater treatment costs, the subsidy scheme makes it possible to face the specific needs of a certain region without endangering the tariff regime. By having this subsidy mechanism, it has been possible to overcome many of the obstacles to approve legal reforms or to privatize water companies. ■

# The Privatization of the Water Sector in Chile

**Ms. Maria de la Luz Domper**

Investigadora

Programa Economico, Insitituto Libertad y Desarallo

---

## The Sector before its Privatization

---

### Institutional Framework

The legal framework that rules the operation of the water companies is from 1988. Since then, various laws and bylaws have been issued. This legislation has set a new and modern legal, tariff and institutional framework that has influenced the development of the sector. This legal framework established the following:

- a) An efficient tariff system, thus in which the price is equal to marginal. The tariff system is differentiated since it takes into account peak and low demand periods. Also, a monthly fix charge is considered to cover initial investments for capacity. This tariff system as well as other natural monopolies have been copied and used by other countries.
- b) These laws seek to avoid the use of monopoly power.
- c) A consumption subsidy was designed for poor households.
- d) It exists a Superintendence of Water Services that aims to regulated and supervise the sector.

### Structure and Organization

During 1993, 97,6% and 81,3% of the urban and rural population has acces to water services

respectively. This service was provided by thirteen state water companies, Corfo branches and by four private water companies located in Santiago. The state companies were the following:

- a) Empresa de Servicios Sanitarios de Tarapacá S.A. (ESSAT)
- b) Empresa de Servicios Sanitarios de Antofagasta S.A. (ESSAN)
- c) Empresa de Servicios Sanitarios de Atacama S.A. (EMSSAT)
- d) Empresa de Servicios Sanitarios de Coquimbo S.A.(ESSCO)
- e) Empresa de Servicios Sanitarios del Libertados S.A. (ESSEL)
- f) Empresa de Servicios Sanitarios del Maule S.A. (ESSAM)
- g) Empresa de Servicios Sanitarios del Bio-Bío S.A. (ESSBIO)
- h) Empresa de Servicios Sanitarios de La Araucanía S.A. (ESSAR)
- i) Empresa de Servicios Sanitarios de Los Lagos S.A. (ESSAL)
- j) Empresa de Servicios Sanitarios de Aysén S.A. (EMSSA)
- k) Empresa de Servicios Sanitarios de Magallanes S.A. (ESSMAG)
- l) Empresa de Servicios Sanitarios de Valparaíso S.A. (ESVAL)
- m) Empresa Metropolitana de Obras Sanitarias S.A. (EMOS)

During this period, the coverage of drinkable

water didn't reach 100%. Additionally, only 85,9% of the urban population had cleaned up waters (sewer system) and only 13% of the urban served water was treated.

### Tariff System

The laws enacted that water companies are mandated to grant services within their concession areas. The operation of these companies is based on a yardstick model, thus the price is a function of the marginal costs of development a model company.

### Sector Problems

The main problem of this economic sector is its investment deficit. It was estimated prior to the privatization process that approximately US\$2,400 million were needed, for the period between 1995 and 2000. About 63% of those has to be used in sewage service, and the remaining to cover the deficit of drinkable water and sewer system. The state water companies between 1993 and 1994 invested approximately US\$150 millions every year, therefore, the deficit rose to US\$250 millions.

### Other Ratios of Inefficiency

#### a) Operational inefficiencies

**Profitability:** Reviewing the performance of these 13 water companies during 1994, some companies arose with a negative profitability, such as Essat -4,1% and Emssa -3,2%.

**Losses:** Among the state water companies the loss (corresponds to the difference between production and billed) varied between 43% and 24% of the total production. It is known that losses higher than 35% are too big for these companies, since an efficient management can lower this figure significantly.

**Labor:** An increase of the work force was observed in the water companies, specifically in management areas, but not in the production areas. Although, in 1994, EMOS increased its work force

in 10% with respect to 1990 and in ESSBIO, this rise reached to 5%.

**Average Cost of Production:** The average cost of production increased between 1990 and 1994. For example, the average cost of ESVAL increased 30% and in ESSBIO 11%.

**Management and Sales Costs per Customer:** The management costs increased steadily between 1990 and 1994. For example, the management costs in ESVAL increased in 140% and in the case of EMOS this figure increased 40%.

#### b) Service Quality

There were some geographic areas in which the water quality was not optimal. In certain circumstances it presented brown color and particles. The above situation did not allow its use for consumption. During winter the pipes are congested, then it is impeded a fluid circulation of served water. This situation implied an important deficit of water collectors.

