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E C L A C

Economic Commission for Latin America and the Caribbean

**Report on the Second Workshop on  
Private Participation in Water Supply  
and Sanitation Utilities in the Americas  
(San José, Costa Rica, 3-6 February, 1998) \***

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## **Abstract**

This report presents a summary of the general debate, conclusions, programme and the list of participants of the workshop organised by the American Society of Civil Engineers (ASCE) and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), in conjunction with the Co-ordinating Committee for Water Supply and Sewerage Institutions of Central America, Panama and the Dominican Republic (CAPRE). The discussions at the workshop focused on such aspects of private sector participation in drinking water supply and sanitation services as the experience so far, new initiatives and the special case of smaller countries. Presentations of experiences were made from Europe, both east and west, India, and North America, as well as, from Central and South America. The report also contains a selection of the papers presented at the workshop.



## Proceedings

The workshop was organised by the American Society of Civil Engineers (ASCE) and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), in conjunction with the Co-ordinating Committee for Water Supply and Sewerage Institutions of Central America, Panama and the Dominican Republic (CAPRE). Participants were invited from Central America, South America, North America and Europe (see Annex 2 for a list of participants).

The workshop, held at the Villablanca Hotel, Bosque Nuboso, Los Angeles outside San José, Costa Rica, was organised on an informal basis. The bulk of the workshop consisted in a series of plenary sessions with the presentation of papers by the participants and subsequent sessions to comment and discuss them, a copy of the programme is attached in Annex 1.

The discussions in the workshop focused on such aspects of private participation in water supply and sanitation services as the experience so far, new initiatives and the special case of smaller countries. Presentations of experiences were made from Europe, both east and west, and North America, as well as, from Central and South America. A selection of the papers presented is given in Annex 3.

The workshop concluded with a discussion and agreement on a set of conclusions on the sector and on private participation. The most significant of these was the suggestion that more consideration needed to be given to the question of improving the management and operations of public sector water companies as an alternative to solving the problem by passing management to private companies through concessions. If the public sector companies were more efficient then they were far more alternatives open for private participation as the experience in Chile illustrates.

Finally, it was agreed that these workshops should be continued in the future and that a third would be held in 1999 or 2000.

The workshop was judged by the participants to be an unqualified success. All aspects of the meeting went smoothly, the presentations were of an usually high order and the discussions, both formally and informally, were intense and informative.

## Conclusions

### ***Setting goals, priorities and strategies for water supply and sanitation so as to protect human health and safeguard the environment.***

- The prime goal must be the protection of human health, therefore, drinking water supply should be given priority until universal supply has been achieved.
- If pressurised piped water supply and water-borne sewerage is the preferred solution then joint installation is to be recommended, the best option to also install major collectors or, at least, design for their future installation. Solutions must consider individual situations, for example the importance of protecting tourism, and be site-specific.
- Waste treatment, ***normally***, can be a secondary priority once universal water supply and sewerage coverage is achieved.
- Education should be an important element in strategies.
- The goals established and the actions to achieve them should recognise national and local health and environmental characteristics as well as the availability of resources.

### ***Improving the efficiency of public sector water supply and sanitation companies.***

- The Chilean experience has shown that it is possible to achieve high levels of efficiency in water supply and sanitation provision through public sector companies. Two of the prime elements in this achievement appear to have been:
  - ***strict standards for financial reporting, similar to those of private companies***
  - ***the establishment of a rigorous independent regulatory authority***

Other elements seem to be a well-qualified staff, competitive salaries, company autonomy and accountability to directors, to owners (CORFO) and to the consumers.

- The World Bank and the IDB made a major effort in the 1980's in institutional building in the public sector, but it did not succeed. There seem not to have been any thorough studies of why this occurred.
- Not only in Chile are there well run public sector companies. It is important to learn which factors are most significant in improving performance.
- It is important to recognise and influence public expectations. Public involvement, through advisory consumer groups, as the experience of São Paulo illustrates, can help to improve accountability.
- There is a general tendency towards "municipalisation" of services. The question here is to ensure sufficient managerial ability and financial resources to allow real

improvements in services, as well as, to manage private participation. There is a need to look again at the Chilean experience with regional companies.

ECLAC offered to attempt to identify relevant criteria to take into account when governments are considering changing the structure of the water supply and sanitation sector.

## **Future Activities**

It was unanimously agreed that Breck Plauché would be the co-ordinator for the future activities of the group and that he would receive assistance from Vinio Floris, Terence Lee and Robert Montgomery, who would continue as treasurer.

Some discussion was held as to the possible location of the next meeting. Lima and Quito were tentatively proposed as good alternatives and offers were received from the participants to hold the meeting in Guatemala, Mexico and the Dominican Republic.

It was also suggested that in any future meetings consideration should be given to extending invitations to people from the public health field.





# Annex 1

## Programme

### February 3

Evening: 8.00 p.m.

#### **Welcoming Session**

Co-chairs: Terence Lee and Vinio Floris

#### **Cocktail**

### February 4

Morning: 9.00 am

#### **Inaugural Session**

Chair: Jack Day

Speaker: Ms. Liliana Arce, Executive Director, CAPRE.

Morning: 10.30a.m.

#### **First Plenary Session: Privatisation the experience so far**

Chair: Walter Lyon

Speakers: Terence Lee, ECLAC, *Privatisation in Latin America*.

Richard Franceys, IHE, The Netherlands, *Experience with Service Contracts in South Asia*.

Discussion

Lunch: 1.00 p.m.

Afternoon: 3.00pm

#### **Special Session: Keynote Address**

Chair: Vinio Floris

Speaker: Dr. Rodrigo Carazo, Former President of Costa Rica, *¿Participación del sector privado?*

#### **Second Plenary Session: Private participation in Medium-size and Small Systems**

Chair: Breck Plauché

Speakers: Roland Calvo, General Manager, A y A, Costa Rica, *Modernisation of Water Supply and Sanitation Services in Costa Rica (Modernización de la Prestación de Servicios de Agua Potable y Saneamiento de Costa Rica)*.

John Banyard, Severn-Trent, England, *Experience in Trinidad and Tobago*.

Walter Lyon, USA, *The Work of the Capital Region Water Board and others in Water Systems in Pennsylvania*.

Discussion

End of session: 6.00pm

## February 5

Morning: 9.00 am

### **Third Plenary Session: Private participation in Large Systems**

Chair: Terence Lee

Speakers: Henry Lee, Harvard University, USA, *Comparison of Privatisation in Santiago, Chile, Cartagena, Colombia and Cancún, Mexico.*

Javier Morales WEDC, Guadalajara, Mexico, *Public-Private Contracts: Analysis and Formulae for Sustainability. Development and application in Mexico (Contratos Público-Privados: Análisis y Formulación para sus Sostenibilidad. Desarrollo y Aplicación en Mexico).*

Miguel Solanes, *La Necesidad de un Marco Regulatorio Adecuado.*

Vinio Floris, *Privatisation of Water Utilities in Latin America and their Regulatory Frameworks.*

Discussion

Lunch: 1.00pm

Afternoon: 3.00pm

### **Fourth Plenary Session: Institutional Adjustments**

Chair: Terence Lee

Speakers: Jack Day and Douglas McTavish, University of Wisconsin, *Recent Progress with Cost-effective Activities in Water Resources Management in the Great Lakes Region.*

Marta Elena Tobar, *Modernisation of the sector in Guatemala.*

Francisco Antuñez, *Proposed reforms in Honduras.*

Angel Aguilar, *Regional companies in Nicaragua.*

Frank Nicomedes Pérez, *Proposals for reform in the Dominican Republic.*

Discussion

End of session: 6.00pm

## February 6

Morning: 9.00 am

### **Discussion Groups: Theme - The Way Forward**

Morning: 11.30 am

### **Final Session: Conclusions based on the results of the discussion groups**

Co-Chairs: Vinio Floris and Terence Lee

Closure

## Annex 2

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**Annex 3**  
**Selected Contributions**



# Trinidad & Tobago - The Stepping Stones to Privatisation

*John Banyard  
Severn Trent Water*

## INTRODUCTION

The concept of privatisation of utility businesses which began in the UK in the 1980's has spread to become a world wide phenomenon around the world, both rich nations and poor are now asking the question whether their state monopolies and utility businesses would not be better placed in the private sector.

There is no universal answer to this question and there are a number of different privatisation models available, each of which is frequently generically referred to as "privatisation". This use of a generic term for vastly differing arrangements has undoubtedly added confusion to the debate.

It is perhaps helpful to understand why privatisation of utilities evolved in the way that it did.

Prior to the privatisation initiative of the UK government there were in existence private companies providing utility services in many other countries of the world.

In the USA, private sector ownership of power companies and water supply companies was well established and they were, and still are, regulated on the basis of rate of return. That is, an agreed percentage return for every dollar spent.

In France and other French speaking countries the awarding of concessions in the water industry had been established for well over 100 years; although the term 'concession' was confusing in that it covered differing arrangements, from simple operating contracts at one end to the provision of capital (early BOOT) at the other end of the spectrum.

What made the UK privatisations different is that they were the first large scale sell off of Government monopoly companies and the financial regulation was based on the price cap (or Austrian) method rather than rate of return.

While the companies operating the French concession model had largely come into existence because of the fragmentation of the client base (36,000 communes) and the inability of this disperse client base to attract enough technical expertise, the British privatisation was driven by a need for fiscal prudence by the Government of the day and in particular a need to reduce significantly the Public Sector borrowing requirement (PSBR).

The two French companies had themselves experienced this many years earlier and both had contractual arrangements in place which allowed them to provide the necessary capital to their clients for construction of water and sewage works in addition to the simple contract operations.

It can thus be seen that privatisation has historically been introduced by the client's need to obtain higher levels of technical expertise and/or access to alternative means of finance.

More recently the question of management expertise has also moved into the equation, with some privatisation decisions, particularly in respect of contract operations arrangements being driven by the client's desire to reduce revenue charges rather than seek provision of capital loans.

In many cases it is possible for the client body to decide which of these options it wishes to move to and move in one step. However, there are also many situations around the world where it is not practical to move to a transfer of ownership without initially adopting some intermediate strategy in order to improve significantly the prospects of obtaining private sector involvement at an attractive price.

The current Severn Trent/Tarmac contract in Trinidad and Tobago illustrates this latter situation.

## **Trinidad & Tobago**

### **Background**

The Islands of Trinidad and Tobago are in the Southern Caribbean and have a combined population of 1.3 million persons.

Trinidad and Tobago has a healthy economy which is growing through the development of natural gas resources and in addition has an expanding industrial base in addition to its traditional agriculture sector.

Water and waste water services are provided throughout the islands by WASA (the Water and Sewerage Authority). The services provided range from supplies to modern commercial and industrial areas, major towns the residential areas, (the population of the greater Port of Spain area is around 80,000) through to dispersed agricultural communities. Although 90% of the community do have access to a water supply, stand pipes and tankers are prominent elements in the level of service currently provided. WASA is a national authority established under the Water Act of 1965 and controlled by a Board of Commissioners. However, central government has always kept direct control of tariffs, budgets and investment, together with other matters of national interest. Although WASA has extremely well educated local managers and technicians on its staff, they have been hampered almost since its inception by a lack of funds. Currently, there is short fall between revenues collected and actual expenditure of around 40%. In fact, the



independent Public Utilities Commission (PUC) which is responsible for setting the water rates awarded only two rate increases between 1986 and 1993.

Initially successive Governments funded the shortfall out of public tax revenue, regarding the utility more as a social service than a commercial enterprise. However, by the late 1980's the subsidies were becoming less dependable and failing to meet the full value of the shortfall. WASA was therefore left to manage on short-term bank debts and was forced to postpone crucial maintenance work.

Internal management improvements to WASA were tried over the years, including a period of top management support by local consultants. However, in the face of the continuing funding deficit this approach, not surprisingly, failed and eventually a Water Task Force was established, with a brief to investigate all possible solutions and all potential operating models.

The Task Force was established in 1993 and reported back in 1994. There was then a further period of two years for contract development, bidding and bid evaluation before the final recommendation was implemented.

## **Form of Contract**

The task force recognised that there was a need to have reliable access to the funds necessary to develop a reliable water service (both clean and dirty) for the island, and to sustain that service once it had been established. They also recognised that in its present state the water service reflected a situation where there was an abundance of raw water resource, but the infrastructure was in an extremely poor condition, with the result that the population received a very poor service. It would not be possible to move to full privatisation without some interim measures being put in place.

They therefore adopted a two stage approach:

Stage 1 - bidding and letting a 3-5 year interim operating arrangement (IOA).

Stage 2 - a long term arrangement, still to be negotiated, but with a 20-30 year term.

The Interim Operating Arrangement would be put in place to:

- correct the previous service problems
- improve management and financial performance
- establish adequate and reliable information to determine the best format for the long term arrangement

The Interim Operating Arrangement developed many of the characteristics of a traditional management contract, but control of the utility is exercised through the secondment of a new management team (expertise) by the private operator. Following competitive bidding by five short listed international operators, the contract was awarded to the Severn Trent/Tarmac joint venture - Trinidad & Tobago Water Services TTWS.

The contract involves arrangement of funding for the operational shortfall for the 3-yr contract term (amounting to around US\$ 83). The IOA defines a number of goals which have to be achieved and which are covered later in this paper. However, it also contains a severe penalty that can be imposed if the commitments are not met. This penalty allows the government to withhold up to 61% of the fee in the event of default.

The fee, (as stated in the IOA) is:

- \$5.57 million for management staff
- \$3.5 million for expenses associated with secondment of staff
- \$937,000 for special focus team personnel

The IOA also gives the contractor a “preferential right” to participate in the ownership of WASA immediately after the expiration of the IOA.

## **Targets**

Of the targets to be met, increased revenue is the prime requirement. The original request for proposals had envisaged a single formula relating to continuity of supply to the population. With the situation where only twenty-six percent of the population enjoyed a 24 hour water supply, it is not surprising that this was seen as the prime issue by the client. However, during negotiations these problems were reviewed with the client and the single main measure was expanded into six measures covering a wider range of service and contract deliverables. These are:

- continuity of supply of water
- costs per connected property
- operating debt to income ratio
- operating sales
- treated water production capacity
- operator staff seconded to WASA

These targets were developed to address more fundamental weaknesses which had been found, including:

- 600 kms of the 3,000 kms pipe network was corroded, encrusted and/or undersized.
- There were approximately 60,000 leaks in the cistern with new ones appearing every day.
- Leakage was estimated to be in excess of 50% of the supply in some areas.
- Operating income was TT\$280 million US\$46.6 million, compared with expenditure of TT\$400 million US\$66.6 million.
- There was a significant amount of over staffing, with 12 workers to every thousand connected properties, compared with the international standard of 6-10 employees per thousand.
- Payments were not being received for 20% of the properties to which the water supply was connected.

- Twenty per cent of the electrical and mechanical equipment was missing. Downtime was 59 days on average.

## **Progress to Date**

The first task facing the new TTWS organisation was to improve the quality of water service. The initial focus was to achieve a significant reduction in the number of leaks, and 32,000 were repaired in the first twelve months of operation. This of course did not prevent new ones from occurring and the effort was very much a case of seeking to reduce the backlog and tackling new ones as they were found.

Some of the islands' water treatment works have also been refurbished and revised administrative and operational systems introduced, including computerisation of billing, and higher focus customer relations.

The problem of downtime was tackled energetically, new equipment was purchased and new working practices introduced with the result that average downtime reduced from 59 days to 3 days.

All of this effort had a significant impact on the continuity of supplies, although capital investment was still required to improve treatment plants and processing efficiency.

A small customer survey was undertaken which gave the encouraging result that supplies to nearly a quarter of the population were perceived as having improved, even before any significant capital investment had been undertaken. It did not permit the end of 'scheduling' but, nevertheless areas of the islands are now enjoying water supplies that they have not received on a regular basis for the last twenty years. Indeed, a recent TV poll indicated that 59% of those questioned thought that the water supply in Trinidad & Tobago was improving.

## **Capital Investment**

Several years before the award of the IOA, the World Bank had agreed in principle to lend WASA US\$60 million for an extensive refurbishment programme, however there were strings attached to this loan, namely that there had to be a degree of privatisation of WASA and the money would not be available until that condition had been met.

The World Bank has now agreed the involvement of Severn Trent and Tarmac in the IOA fulfilled this condition; this has enabled a capital programme to be developed which will include:

- the design and replacement of over 100 kms of pipes in the distribution system
- increase supplies to industrial estates.
- rehabilitation of 11 service reservoirs.
- construction of new water wells and the installation of water meters.

Water meters are viewed as a critical element in WASA's future success. The utility has no control over the rates that it can charge when these are determined by the TUC. However with metered water, the charging regime provides more flexibility and the aim is to install 60,000 meters per year until the whole of the island's 260,000 properties are metered.

## Utility Funding

The Trinidad and Tobago situation is unusual in that the interim IOA required the successful contractor to arrange additional funding to cover the shortfall between income and operating costs, while at the same time allowing access to world bank loans for capital investment.

In many countries of the world it would not have been practical for the award of the IOA to be tied to a requirement for the shortfall funding to be arranged by the successful operator.

In the case of Trinidad there is a substantial and effective banking and investment infrastructure, and on the basis of the track record of the Operator and the strength of the proposed Business Plan for WASA a US\$ 83 million loan facility was arranged all in local currency by Citicorp Merchant Bank, a local subsidiary of Citibank of the USA. This particularly innovative funding mechanism avoided the need for Government guarantees.

It is noteworthy that whilst routine maintenance is included in the Citibank funding, the IOC explicitly excludes the funding of longer term major renewal. As explained above, part of the capital funding will be via World Bank loans and the Government and WASA retain responsibility for securing any extra capital funding that is found to be necessary.

## Conclusions

The Trinidad & Tobago IOA provides an interesting example of the recognition for an interim "stepping stone" on the road to privatisation.

Some key lessons can be drawn from the experiences so far:

- The former contract is dependent on local issues as well as business issues. No single model can be used universally.
- Accurate information on the current state of the utility and its infrastructure essential at tender stage. This reduces uncertainty and leads to an increase in the competitiveness of the bids received. It also encourages and operator to share a greater part of the risk.
- In the case of Trinidad, the existing information was poor, and the idea of a joint pre-project preparation study and data collection exercise during the negotiation stage was commendable and led to a more rapid and effective contract start-up.
- Adequate levels of management control need to be clearly established early in the project in order to allow the Operator to manage effectively and within a clearly defined framework.

- The regulatory mechanism for the utility business needs to be clearly established and defined within the contract. This ensures that both the awarding authority and the Operator have a clear understanding of the nature of the regulatory regime.
- The contract must identify the resources to be provided by both the Operator and client.
- A strong customer service approach is the hallmark of effective modern utility management. In some circumstances, this may require significant changes to be made.
- The prudent Operator will develop a full range of key performance indicators and an appropriate management information system in order to monitor the impact of its proposals.
- Funding remains a major issue surrounding privatisation proposals and even the establishment of interim arrangements such as those in Trinidad & Tobago.
- In recent years the numbers the numbers of contracts involving private management for the operation of water and waste water utilities has increased. In line with this increase the form of contracts adopted has expanded from a few conventional models to a wide range of options and variables. The situation in Trinidad & Tobago has itself broken new ground while the approach was undoubtedly assisted by the strength of financial institutions in the country, it nonetheless represents another interesting step forward in the transfer of utility responsibilities to the private sector.

# Contracting Goods and Services from the Private Sector as a means for Promoting the Modernisation and Transformation of the Public Sector in Costa Rica

*Ronaldo Calvo  
General Manager  
Aguas y Alcantarillados*

## What has AyA achieved?

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Under the traditional public institutional model AyA, over its thirty-six year life, put Costa Rica among the first rank in Latin America in respect of the indexes of coverage (over 94%) and quality of water supply services. Costa Rica is an example for the other countries of this continent.

## What has AyA achieved?

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The major advances in water supply contrast with the limited development of sewage systems both in terms of coverage (less than 30%) and the incipient level of treatment (less than 6%). This is due to the fact that both the majority of investment has been in water supply and to the high costs of sewerage systems.

## Contracting civil works (begun in 1968)

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- **Metropolitan Area** (water supply)

*First stage of the Metropolitan Aqueduct (Puente de Mulas)*

Cost ¢57 million.  
Finance: AID, EXIMBANK and local.  
Construction period: 1968-1971.

*Second stage of the Metropolitan Aqueduct*

Cost ¢207 million.  
Finance: BCIE, British Government and local.  
Construction period: 1973-1979.

*Third stage of the Metropolitan Aqueduct (Orosi)*

Cost ¢4.000 million.  
Financing: BIRF.  
Construction period: 1980-1987.

## Private Participation in AyA

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AyA has made use of private participation for over 20 years. It can be seen in:

- The construction of large projects which in the beginning were built directly but now are undertaken through competitive bidding by private construction companies. The results have been highly satisfactory and construction times have been radically reduced.

## Contracting civil works (begun in 1968)

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- **Metropolitan Area** (waste waters)

*First stage of the Metropolitan Sewerage System*

Cost ¢37 million.  
Finance: IDB and local.  
Construction period: 1971-1975.

*Second stage of the Metropolitan Sewerage System*

Cost ¢22.2 million.  
Finance: IDB and local.  
Construction period: 1977-1981.

### Contracting civil works (begun in 1968)

#### Other projects in urban areas First stage of urban Aqueducts Construction period: 1971-1976

##### Puntarenas

Aqueduct Cost: ¢15.6 million Construction period: 1973-76	Sewerage Cost: ¢2.5 million Construction period: 1972-74
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##### San Isidro del General

Aqueduct Cost: ¢6 million Construction period: 1971-74	Sewerage Cost: ¢6 million Construction period: 1971-74
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### Contracting civil works (begun in 1968)

#### Other projects in urban areas First stage of urban aqueducts Construction period: 1971-1976

##### Liberia

Aqueduct Cost: ¢4.8 million Construction period: 1972-74	Sewerage Cost: ¢4.9 million Construction period: 1972-75
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##### Limón

Aqueduct Cost: ¢12.3 million Construction period: 1972-74	Sewerage Cost: ¢2.5 million Construction period: 1972-75
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### Contracting civil works (begun in 1968)

#### Other projects in urban areas Second stage of urban aqueducts Construction period: 1976-1980

Projects completed:

Sewerage in Santa Cruz

Aqueducts in:

San Ramón  
Palmares  
Nicoya  
San Pablo de Heredia  
Pasito de Alajuela  
Puriscal  
Quepos  
Bagaces  
Cañas  
Ciudad Quesada

### Contracting civil works (begun in 1968)

#### Extension and rehabilitation programme for aqueducts in rural communities and sewerage in Puntarenas

Cost: \$28.3 million

Finance: IDB

Construction period: 1988-1992

#### Rehabilitation of drinking water infrastructure in Limón province and other cities

Cost: \$51 million

Finance: IDB

Construction period: 1993-1998

#### Second water and sewage project

Cost: \$40 million

Finance: IDB and local.

Construction period: 1995

### Private participation in AyA

There are activities other than construction in which there has been private participation, allowing the Institute to dedicate staff to specialised functions. This has allowed those permanent units for which there was only sporadic demand for their services to be reduced to a minimum. For example the following functions have been contracted:

- Installation of meter boxes
- Installation of water meters
- Installation of new connection
- Repairing leaks
- Bill collection
- Design

### What's next?

- The levels of service reached in water supply have to be maintained and extended to satisfy the increasing demands, from more exigent customers.
- Although the coverage and quality of service are high, it is necessary to optimise the operation, maintenance and control of the systems, to diminish losses instead of developing new sources of supply.

### What's next?

- In sewerage, it is necessary to make a great effort to redress the balance with water supply and to contribute to better environmental conservation. The required investment is really impressive and also requires new technology.
- The required investments cannot be made by the governments of developing countries. It is necessary to attract private investment to aid in the solution of this issue in many countries.

### How to provide the necessary infrastructure

- Financing water supply and sanitation projects is a significant challenge both here and in any part of the world.
- To improve the actual balance between the risks and benefits associated with investment projects innovative solutions are required from governments, the financial sector, the private sector and civil society.

### How to provide the necessary infrastructure

- To resolve these issues new ideas are required taking into account that the commonly accepted ideas have radically changed on the nature of public goods and services, "natural monopolies" and the functions of the public and private sectors.
- If the State strengthens its ability to regulate and control, achieves efficiency in the management and quality of services, there will be many infrastructure projects and many services which are not presently being provided which can be transferred, at least in part, to private investment.

### What's next?

- If we want these basic services to continue to be provided under public management, we must understand that the level of service must be the same or better than that of private companies. The management indices (unaccounted for water, staff efficiency, quantity, quality, coverage etc.) must be within an acceptable level, with an adequate tariff corresponding to efficient costs and satisfied customers.
- It is important to give service as to provide efficiently.

### How to provide the necessary infrastructure

- Developing countries face an enormous financial challenge. It is estimated that only to satisfy the actual demand (of these countries) in water supply and sanitation, it is necessary to invest between 30 and 60 billion dollars a year over the next decade.
- The capacity of the traditional development lending institutions is far from the reality of the needs (only 10 or 15%). For this reason it is necessary to consider that the private sector should participate in the solution.

### How to provide the necessary infrastructure

- When there are more financial alternatives, governments, with budgetary limitations, can concentrate their effort more selectively and effectively than in the past.
- The State can also assume the role of creating the required legal and normative framework, as well as, the necessary policies to protect the common interest, protect the environment and allow the operating companies whether public, private or of mixed ownership to manage the services with quality and efficiency.



### **How to provide the necessary infrastructure**

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- The incorporation of private participation to resolve problems is not an easy task and cannot be achieved overnight. It requires radical changes by the government and putting into place a number of fundamental requirements:

A stable and prosperous economic climate;  
 Effective regulation and effective service provision;  
 Improvements in project design;  
 Structural and institutional reform;  
 An adequate institutional structure;  
 A clear definition of the government's objectives;  
 A wide understanding of the proceedings and rules of the game;  
 A clear regulatory framework which assures complete State control.

### **What has been the role of the State?**

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- Other activities that the State has undertaken:

Service provider;  
 Employer.

Today the most important part of the State's role is:

Ensure that service provision is efficient and at the lowest cost whoever it is who provides the service.

### **The State as service provider**

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- The State must assure dignified employment for all citizens, which does not mean it should do so directly. Its job is to create the conditions.
- Working in the public sector cannot be justified in itself, neither should it exist to solve the problem of unemployment in the country.
- The State must ensure efficient and accessible services to the whole population, but not necessarily provide them.

### **What has been the role of the State?**

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- Until now the role of the State has been to:

Control  
 Supervise  
 Pay attention to the needs of the population  
 Ensure equality among the population in provision of services  
 Pay attention to vulnerable groups  
 Carry-out preventive actions

### **Limitations in public administration**

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- Bureaucracy  
 Inefficiency  
 Unnecessary expenses  
 High costs  
 Slowness  
 Gigantism  
 Rigidity

### **Public policies which restrict the activities of state companies**

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- Restraints over the number of jobs.
- An unoccupied post is abolished.
- Programmes of reduction in the number of positions.
- Budget reductions.
- Limitations on the amounts of investment.
- Limitations on overtime.
- Excessive controls.
- Finally, complex sets of rules, often obsolete and created for another situation and other times.

### This has led to...

- Searching for alternative ways of providing services without increasing staff, such as:

Contracting soft-services;

Looking for worker participation in problem solution, converting workers into businessmen.

Tendering out works;

Community participation;

Giving projects in concession, etc.

### In summary

- Public institutions do not have to solve two common problems:

directly reduce unemployment;

compensate for the fact that bills are not paid because of the economic incapacity of the clients, this should be the responsibility of the State as a whole.

The mission of the public company is to guarantee adequate service to the customer.

The State should, therefore, with the means at its disposal, create employment and establish compensation programmes or direct subsidies.

### In summary

- Private participation in the production of public services presents us with the need for regulation. This is understood as the obligation of the State to modify and direct private sector actions within the public interest.

Regulatory action by the State is justified to solve economic and social problems which due to the innate nature of markets, will not be resolved.

The State cannot, and must not, give up:

The role of guide, controller or supervisor;

The definition of policies for service provision;

Its authority to intervene;

The right to the use, protection and assignment of the water resources.

### The new culture of customer service

- The quality of services and the attention to the customer is more and more important and competitive.

Customers no longer accept poor service.

There is a growing threat of private participation, which is expressed unequally as it is driven by other rules. Its activities will be more flexible within a legal framework more in keeping with the times.

### In summary

- The required changes should not be blocked solely on the argument that jobs must be guaranteed. We cannot sacrifice service quality, or provide mediocre services to avoid unemployment.

Public institutions cannot compete in efficiency with the private sector due to the differences in the legal framework and in the flexibility of management.

### In summary

- Worker-based limited companies are an alternative so that the employees can become businessmen and prosper after leaving salaried jobs. It means they can collaborate with the State in the provision of efficient basic services.

For the State, this means a reduction in costs, an increase in efficiency and concentration of its resources in priority activities, improving investments, projects, etc.

**In summary**

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- The experience with worker companies in AyA has been:

Better quality and efficiency in services.

Reduced response time.

Improved responses and greater seriousness in carrying out tasks.

Immediate response to emergencies.

Better control and security.

Lower administration costs.

Reduction in the number of employees.

Better service for both internal and external clients of AyA.

**In summary**

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- It is necessary to attract the private sector to solve problems and to favour the customer. It should not be for the end of making private profit.

The possible profits of the private sector should be regulated by competent controlling bodies.

Services must be maintained and improved constantly, to this end all the new ways of administration should be applied.

# **Recent Progress with Cost Effective Water Resource Activities in the Great Lakes Region of North America**

*Jack Day*  
*University of Wisconsin*  
*and*  
*Douglas McTavish*  
*International Joint Commission*

## **ONTARIO**

### **Ontario Clean Water Agency (OCWA)**

In 1956 the Province of Ontario enacted legislation creating the Ontario Water Resources Commission. It was an agency of government that could enter into agreements with municipalities to fund construction of water and sewage services. These services were in high demand as a result of the rapid growth that occurred after the second World War and also as a result of the lack of activity during the war years.

The Crown Agency, the Ontario Water Resources Commission, carrying out this mandate was subsidised by the Province and by the mid 70's the government attempted to return the facilities to the municipalities. This attempt was largely unsuccessful in that municipalities felt they had a very satisfactory arrangement with the Agency. In addition the Agency had ownership of the real estate associated with these facilities.

The debt of the Province increased substantially during the early 90's. The yearly deficits contributing to that debt were also growing. By the mid 90's the new government in power in Ontario looked to privatisation as one approach to improving the deficit situation and ultimately decreasing the debt. Full cost accounting and user pay principles were also promoted as well as partnerships with the private sector. To help implement this in the water and sewage field, the Province enacted legislation in 1997 that transferred ownership, of the real estate associated with the water and sewage facilities provided through the Agency, to the municipalities. Approximately 8000 transfers are involved and they are still in process.

As further explanation, in 1972 the Ontario Water Resources Commission was incorporated into a Provincial department of government. Its functions were carried out by that department, the Ministry of the Environment, until 1993 when a new Crown agency was formed. It was formed to eliminate a potential conflict of interest for the Ministry of Environment since it was the regulatory arm of government for water and sewage facilities as well as owner and operator of many of the facilities within the Province. It also afforded an opportunity to pass the administrative costs of operation to the municipalities.

Previously these costs had been carried by the Province. The new agency was the Ontario Clean Water Agency (OCWA).

OCWA renegotiated most of its operating agreements with municipalities following its formation. In response to the 1997 legislation it positioned itself to compete in tenders for operation of municipal sewage and water facilities. With ownership being transferred to municipalities the municipality had the option of operating with its own forces or contracting out. Contracting out opened it up for OCWA or private firms to bid.

OCWA currently operates 77 municipal water and 153 municipal sewage works. The agency has reduced its staff from 1100 to just under 700 to be more competitive. It recently lost one of its larger facilities to a private firm but was successful in the competition for the sewage service for the Region of Waterloo. Several other contracts are coming up this year with Peel Region being one of the most significant. Peel Region includes a large portion of the new mega-city of Toronto.

The Province is now also considering a share offering for OCWA. This would include limiting the percentage of shares that could be owned by any one individual or company. Also under consideration is to have certain of the shares available for employee purchase. If this comes to fruition, OCWA will become much closer to a public company than an arm of government.

## **Hamilton**

The Regional Municipality of Hamilton Wentworth, with a service population of 450,000, entered into a 10 year contract with Philip Utility Management Corporation (PMUC) to operate a large waste water plant and two smaller ones. Operation was assumed on January 1, 1995. PMUC assumed these responsibilities for an annual fee that is \$513,000 (U.S.) less than the Region's Base Budget for these facilities. The financial term of the contract was structured so that the Region's Base Budget can be adjusted at the end of each year based on price changes and adjustment in the quantities of water produced or waste water treated during the past year. To facilitate adjustments to the Base Budget indices were established for various fixed costs such as salaries, wages, property and business taxes and variable costs such as sludge disposal, chemicals, electricity and gas. In 1994 the Region's Base Budget for these facilities was \$13.72 million (U.S.) and was comprised of \$8.68 million (U.S.) in fixed costs and \$5.04 million (U.S.) in variable costs.

In addition to guaranteed savings of \$513,000 (U.S.) PMUC has agreed to share additional annual cost savings over \$1,243,000 (U.S.) with the Region on a basis of 60% PMUC and 40% Region.

PMUC believes that it can generate cost savings through reducing electric power rates by negotiation, reducing sludge disposal costs through total operations, reducing chemical costs through the use of industrial by-products and increasing productivity through computer-based maintenance management systems and inventory/purchased control systems.

The Region's risks in the transaction are limited through various insurance and control mechanisms including a \$3.65 million (U.S.) performance bond and a \$14.6 million (U.S.) environmental liability policy. A dispute resolution process is established based on a pre-selected arbitration panel.

## **Region of York**

York Region is a fast growing area on the northern limits of the new mega-city of Toronto. Between 1971 and 1993 the population of the Region increased from 166,000 to 538,000. Forecasts for future growth contained in the Region's official plan project a population of 934,000 by the year 2011 and 1.1 million by the year 2021. Commercial and industrial forecasts indicate similar growth patterns.

York Region is responsible for water production, its treatment, storage and transmission. The nine area municipalities that constitute the Region are responsible for local distribution, service connections, billing and customer service.

The Region's commitment to meeting this challenge of growth includes the commissioning of a Long Term Water Supply Study from its consultants. Among other things, the Study recommended that the Region develop an approach to finding a private sector partner with whom the Region would develop a long term water supply that would be operational by the year 2000.

Following an intensive and highly competitive selection process that had begun with nine consortia responding to a request for qualifications, York Regional Council, on the advice of an advisory team, chose Consumers Utilities as the Region's Private Sector Partner.

Consumers Utilities is a joint venture between an affiliate of Consumers Gas and North West Water of Britain which is pursuing public/private opportunities in the water and wastewater industry in Canada.

To provide stability and control, the Partnership will be governed by the following principles:

- Decision-making authority for the approval of any plans developed by the Partnership rests with York Region.
- In pursuing solutions, the Region contemplates a system wide approach, rather than a solution based solely on existing political boundaries.
- All stakeholders and especially the public will have many meaningful opportunities to participate in the development of the Partnership's plans.
- For each alternative evaluated, the Partnership will examine the impact on the Region's water rates and charges.
- The Partnership will examine alternative sources of financing to ensure that the impact on York Region's credit rating is not significantly influenced.
- Environmental stewardship is a key objective of the Partnership.

Currently the firm is finalising its work plan for submission to the Region.

## AQUATIC ECOSYSTEM MANAGEMENT

### Ashtabula Partnership

Ashtabula is a city on Lake Erie in North East Ohio in the United States. It was settled in the early 1800's with a Port and industries developing around the mouth of the Ashtabula River. Ashtabula is a native Indian word meaning "bountiful fish".

The lower Ashtabula River and the Harbour were designated as an Area of Concern (A.O.C.) in 1985 by the International Joint Commission, characterising it as an area with impaired beneficial uses and environmental degradation. Contaminated sediment contributed to a fish consumption advisory, reduced recreational boating and commercial shipping, habitat loss and biota impacts.

The industries, in this city with a population of 22,000, include metal fabrication, transportation equipment, rubber, chemicals and automotive equipment.

During the early 80's the U.S. E.P.A initiated its Superfund program to bring about cleanup of one segment of the Area of Concern. This program provides federal funding to clean up and through court actions, recovery of costs from the potentially responsible parties (PRP). By 1993 \$25 million had been spent and no contaminated sediment had been removed. Estimates of the costs of remediation of the sediment, including a secure disposal facility were \$30 to \$50 million.

In 1988 an advisory committee formed to help develop a Remedial Action Plan (RAP). It involved local citizens, the U.S. and Ohio EPAs and some local industries. This committee had developed a plan for cleanup and in early 1994 unanimously decided to form the Ashtabula River Partnership. In support of this proposal the U.S. EPA indicated it would hold off the Superfund designation (and all of its accompanying legal proceedings) pending evidence of progress.

The Partnership: In August of 1994 a charter amongst the agencies, the PRP's and local political leaders was signed. Bylaws were written. A total of 43 companies and organisations are charter members.

Organisation: A co-ordinating committee was established as a steering mechanism. Reporting to the co-ordinating committee is 1) an outreach committee, 2) a siting committee, 3) a project committee and 4) a resource committee.

- Outreach committee - informs the community through public meetings. It has a speakers bureau and media contacts. It recruits new partners and provides informational materials. The Partnership is well known in North East Ohio as a result of the media coverage generated by this effort.
- Siting committee - to locate a disposal site. The committee has developed criteria for the site and will provide information for the environmental impact statement.