#### c) Management Problems

The problems faced by ESVAL, regarding the construction of the last step of the served water collector that link Viña del Mar and Valparaíso, showed an inefficient administration within the company. The contractor left the work twice, and also the cost of the last step of the collector was three times higher the original cost. These problems among others, reflected the lack of an efficient administration of this state water company.

## Why Privatize?

---

One of the main objectives of the privatization of these companies was, the sector modernization. The problems indicated above brought the government to implement a development strategy to promote production efficiency and profitability.

On the other hand, the sanitary sector required financing to carry out new investments to reach a 100% coverage in drinkable water and sewer system and served water treatment. The public sector did not have the resources to do that.

### Privatization Benefits

The benefits of privatization are multiple. The privatization process carried out in Chile during the 1980s allowed the private sector to buy state companies in the following sectors: power, mining, telecommunications, airlines, among others.

In 1985 the state productive sector shared 25,7% of GDP, in the telecommunication sector its share reached to 96,3% of GDP and in mining to 83%.

One of the most important benefits of this privatization process was the employment generation. The employment increase on average 10% prior to the last two years (Luders and Hacchette) (see Chart N° 1).

**Chart N° 1**  
**Employment in Privatized Companies \***

	State	Private	%
Chlgener	799	861	8%
Chilquinta	958	970	1%
Chilmetro	2.352	2.689	14%
Endesa	2.917	2.953	1%
CTC	7.280	7.442	2%
CAP	5.359	6.845	28%
lansa	2.066	2.083	15%
Soquimich	4.412	4.864	10%
Entel	1.394	1.458	5%
Laboratory Chile	589	650	10%
<b>TOTAL</b>	<b>28.126</b>	<b>30.815</b>	<b>10%</b>

\* The average annual employment before privatization was compared to the one generated once the private capital reached 51%.

Source: R. Luders and D. Hacchette, «La Privatización en Chile», Panama. CINDE.

Due to the actions taken since 1985, such as pri-

vatisations, international trade openness, macroeconomic equilibrium, etc, the domestic saving reached 17,2% of GDP in 1989 (2,3% in 1984) and investment rate rose to 20,3% of GDP (13,6% in 1984).

Therefore, the privatization process helped to increase companies and market efficiency and increase employment, savings and investments levels. The above effects enhanced economic growth and helped to promote economic development strategy based on the market economy.

How to Privatize?: Sharing Property and Capitalization

An ideal privatization plan must include the following aspects:

#### a) Sharing the Property in the Workforce

the first priority must be given to workers of each company. The workers must have the possibility to buy the 10% property share in each company. An option is that they finance this using their severance payments.

#### b) Sharing the Property in the Region

simultaneously you must offer to every head of every household in the region and to the ones registered as customers of each company the possibility to buy a maximum stake of 20%. The price of each share had to be announced on the Stock Exchange.

#### c) Sharing the Property in the Pension Funds

after the sale to the workforce, shares must be placed throughout auctions of share packages between 20 and 30%.

This timeline will give confidence to the market about the participation process in the property, therefore it should be reflected in the share value.

d) **Capitalization:** depending on the situation of each company, it should be offered between 40 and 50% of the company to private investors using a mixed formula that brings an increase

in the company investment. This formula consists on a sale of an old and new capital (the latter is calculated as a function of the investment needs and of its debt structure). The bid is awarded to the company that has all technical requirements and that offers the highest price for the old shares and for the new capital.

The above features have the following advantages for the sector modernization: first, it includes the workforce and customers, which give a political support to the modernization process. On the other hand, the process will bring higher investment and employment levels and finally, the private sector will be stimulated to make an investment effort.

### Privatization Versus Concessions

There are different alternatives to include capital in water companies: increase in private capital; the management investment contracts; partial or complete sale of the state stake; the total transfer of the concessions to the private sector, and the segmentation of the disposition concession and treatment of served waters.

In the case of Chile, Frei's administration chose the sale or privatization of almost every share of water companies, using the Law N° 19.549, which modernize the sector and authorizes the transfer of a maximum of 65% to the private sector. Afterwards, under Lagos's administration, a bidding scheme for concession of 30 years was set up instead of privatization. This type of administrative contracts are basically designed to delegate the management, operation and investments to the private sector for a certain period of time, at the end of which the companies return to the State. This scheme was used to auction Essam and Essar. In the former, only one bidder offered a bid and in the latter there were no bidders interested.

If we compare the price paid for Essam's concession (approximately US\$1.000 millions) and the sale price of the former privatizations (between US \$2.095 and US\$1.349 millions), we can get a range

of losses in terms of the decision to award a concession instead of a privatization. Indeed, the cost of a concession instead of a privatization is between 25% and 90% lower. That means that the cost of not privatizing is on average US \$97 millions.