- Project committee - to design the cleanup. The committee is preparing and awarding contracts for dredging, remediation technologies, disposal facility design and costing out the cost share element.
- Resource committee - to implement the entire project. The committee is providing a framework for sharing the costs and funding the work. This will include federal and state funds as well as funding provided by the local community and local industry.

The Plan: A comprehensive management plan for sediment removal has been developed. A financing plan is nearing completion and will be sent to the Federal Government (U.S. Corps of Engineers) for approval. The detailed plans for the disposal facility are underway and planning alone will cost approximately \$2 million. The State of Ohio has made a commitment to fund \$7 million and the Corps of Engineers can pay up to 50% if navigational interests are involved. The private sector is interested in participating, in part to avoid potential litigation associated with the Superfund program. Preliminary plans call for a tax exempt environmental bond with the bond being funded in large extent through a cash flow arrangement with the private sector. It is contemplated that 30 to 35 separate entities will float the tax exempt bond for \$30 million. The agreement for this will require approval by the federal government and the package to obtain this approval is being finalised.



# Water and Sanitation Services and Utilities Privatisation in Latin America

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## Abstract

For years, most public service entities in the Latin American Region have been in the hands of government-owned enterprises providing -in average- a less than acceptable service. The most recent data available (1988) shows that 79 and 55% of urban and rural areas had water connections respectively. In urban areas, 49% of the population had house connections for sewerage and excreta disposal, while the situation in the rural areas was critical: only 32% had access to them. Partial and more recent data indicates that the situation has not significantly improved since the 1980s.

In order to increase coverage and improve the efficiency and reliability of water and sanitation services, the Latin American governments have committed themselves to creating and expanding programs of state modernisation in which privatisation has been one of the most widely used instruments. The traditional role of governments (as owners of public service entities) has been evolving towards the regulation of utilities and promotion of private participation. Pioneer countries like Argentina, Chile and Mexico, followed different schemes and strategies. They were later emulated by several other South American countries and most recently by Central American and Caribbean nations.

Even though privatisation activities are carried out following many and various arrangements and approaches, it is a fact that they all have had an impact on the social, economical, political and environmental aspects of those nations. Water and sanitation utilities are quite different from any enterprise, including other public service utilities. Water is an essential resource for sustaining life and preserving health and environmental quality. Water/sanitation utilities are usually vertically integrated natural monopolies allowing for very little or no competition. For this reason, regulatory authorities play a key role on setting appropriate tariffs and performing enforcement of agreed activities.

The privatisation of water and sanitation services in the Region has shown us some very important lessons. Most of them are related to the existing regulatory frameworks, where it has been proven that an independent and well-trained regulatory authority can greatly assist to maximise benefits and increase efficiency, availability and reliability of services. It was also found that the determination of the appropriate water tariff encourages cost reduction, productivity gains, and the efficient use and allocation of water. Correct prices should also perform well under uncertainty, gradually raise standards, and give incentives for more investments. In addition, suitable legal and

institutional arrangements greatly assist in the private participation process by guaranteeing a fair climate.

## Introduction

For decades, water and sanitation utilities in the Latin America Region (the "Region") have provided mostly unreliable and inefficient services to the population. Provision of these basic services has favoured the few larger and wealthier cities, mainly urban populations (There were some notable (and very few) exceptions in the Region. Chile and Costa Rica invested heavily in providing wide availability water services to all of their citizens. For instance, Chilean water utilities increased the population's access to drinking water from 25% in 1965 to over 95% today. Also, some relatively small water utilities (run as cooperatives) were managed efficiently in provincial cities in Argentina. However, this stands more as the exception than the rule), while neglecting to address the needs of the large rural communities. One of the reasons for this disproportionate coverage is the fact that central and local government enterprises have traditionally owned the utility companies. In an effort to improve the situation, governments in the Region have been immersed in programs of modernisation through the encouragement of private participation and regulation of services.

Government restructuring programs have used privatisation as one of the main tools toward improving the situation, and new policies have granted the private sector a central role in managing water and sanitation public service enterprises. Pioneer nations like Argentina and Mexico in the early 1980s and even Chile in the 1970s (with state-owned utilities running as private enterprises), followed different strategies and implementation procedures. Other countries in the hemisphere have followed suit, and now privatisation endeavours are a common practice.

Water and sanitation utilities (independent of whether they are private or public), need to be under the supervision of regulatory agencies in order to assure a climate conducive to fair play. The Region does not have a tradition of autonomous regulatory bodies but most recently, these organisations have been created to monitor water and sanitation utilities in both the private and public sector. Also, legal and institutional arrangements are being created or enhanced at a fast pace.

This document discusses the situation of water and sanitation services in the Region and the most recent privatisation and regulatory reforms in several nations. The objective of this paper is to show those advances, to discuss weaknesses and strengths of the process and to summarise some of the lessons learned in the process. It is based on exhaustive studies conducted *in situ* by the author in different nations of the Region concentrating in Argentina, Bolivia, Chile, Mexico, Panama and Peru.

## Water and Sanitation Services in Latin America

As mentioned before, the Region has had a history of providing insufficient and generally low-quality services for water and sanitation to its population. During the so-called "lost decade" of the 1980s, the situation worsened in light of high rates of population growth, lower levels of public investment, and deficient operation and maintenance of

infrastructure. Data collected in 1988 shows that 79% of urban areas had water connections, 9% had some access to them, and 12% had no services at all. In the rural areas the situation was even worse: only 55% of the population had water services. For sewerage and excreta disposal in urban areas 49% of the population had house connections, 32% had some other solutions (septic tanks, latrines, etc.), and 19% had no services at all. In the rural areas the situation was very critical as only 32% of that population had access to sewerage and excreta disposal (Floris and Castro, 1997).

Current data is scarce but it is known that in recent times the situation has not improved much. Of the one billion people world-wide currently lacking an assured supply of good quality water, 100 million live in Latin America; and of the 1.7 billion people in the world who have no adequate sanitation, 140 million are also in the Region (Reilly, 1997). For instance, in Mexico in 1990, 16.7 million people lacked access to potable water and 28.8 million did not have any sewerage services. Of the 250 m<sup>3</sup>/s that were provided to the population, 160 m<sup>3</sup>/s returned to water bodies as wastewater and of this total 10% at most was treated. Even in 1994, cities/towns with less than 500 people got 48% and 26% of water and sewerage services respectively, while cities with 80,000 people or more got both services over 90% (Floris, 1998) (it is important to note that in Mexico, 80 cities of over 50,000 inhabitants do not have any wastewater treatment at all, even though they have excreta systems (Reilly, 1997)).

A major concern in the Region is the growth of urban populations with huge marginal zones in the peripheries, which is a product of massive immigration from rural areas without any planning for infrastructure and services. These regions already harbour 40% of the urban population and are expected to account for 80% of the population growth during the 1990s (Floris 1997). It is estimated that the population for Central and South America will almost double from year 1990 (404 million) to year 2050 (754 million), according to a United Nations estimate (United Nations Department for Economic and Social Information and Policy Analysis, 1996). Already, there are 13 cities in Latin America with more than 3 million people and urban populations are growing at 3.6% per year (Lee, 1997).

There is very little culture of wastewater treatment in the Region. It is estimated that less than 10% of sewerage systems have treatment plants, between 5 and 10% of collected wastewater receives some treatment (which is often inadequate or incomplete), and less than 5% of raw sewerage receives proper filtration and bactericidal processing. Estimates also show that in 1990 a total of 350 m<sup>3</sup>/second of untreated wastewater were improperly disposed (Floris 1997).

The absence of even limited availability of water and sanitation services increases the incidence and prevalence of associated diseases and accelerates the degradation of the resource and the environment. For instance, in 1993, 3.8 million children under the age five died in the developing world from diarrhoeal diseases caused from impure drinking water (Reilly, 1997). This problems are augmented by untreated industrial releases, such as heavy metals and chemical substances coming from pulp/paper and steel/iron industries (two of the Region's biggest industrial polluters), into water bodies. These industries are growing twice as fast as the economy as a whole and give off residuals which are more harmful than those found in domestic wastes.

## Investment, Costs and Pricing of Water/Sanitation Utilities in the Region

There is little doubt that the long years in which public bureaucracies exercised a monopoly over the provision and cleanup of water were characterised in country after country by overstaffing, poor maintenance, high losses, and inefficient collection of tariffs (see Figure 1 as an example for the former water and sanitation utility of Buenos Aires, Argentina). To compound the matter, undercapitalised utilities have the urgent need to invest in water and sanitation infrastructure. The World Bank estimates that the world will need about \$600 billion over the next decade to augment water reserves and meet quality needs. The Bank anticipates that it can provide \$30 to \$40 billion. Latin America alone needs between \$100-200 billion in infrastructure investment over the next decade and multinational financial institutions can only provide about 10-20% of the financing needed. Government funds fall far short of meeting these needs, leaving the private sector with the opportunity and challenge to come up with the remainder. However, it has been found that water/sanitation infrastructure does not have the financial attractiveness than do other capital-starved services (i.e. telecommunications, energy and even transportation). Political and economical instability, and weak legal and institutional arrangements have contributed to have an unattractive rate of return for the private sector. For instance, the construction of a conventional secondary wastewater treatment plant for a population of a 1 million requires a capital investment of about \$100 million plus additional steady and substantial expenditures for the proper operation and maintenance duties (Idelovitch and Ringskog, 1997).

Water is vastly underpriced in the Region and, as consequence, does not cover the cost of supplying and maintaining the resource, and treating its wastewater. Water utilities are always in financial stress and end up being subsidised in many manners, the most notorious being the cross subsidies of energy users in Caracas, Venezuela. The consequence of these policies creates insolvent utilities that cannot invest in new projects. Because there is still a large unsatisfied demand of water, an informal market is created ("vended" water) which supplies the resource at inferior quality condition and about 5 to 20 times the price of "piped" water. Ironically, people at the lowest income levels are the ones who pay for these services and subsidies beneficiaries are large industries and others who do not need economic protection. Table 1 shows some water and sanitation rates in the Region.

**Table 1**  
**Water and Sanitation Rates in Latin America (in US\$/m<sup>3</sup>)**

City	Vended	Piped
Santiago, Chile	-	0.70
Northern Chile	-	1.50 - 3.00
Cochabamba, Bolivia	4.00	0.10
Buenos Aires, Argentina	-	0.33
Lima, Peru	6.00 - 8.00	0.43 - 1.12
Panama, Panama	not available	0.34
La Paz, Bolivia	not available	0.19 - 0.56

Figure 1

**Pre-privatisation conditions of Obras Sanitarias de la Nación in Argentina<sup>1</sup>**

Obras Sanitarias de la Nación (OSN) was the Argentinean national water utility since 1870. Until 1980 it had national jurisdiction but it later became the water company for the Greater Buenos Aires.<sup>2</sup> In 1985, OSN had the following characteristics:

- **Regulated area:** 281,500 ha, from which 50,900 ha had water supply and 37,400 ha sewerage availability.
- **Total serviced population:** 8.4 million, from which 5.5 million had water supply and 4.6 million sewerage.
- **Water production:** 3,578,000 cubic meters per day.
- **Water connections:** 1,002,176 but only 148,354 had measurement devices.
- **Sewerage connections:** 665,347.
- **Wastewater treatment:** 97,080 cubic meters per day.
- **Number of employees:** 9,000 with an average age of 52 years; only 50% involved in fieldwork.
- **Consumption:** 600 litres/person/day. The UN World Health Organisation considers that 400 litres/person/day is a reasonable consumption for a city with more than 1 million inhabitants.
- **Age of the water network:** 83% was 40 years or older; 55% was 60 years or older.
- **Time for repairing water leaks:** 1 month in the City of Buenos Aires and 2 months in its suburbs.
- **Real tariff (1960 = 100):** 19.6 (average of all public services = 128.1).
- **Delinquent payment:** 85% (average delay in payment: 2.5 years in the Federal Capital).
- **Real Salaries (1978 = 100):** 164.1 (average for all public services = 124.1).
- **Annual absence record:** 20.4% (average for all public services = 14.5%).
- **Labour cost/total income:** 57.0 (average for all public services = 25.6).
- **Investment (in 1991 US\$ million; 1981 = 100):** 67.8 (average for all public services = 67.8).

<sup>1</sup> Most information taken from Artana et al, 1996.

<sup>2</sup> Includes the Federal Capital (Buenos Aires) and 13 "partidos" (districts/suburbs).

## **Privatisation of Water and Sanitation Utilities in Latin America**

With all the pros and cons of private participation in water and sanitation, the Region has been quite active in privatisation activities. Here are the results of a study conducted among several countries.

### **Argentina**

Argentina is the world's pioneer in the privatisation of water and sanitation utilities. By the end of 1997, the Greater Buenos Aires Metropolitan Area and the Provinces of Santa Fé and Córdoba (Aguas Provinciales de Santa Fé and Aguas Cordobesas, S.A., respectively) had privatised their water and sanitation utilities (a total of six of the 22 provincial water companies have been privatized (Poole, 1997)). The Province of Mendoza and some cities in the Province of Buenos Aires are in the process of being given in concession. The concession contract with the Province of Tucumán has been cancelled after a long dispute with province authorities.

Aguas Argentinas (the concessionaire for the Greater Buenos Aires) has turned a money-losing utility (\$200 million a year) into a profitable one without raising rates to customers in real terms (Poole, 1997). However, the concession has not achieved the expected improvement in wastewater treatment and sewerage infrastructure.

Water and sanitation regulatory matters are being carried out by the Tripartite Sanitary Works and Services Authority (*Ente Tripartito de Obras y Servicios Sanitarios* or ETOSS), an agency that represents federal, provincial and municipal governments. Its mission is to ensure enforcement of the concession contract, including the conditions of service, investment plans, and allowable tariffs. ETOSS' income for enforcement and its operational duties come from a percentage (2.67%) of the regular water fee.

## Bolivia

Bolivia has recently privatised its water and sanitation services for the cities of La Paz and El Alto (700,000 and 500,00 habitants, respectively) to a French consortium called Aguas del Illimani, S.A. One of the main and challenging assignments of the new concession is to make the resource available to deprived areas like El Alto which has high indexes of poverty and vastly lacks water availability.

All sewerage of the city of La Paz is disposed (without any treatment) to the Choqueyapo River which is used for irrigation of small vegetables. Aguas del Illimani has contractual obligations to implement a mitigation plan. However, during the first five years of the concession, beginning in 1998, the company is supposed to study the problem and present alternative solutions. Aguas del Illimani will also start an industrial pollution inventory in March of 1998. With this information, the company will renegotiate the contract and new sanitation fees will be determined. The city of Cochabamba has recently started its privatisation process.

Bolivia's water regulator is the Superintendent of Waters (*Superintendencia de Aguas*). This institution, the national regulator of all water companies, agreed on water quality levels in the Aguas del Illimani's contract. The concessionaire has the obligation to self-monitor its water releases but the control and certification is done by a private firm paid by the company, which raises an issue of conflict of interest.

## Chile

Water and sanitation utilities have remained public (with the exception of *Aguas Décima* in Region 10 and other small ones), but acting as true private firms with acceptable profitability and efficiency levels. However, there are few build-operate-and-transfer (BOT) projects with the regional (public) water companies. One example is a water treatment plant in Antofagasta by British firm Bywater. Most utilities have four different (perpetual) concessions given by the Superintendent of Sanitary Services (SSS), its regulatory agency. These are: (i) water extraction and treatment, (ii) distribution, (iii) wastewater collection, and (iv) wastewater treatment. Each concession has different tariffs set by the SSS.

The SSS supervises all water companies' operations and also develops norms and standards for water, wastewater and liquid releases. Environmental auditing is self-performed but the SSS does random testing (for water supply only). The water utilities render outstanding water supply services but have achieved very little in the provision of environmentally acceptable sanitary services. Wastewater is usually discharged raw to different water bodies and around 10% of the country's sewerage gets any treatment.

## Mexico

The National Water Commission (*Comisión Nacional del Agua* or CNA) is an independent and decentralised institution of the Secretariat for the Environment, Natural Resources and Fisheries (*Secretaría de Medio Ambiente, Recursos Naturales y Pesca* or SEMARNAP) that manages all federal waters (including water supply and sanitation). Mexico has a Water Law (*Ley de Aguas*) and regulations with special sections for prevention, and pollution control and penalties. The CNA gives two kinds of permits for water use: (i) concessions to the private sector, and (ii) designation or "*asignación*" to the public sector. Both licenses are for specific uses of water, human consumption being the highest priority. Water supply and sanitation quality is monitored by the health authorities and is enforced by the CNA.

There have been some water supply privatization experiences in Mexico. One of the most recent is the one in the Federal District (*Distrito Federal*) in which CNA has awarded water supply and sanitation concessions. However, all four concessionaires are finishing the infrastructure inventory and implementation of the commercial system stages. So far, they have not been able to operate and maintain the water/sanitation network and no wastewater treatment has been implemented yet. Other water supply and sanitation experiences are in Cancún, Aguas Calientes and Puerto Vallarta.

Wastewater collection and disposal violate minimum and maximum standards mandated by Mexican law. The government lacks resources for monitoring, developing and rehabilitating appropriate infrastructure. In sanitation alone, Mexico has had several experiences for implementing wastewater treatment plants, mostly implemented by BOT. Private and public sector officials estimate that Mexico needs to invest at least US\$ 6 billion to solve its municipal wastewater needs in major municipalities.

## Panama

The National Institute of Water and Sanitation, IDAAN (*Instituto de Aguas y Alcantarillados Nacionales*) provides water and sanitation services to seven provinces plus an eighth zone composed of the Panama City Metropolitan area, West and East Panama (Panama Province) and the Province of Colón. This last zone is the jurisdiction of the recently created IDAAN Metropolitana, S.A., a company that provides services to approximately 74% of the total inhabitants of the area. IDAAN's privatisation committee (*Comisión de Incorporación de la Participación del Sector Privado* or CIPSP) plans to sell at least 51% of IDAAN Metropolitana, S.A., and give thirty-year concessions to the Province of Chiriquí and the Central Provinces.

With the support of the multinational financial institutions, the government of Panama is accomplishing the following with regards to environmental issues:

- Development of the regulatory and institutional framework (final stage).
- Establishment of a regulatory institution (already functioning).
- Estimation of environmental liabilities (to be started in 1998), but limited to water supply and not sewerage.

All rivers which release waters into the Panama Bay and the Bay itself are very polluted with raw industrial and domestic waste. Wastewater treatment is a complex topic that has no short-term solution and it is not included in the privatisation of IDAAN.