Also, in the case of Essar means that investments projected for the period 2000-2010 will be delay. The above implies a cost of \$85,000 millions and also means a delay in the treatment of served waters that implies resources for \$42,000 millions for the period 2000-2010. It also implies a delay in the increase of coverage for served water treatment (the goal was to increase the coverage in 4,4% within the urban population and reach 95% in 2010). On the other hand, it will imply a higher unemployment rate in the IX region and an increase in the enteric illness (typhus, hepatitis, etc)

The above figures shows that concession was not the best choice. Next, we will characterize the main problems due to a concession scheme:

1. **There is a lack of an appropriate legislation.** The application of this system in Chile generated problems to the authorities, since the Chilean legislation does not include this type of operation within the water sector.

Although, the system faces some problems with financing the investment. In fact, there are not collaterals to guarantee. Also, other issues that have to be solved are: what happened if the contract ends earlier, bankruptcy, breach of contract, etc. Furthermore, there are some difficulties with monitoring, since it is not clear who is the responsible of any problem.

The above risks and struggles are entailed in complex and imperfect contracts that, finally, resulted in several conflicts and operational inefficiencies and higher cost for the system.

2. **A lower incentive to invest.** The temporary contract implies a lower economic valuation of the assets involved in this business, due to a higher

risk faced by the private sector. Also, at the end of the contract term the motivation of the concessionaire decrease since the assets have to return to the State.

3. **A lower service quality.** At the end of the contract term should be expected a drop in service quality, because the company has to return the assets to the State.
4. **A higher price for the service.** The higher risks involved in a concession contract versus privatization entailed a higher price for the customers.

## Privatization Effects

### The case of Chile

Since 1998, the following state water companies were privatized:

- a) Empresa Sanitaria de Valparaíso S.A. (Esval)
- b) Empresa Metropolitana de Santiago S.A. (Emos)
- c) Empresa de Servicios Sanitarios de Los Lagos S.A. (Essal)
- d) Empresa de Servicios Sanitarios del Libertador S.A. (Essel)
- e) Empresa de Servicios Sanitarios del Bío Bío S.A. (Essbio)

Further, Essam was awarded using a concession scheme to the private sector.

After the privatization of these companies the following features have been reached:

- a) **Coverage:** The national coverage of drinkable water and sewer system, in the urban areas, in December 31, 2000 were 99,6% and 93,1%, respectively. The coverage of treatment of water served in urban areas in the same period was on average 20,9% for the almost 20 companies. This means that one of each 4,8 people has a service of sewage treatment. According to companies projections this index should be

increased to 26,6% in 2001; to 77,9% in 2005 and 93,8% in 2010.

- b) **Management:** After privatization, the index of operational costs of billing shows a decreasing trend in Esval, Emos, Essel and Essal, besides the short time since they have been privatized. Esval was privatized in 1998, Emos, Essal and Essel in 1999 and Essbio in 2000.
- c) **Investment:** Since 1998 private companies have invested US\$482 millions (see Chart N°2). For the period 2002-2005 forecast shows that the private sector will invest US \$813 millions, of which 60% will be used to finance investments in sewage treatment. On the other hand, water companies still in state hands will invest US\$181 millions along the same period.

Chart N° 2

	Water Sector Investment		
	Investments Total (Mill us\$2000)	Investments Private Companies (Mill us\$2000)	Investments State Companies (Mill us\$2000)
1995	168		168
1996	160		160
1997	197		197
1998	231		231
1999	153	72	82
2000	199	123	76
2001	380	287	93
2002-2005	994	813	181

Source: Informe de Gestión Sector Sanitario, Superintendencia de Servicios Sanitarios y «Evolución reciente de la Inversión Pública en Chile 1995-2000» MIDEPLAN, 2001

- d) **State Revenues:** Due to privatization of Esval, Aguas Andinas (former Emos), Essal, Essel and Essbio, state revenue rose to US\$1812 millions. On the other hand, the state has a remaining stake in the property of these privatized companies. The above implied approximately US\$43 millions for the state. Then if we added up the resources obtained during in 2000, (assum-

ing that the private companies distribute 100% of their revenues, US\$43 millions), with the annual flow for next thirty years resulted from the privatization down payment, revenues rise to US\$225 millions annually. On the other hand, prior to privatizations, the annual net revenues of the former state water companies reached US\$89.6 millions in 1996. Assuming an average growth of 17% until 2000, the government would have received an annual flow of US\$104.5 millions if it was decided not to privatize them. Because of that, due to privatizations, the state gets an additional revenue every year of US\$120.5 millions extra.

Chart N° 3

**Revenues with and without privatization \***

Without Privatization	With Privatization (100% earnings distributed)
US\$104,5 millions	US\$225 millions

\* expressed in US\$ and \$ of 2000.

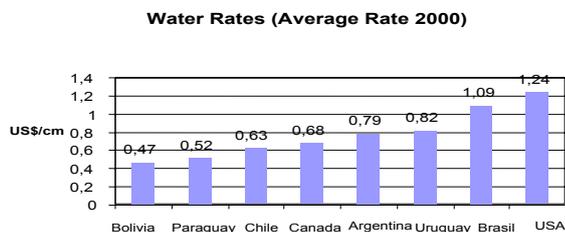
Source: own elaboration

**e) Resources available for social purposes:** As long as the private sector got into the water sector, public resources became available for social affairs. For example, with the sale of 42% of Emos, the state received US\$500 million (minimum bid was set to US\$420 million and the shares were awarded to the company who bid US\$964 millions, then US\$516 million went directly to fiscal revenues). Therefore, US\$1.000 millions were used for social purposes instead of sewage treatment investments. This latter investment are now responsibility of the private company.

**f) Effect in rates:** there was no increases in rates due to privatization. An average increase of 10% in rates of drinkable water in Santiago, since December 2001 was due to investment in a new plant (El Trenal) of sewage treatment. An increase of 3% in rates for Santiago is explained by the indexation process. Nevertheless, an 80% of Santiago's customers pay less than \$5.000 monthly (average consumption between

0 and 30 cubic meters) and there is only 3,5% of delinquency. In the regions VI and X the average rate increases have been between 20% and 25%, due to the same situation, the entrance in operation of new plants of sewage treatment. An international comparison of average rates shows that Chilean cities (0,63 US\$/cubic meter) have lower tariffs than cities such as Argentina (0,79US\$/ cubic meter), Uruguay (0.82 US\$/cubic meter), Brazil (1.09 US\$/cubic meter) and USA (1.24 US\$/cubic meter) (see Figure N° 1)

Figure N° 1



**The Case of Santiago**

- Aguas Andinas, former EMOS, is the main supplier of drinkable water and sewer system in Santiago. It was privatized in 1999 and 51,2% is own by Inversiones Aguas Metropolitanas Ltda. This company is part of Agbar and Suez. Furthermore 3,389% of Aguas Andinas is owned by its workers; 1,235% is owned by small shareholders and stockmarket and 44,17% is owned by CORFO.
- The customer base rises to 1.200.000.
- Aguas Andinas earn a rate of return invested over capital of 10,33% in 2001.
- After its privatization the average yearly investment has increased 52%. Total investment for 2001-2002 reaches \$485,000 million. More than 80% of this investment has been used to sewage treatment.
- The main goal is to clean 100% of sewage of Santiago's basin during the next 7 years. The first plant of sewage treatment, El Trenal (MMUS\$150), is already in operation since 2001.

In 2003 the plant La Farfana (MMUS\$315) will enter in operation and it will clean up 70% of sewage. Also, in 2009 the plant Los Nogales will enter in operation (MMUS\$210) that will help to reach the goal.

- The sewage treatment within Santiago will result in savings of between US\$30 and 80 million every year, with a direct effect into tourism, health and exports.
- For instance, Aguas Andinas during 2000-2005 will invest 25 times the investment of the period between 1995 and 1999, approximately US\$320 millions. In the case of the plant La Farfana, investment is increased in 28 times the average tariff.
- Aguas Andinas has the lowest tariff in Latin America (0.44US\$/cubic meter).

## Public Policy Recommendations

---

There are some public policies that have to be implemented to improve the water sector.

### a) Companies Objective

The law states that the objective of water companies are as follows «produce and distribute drinkable water, evacuate and treatment of sewage and carry out other services related with this activities under the conditions set by law...» Although the law allows water companies to do other related activities, however in practice they have found some constraints and obstacles, since the Superintendence has been very restrictive in this matter. The Superintendence Argues that any related activities could introduced some noise in the definition of the model company as well as the relevant variables to determine tariffs. The law should allow to the water companies to own and operate branches, specialized in related business, but with independent accounting, thus, tariff setting process will not be affected and also it does not affect the definition of the model company.

### b) Participation Constraints

Law 19549 includes some participation restric-

tions that affect competition since it restrains the possibilities to participate in the bidding process of other companies. This situation result in a lower sale price. Therefore it would be very helpful for the efficiency and competition of this sector (mostly for small and medium companies), to eliminate these participation restrictions.

### c) Overlapping Constraints

Law 19.549 also constraints the participation in the property of other public utilities located in the same geographic area. This restriction was originated to control thye real state development of any geographical area. This restriction should be completely eliminated.