## Peru

The Peruvian water and sanitation services are, in general, below any acceptable standard, both in quality and reliability. For instance, in the rural mountain area (the so-called "*sierra rural*") of every ten poor people, only two have access to potable water, one to electricity and none to sanitation services (Revista Caretas, 1998). Generally speaking, most water supply facilities have basic treatment but sanitation infrastructure only collects sewerage and disposes it raw to different water bodies (the central government has created the Water and Sanitation National Program (*Programa Nacional de Agua Potable y Alcantarillado* or Pronap) which contains the ambitious Residual Waters Management Project for Metropolitan Lima (*Proyecto Manejo de Aguas Residuales de Lima Metropolitana* or PROMAR) which is in charge of planning and implementing a vast sanitation program for Lima. The cost of the first stage will be \$165 million, of which 125 million is expected to be financed by the Japanese Overseas Economical Corporation Fund (OECE) and the remaining by the Peruvian treasury). This has created serious health problems and environmental liabilities. The Superintendent of Sanitary Services (*Superintendencia Nacional de Servicios Sanitarios*) serves as the national regulatory agency. It was able to comply with some of its regulation duties in Lima but other cities in the provinces are only partially regulated. Also, little environmental monitoring and enforcement is performed.

In 1993, Lima's water utility was in the process of being privatised but this operation was halted by the central government, and since then no other privatisation initiative prospered. The government has several programs to improve water and sanitation services but still no private participation is expected due to the lack of political will, insufficiency of incentives, incomplete legislation and weak institutional arrangements.

## Lessons Learned

There is little doubt that water and sanitation infrastructure investment is badly needed in the Region. Nonetheless, governments and multinational financial institutions can only provide a small portion of the total expenditures. The private sector can certainly play an important role by increasing their investment in the Region thereby easing the severe deficit. However, it is important to take into account that privatisation of water and sanitation utilities is different from any for-profit enterprise and even from other public services. Due to the fact that there are few or no opportunities in water/sanitation utilities of introducing competition among suppliers, natural monopolies are inevitable in order to provide those services. Also, as opposed to other public services (i.e. energy), water and sanitation utilities are usually vertically integrated (production, treatment, storage, and distribution of water, and wastewater collection and treatment). Although theoretically it is possible to separate those processes with competing firms, "no one has yet succeeded in implementing this sort of competition" (Klein and Irwin, 1996). It goes without saying that water is an indispensable fluid for preserving life and health and maintaining a critical environmental balance.



Previous privatisation experiences in the Region are showing that if especial care is taken, private participation can lead to significant reduction of social costs (by maximising social welfare) and increase efficiency, availability and reliability of services. Nevertheless, one of the main issues that have to be seriously considered are the one related to the regulatory functions. Regulatory agencies should be mainly concerned on setting prices to allow an efficient company to make a “reasonable” profit, but not higher. The regulator should have access to information to determine the appropriate price of water and encourage cost reduction, productivity gains, efficient use and allocation of water, perform well under uncertainty, gradually raise standards, and give incentives to invest more but always considering the shortfalls of the investment. It is also essential that the regulatory agency has well-trained and technically competent staff, be as independent and financially sustainable as possible, and fulfil its mission avoiding manipulation of either the government or public utilities.

Privatisation concession contracts are of great need and importance in the Region. Essentially a well balanced document contains the “rules of the game” for the next 20-30 years. All parts should agree in avoiding ex-post opportunism by governments or private companies, and asymmetry of information. Contracts usually perform well when framework laws and regulations, commercial and antimonopoly codes and institutional structures are complete and in place. Even though the Region is immersed in a massive elaboration of institutional and legal arrangements, there is still room for improvement especially when tangible experiences can be learned from countries like Argentina, Chile and Mexico.

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# Private Sector Participation in the Indian Urban Water Supply and Sanitation Sector

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## Urban India

Urban India comprises approximately 300 million people in 3,400 towns and cities of varying sizes (30 cities larger than a million, 345 between 100,000 and a million) with an annual growth rate of the 26.1% urban population reported to be 3.2%.

An analysis of water supply in 21 urban centres in India (representing 10% of the urban population, with city populations ranging from 17,600 up to 10,300,000) reveals that water is supplied on average for 6.6 hours per day to a claimed 85% of the target population (informal housing areas not always included) - at a rate of 13 people per connection (includes standposts). The quantity of water reported produced is 148 litres per capita per day with an average 27% unaccounted for water (47% of connections are metered). The average domestic tariff is Rs 1.6/m<sup>3</sup> (\$0.04) (assuming household consumption of 15 m<sup>3</sup>/month) and Commercial/Industrial tariff is Rs 4.3/m<sup>3</sup> (\$0.12). The average operating ratio, that is the ratio of operating costs to operating revenue is 2.5 times. Average bill collection efficiency is reported as 75% (MDSUPHO 1994-1997).

Even in the area in which the engineers have invested so much of their time, which is in new works, there are significant problems with delays in project completion due to contractor failure, project management failure and land acquisition failure. There are the additional problems of shortage of cash to be disbursed because of capital grants being siphoned off for operating expenditure for schemes that have not been taken over.

Water supply and sanitation is a State Subject under the Constitution. At present, States undertake through their State PHE Departments and Water Boards to plan, design and execute water supply and sewerage schemes, with resources allocated under the Five Year Plans. World Bank (1997) suggest that the urban water supply sector in India has received through the Plans Rs 136.4 billion at current prices (\$3.79 billion) over the 45 years of funding, roughly equivalent to \$0.42 per capita per year of investment. Current plan investment is of the order of \$1.10 per urban person per year.

## Decentralise, Commercialise or Privatise

The challenge facing the Indian urban water sector is to find a way to provide a more effective, equitable, sustainable and efficient service to urban customers. The options available to achieve these targets are to decentralise, to commercialise and/or to privatise.

*Neither politicians nor bureaucrats have been willing to surrender the vast pools of patronage that lie in the public sector. Nor have they been ready to contemplate the job cuts which might be involved in raising efficiency to private sector standards. (Wagstyl, 1997)*

The 74th Amendment has given the impetus towards decentralisation with the urban local bodies increasingly likely to be given more responsibility for urban water supply. The existing State level agencies, often the direct providers by default, 'know' that the urban local bodies do not have the engineering skills to undertake their new roles. Engineering staff are reluctant to be seconded let alone transferred to enable the local bodies to perform. They often have the powers of the unions, the courts and established practise to allow them to resist any such moves. However, history shows that limited decentralisation will take place in the expectation of failure and perhaps to prove the need for the State level agencies to come in and 'pick up the pieces'. This summation is not in agreement with World Bank (1977) who comment on the "almost universal agreement on the need to devolve the UWSS functions to the municipal authorities".

The drive for commercialisation is apparent in the Metropolitan Boards but elsewhere the concept is anathema. At heart, there is the widespread belief that water and sanitation are such a basic need and that consumers are so poor that it is unrealistic ever to expect a commercialised approach. At best there may be the expectation that consumers should pay operation and maintenance costs in order to promote some degree of sustainability. Capital costs however, it is widely 'known', have to be provided by others.

## **Examples of private sector involvement in water supply**

As the sector tries to overcome its limitations, limited experiments are being undertaken with private sector participation. Schemes are aimed at increasing efficiency, at avoiding manpower increases and at generating private finance.

In Rajasthan, a step towards private sector participation has been taken with the letting of service contracts (June 1995) for the operation and maintenance of a newly constructed 112 km transmission main and 132 million litres a day treatment plant. The letting of the contract was driven by the ban on further recruitment of government staff. The rates initially tendered from four existing contractors were twice as high as expected when they appeared to be in a cartel. There were difficulties in approving other firms of sufficient experience to be placed on the tender list but these were overcome by using a co-operative of retired engineers whose years of service were accepted as Class A Contracting experience. After a court challenge the contracts were let at 40% less than the cartel contractors had offered (but for a reduced period of time). Over the past two years the work has proved to be satisfactory. There is now consideration of moving towards management contracts.

In Goa, the Public Works Department has started contracting-out maintenance works in pumping stations and repair of pipelines and 'performance on this has so far been encouraging'. More significantly, tenders have been called for a 20 year BOOT for

planning, construction and maintenance of a 115 million litres a day water supply scheme estimated at Rs 25 billion (\$70 million). Following a pre-bid meeting in October, 1996, a final bid meeting in March 1997, bids were opened in July 1997 with two main applicants competing, one national and one international, with some links to European contractors. The Department finds it has to use international consultants to assess the tenders at an estimated cost of \$300,000. The resulting tariff to industry is estimated to be Rs 19/m<sup>3</sup> (\$0.53) but 'this will not affect domestic consumers'.

In Andhra Pradesh, the Hyderabad Metropolitan Water Supply and Sewerage Board, facing the large investments required to maintain and upgrade the supply, have started developing the organisation along commercial lines through a \$6 million institutional strengthening programme. Hyderabad is also experimenting with private public partnerships. The Sewage Treatment Plant has been maintained on contract basis since its rehabilitation in 1995. The private contractor (who was a sub-contractor in the rehabilitation) is being paid Rs 300,000 per month (\$8,300) for a three year contract with 10% annual inflation increase agreed. The Contractor is paying Rs 90 per day for labourers which is 50% more than the Board is allowed to, but which 'is needed to get people to do such unpleasant work'. The engineer responsible comments that "the contract has been a success and should be renewed; there are 20% cost savings but that is not important - with government staff we would never have been able to maintain it like this". Surprisingly, other local observers comment that "there are problems with the contractor as he is asking for more money - a labour only service contract is not proper privatisation".

In addition to the sewage treatment plant being maintained on contract basis by a private contractor, the idea has recently been extended to a 120 million litres a day water treatment plant and a new experiment will include a large water pumping station. The Board are also now trying a variety of pilot projects, including bill delivery, cash collection from area offices, all by private contractors in addition to self-reading of meters (for a possible 10% price reduction).

However, the attempt to fund the multi-million dollar Krishna water project, to bring over 400 mld to the city from a distance of 130 km through a BOT failed when the interested international bidders demanded too much in the way of Government guarantees. The proposed Krishna BOOT contractors wanted to be "paid next day - or next week. How could we agree to that when some people in the city have not received a bill in years."

In Tamil Nadu, the Tirupur Area Development Project is being developed as a comprehensive project, envisaging the provision of 185 mld water in addition to sewerage and drainage facilities, industrial effluent collection and treatment and improvement and expansion of city roads. The total cost of the project, expected to be completed by 1999, is \$170 million, of which the water supply component is estimated to cost \$72 million.

The uniqueness of the project lies in its financing mechanism and the institutional arrangement being used for implementing the project. The project will be financed by both debt and equity with the debt: equity ratio of 2.6:1. A Special Purpose Entity called the New Tirupur Area Development Corporation Limited (NTADCL) has been set up to

implement the project and to raise funds from institutional investors and capital markets. The NTADCL will have equity participation from local institutions, state government, central government, a financial institution (Infrastructure Leasing and Financial Services), and the BOT Operator. About \$47 million would be raised through equity. Debt to be raised through water bonds will provide \$122 million. These would be revenue bonds with variable redemption period.

The project will thus set a precedent for involving the private sector to develop a source and convey water to the distribution system. This will reduce the financial burden of government entities and will enable them to improve the quantity of water supplied as well as increase the coverage. (Raghupathi, 1996).

The major metropolitan city in Tamil Nadu, Chennai (formerly Madras), has its own specific water supply company. Chennai Metropolitan Water Supply and Sewerage Board has particular problems with the city lying under a rain shadow with no major river systems supplying surface water. Unusually, no grants are received from government, only loans. In 1993 there was no piped water for six months and at one time it appeared that the city might have to be evacuated when the existing rain-fed reservoirs dried up. Approximately 6,500 deep bore wells were provided and water tanks provided for each street as emergency measures.

In 1995-96 an operating ratio of 0.62 was achieved. Personnel costs had reduced significantly from 56% in 1987/88 to 44% in 1995/96 whilst staff productivity has improved from 56 per thousand connections in 1987 to 28 per thousand in 1995 (Chennai Metro Annual Report, 1996)

In addition to controlling its finances in the face of severe droughts, Chennai Metro has begun to experiment in contracting-out various services. For example, many of the staff cars are now supplied by a taxi firm and the water tanker service has been contracted out. It was discovered that vehicle repairs were 3% of operating and maintenance costs and vehicles were off the road for 50% of time. Metrowater disposed of 59 vehicles and is now hiring vehicles in, particularly tankers. It used to cost Rs 300 for 6 m<sup>3</sup> delivery by Metrowater truck, now it costs Rs 150 for a 12 m<sup>3</sup> delivery by a private truck.

Maintaining and operating pumping stations had traditionally been problematic for the Board. In particular, station labour quality and absenteeism jeopardised the conduct of these duties and the Union rejected any attempts at imposing discipline. Policing and monitoring the work was difficult and expensive. Realising this from 1992 Metro invited tenders from contractors to undertake the operation and maintenance of sewage pumping stations. The great advantage to the contractors is the minimal capital outlay required to win and manage a contract. This allows them to build up their skills and experience gradually. They also receive cash up front, before they have to pay out and they trust Metrowater not to abuse the contract conditions which although appearing onerous are in fact standard for the Government of India.

The Metro Board reports that 14 sewage pumping plants were contracted out for a year in 1993 at an average cost of 20% less than the estimate for Metrowater to carry

out the work. Two or three contractors took a couple of pumping stations each, the remainder were taken by single contractors. Only in one case had a contractor failed to fulfil adequately the contract and in this case the damages clause in the contract was resorted to.

Another 22 pumping plants (out of the total of 103) were privatised in 1994, on that occasion for three year contracts, resulting in bids coming in at 40% less than Metrowater's estimate for their own staff to do the work. The contractors could make those sort of savings because 90% of operation and maintenance costs is labour. For example, a new graduate would have to be employed by Metrowater for Rs 6,000 per month but a contractor will only pay Rs 2,500 and will still get staff. Young engineers are willing to work at these reduced rates because the contractor represents an opportunity to gain experience quickly and the recruits would move on to better paid jobs. Each contract had up to 6 bidders competing to win and each had a strong incentive to be price competitive. Even with the 40% reductions it is believed that the contractor is obtaining a 20% profit margin (Franceys, 1995).

More recent communication suggests that the nature of labour only contracts quickly reach a limit in terms of efficiency and effectiveness which leads to a breakdown in trust and a more adversarial] relationship, because there is no other opportunity to generate an adequate profit. Notwithstanding, Chennai has now let a service contract for operation and maintenance of a sewage treatment plant.

It may be that small scale contracting-out can be used as the 'Trojan Horse' of institutional development by forcing sector managers to see the level of efficiency that can be achieved in part of their business and hence the potential to replicate it in other parts. Though as with much else in India, nothing is straightforward. Rajaraman (1990) reports that "A legislative provision [is] now on the books, under which no function or activity of a perennial nature may be contracted out by government. Any contracting out presently being done is in contravention of this law."

Until a consensus grows amongst the primary stakeholders that the existing situation is not sustainable then attempts to deliver an outside model of institutional development will fail.

"In theory, the abysmally inefficient public enterprises could be transformed without a change of ownership, by giving the companies greater autonomy and by encouraging competition. In practice, given India's political and bureaucratic culture, this is little more than a pious hope, with long-drawn-out decay and a waste of resources being the likely outcome. Privatisation is therefore urgently needed" (Joshi, 1997).

## **Conclusion**

The Indian urban water sector may be summarised as a potentially well-engineered product failing to coincide with most consumers' demands, but meeting the needs of its primary stakeholders, the engineers and politicians, in their 'unholy alliance'.

The sector is not changing significantly and shows few signs of wanting to change - or even seeing any need to change. The public works mentality is deeply entrenched and has been little affected by modest organisational changes. There is no sense of being part of a liberalising economy that requires sustainable infrastructure to promote economic development. There is a commendable belief that the engineers' role is to serve the people but this self-justification continues irrespective of the evidence that clearly shows a bias by default towards serving and subsidising the higher-income groups.

A few metropolitan water boards have begun to edge their way forward when run by IAS Officers who have been allowed a reasonable tenure of office. Perhaps a clear sign that the sector can no longer be entrusted to the engineering cadre.

The sector is desperately in need of a revolution. However all the indications are that significant privatisation will be resisted at all levels. State water boards have no perception that they are in fact consulting engineers with a guaranteed workload - but prefer to see themselves as an arm of government. Municipalities and most municipal corporations do not have the engineering skills or the capability to run commercially and are overwhelmed by the demands on their resources.

In the end the key question has to be answered by government. What role does government want its water industry to perform? Is it to provide a fiefdom in which politicians can enjoy exercising patronage with a social service for a limited number of government employees and water supply as an occasional outcome, or does it really desire an effective, equitable, sustainable, efficient water and sanitation service for all? Decentralisation, commercialisation and privatisation have a vital role to play as the drivers of change but to be widely effective, public perception of water has to change.

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# Designing Water Concessions: Case Studies from Latin America

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## Abstract

Over the past three years, the John F. Kennedy School of Government has assessed privatization efforts in a number of Latin American countries. These case studies have been used in the infrastructure management training program that was introduced at Harvard University in January of 1998.

My presentation at the Villablanca meeting focused on three cases - the privatization of Cancun's water system, the concession agreement to privatize Cartagena's water supply and the regulatory and management reform of Chile's water system.

The Chile case is significantly different from the other two. Its existing system of 13 public regional water companies has been successful. The companies are well managed and the quality of service is superior to that in any other Latin American country. Water revenues are sufficient to cover the cost of operating the system plus fund a significant proportion of the new wastewater treatment facilities that will be needed. Admittedly, the existing regulatory system will have to be strengthened, since it was not able to expeditiously handle all the filings, but reforms were being made at the time the cases were written.

Chile is an example of state owned companies managing a water and sewerage system efficiently and effectively. Further, Chile by structuring these companies so that the managers must meet strict performance standards, will find it relatively easy to privatize all or a percentage of these companies, if it so chooses. Whether one would want to disturb a system operating as well as Chile's water companies remains an open question.

The Cancun and Cartagena cases raise very different issues. Initially both cities suffered from similar problems. Substantial portions of the population were not hooked up to either the water or sewerage systems. There was no working wastewater treatment. The existing municipal operations were rife with inefficient and corrupt management practices. Bills were not collected and leaky pipes not fixed. There was no effective regulation and tariffs did not come close to covering costs. To make matters worse there was substantial opposition to any increase in the tariffs, as a vocal portion of the population felt that low priced water was a government obligation.



Local officials ignored the reality that low water rates induces increased consumption, putting more pressure on communities to invest in additional supplies, thus raising costs still further and placing more pressure on the municipal budget.

In the 1990s both Cancun and Cartagena decided to privatize their systems. After a heated political debate, both awarded concessions without any competition. Cartagena signed a 26 year operating concession with Aguas de Barcelona, a multinational water company and Cancun signed a 30 year operating contract with Desarrollos Hidráulicos de Cancún, a subsidiary of one of Mexico's largest construction companies, Grupo Mexicano de Desarrollo.

The overheads used in my presentation at the Villablanca meeting are attached as an Appendix. They describe the particulars of each arrangement, therefore I will not review the details of the two concessions; instead I will focus on four key lessons to be learned from these experiences.