### d) Tariff Setting Process

#### (i) Experts Commission

The regulator as well as companies participate in the tariff setting process. This process implies technical reports and sharing information. If there are any difference between both technical reports and there is no agreement, an Expert Commission is called upon. This Commission has to decide between both technical proposals among every discrepancy, however it can not find an average position. The last modification to the Regulation Document (regulate designation and functioning of this Commission) has improve the institutional framework.

#### (ii) Yardstick Competition Model

This optimization model compares the company subject to regulation with a model company, which is based upon different geographic areas. Therefore, a relative performance is determined, setting a minimum rate of return.

The pattern of efficient company has demonstrated to be successful in the Chilean case. Most of the elements that intervenc and they define the process regulatorio they are established in the law, that which doesn't happen with other tariffication models that are based more on the discrecionalidad of the regulator.

Nevertheless, this model requires some improvements. The main problems are generated by information asymmetries, so to minimize these problems it would necessary to publish all the available information regarding the model, such as experts reports when tariff setting process is ended and enhance and improve the regulatory accounting.

#### **f) Superintendence of Water Services**

The superintendence appointment process has to be changed, since it is a technical and not a political position. It should be required some technical skills from the nominees and its nomination has to be from three candidates, finally the Senate chooses the superintendence, in which the term should be limited and introduced some limitations for any future position in the private sector.

#### **g) Subsidy for Water Consumption**

The 2002 Budget Law assigns to this item \$23783 millions (US\$35 millions), an increase of 0,5% with

respect to 2001. This subsidy has been worked correctly. Recently, the government decided to improve the targeting of this subsidy toward the poor households. Therefore, prior to this modification the subsidy covered between 50% and 80% of the first 15 cubic meters, currently the subsidy covers between 35% and 83%.

## **Conclusions**

---

The development of the Chilean water sector has been more dynamic after the approval of the Law 19.549 that regulates the private sector. Nevertheless, it is important to enhance the incorporation of the private sector and improve regulations and laws that discourage private participation and reforms that foster competition within the sector. ■



# Santiago

## Discussion

---

### **Andrew Nickson**

I would like to ask Mr. Mladinic, who gave us a very interesting presentation some minutes ago, the following. I come from England, where the water and sewerage sector also underwent a privatization process in 1990. The regulating entity is facing a serious problem at this moment of controlling what we are now calling the transfer prices, which are the purchase/sale transactions carried out by the companies with other activities under its own control, but outside the water sector. I understand that is not a big problem in Chile, because according to what you told us this morning, the privatized companies are limited to certain levels of transactions with activities outside the water sector. My question is the following: You have a joint venture system here in Chile. Under that joint venture system, the company in turn contracts a management contract generally with the same majority partners to manage the daily operation of the water company. How do the regulators in Chile or those who protect the common good, assure that abuses are not committed in the use of the transfer prices? In other words, I concretely refer to the relationships between the majority partner as a member of the operating company and the same majority partner as an entity, which has been given the right to manage the same company's daily activities.

### **Carlos Mladinic**

I want to underline that what we have in Chile is different. It is the controlling party, the company's board of directors that has the control, and like any controlling shareholder, it selects its executives. But there is no management contract. The company hires the managers, the executives, and our task in the board of Aguas Andinas and in the board of any other company, is to protect the

interests of all the shareholders and not only our interests, to make sure that the company gets the best rate of return possible. Of course -like any other minority shareholder in any corporation- we try to prevent that through transactions with related companies, the majority shareholder may seek to reduce company profits or increase its own profits as majority shareholder. As we are minority shareholders, we are concerned about that. The recently approved Chilean law on that matter also gives minority shareholders a majority in the account-reviewing committees. This is not only valid for us as State shareholders but all minority shareholders of any corporation in Chile currently have the possibility of forming part of the committees that review those types of expenses. But the difference is that there is no management contract as might be the case in other countries, but simply whoever has the company's control chooses the principal executives. I would also like to add that in several of our experiences with our different majority partners, they have proposed the executives and we have fully supported them because they have proposed highly-qualified people to direct the business, people with a vast experience, usually persons that have worked for other companies or the same controlling company for many years and whose results show that they have done a good job, therefore, we are fully satisfied with the election.