- The ability of both communities to bargain with the concessionaires was limited, due to the absence of any competition for the contract. Neither Cancun nor Cartagena could afford to have the negotiations break down and the private operator walk. The lack of bargaining power affected what the government could demand.
- Pricing water so that all costs are covered is an essential ingredient of any efficient water system. However if public does not perceive any improvements in service, it is politically very difficult to get public support for tariff increases. In the case of Cancun, the expected improvements did not occur, while the privatized company made a substantial profit (17%). The negative backlash was loud and forced the municipality to declare the concessionaire in default of its contract.

In the case of Cartagena, the privatized company did an excellent job of publicizing the improvements it did make. Most people in that city felt that water services were improving. Thus when the privatized company eventually sought a tariff increase, there was almost no public opposition.

- The absence of an effective regulatory agency had a significant effect not only upon the performance of the concessionaires who were private monopoly suppliers, but in the case of Cartagena, on the politics of the negotiations.

In the latter case, Cartagena's mayor, realizing that the Columbian federal regulatory bodies were ineffective and the city was not in a position to establish its own regulatory body, fought to give the city a majority interest in the newly privatized water company, Acuacar. He insisted on this arrangement, even though he knew that Aguas de Barcelona might walk away from the negotiations, leaving the city with a system in disrepair. Later when it became clear that significant additional investment was needed, the new mayor refused a much-needed loan from the International Finance Corporation (IFC), a subsidiary of the World Bank, when the lender insisted that the private investors, not the city, have majority ownership. If there had been an effective regulatory mechanism in place, the mayor probably would have had the flexibility to grant

the private operator a larger share of the company, while retaining the government's ability to protect the city's interests. Without the presence of an effective regulatory body, the mayor had no political choice but to insist the city retain a majority position on Acuacar's board.

In the case of Cancun, the lack of an effective regulatory mechanism had much more dire consequences. When DHC's performance lagged, the city had no option except to sever the concession contract. A regulatory agency would have allowed the government to establish standards for service quality and an array of tools to enforce those standards. Cancun could only encourage the concessionaire to do better, it had no ability to protect the interests of its citizens, short of abrogating the contract, which it was eventually forced to do. Admittedly, the city renegotiated a second, more flexible concession with the same company, but it had to go through eight months of threats, counter threats, and difficult negotiations to reach this end.

An effective independent regulatory mechanism is an essential element in any privatization program. If one cannot be established or if there is no tradition or experience with regulation, governments should be wary of long-term privatization arrangements to deliver services that are by definition a natural monopoly.

- Under the best of circumstances, the assumptions behind the expectations in a concession contract will be quickly outdated. Economic factors change, as do political needs. In circumstances where the condition of the water system is not well known to either party and information on consumption and bill collections is absent, invariably one or both of the parties is likely to want to revisit the contract within a short time period. If the concession contract has no mechanism to resolve these differences, it is not likely to be sustainable. Signing 20-30 year concessions for operations is not in the strategic interests of a municipality facing substantial investment needs. Governments should consider shorter operating contracts of five to six years. Alternatively, it could pursue longer contracts and specifically include investment targets to expand coverage and improve the overall system. Finally, concession contracts should contain workable dispute resolution provisions so that the signees do not have to repeat Cancun's experience.

In summary, Cartagena and Cancun locked themselves into long-term operating concessions without having delineated an adequate solution on how they would meet their need for additional investment. As mentioned earlier, this was a bigger problem in Cartagena, but it also existed to some extent in Cancun.

Privatization of municipal and state water supplies can provide significant benefits in the form of improved services and increased financial investment. But these benefits depend on the recognition that water is a natural monopoly. The government cannot escape responsibility for insuring adequate oversight of the newly created private monopoly. Hence effective regulation is critical to any privatization effort. If that regulation is in the form of overseeing the concession contract, the contract should include effective dispute resolution mechanisms. If not, an independent regulatory body should be established. If neither option is possible, governments should reconsider other options

such as a mixed public-private company or a corporatized public entity, similar to the Chilean regional water companies.

Finally tariff reform is as important as structural reform. Below cost pricing creates incentives that are contrary to the interests of all the parties, including the very consumers they are supposed to help. Direct payments or vouchers to those people or sectors in need of assistance create much less distortions and allow the water system to attract the investment needed to improve the quality of service.

## Appendix

### Three Cases

- Cancun
- Cartagena
- Chile

#### Cancun

- State Water Company: Comisión de Agua Potable y Alcantarillado (CAPA)
- In 1993, State of Quintana Roo decides to pursue a concession contract for Cancun and Isla Mujeres
- Water Services in Cancun
  - 60 percent of city had running water
  - 30 percent had sewerage
  - Primary water treatment plant no longer able to handle volume of waste
- Tariffs
  - Huge differences within customer classes
    - o 11 times for residential customers
    - o 16 times for industry
    - o Hotels paid 7 times more than other commercial users
    - o 95 percent of customers subsidized by 5 percent of customers
  - Many users not metered
  - Most customers paid less than cost

#### Concession

- Thirty year concession for operation and improvements signed with Desarrollos Hidráulicos de Cancún (DHC) a subsidiary of Grupo Mexicano de Desarrollo (GMD)
- First water concession in Mexico
- Single source negotiation

- Contract provisions kept vague
- Requirements/goals
  - 95 percent of urban area to have water by 1996
  - 95 percent to have sewerage by 1998
  - Water losses to be reduced
  - Bill collection to be improved
- Fees
  - An initial fee of \$4.8 million
  - A first year fee of \$1.1 million
  - A fee of \$2.4 million every year thereafter
  - DHC also absorbed previous debts
- Tariffs
  - To reflect cost increases as long as DHC improved efficiency of services

#### Result

- DHC unable to obtain credit from banks to finance promised improvements
- Performance goals not met
- All construction to parent company: GMD - no bidding
- Public reluctant to pay bills, saw water as free good supplied by state (32 percent of bills paid)
- DHC not allowed to curtail service for late payment
- Plan called for DHC to invest 120 million pesos, they invested 37 million
- DHC made 17 percent profit
- Tariff increases denied because performance goals not met

#### Result

- In June 1996 CAPA took DHC to court

- In August, court appointed an administrator to take over the company

### **Cartagena**

- Water responsibility of municipality; state regulation, but it is ineffective
- Existing water company - EPM rife with corruption and mismanagement
  - 30 percent of network in disrepair
  - Water supply rationed to most customers
  - 52 percent of water lost
  - Massive pollution problems
  - Revenues below costs
  - No monitoring or measurement
  - Tariffs collected from only 40 percent of customers

### **Concession**

- 26 year concession contract for operations signed with Aguas de Barcelona
- First water concession in Columbia
- Single source negotiation with outgoing mayor
- Formed mixed capital firm - Acucar to "manage and operate water and sewerage system"
- Issue was control of board. New mayor insisted on reducing Aguas de Barcelona share to 46 percent (from 86) and increasing city's share to 50 percent
- City had veto over all major decisions
- Establish 20 year Reversion fund to pay back Aguas de Barcelona the money they paid for stock, plus interest, adjusted for inflation
- City assumed control of previous company's pension obligations

### **Water Services**

- 70 percent of city had running water
- 50 percent had sewerage
- 0 percent of water treated

### **Result - First Year**

- Increased metering by 75 percent
- Doubled bill collection
- Increased detection of illegal connections (321-2166)

- Earned profit of \$900,000 in 1995 (versus \$2.5 million loss in 1994)
- Excellent public relations campaign

### ***Problem - No Provision for New Investment***

- IFC offer
- Water treatment needs
- IDB offer to city

### **Chile**

- State water companies
  - 13 companies owned by Corporación de Fomento de la Producción (CORFO)
  - 7 small private companies
  - 1 municipal utility
- Water services
  - 98.6 percent of country has running water
  - 90 percent of country has sewerage
  - 14 percent of water treated
  - Water losses average around 35-40 percent (save EMOS)

### ***1990 Reforms Results***

- Each company has board primarily consisting of government representatives
- Each company must meet strict performance standards
- Each company subject to financial audit and disclosure requirements
- Many operations out-sourced - 52 percent of total operating costs
- Rate of return grew from - 1.6 percent to + 5.9 percent
- Investment in urban sanitary sector grew from 26 billion pesos to 84 billion pesos in 1995 (approximately \$65 million - \$170 million)
- Regulatory body SISS - restructured and improved
- Water tariff reflect long run marginal cost
- Most social subsidies removed from tariff

### ***Privatization Legislation***

- Purpose
  - Raise funds to cover cost of water treatment investments

- Reduce losses
- Provide permanence for reforms

### **Lessons**

- Water is a natural monopoly and will be the hardest sector to privatize
- Below cost rates will erode the economic viability of a system (rates matter)
- Privatization without competition will depend on the effectiveness of the concession contract or regulatory system

- Really hard to write a living contract
- Really hard to establish and operate a workable regulatory system
- Privatized firms are often more accountable to public
- Public expectations regarding the provision of infrastructure services is very different than expectations of provision of other services

# The State of Private Provision of Water-Related Services in Latin America

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## Introduction

Until the late 1950's, power utilities in most Latin American and Caribbean countries were privately owned (Santos, 1993); prior to 1950, it was not uncommon to see private provision of drinking water supply and sanitation services (Richard and Triche, 1994); and the private sector has always maintained an important role in the development of irrigation in most countries (ECLAC, 1994). The direct involvement of the public sector, other than municipalities, in the operation of water-related infrastructure is a relatively recent phenomenon. After the mid 1940's governments increasingly adopted the policy that water-related services should normally be provided by agencies of the central government rather than by states or municipalities (Lee, 1990). The reasons for this expansion of the public sector into the provision of water-related services are complex, but basically arose from the decision of governments and international institutions that decisive government intervention in the economy was required to maximise economic welfare through economic growth. By 1975, most water-related public services were provided by central government agencies.

The reversal in this situation came very shortly after. The crisis of the 1980s reversed the direction of policy opinion to increasingly place emphasis on maximising the role of the private sector. Again, the reasons for the reversal of policy advanced are varied and the particular arguments advanced depend on the conditions in each country. There is, however, a basic reason, a change in ideology and it is now generally accepted that the private provision of productive services is the more effective tool for bettering economic welfare.

As a result, since the 1980's, and beginning with the electricity industry in Chile, the governments of Latin America and the Caribbean have been transferring responsibility for water-related services to the private sector. There are now numerous examples in Latin America and the Caribbean of the successful incorporation of the private sector into different water services in a great variety of ways.

Private sector involvement in the water sector offers potentially significant efficiency gains but does not in itself guarantee lasting welfare improvement. Results depends on the ability of governments to find adequate institutional and regulatory solutions to the provision of water-related services by the private sector. Given that the transfer of the responsibility for the provision of water-related goods and services and their management to the private sector has formed and will continue to form in many Latin

American and Caribbean countries an important part of the privatisation process, it is important to explore whether this shift in orientation is welfare improving, and to identify its features which contribute to its success or failure.

## **Government Policies**

Increasing private participation in the provision of water-related public utilities is the announced policy of almost all governments in Latin America and the Caribbean. The specific nature of the policy varies enormously from country to country both in content and, even more so, in execution. Moreover, policies encouraging private participation began very much earlier in some countries and, in consequence, these countries are more advanced in their application. Even, however, in countries where privatisation has gone furthest, such as Chile, this has not always included all water-related public services. These differences and other factors, such as the level of government, in many countries municipalities, undertaking the privatisation of the service and the variations in regulatory systems effect the nature of the policies that are being adopted.

## **Variations in Privatisation Policies**

Other than the earlier start of privatisation in Chile, the major differences among the countries of the region reside in whether, and to what extent, public services related to water have been included in the privatisation process and in the level of government responsible for the services. Only in a few countries has the management function for water supply and sanitation services been transferred to the private sector, although other more technical functions within the services have been contracted with private companies in many countries. Even electricity generation and distribution, until very recently, had only been extensively privatised in Argentina, Bolivia, Chile and Peru. Elsewhere much of the electricity sector remains in government hands. Other countries have now begun extensive privatisation in the electricity sector, especially Brazil and Colombia, but also in some countries in Central America, including Guatemala and Panama. Even in Mexico, there has been a limited opening towards private investment in electricity generation. There are, however, only four countries of Latin America in which the main management responsibilities for water-related electricity utilities have been transferred to the private sector. Only in one of these four, Argentina, has management responsibility for major water supply and sanitation systems been transferred to private companies.

It is important, therefore, in discussing private participation in water-related public services not to exaggerate its extent. In general terms, for the region as a whole, private participation remains incipient and in most countries, the greater part of the infrastructure is still managed by the public sector. The experience in managing private participation in management is, in consequence, very limited. It is limited both in time and space and, because of this, the lessons of the existing experience, which on the whole has been very promising, may not be applicable generally within the region. In contrast, experience with more limited private participation in operational activities through service contracts is much more widespread. This form of private participation does not provide the same kind of challenge either to the private sector or to the public administration, however, as that caused by the transferring of management responsibility under concession or by direct sale.

The sale of existing infrastructure to private investors has been the chosen policy for most electricity generation in Argentina, Chile and Peru, and seems to be the likely choice in many other countries, including Brazil and Colombia. Sale has not been used for the transfer of water supply and sanitation services, although the Government of Chile is proposing to sell up to two-thirds of the shares in its regional water companies. In Argentina, concession arrangements have generally been used, although in the Province of Mendoza, the sale of shares is proposed. In Bolivia, the system in La Paz has been transferred by concession to a consortium of private companies and the Government of Peru is considering a concession for the operation of the Lima service, SEDAPAL. In Mexico City, management contracts are the medium used, although the policy contemplates these to be converted into concession arrangements in the future. A similar approach has been adopted in Trinidad and Tobago. A further example of concession arrangements is the extensive use of BOT contracts in Mexico, particularly for waste treatment plants.

Rather than the transfer of existing assets, a number of countries have adopted policies allowing private investment in new facilities, particularly in electricity generation, here, in Costa Rica, for example. Private investment and ownership is also increasingly common in small water supply and sanitation systems, especially in isolated resorts in the Caribbean and in new high income suburban developments almost everywhere.

## **Regulation Policies**

The opening of water-related public services to private participation, in many countries, has been restricted, in part, by the lack of a regulatory framework to govern the operation of economic activities with monopoly characteristics. In most countries, with such activities in public hands, it was not thought necessary to regulate provision or the major public agency was also the regulator. With increasing private participation, the situation has now changed and it has become necessary to develop regulatory systems, although, outside Argentina and Chile, few have as yet much real experience in their operation. In some cases, the restructuring of the industry with privatisation has change a public monopoly into a private competitive market not requiring specific regulation, electricity generation in Argentina, for example.

In most countries, it is proposed to regulate each industry separately, but in water supply and sanitation services in Argentina, regulation is basically company by company, as the responsibility for regulation lies with each province. In some smaller countries, as exemplified by Costa Rica and Jamaica, one regulator is proposed for all public services. The development of regulatory systems is not proving to be easy and it is necessary to develop systems in such a way that they can readily incorporate the lessons of experience, as it is not possible to foresee all problems from the beginning. The major obstacle to the putting into place of regulatory systems has been the lack of experience in regulation and a relatively steep learning curve for the regulators once in operation. This has been a particular obstacle for increased private participation in water supply and sanitation services.

The decentralisation of operating responsibilities and the establishment of a well-structured regulatory system can be a powerful tool for improving the functioning of



public services even within the public sector. Without any transfer of ownership or management responsibility to the private sector, a marked improvement in the efficiency of the management of water supply and sanitation services has been achieved in Chile over the six years since such a system was established. A key to the success of regulation in Chile has been the design and application of an effective tariff system.

It is clear, that the transfer of management responsibility for public services to the private sector cannot succeed without an adequate and functioning regulatory framework. Undeniably, regulating private monopolies is very challenging for the public administrations of the region and the regulatory policy must make the most of competition, anticipate the need to renegotiate with providers to adjust the regulatory framework and rules to the lessons of experience and to place emphasis on tariff design and not to underestimate the problems that this can involve. The importance is illustrated by both the attempt to privatise water supply and sanitation services in Caracas failed largely because of the absence of a sufficiently well defined regulatory structure and the situation in Buenos Aires where despite the general success of the transfer of the water supply and sanitation system to private management under concession, problems remain with the regulatory system, in particular, the design of the tariff system.

## **Irrigation**

The evolution of policy towards private participation in irrigation deserves separate treatment given its very distinct characteristics. In irrigation, the policy trends in the region are strikingly uniform. Since 1990, nearly all countries have adopted policies to transfer the responsibility for the management, operation and maintenance of irrigation infrastructure to the farmers.

This has involved considerable changes in related policy areas, for example, the major modifications to the *ejido* land holding system in Mexico. It has also led to the development of new markets for the provision of the products and services required to manage and operate irrigation systems. Services once provided from within government departments responsible for irrigation management are now open to the private sector. In Peru, the transfer of responsibility for the operation of the irrigation systems and resulted in proposals for complete reform of the water law.

As yet, however, in no country, has there been a sale or transfer of irrigation systems as units to private investors. The infrastructure has, instead, either been transferred totally to the farmers or, more commonly, the secondary works have been transferred leaving the major control works in the public sector, as in Mexico. Only in Chile do the users control the total water management process from the distribution of river flows to the delivery of water to the farm or another ultimate user. This requires that the users also invest in major control structures, but even in Chile many of these large structures are still being built, and partially financed, by the public sector.

## **Investment Opportunities**

The opening of the water-related public services to private participation has created a large number of different new investment opportunities. The most interesting of these may well

be the possibility of taking responsibility for the service either through direct purchase or through a concession arrangement, but the opportunities are not limited to the assumption of the major management and investment responsibilities. Management contracts can also provide significant opportunities particularly for companies specialising in the provision of specific services with the larger number of companies participating in the market. The break up of former central government monopolies and the transfer to provincial, regional or municipal operators within the public sector has created in many countries a large new market for the private providers of services to the electricity and water supply and sanitation industries. Similarly, in irrigation, the transfer of responsibilities to farmers has created new opportunities for the private sector in the contracting out of management responsibilities.

Investment in infrastructure in Latin America and the Caribbean according to World Bank data dropped markedly in the 1980s from the 1970s especially in drinking water supply and sanitation. It also has been lower than in the Asia and Pacific region. Investment has grown significantly in some countries in the last few years and can be expected to grow more generally in the future as the economies continue to expand and living standards rise.

So far, most of the interest shown by the private sector has been concentrated on the possibilities provided by the sale or concession of electricity generation and distribution. These investment opportunities have attracted many companies from outside Latin America and the Caribbean. Perhaps one of the most interesting phenomenon has been, however, the expansion of Chilean electricity companies outside Chile. They have become major operators of both distribution and generation companies in Argentina and Peru, and are now beginning to enter markets, elsewhere, as privatisation proceeds. In turn, these companies have, themselves, attracted investor interest, particularly, as the tendency is for investors to operate in consortium with both international and local companies. Two of these companies have also ventured into the operation of water supply and sanitation services in Chile and have announced an interest in investing in systems in other countries.