### **Edmundo Dupré**

I would like to say something in relation to that same question. In my opinion there are three levels in which these eventual transfers could take place. First, which is the one which companies resort to, and which they also tried in Chile, which is the management fee, saying «Look I'm going to provide a management service I deserve



a management fee». At that time the Chilean government told them, «Look, this is an open bid. If you want a management fee you will have to include it in the price of the stocks, you will have to discount it from there». Therefore, in open international bids, the management fees are totally eliminated. Second, there is the issue of the way of selecting contractors. Evidently, here there are big investment programs and almost all private companies in one way or another have linked their contracts with related companies. However, the law requires contracts over 500 UF to be granted through international public bids, which must follow certain regulations. Therefore, the private companies have complied with the law in that respect, and the regulator is permanently concerned about the participation of related companies. Finally, we have inputs or/of general supplies. There are some international companies, for example, that also own chlorine production companies, and with which they have supply contracts. Well again here we have the Chairman of the Water & Sewerage board literally on top of us about those supply contracts. In Chile, the regulator has a study of cost or/of real costs incurred in companies, but it does not have the obligation of respecting those costs, because the regulator considers the company's efficiency to determine concessions. Therefore, what they simply are saying is, «look, maybe you allocated US\$90 per inhabitant to the cost of building a wastewater treatment plant in Temuco or another place but, I'm sorry, as you own a related company, how can I know whether or not this is a transparent price, and in fact I think that US\$40 is a reasonable price». And the water authority has the attribution of doing that. That is the way it is regulating and, there, the private sector has a small problem with the regulator. The same happens with input prices. Therefore, transfer prices are quite controlled. And this is quite an important issue because most of the companies -in the case of Aguas Andinas, ESVAL and probably now ES BIO- are financing their liabilities by issuing bonds to the public; therefore, from the point of view of the institutional investors, the control of transfers inside the companies or avoiding the

transfers of subliminal dividends, is one of the central elements to evaluate the risk of these bond emissions. Therefore, financial market analysts are also carefully examining the companies. The company merger issue, the issue of non-transparent cost lines is also an element that may result in a risk rating that may jeopardize the company's success.

#### **Edgardo Castañeda**

I have a question for Mr. Dupré. I understood that the Chilean legislation, in an intent to promote market competition, permits to carry out developments and provide a certain section or area of the market. My question is: How can you control the skimming of the market? Because when one has a concession one has cherries and leaves and, in this case there are very poor areas with smaller payment capacity. Have you faced this problem? Have there been initiatives that have carried out small developments to provide the service, probably paying a toll? How can you prevent that risk after a concession has expanded to the entire market? And then there are some developers that think that the rates can be lower but choose the market's cherries?

#### **Edmundo Dupré**

I will answer with an example. We understand by skimming the market, the fact that there is a strong incentive for companies to go to the more profitable sectors, to provide the service to higher income segments, which show high growth in water and wastewater treatment demand. However, the regulator in Chile has the faculty of extending the concession of determined companies to determined areas that are probably not profitable. I will give you a concrete example. Some months ago we had a very heavy storm in Chile, and as a result there was a landslide in Region V, 200 km north of Santiago. That locality was served by a small private water company that did not have the capacity to rebuild the infrastructure and systems quick enough. This is an area that is not very attractive for any private company to ask for the concession, it has no scale economies, the income level in the area is not very

attractive. Therefore, the regulator approached a company and suggested that it would see with very good eyes that it took over the concession in that sector, and naturally the company immediately accepted.

**Roberto García**

I would like to know about sludge management. Is this the responsibility of the country or of the water & sewerage company that included sludge disposal in its wastewater treatment program?

**Laurent Brunet**

The company is responsible for managing the wastewater treatment plant and the products it generates (sludge). There are different destinations, such as sanitary fills for instance. But we think that there are other more sustainable solutions, like using sludge for agricultural soil recovery. In order to be able to choose among the different solutions we first need clear regulations. CONAMA is developing the regulations. In Chile the most sustainable solution is agricultural use, the recovery of eroded soils, using it as fertilizer, if we really want this to be a long-term, sustainable solution. That is why working in collaboration with the Ministry of Agriculture, as we actually do it, is necessary to find a sustainable destination.

**Question**

What is being done with the sludge at present?

**Laurent Brunet**

We currently have a sludge storage place in el Trebal and la Farfana, with capacity for 5-year sludge production. Five years is the maximum time that we have to find other sustainable destinations for sludge, therefore, we are working in all those pilot programs with farmers.

**Question**

Who is the owner of the water after it has been treated?

**Laurent Brunet**

According to Chilean laws, the company owns the water, until it discharges it back to the river.

Therefore, the company may decide to return the water to the river or reuse it. It all depends on what adds greater economic value to the water. For the time being we are returning it to the river at certain well identified points. This does not mean that in the future this water may not be destined to other uses. It is very likely that new urban settlements will be developed along the Mapocho River in the future, and there will be greater water needs. Therefore the same quantity of water returned into the river may be used downstream as a source of raw water to make it potable.

**Comment**

In my opinion the user owns the water because you are charging us for its treatment.