In water supply and sanitation the offerings for private participation of whole systems has been limited to Argentina and to Mexico City. These contracts have generally been taken by consortia of local and foreign companies, mainly led by large European water supply and sanitation operators. In general, it can be expected that given the size of the companies that are likely to be opened for private participation that the consortia approach will continue to dominate. Should, however, smaller municipal-run systems be opened to private operators, a large market could be created for smaller investors in a number of countries. There is also a large potential equipment market.

## **The Impact of Privatisation on the Public Bureaucracy**

The shift from the reliance on public ownership and bureaucratic control for the provision of water-related services to the reliance on a regulated private monopoly, completely changes the demands on the water management institutions and also requires a thorough reconsideration of the policies that have been adopted towards water management in the past. The privatisation of water services forces a reconsideration and readjustment of the role of the state in water management. It demands not only that the state withdraw from

many activities but, that it takes on new ones, often of a very different nature and requiring different skills and knowledge of the public sector personnel. In water resources, all the experiences show that privatisation does not just stop with the transfer of assets, but requires continuing regulatory action by the public sector.

This can mean, and has meant, the restructuring of ministerial responsibilities - for example, the transfer of the supervision of drinking water supply and sanitation companies from the Ministry of Health or Public Works to Economy or Finance or to an autonomous regulatory commission - in line with the new role of government in the regulation of private companies instead of their direct control through public ownership. It means the disappearance of activities from the public sector, as private operators take over responsibilities for activities such as, investment planning when the supply of new facilities is left to be determined through competition and the market, plant operating (dispatching) schedules for power stations when they are decided by competitive bids rather than by a central dispatcher office, the supervision of cultivation plans for irrigation districts when the individual farmer decides on production or the determination of release schedules for reservoirs where the operators are privately owned electricity generating companies. In the countries where state owned enterprises have been entrusted with regulatory functions, privatisation necessarily involves the reallocation of these responsibilities to an independent regulator. Keeping agencies responsible for operating functions independent of those with regulatory responsibilities is necessary to ensure consistent and unbiased administration of regulatory standards and because a service provider with regulation functions can control access to the market and deter potential competitors.

The expansion of the private sector also creates new job and career opportunities for those public servants formerly responsible for the public sector companies. Many of the new private operators rely on them to staff the new companies, often at considerably higher salaries. This, in turn, has necessitated a revision of staffing and remuneration policies in the public sector and the adoption of a more competitive staffing policies.

## Conclusions

Given that in most Latin America and Caribbean countries there has been a long history of state interference, and political control, in the provision of basic water services, the possibilities for establishing non-political regulatory systems, even now, seems to be fraught with many obstacles. For example, in many countries, the tariffs of water based services remain unrealistically low. If they were to rise to reflect real economic costs, there is likely to be considerable political opposition and pressure to minimise any increases. It took years in Chile to raise tariffs to profitable levels. In part, however, privatisation can aid in resolving problems of political interference because it increases and makes more explicit the costs such interference cause.

In regulatory policy, there is a clear priority for Latin American governments, the development of an effective regulatory capacity through the establishment of autonomous regulatory authorities *free* from political interference (ECLAC, 1996a and 1996b). At the same time, those defining regulatory policy must be absolutely clear that its objective must be to ensure, that in activities subject to natural monopolies, there is maximum competitive pressure. The regulator must act as a substitute for the market. In general,

that is why price regulation is the preferred approach leaving other decision to utility managers.

Privatisation will not succeed in solving the problems of poor management and lack of investment that have been characteristic of public utilities in the region unless effective, clear and explicit regulatory rules are established. Privatisation should mean that, at last, public utilities are accountable to both the consumer and to society in general.

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# **Regional Water Supply Planning - the Work of the Capital Region Water Board**

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## **Abstract**

The Capital Region Water Board of South Central Pennsylvania was formed to study and evaluate the water supply situation of the Region. The Board is attempting to address the problem of viability of small systems by searching for regional solutions. It may now expand its scope to do more comprehensive planning to a larger Region in order to represent the Region's interests in facing out-of-basin diversions.

## **The Capital Region of Central Pennsylvania**

The Capital Region of Central Pennsylvania comprises an area of approximately 1,500 square miles and includes the City of Harrisburg, all of Cumberland County, portions of Berks, Dauphin, Franklin, Lebanon, Perry, and York Counties. Some of the features of the Region are:

- Harrisburg is the State Capitol.
- The Region is a cross-roads to both rail and interstate highway systems of the Eastern United States.
- The Region is a tourist mecca to visitors of the Amish and Pennsylvania Dutch Region to the East, the Gettysburg Battlefield to the West, and the Hershey amusement and entertainment facilities in Dauphin County.

Over half a million people live in the areas served by the Capital Region Water Board. Of these, 70% are served by public water supply systems while almost 30% have private wells. Twelve large systems in the area, each serving over 1,000 customers, provide water to about 85% of the people served by public water supply systems. The remaining residents who have water service are served by 116 small systems ranging from mobile home parks to municipal systems serving hundreds of homes. These small systems serve approximately 60,000 people.

## **The Work of the Board**

In 1984, three retired professional staff members of the State Department of Environmental Protection (2 attorneys and an engineer) came together in their desire to enhance the quality of life in Central Pennsylvania. They formed an organisation called, "The Law and Planning Institute". A number of activities designed to address the problems of the Central Pennsylvania Region were initiated by the Institute. One of these was the

formation of the "Capital Region Water Board". The other was the formation of "The Susquehanna Conference" (a citizens organisation designed to do education and to improve the quality of life in Central Pennsylvania). During the summer of 1989, the Law and Planning Institute convened a meeting of representatives of water suppliers in the Capital Region, state agencies and the Susquehanna River Basin Commission in order to discuss the desirability of conducting a water supply study of the Region. There was enthusiastic consensus at the first meeting to form an organisation for that purpose.

## **Goals of the Board**

At the third meeting in September 1989, the following study goals and objectives were suggested and adopted.

- To provide the Region with a safe and reliable supply of water at reasonable prices.
- To meet federal, state, and local standards of drinking water quality and quantity, now and in the foreseeable future, with minimal adverse effect upon receiving water quality.
- To address the management and resource needs of public water suppliers in the Region.
- To study a broad range of alternative forms of regional Cupertino.
- To facilitate Cupertino by public water suppliers in the region to meet the stated goals and objectives.

There was consensus on the need for a regional water supply study and work on the development of a study outline and the request for proposal began. On March 20, 1990, the Board held a public meeting where it explained its purposes and the outline of the proposed study. As a result of that meeting, the Corps of Engineers suggested to the Board that federal financing for such a study would be available under Section 22 of *The Federal Water Resources Planning Act*. During the spring of 1990, negotiations were concluded for a contract with the Susquehanna River Basin Commission that would provide the fiscal and administrative home for the study contract. By the end of 1990, a Corps of Engineers' work plan and budget for the study had been approved, and the study was conducted during 1991 and early 1992.

The cost of the Board's operations were borne by the large water suppliers and the Baltimore Office of the Corps of Engineers who contributed to the Boards operating expenses throughout its history. These costs consisted largely of conducting Board and public meetings relating to the work of the Board and to maintaining the records and financial affairs of the Board.

## **The Regional Study**

The work of the Board has consistently followed the objectives set during its early meetings in 1989. The *Harrisburg Metropolitan Area Regional Water Supply Study* was concluded in November 1992. The Study found that the Region had abundant water and should be able to meet the needs of the future using local sources. Approximately 60% of the people living in the study area received their water from the 12 large systems serving

the Region. The Study found that the water managers of these major systems had anticipated growth and had made plans to expand their systems to meet the growing demand within their service area. However, approximately 10% of the study area residents received their water from 116 small water supply systems. The Environmental Protection Agency (EPA) drinking water quality regulations may require some of the systems in the area to increase water quality testing and to filter those ground water sources which are found to be under direct influence (UDI) from surface water sources. Because more than 90% of the water used by small systems is ground water, small systems are likely to be impacted by the requirements to filter UDI ground water sources. The Study found that meeting these drinking water regulations is expected to be an expensive endeavour for small systems and their customers. Therefore, it was important to see how many of these small systems might benefit by some form of regionalisation either with each other or larger systems. It is well-known that scale economics makes the per capita or per family costs of small systems significantly greater than similar costs in larger systems. Regionalisation will therefore reduce per family costs. In order to analyse the feasibility of regionalisation, three categories were established for small systems.

- ***Fringe Systems.*** These are systems which are located within one mile of the outer boundaries of the twelve large systems. Therefore, they have the opportunity to connect to a large system. There were 39 fringe systems. In addition, there existed 22 interconnections between systems in the Region. Eleven of these provide all the needed water to the other systems. The others provide occasional or emergency service.
- Another approach to regionalisation is grouping or clustering of systems into one new large system with a centrally located water treatment plant. In the Regional Study Area, the possibility exists for 49 small systems to form up to 8 new clusters, ranging in size from an average usage of 24,500 to 504,000 gallons per day.

## **Sub-Regional Studies**

The Study recommendation that more detailed assessments of small systems be conducted in parts of the Region in order to advance the cause of regionalisation. As a result of that recommendation, 4 additional studies have so far been conducted by the Baltimore Office of the Corps of Engineers in Cupertino with the Capital Region Water Board and its members. The local share of the studies was provided by the Pennsylvania Department of Environmental Resources (later to become Protection). These studies were done in the following sequence:

- The Small Systems Regionalisation Study For Lebanon County that was concluded in April 1995.
- The Shippensburg Area Regionalisation Study For Cumberland County that was concluded in February 1997.
- The Small System Regionalisation Study for Cumberland County, Pennsylvania which is expected to be concluded in Spring 1998.
- The Market Feasibility Study Lebanon County, Pennsylvania which is expected to be concluded in 1998.

The first three Studies provided detailed information concerning each of the small systems, including administrative and basic information about capacity, distribution systems, treatment systems, storage systems, projected usage, and information on water sources. The Studies provided specific cost estimates for alternative improvements of each system and detailed discussion concerning alternatives available to each system. These Studies provide an excellent database for anyone; the state, private water companies, counties, or others to plan Regionalisation efforts which might greatly reduce the future per capita cost of water service and greatly enhance the quality of service provided by these small systems.

The *Small Systems Regionalisation Study For Lebanon County* is being followed by the *Market Feasibility Study Lebanon County, Pennsylvania* that is expected to be completed in 1998. This Study looks at system alternatives in more detail, discusses financial and institutional alternatives, and recommends regional institutional alternatives. The first recommendation of this Study is to create a county-wide institution to address particular problems of small systems. The system would also provide well-head protection and comprehensive water supply planning since it does not now exist in Lebanon County.

## **The Problem of Small Systems in the United States**

### **Fragmentation of Local Government**

The problem of small systems is not unique to Pennsylvania. Pennsylvania has many small systems because of the high degree of fragmentation of local government. Pennsylvania has 6,700 municipalities. It is estimated that the Capital Region Water Board Region includes more than 100 municipalities. A recent report entitled *Community Water Systems Survey* conducted by the EPA indicated that there are 180,000 water systems in the United States serving more than 250 million people. According to this survey, most of the community water systems are considered "small" systems serving 3,300 or more people. Large systems serve 50,000 or more. In the United States, 2% of the systems are large, 13% are medium and 85% are small systems. The Report indicated that during the past decades, water rates have increased faster than the Consumer Price Index. EPA found that many water systems have costs that exceed revenues. 40% of the small systems serving less than 500 people reported a deficit. It is the author's opinion that the rising costs for drinking water in the United States is creating a growing gap in the ability of a large number of systems to meet modern drinking water standards.

The work of the Capital Region Water Board has helped to provide detailed information concerning that situation in Central Pennsylvania and is designed to promote increased regionalisation which will help maintain water service costs at a reasonable level. Certain other activities in state government have also been stimulated by the work of the Board and the recognition of the problems.

### **Viability**

The Pennsylvania Public Utility Commission has been very active in working with the Department of Environmental Protection on the viability issue. A movement is under foot



to prevent the creation of non-viable small systems. Criteria for viability are being developed and applied to discourage the formation of small non-viable systems.

## **Violations of Law**

A recent report by the Small Systems Research Committee of the American Water Works Association highlights these problems. It indicates that 90% of the violation of maximum contaminate levels monitoring and reporting requirements occur in small systems. The Committee concludes that available research funds be allocated in the following priorities:

- Funding, financing, and costs.
- Adequate qualified staffing.
- System viability.

## **The Link to Land Use**

It is this author's opinion that the prevalence of small systems should also be considered a land use management issue and needs to be addressed in that context. Land use decisions that encourage sprawl and the creation of small systems impose a hidden cost on present and future population that are rarely discussed in the public policy context. If these problems are addressed with the kind of data that the Board has collected, the Region should be able to make better water management decisions in the future.

## **The Future of the Board**

The Capital Region is located in the Lower Susquehanna River Basin which is one of the least developed basins in the Commonwealth of Pennsylvania. The Susquehanna River Basin Commission has recently proposed a new set of policies for the diversion of water out of the basin. It has given the Capital Region Water Board an opportunity to consult with the Susquehanna Assembly for Effective Governance (an eight county organisation of elected officials and community leaders who are beginning to look at the problems of the South Central Pennsylvania Region). The policy, now written, requires an extensive amount of regional land use and water supply planning before the Commission will seriously consider an out-of-basin diversion. This means that both the area of origin and the area where the out-of-basin diversion will be destined will be required to provide an extensive planning document for future needs. This suggests the possibility that the geographic area and the scope of the water studies being conducted in Central Pennsylvania should be greatly broadened to cover other areas: such as, waste water management, flood control, irrigation, recreational uses and others for the entire Eight County Region. One of the issues which now confronts the Board and the Region is whether its work should be expanded both geographically and in terms of water use scope. Sound decisions regarding the protection of the quality of life in a region such as South Central Pennsylvania demands sound data in order to discuss options for the future. The work of the Capital Region Water Board and the agencies which have supported it have provided that kind of data and that kind of framework. Decisions about water and land use go hand in hand and need to be dealt with in a unified way in order to serve the future quality of life in the Region.

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# Public-Private Contracts: Analysis and Formulae for Sustainability. Development and Application in Mexico

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## Summary

The objective of this paper is to describe the analysis of financial transactions and capital costs in cases of public-private contracts in Mexico and to recommend new strategies and formulae that will contribute to financial sustainability and customer' affordability.

The analysis is focused on private participation in the construction and operation of wastewater treatment plants. A typical case study is used as an example. First, the situation of build-operate and transfer schemes in Mexico is reviewed. The experience to date has been generally unsuccessful, mostly due to financial, affordability and country risk issues.

Second, a project cost analysis is presented to outline the importance of capital costs and inflation, in relation to tariffs and affordability of new projects under uncertain economic conditions.

Third, analyses are presented of capital funding and related variables in the form of a Debt-funding Matrix.

Finally, alternate formulae and financial transactions mechanisms are proposed more suitable to actual complexity of the funding-payment process. A new strategy is recommend which will increase the middle and long term sustainability of public-private contracts. The conclusion can be summarised as follows:

- Capital cost and its management in the operational service charge, is a key issue for project sustainability and customer's affordability.
- Better strategies are needed to reduce capital and financial costs, including returning to subsidies and public finance, especially for sanitation infrastructure.
- The Debt-funding Matrix provides a schematic view which can help the analysis, management and payment of the capital costs of a public-private project.
- The recommendations made should result in greater transparency of capital costs and financial transactions and will provide a mechanism to search for a cheaper tariff in variable economic conditions. At the same time, they would provide for a more precise regulation and better adaptation to the specific characteristics of each project.

## Introduction and Problem

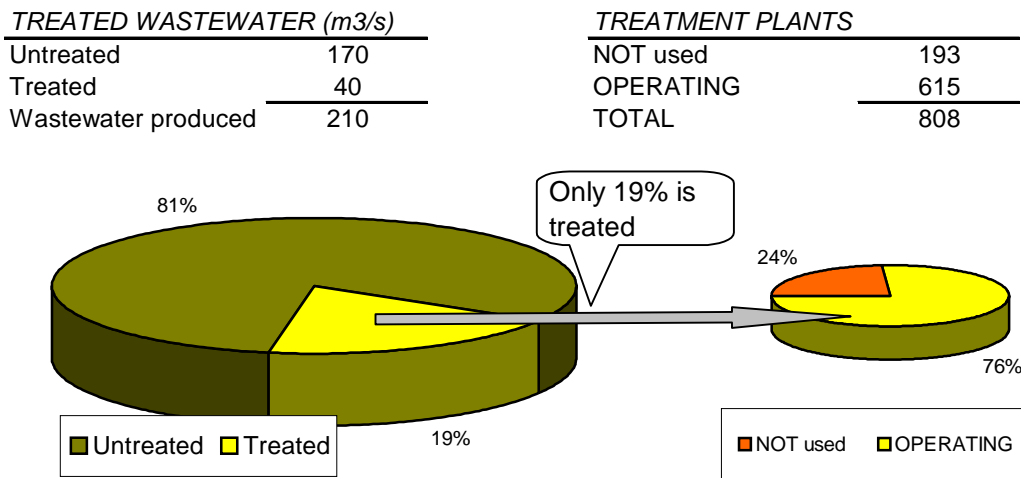
### Private Participation

The trend towards Private Sector Participation (PSP) in the Mexican water sector began in 1991, however completed and operating examples are few. Apart from the known projects such as Cancun, Aguascalientes and Mexico City, most PSP efforts have been concentrated on Wastewater Treatment Plants (WWTPs)<sup>1,2</sup> using a Build Operate and Transfer (BOT) and derivatives approaches.

To some extent the reasons for this are understandable: Mexico is treating only approximately 19% of its municipal wastewater,<sup>3,4</sup> so the authorities were required to act but WWTPs are expensive and technologically demanding, especially if secondary treatment is to be provided. Since technology, investment capacity amongst other factors, including improvements in efficiency are associated with PSP, the private sector has been promoted for sanitation schemes such as BOTs. See Figure 1.

Figure 1

#### Wastewater treatment plants in Mexico, 1997



Operating private plants are few (only 2% by number) but account for approximately 36% of the actual treated flow, which could grow to 80% taking account of ongoing and projected projects (including the Mexico City plants).<sup>3,4,5,6</sup> This reflects both government policy and PS interest to go for the greatest and more affordable projects.

Nevertheless, truncated and unsuccessful WWTPs projects are a major concern: Since 1992, only 29% of projects were completed and are in operation; within this percentage, the biggest plants correspond to those not financed by the private sector e.g. Monterrey.<sup>5,6</sup> The estimated growth to 80% is mainly due to the addition of future large plants: Mexico City and Guadalajara, but even the first of these will not to be financed by private capital.

## The Problem and Objective

Most PSP in WWTPs in Mexico can be classified as B.O.T. (Build-operate and transfer). All of these have required much tailoring effort to the specific national, regional and local circumstances<sup>2</sup> and yet, only the 30% are operating (only 23% of those privately financed).