**Lye Lin Heng**

I just want to ask a very short question to clarify on the subsidies. You mentioned that for example in 2001, the municipalities did not use 13,800 subsidies. Does this mean that you anticipated 13,800 poor families that needed subsidies but it turned out that they didn't need them?

**Laurent Brunet**

What I mentioned is that there are a number of subsidies that are assigned, but many of them in the end are not used, they do not get to the beneficiaries. Therefore, the person that would have been entitled to a subsidy did not finally get it, and has been forced to pay his complete water bill.

**Answer**

A quick answer about that. It happens that the one who decides who would be appropriating that subsidy is the municipality through a special survey that they have made neighborhood per neighborhood identifying the poor target families. So if the municipality does not do its job correctly of identifying these families, the subsidies that have been approved by the Ministry of Finance do not reach the beneficiaries.

**Andrew Nickson**

Just a brief comment. It seems to me that the use of the term concession is very different from the



way it is used in the rest of the world. I say this because these concessions are for an indefinite period. In most of the world, the word is used with the French connotation, which implies a limited period of 30 to 40 years.

My question is related to the subsidy system. The Chilean subsidy system is through indirect subsidies granted through the Municipalities. Could you please tell us why you have opted for this system, considering that the crossed-subsidy system also has certain advantages. First I presume that the transaction costs in this system are much higher because it requires making a socio-economic survey. In Santiago there are 13,000 families that do not get the subsidy for some reason or other. We also have to consider the equity issue, that consumers with higher income who have gardens with sprinklers or pools are not complying with their duties as citizens. In terms of equity, protecting the common good of the poorer segments of the community. Maybe you could explain further.

### **Magaly Espinoza**

The Chilean water & sewerage system copies the focusing of subsidies of all the other sectors, the water subsidy clings to the other subsidies that exist in Chile and they are all granted through a system established many years ago by Mideplan, after rating the population with socioeconomic problems into strata. Therefore, subsidies are assigned according to an already existing network. However, 10 years ago, the system's operating difficulties that could arise could not be foreseen, therefore, the system is being gradually improved. There is no intention of changing the system. The rate in Chile does not have the social or solidarity element incorporated into it, the rate is determined on the basis of the costs, and that is due to a problem of allocation of resources, of maintaining certain efficiency in the general economy and that is a general policy in all systems.

The Water & Sewerage Commission has 140 employees. It is in charge of regulating all water

and sewerage companies in Chile. We are permanently requesting a greater budget to increase our regulating and surveillance capacity. The regulating cost is a permanent issue. The current system contemplated this cost and therefore, some regulating bodies were created. With the change in the sector companies' ownership structure, the Water & Sewerage Commission is rather focused on incorporating new information technology tools, because we exercise surveillance basically through what we call self-control. It is not a direct onsite surveillance. That is very occasional. On the other hand, we are permanently contributing to rate-fixing studies. Resources always seem to be insufficient, but the thing is to be efficient with the resources available.

### **Andrew Nickson**

I would again like to ask a little about why you have this particular subsidy system because it has generated great interest in the rest of the world, so I would like to know more about it. Staggered rates that make up the administrative base of the crossed subsidies have another advantage in addition to the advantage of solidarity, which is the benefit of water sustainability. I would like to know if it is lost with the Chilean system. This is a matter that Mr. Brunet mentioned in his presentation. What concerns me within the neoclassic ideological framework, the crossed subsidies, is that the staggered rates have the advantage of contributing to protect the sustainability of water. Maybe you can tell me whether I am wrong but I suspect that the benefit is lost when you don't have staggered rates. Maybe you can tell us something about that.

### **Alejandro Jadresic**

Well, opinions may be divided in this respect. I don't want to say which system is better because that would take very long. The problem is that when you generate crossed-subsidies you create a series of distortions that are difficult to solve. Companies have to face these distortions in practice. One of these distortions is that it encourages high-income consumers to disconnect from the system and there are water companies that have

faced that problem. The rates for higher income families, industries and commerce are raised, and then they are encouraged to disconnect from the network and self-supply themselves. This complicates the water company's financial situation because it finds that its best users disconnect from the network and then they do not have another way out other than raising rates further to the lower-income users. Therefore, we have the problem of how to assure the companies' viability because you cannot force your users to remain connected to the network when they have a cheaper option.

The other problem that is also difficult to manage is that of investing in lower-income areas. If the company knows that the prices it will get from consumption of lower-income users permits covering costs it has the incentive to invest in that area. Otherwise, and this has occurred in some parts, if there is a lower rate in poorer neighborhoods, companies do not invest and the service is not delivered and the regulating authority has no other alternative than establishing a series of investment obligations that are very difficult to control. The other thing that occurs is that the service quality deteriorates in the poorer sectors. I don't know whether Mr. Brunet may give his opinion in this regard.