The main problems faced are related to financial, regulation and political matters. This paper will focus on the former, since financial considerations emerge throughout the contracting process and the uncertain economic conditions weaken or expose project sustainability to financial issues.

The contracting out process, before construction, can be divided in four main stages: feasibility studies, bidding, contract writing up and the detailed project. At the feasibility stage there is usually a lack of resources to develop a correct assessment and it is common that personal interests or political timing effect key decisions. Interestingly, funding agents are bypassed, although they, eventually in the contracting phase, set the conditions to proceed.

The bidding process, often takes longer than expected, therefore investment cost increases especially with the prevalent unstable economic conditions. The bidding documents strongly influence the final contract, if the bidding documents lack precision or specific procedures for the financial transactions, so will the signed agreement, consequently, key negotiations and modifications are usually transferred to the contract development stage.

This promotes more delays during contract revision and changes to projected works often increase the estimated investment cost, which weakens affordability to pay for service. It is at this stage when funding institutions come into the arena, reviewing the whole process and often conditioning loans so that the projects are interrupted.

## The Main Objective of the Paper

The main objective is to analyse the financial transactions and capital cost of public-private contracts and to recommend new strategies and formulae that will contribute to project's financial sustainability and customer's affordability.

### Specific Objectives

- Project cost analysis for a model case will be summarised to outline the importance of capital costs and inflation, in relation to the service tariff (in this paper, "service tariff" will mean the *service charges* or pay-back that the private contractor of a BOT charge to the public organization) charges and affordability (*affordability* of the project in relation to the client (public institution) capacity to pay back the WWTP service, which is supported by the end-payer (customer water and sanitation tariffs)) of new schemes.

- Capital funding and related variables will be analysed by means of a Debt-funding Matrix. This matrix correlates the impact of debt (whether public or private assigned) versus the founding origin.
- Alternate formulae and financial transaction mechanisms will be proposed which better suit the actual complexity of the funding-payment process.
- Finally, recommendations to increase the middle and long term sustainability of public-private contracts will be proposed.

## The Case

Project:	Primary and Secondary wastewater treatment plant for a Municipality.
Size and reuse:	800 lps (18 MGD) capacity, of which half will be sold for industrial use and half will be used for irrigation at no charge.
Investment:	30 million US dollars.
Population:	600,000
Contract type:	Base B.O.T. 20 years operation.
Financial Indicators:	Annual interest rate (before inflation) 12% and estimated inflation of 12% average (15-10% variations)

## Cost Analysis and Affordability

### Capital Cost

The cost and financial analysis of a water project play a pivotal role, especially considering capital costs in the conditions of developing countries. The cost and affordability of the scheme will depend on a multi-variable analysis. Amongst the principal variables affecting the capital cost will be the size and technology selected, quality standards required, interest rates, return on capital, country risk, payment mechanisms and tariffs, devaluation and inflation.

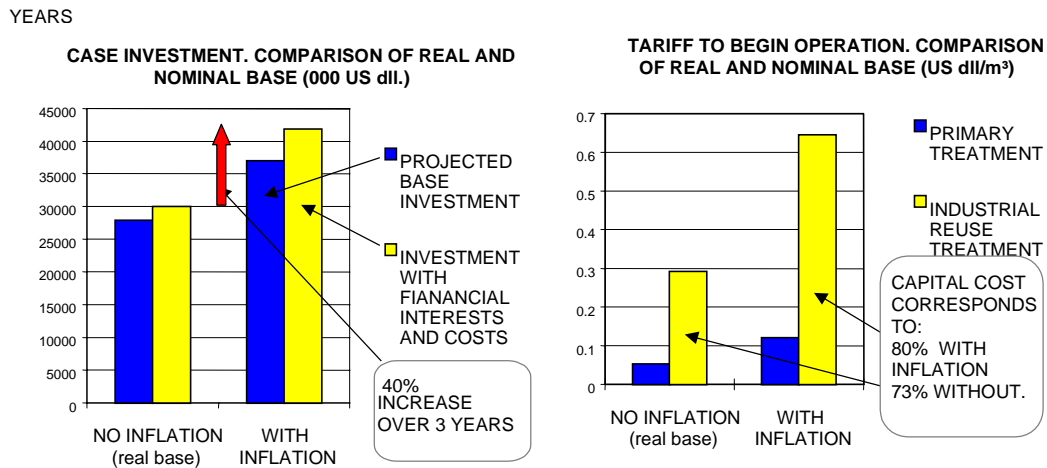
Currency devaluation and inflation will be vital risk factor in any developing economy, particularly where foreign investment and equipment are involved. Additionally in Mexico, inflation is important as tariffs (generally the customer tariff does not differentiate between water and sanitation services) are not indexed to inflation but linked to an annual review by Congress and, therefore, political interference. On the other hand, the *service tariff* charge to the client by the private partner is usually indexed linked at least, to the national inflation index (INPC), although this is changing, it is still the case in most municipalities. Customer tariffs depend upon politics or electoral decisions, which means that most of the time they are far below costs and inflation. This means that, together with the low historic water tariffs charged in Mexico and the absence sanitation charges, WWTP projects are not easily paid for by the domestic customer.

Given the characteristics of our case, if the period from feasibility studies to the end of construction lasts 3 years (which would be normal), the impact on capital costs and service tariffs will be as shown in Figure 2.

Figure 2 shows the following:

Figure 2

## Investment and tariff for an investment of US\$ 30 million in a WWTP



Note: "nominal base" calculation include inflation, "real base" calculation excludes inflation.

- The total investment and financial costs will increase closely or beyond inflation, from US\$ 30 to 42 million due to the longer bidding-contracting period. This should be self-evident, but it is not clearly conceptualised or weighted by the decision-makers.
- The capital and financial cost increase will result in higher service charges by the contractor-investor, than the one published in the bid.
- The difference between a tariff for primary treatment and that for advanced secondary is very large. Partly due to this, the legislation in Mexico was changed to lower standards (NOM 001 ECOL 1996, TSS of 150 and DBO5 of 150 mg/lit, figure of monthly average for treated water to be used in irrigation).
- Considering the *real base* analysis, if the tariff for water services is around US\$ 0.3m<sup>3</sup>, primary treatment may be affordable since the service charge only represents 18% of the water tariff. Secondary treatment costs require a tariff which approximates the water tariff. Water charges to the end customer are comparatively low, but politicians can not afford to double the charge.
- Considering the *nominal base* analysis, the tariff for primary treatment may reach 40% of the water tariff. If the customer tariff is not actualised to inflation, the charge when operation begins will represent a real burden. Thus, the whole period should be considered in the financial analysis and the establishment of tariff indexation contemplated.
- Finally, the analysis clearly shows that the capital cost component of the tariff represents the major cost.

The experience in Mexico has illustrated that the analysis in nominal terms (with estimated inflation) and over the whole project period provides a better picture of the project's impact for politicians and decision-makers. This analysis responds also to the necessity for better project planning and paying strategies.

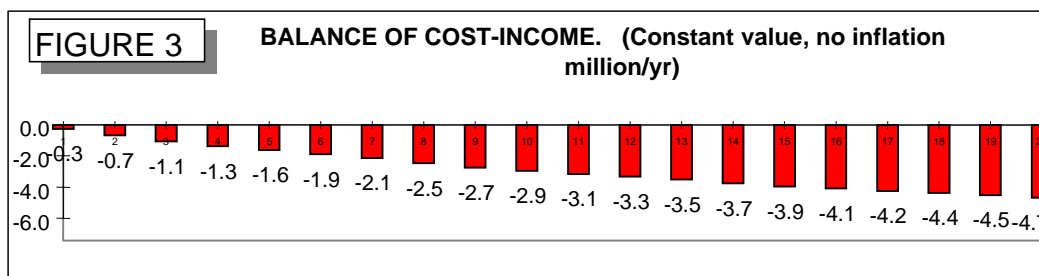
As a consequence of recent experience in Mexico (together with the scarcity of funds for infrastructure), the actual trend is towards the reuse and sale of treated wastewater and to engineer cheaper alternatives.

This has promoted projects such as those in Tampico, San Luis Potosi and possibly La Laguna,<sup>6,7</sup> where treated water may be sold for industrial reuse and subsidies to capital cost are again been considered in public-private projects.<sup>8</sup> Outlandishly, in some cases, sales are negotiated with state companies such as PEMEX and electricity (CFE), which require large flows for cooling, but (as the case of San Luis) without considering inflation.

## Affordability

On the basis of the analysed case, the following data reveal the typical impact on affordability of a project in Mexico:

- If no treated water is sold, the annual cost (without taking into account inflation) would be about US\$ 7.4 million, representing about US\$ 4.50/family-month, equivalent to 75% of actual payments for drinking water payment (US\$ 6.00).
- If water subject to secondary treatment is sold at US\$ 0.60/m<sup>3</sup> (a reasonable price for an electric plant) and if this is indexed at only 50% of inflation and, additionally a new *sanitation* tariff per family per month of US\$ 0.60 is set (apart from the water tariff) and indexed at least 5% per annum, the result will be negative, as shown in Figure 3.



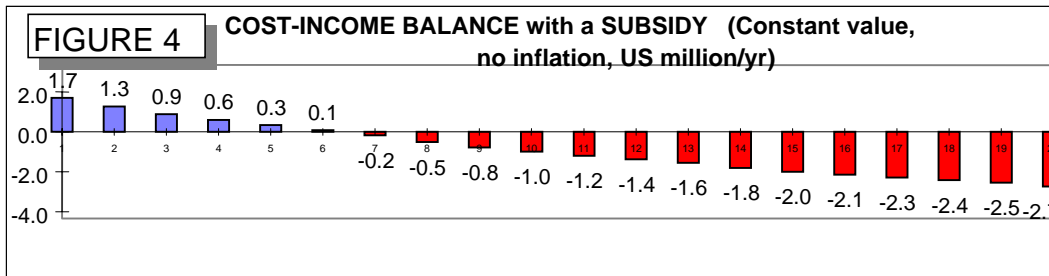
- The negative balance will mean that in the middle period an extra US\$ 1.75/family-month would be required in real terms. Alternatively, other measures could be considered such as, better selling conditions or capital reductions.

Due to the poor performance of BOT's and the 1995 crises, the Mexican government has been considering subsidies of from 30 to 40% for sanitation infrastructure.<sup>8</sup> Applying a 35% subsidy to the case study would give the results shown in Figure 4.

- Figure 4 shows that there is an increase in cash flows at first due to the subsidy.
- Nevertheless, in the middle period an additional charge of US\$1.00/family-month will be required and of US\$2.00 at the end. To the ordinary customer this may still be difficult to manage, especially considering the poverty of the majority of



the population, the poor payment culture and the slowness of water utilities (and politicians) to set real cost tariffs.



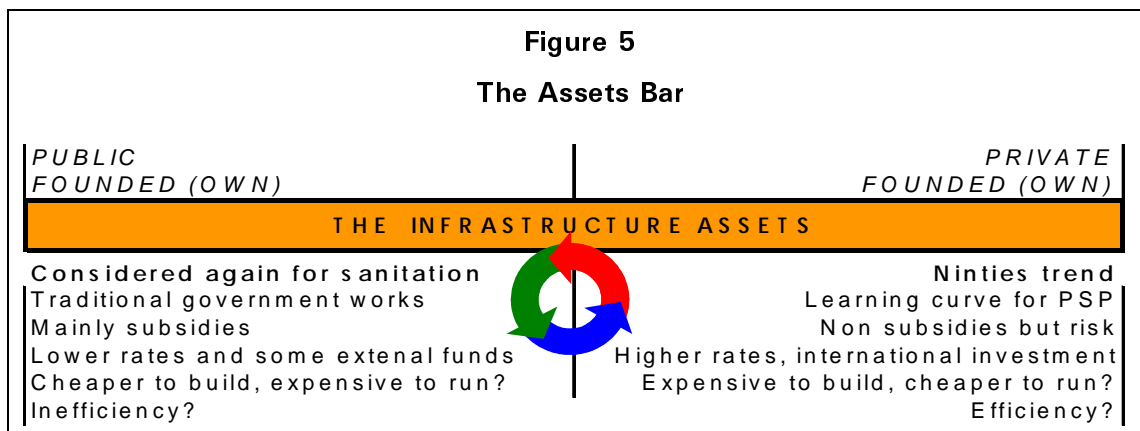
### Preliminary Conclusion

- It is necessary to manage the tariffs as well as trying to sell the treated wastewater for reuse. The establishment of indexed tariffs should be considered.
- Subsidies and public finance at lower rates should be considered for sanitation in the less affordable projects (specially when there is no reuse). If private capital is required, although it may promote permanency and efficiency, it may be more expensive than transparent public funds.

Better strategies to reduce the capital and financial costs of private capital projects (or mixed funds projects) are a priority since these costs represent the major cost. It is also important to improve the management of financial transactions over the whole life of a project.

### Contract's Finance. The Debt-Funding Matrix

As was seen in the previous section, the capital cost of a private-public contract (such as BOT) is the principal component of the operating tariff. The lack of government funds, and other considerations,<sup>1</sup> has shifted the balance between public and private financing (to the right in Figure 5). Some key questions remain to be asked. Should financing be subsidised? Which is cheaper - public or private? Which is more efficient? Should there be a compromise?

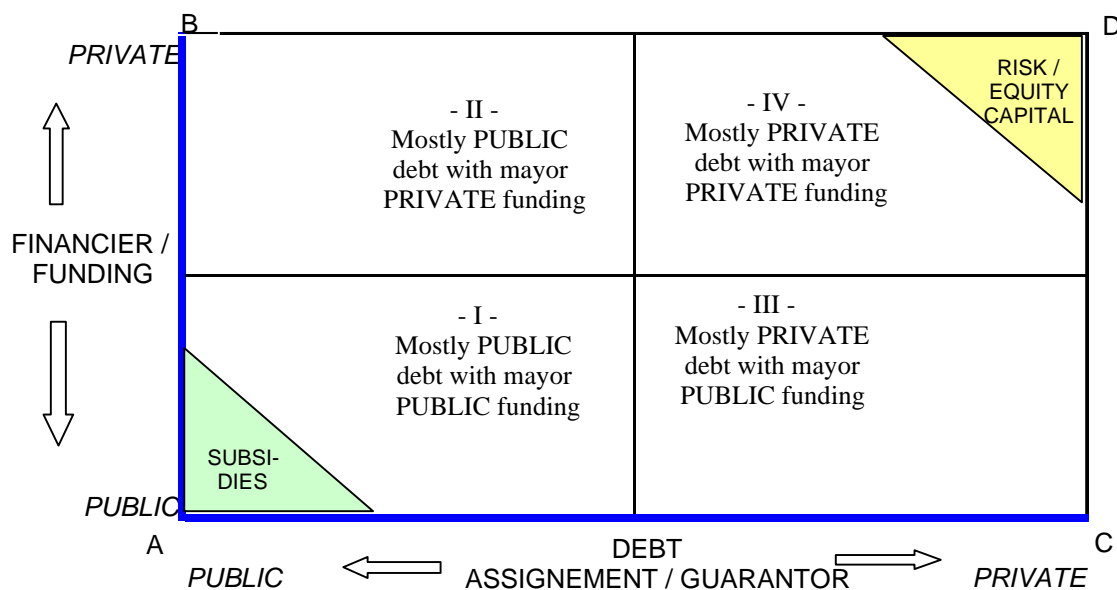


Certainly reality is more complex than shown here and will combine factors from multiple disciplines. Keeping in focus the capital and funding issues, however, projects in Mexico are demonstrating that contracting-out can combine several distinct debt-loan situations:

- Government subsidies<sup>8</sup> are again being considered (and also giant public works).<sup>9</sup>
- Private companies seek funds from public banks and international organisations (bilateral).
- Public utilities take the risk or debt, sometimes with private funding.
- Private companies take projects, but the risk is taken by public entities or the project itself.<sup>10</sup>
- Private capital risk is minimised by leverage, sometimes even equity obligations.

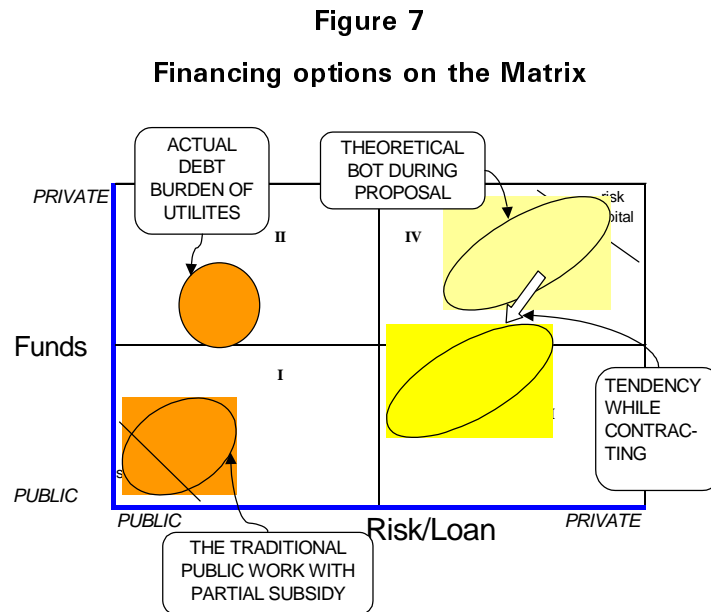
The positioning of these factors and the different risk and conditions they expose, are simplified in the Debt-Funding Matrix, see Figure 6. The matrix shows the correlation amongst these factors, principally: whether the debt is public or private, either assigned or guaranteed, versus a public or private founding origin.

**Figure 6**  
**The Debt-Funding Matrix**



The matrix contract financing in four main quadrants. The "X" axis is the debt-risk classification (to whom is the debt assigned or whom is the guarantor), and the "Y" the financier (who or where). The triangle in A represents subsidies, government grants to government (or public) institutions. The triangle in D represents private risk capital (the company funds or equity, not borrowed). Private funding or company leverage is located in the IV<sup>th</sup> quadrant. In this matrix, the Assets Bar drawn in Figure 5 is shown as the diagonal A-D.

As seen in Figure 7, typical B.O.T. financing would be located in quadrant IV. However, during the contracting process this tends to move to the III<sup>rd</sup> quadrant, borrowing from public institutions and even partially to the I<sup>st</sup> quadrant, with subsidies or transferring the majority of the risk to the government or project itself.



This description explains to some extent the comportment of project finance in Mexico, which is increasingly a mixture of funds and loan conditions. Furthermore, the capital for each project can be a combination within the fourth quadrants and will show important differences according to:

- Interests rates and return,
- Commissions and charges,
- Payment periods,
- Guarantees,
- Negotiation capacity,
- Flexibility to open to the stock market.