### **Oscar Figueroa**

The first thing I would like to say is that I would like to introduce an issue that has not been dealt with in depth in this session, which is the issue of clear urban impacts, not only in terms of emissions but other kinds of impacts that are seen when services are managed in a specific manner. I think that this is a very important topic that cannot be left aside and that we must take into account. If we remember the processes that have taken place in the management of the service in general in Chile, we have that in the late '70s and early '80s the regulatory frameworks were gradually changed before starting with the privatization process that started in the '80s and which ended at the end of the decade. What is the important thing here? The fact that in the extent that the privatization process was generated with different

regulation conditions it also affected the use of the urban area -I am specifically worried about Santiago- because there are a series of situations that must be analyzed in an integrated manner so that we may understand the effects I was mentioning.

First, we have to remember that in the late '70s and early '80s there was not only a change in the regulation of the services that were tending to privatization, but also other phenomena and urban decisions occurred that are also important when we analyze this problem. First, is the abolition of urban boundaries for the city of Santiago. In other words, the elimination of legal restrictions for urban expansion. Second, a municipalization process was promoted. In other words, the definition and introduction of new municipalities on the basis of territory division that mainly tended to generate areas with great social homogeneity in the 34 districts into which Santiago's metropolitan area was divided. This is very important because it is also defining specific market niches with homogeneous characteristics per area. Third, another important thing that occurred in the late '70s and early '80s is the total deregulation of the public transport system that permitted public transport operators to create any kind of routes, any kind of service, with absolute freedom and no kinds of restrictions. I think that here we have a series of situations that we cannot leave aside because there is a strong connection, because the development and expansion of services is closely related to the city's development and expansion, which cannot always be seen so clearly as the success in the development of utilities. I think that there is an important point because this point generated a deep contradiction. We are happy with the creation of efficient companies, with companies that have been able to reduce costs and deliver better services. But to what extent are entrepreneurial management improvements consistent with a process that is not restricted only to the fact of assessing the emissions generated by these services, but basically with what are the general impacts on the urban ecosystem. And it is here where we have problems that are more pro-



found problems that have not been yet solved. For example, if we analyze the water issue, it is interesting to see that since the '80s, there is a large number of people that despite being connected to the water network do not have access to water because they have been cut off from water supply because of unpaid bills. So despite having a coverage of over 90% for water and a similar coverage for sewerage, which we already had for at least 20 or 30 years in Chile, we have that at a given time there were 30-40% of the homes that did not have access to water because of unpaid bills. This also happened with electric power, gas supply, etc. This was not an isolated problem. The interesting thing here is that the creation of the subsidy policy made it possible to solve this problem and permit implementing a rating system that is independent from social fluctuations. It seems to me that this is very important. The stability of the rating system generated on the basis of service stability makes it possible to overcome the consumption problems generated in the lower-income sectors, because there are subsidies that guarantee the system's stability and I think that this is quite a positive thing.

There are a couple of other things I would like to mention, which I consider important and which are connected to the institutional framework. I think that we have an institutional problem that has not been solved. Who are the actors that really decide about service management, assuming that service management is based on a basic element of environmental management -more concretely urban environmental management- understanding that that urban environmental management is not only a problem of emissions. We are not concerned only about wastewater, we are also concerned about other equally important matters, like water consumption. The growth of water companies implies a growth in consumption not necessarily associated with the best and more productive uses. Second, the use of the urban space or territory, which many times implies generating other environmental dangers and threats. Third, on the basis of this situation, how are urbanization policies related to these processes

defined? I think that an issue we have not dealt with and worth mentioning but which is currently in the center of controversy, is storm water collection. Santiago's storm water problem. The lack of storm water collecting systems is due precisely to the fact that when the former water production and distribution company was divided into regional companies, and then suffered a series of transformations, the problem of storm water remained unattended. What happened then? When the water production and distribution systems were developed, storm water evacuation was never contemplated. And we are still facing that problem and we have not fully solved the problem because there is a very complicated management problem. If I have a consumer that does not pay his water bill, I simply cut off his supply, but if I have a consumer that does not pay for storm water evacuation I cannot cut off any service. This generates a series of problems. We must remember that these problems also generate the direct emission problems that have been mentioned here. And we must remember the environmental problems we face every time it rains in Santiago. The sewerage system overflows and it is not storm water that overflows but sewerage. This is a technical problem that has an institutional origin and it must be addressed in this discussion and it is a problem that goes beyond efficient management of the water and other services in Santiago. ■