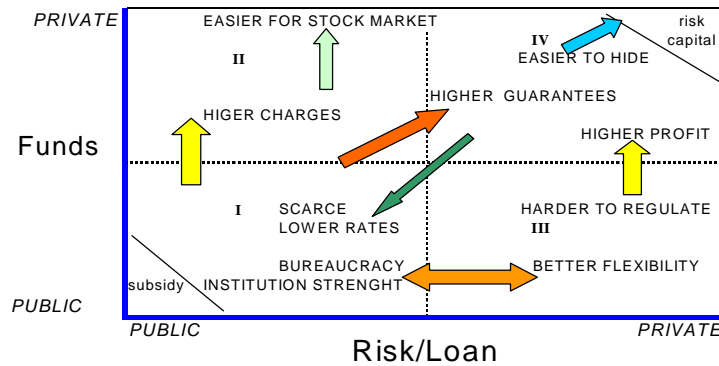
Some of the tendencies that can be observed are shown in Figure 8. For example: public finance will tend to be cheaper but scarcer while private finance requires higher guarantees and will tend to be more expensive. Private assignment or management of debt will tend to be more flexible but also harder to regulate.

## Capital Cost Formulae and Management

Although the capital cost of a project represents the mayor component of the tariff and, despite the relative complexity of debt-founding arrangements, the formulae used for capital repayment remains too simple and, in most cases, inadequate. In this section, this problem will be discussed and a new formulae for the management of financial transactions proposed.

Figure 8

Tendencies and characteristics of funding



The Present Method of Calculation

The basic traditional formula used in public-private contracting-out in Mexico, specifically BOT is shown in Table 1.

Table 1

Traditional Capital Repayment Formulae<sup>11</sup>

	Main formula:
$P_t = T1t + [T2 + Q(T3)]$	Basic formula to pay for capital T1 and operation (whether fixed operational costs -T2- or variable costs T3).
Capital Repayment $T1t =$	Monthly payment for capital amortisation, interests, financial costs and return on capital. (Note: the term used in Mexican contracts is either "T1" or "CFA", the author renamed it to "T1t" for the purpose of the reformulation)
T1t Calculation:	It is calculated during the proposal using the Payment formulae (equal payments) considering the capital, amortisation period and real interest rate.
Updating:	The updating or actualisation of T1t is generally based on the national price index (inflation).

The analysis of Mexican cases has shown that contract application of T1t has several disadvantages and consequently greater development and precision is necessary.<sup>12</sup> Some of the main problems detected are the following:

- The direct indexation of an equal payments calculation (based on a real interest rate) ensures the desired return in time. This is valid for a private investor who requires payment and a return for his money, but it is different for leverage or

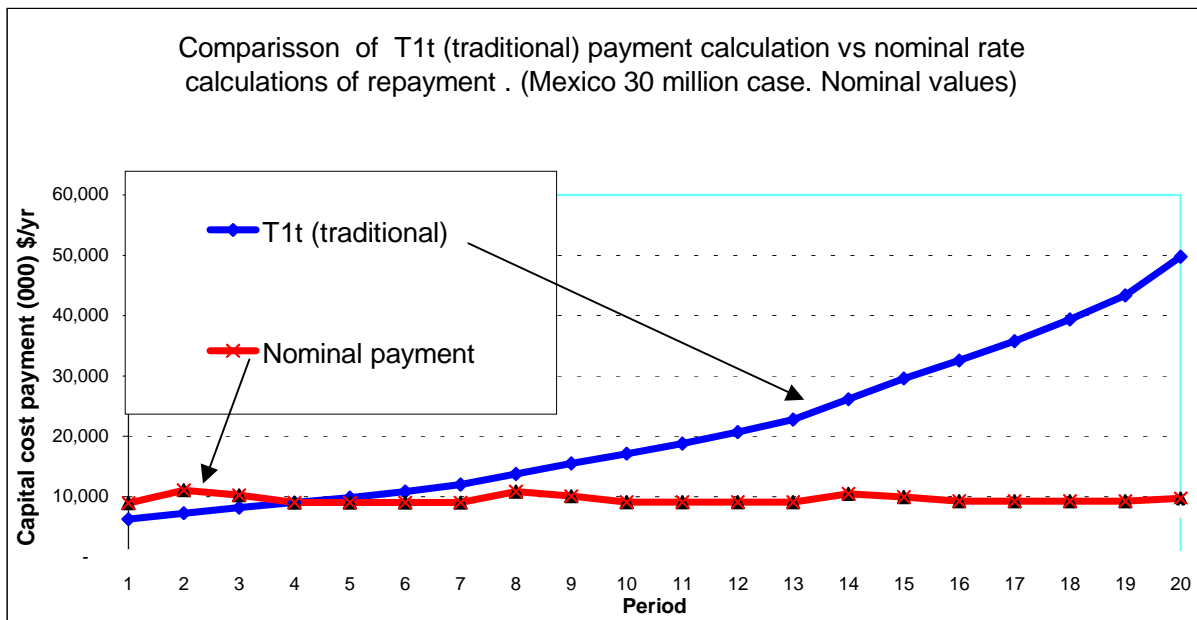
when calculating payments of a bank loan which may be represented fully as a private risk (as happens in Mexico).

- The direct and compound indexation of the repayments implies that payments will follow a different time pattern for the loans repaid based on *nominal annual rates* (with decreasing amortisation, as are most credits for water projects). This shifts costs to the end of the repayment period.
- The compound calculation of inflation will mean that higher peaks (crises) increase total repayment throughout the rest of the period in constant terms (no inflation), regardless of better economic conditions.
- Information on debt balance, modifications, interest rates etc. remains unknown to the public sector and to the customer. If the contract is broken or re-negotiation is required information may be unclear, confusing or hidden.
- Changes in debt composition, cheaper opportunities or conditions and capital repayment will be reserved to whoever manages the debt, usually the private sector or the banks involved. This will prevent the possibility of reducing customer tariffs via future negotiations.
- The simplicity and rigidity of the formula will close opportunities for change and moves towards better arrangements for both parties.

To visualise the problems found, Figure 9 shows the capital repayment in our case study. It shows a comparison of the amortisation amounts calculated with T1t versus a direct repayment at nominal rates (including inflation). In both cases repayment to capital and the real rate are the same.

**Figure 9**

**Results of actual capital repayment options. Case projection**



Certainly, the advantage of T1t is that it is cheaper in the beginning, proving liquidity to the client (government). The difference between the two patterns of repayment

over the period in constant values (deflated from inflation) would be some US\$22 million, which will increase if inflation increases greatly.

## The Compound Formula (T1C)

A Compound tariff (T1C) is proposed to overcome the repayment of capital costs problem for infrastructure projects. The nature of T1C is summarised in Table 2.

**Table 2**  
**Compound Capital Repayment (Formula T1C)<sup>11,12</sup>**

		<b>Main compound formula:</b>	
$P_i = T1C_i + [T2 + Q(T3)] -$		Basic formula to pay for capital T1C and operation (whether fixed operational costs-T2- or variable costs -T3 -based en Q = flow).	
<b><math>T1C_i = TF_i + TR_i + V_i</math></b>			
TOTAL COMPOUND CAPITAL REPAYMENT TARIFF			
<b><math>TF_i</math></b> "FINANCIAL TARIFF" Payment for Public (government) debt	<b><math>TR_i</math></b> "RISK TARIFF" Payment for Private debt		
	<b><math>TR_f +</math></b> Payment for financed Private debt	<b><math>TR_r</math></b> Return on for Risk (equity) capital	
MARKET BASED VARIABLE AMOUNT SUBJECT TO NEGOTIATION CONDITIONS OPEN TO REGULATION AND COSTUMERS, RENEGOTIABLE		PRIVATE RETURN FIXED AMOUNT UPDATING VIA INDEXATION	

Where:

<b>TF =</b>	Total amount of THE PERIOD's payment (capital amortisation and interest) due to the <u>proportional</u> investment financed by one or several institutions (public or private) which guarantor or debt's assignment is the STATE-CONTROLLED ENTITY (at the end of the day the general public-customer- or taxpayer).
Main flags >	<ul style="list-style-type: none"> <li>• The majority of the RISK remains in the public sector.</li> <li>• It is a variable tariff subject to marked conditions such as rates, period, amortisation type and commissions.</li> <li>• It is basically the Grantor (Government) offer, not subject to the initial bidding.</li> </ul>

<p><b>TRf =</b></p> <p>Main flags &gt;</p>	<p>Total amount of THE PERIOD's payment (capital amortisation and interest) due to the <u>proportional</u> investment financed by one or several institutions (mainly private) which guarantor or assignment is the PRIVATE COMPANY.</p> <ul style="list-style-type: none"> <li>• Part of the RISK is transferred to the private sector and most management and negotiation of the loan and credit conditions.</li> <li>• It is also a variable tariff similar to <b>TR</b>, but it may contain a <u>PROFIT factor</u> clearly stated which reflects the company "charges" for competence and negotiation capacity.</li> <li>• It is a private offer when costs and conditions are better than <b>TF</b> though, may be part of the bidding.</li> <li>• It is private capital when private investment is required but open to stock, negotiable and even exchangeable with TF tariff.</li> <li>• <b>TR</b> and <b>TF</b> can be present both or only one depending on conditions set by Grantor.</li> </ul>
<p><b>TRr =</b></p>	<p>Total amount of THE PERIOD's payment correspondent to the proportional RETURN of risk capital invested by the private company. Calculation and updating will be similar to the actual T1t explained in Table 1.</p> <ul style="list-style-type: none"> <li>• The RISK is mainly private sector and it is the guarantee of the company's interest to stay in contract and gain a desired return during the contract span.</li> <li>• It is constant and the main tendering issue, the cheaper return will tend to be the better offer throughout.</li> <li>• This component will also allow to include cost of shares sold to the stock market.</li> </ul>
<p><b>V =</b></p>	<p>Is the summation of THE PERIOD's costs derived of financial transactions such as the trustee expenses, the regulation, the supervision, variable or punctual commissions and others.</p>
<p><b>"i"</b></p>	<p>Refers to THE PERIOD or "Moment" that the amount represents, the principal one's will be the following:</p> <ul style="list-style-type: none"> <li>• <math>i=p</math> when referred to the ESTIMATED amount offered in the PROPOSAL during the bidding process.</li> <li>• <math>i=c</math> when referred to the ESTIMATED amount at the beginning of the CONSTRUCTION. It should reflect the conditions after the contract and detailed project is finished and the financial loans and arrangements signed.</li> <li>• <math>i=1...n</math> first and subsequent CAPITAL PAYMENT during operational period up to the end of the contract "n".</li> </ul>

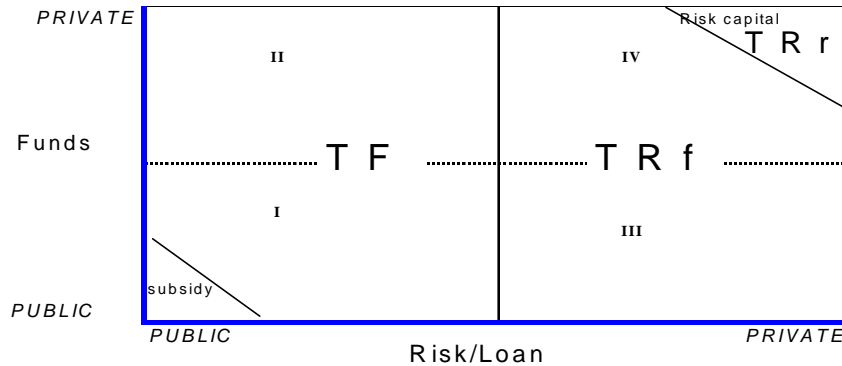
The Compound Capital Cost Formula (or Analysis method) reflects more precisely the characteristics of the capital (or funds) cost involved in the development of a private-public project. The allocation of T1C components within the Debt-Funding Matrix is shown in Figure 10.

### Application of the Compound Formula (T1C)

If there is a 35% subsidy, no changes in capital cost would impact the tariff, except those expenses or commissions required (if any) to complete the operation, and not included in the grant. The case considers a minimum of 25% of risk capital from the private

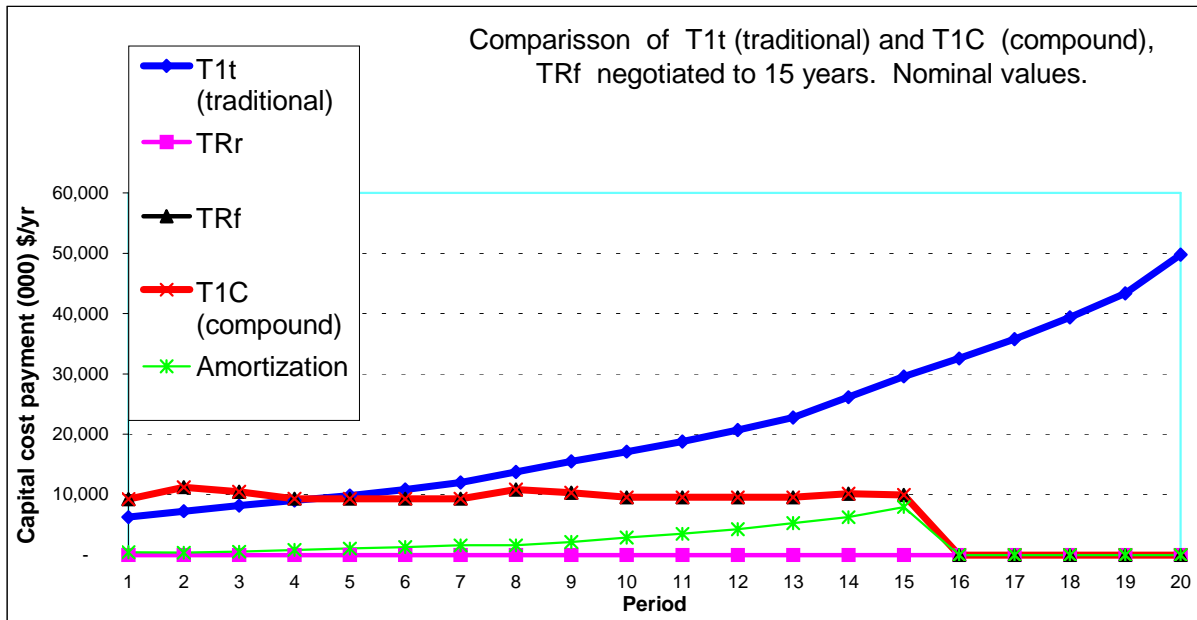
company, the cost of which is represented by TRr with an annual IRR of 12%. A public-private mixture of funds finances the remaining 40%. Repayment, to be managed by the private company through a bank trustee, is represented and projected by the component TRf of the tariff, at a 12% real rate and a 15 year amortisation period. If it was a public loan guaranteed by a state-utility (or grantor), it would be represented as TF.

**Figure 10**  
**The T1C Components' Allocation within the Debt-Funding Matrix**



The result of applying the formula  $T1C = TRf + TRr + V$  are shown in Figure 11. The Curve T1C shifts down from the traditional calculation T1t, the area within the curves T1t and T1C represent a 20 year period, equivalent to a difference in real terms of US\$ 16 million, corresponding to a 22% saving.

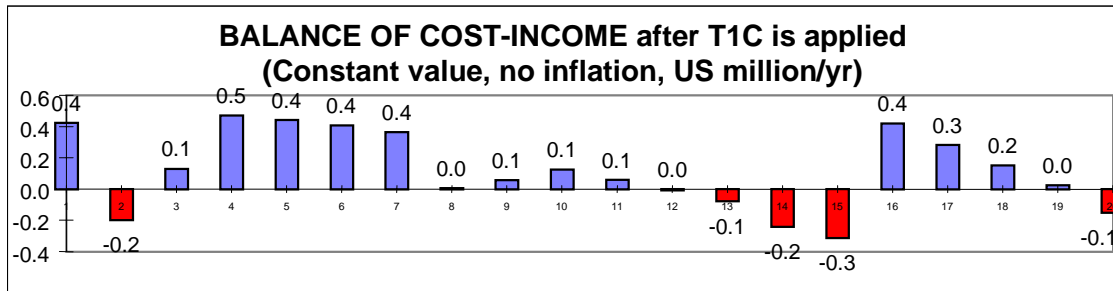
**Figure 11**  
**Results of applying T1C for capital repayment. Case projection**





The differences in cash-flow balance of the project will be reverted to positive as seen in Figure 12. The annual average balance will be reduced from minus US\$ 0.6 million to plus US\$ 0.2 million.

**Figure 12**  
**Case Balance after applying formula T1C (compare with Figure 4)**



To conclude, it would be cheaper and clearer to apply the Compound Capital Tariff to public-private contracts (that include private capital) instead of using the actual formula T1t. It would also increase versatility to suit the specific conditions of developing markets.

The management and regulation of the contract would be more complex. Solutions have been proposed in the Mexican cases which involves a greater participation of the Banobras' trustee (public bank) and a regulatory committee set and founded for each project.<sup>2,13</sup>

## Recommendations and Conclusion

The analysis of the financial transactions and of the costs of the public-private contracts in Mexico shows that capital cost and its management in the operational tariff is a key issue related to the project's sustainability and customer's affordability. The whole period analysis of a project should be foreseen and the indexation for inflation of the service tariff should be considered.

It is necessary to manage the sources of income to pay for sanitation and reuse, but this would require a long term multi-factorial solution which is of limited applicability in developing countries. Priority should be given, therefore, to working out better strategies to reduce both capital and financial costs, including returning to subsidies and public finance, and regulating carefully the transaction of funds over the whole life of a project.

Project funding, the capital-debt characteristics and the risk involved (in one concept: the financial strategy) are project components that should not be minimised in contract specifications, especially when private capital is involved. The Debt-funding Matrix is proposed to explain and simplify the classification of the financial strategy of projects.

The Debt-funding Matrix aids in the analysis and conceptualisation of the Compound Capital Cost Tariff (T1C), as a new way to manage and pay for the capital cost

of a public-private project: It reflects more precisely the characteristics of the funds and loans involved in the development of projects and allows flexibility in managing financial costs throughout a project.

The use of the Compound Capital Cost Tariff is recommended to improve:

- The middle and long term savings through, the transparency of the capital repayment components and their variations over time.
- Information to stakeholders on debt management, the capital costs and supervision of projects.
- Risk allocation and risk reduction since the “market based” characteristic transfers peak variations to the tariff itself, which then can be re-engineered to reduce the impact to the consumer.
- The applicability of diverse capital composition to projects, since it includes public and/or private capital, subsidies and/or equity capital or shares.

The application of T1C may reduce the transparency of costs and profits, and it will provide a mechanism to search for the cheaper tariff in uncertain economic conditions, although it reduces freedom to manage resources for the private investor. At the same time, it would require a more complex contract and a continuous regulation-supervision of project development.

These characteristics may improve the affordability of sanitation projects in developing countries, consequently, it will improve the sustainability of public-private projects, although the formulae and application procedures still require further precision to adjust to the specific conditions of different projects.

The analysis and application of T1C will help decision-makers and utilities to foresee and preview the implications for capital and financial costs of new schemes, therefore it may push toward better financial planning of public-private projects or even, to return to public finance, as it is happening in Mexico.

The system and formulae proposed have been developed to suit Mexican projects, especially wastewater BOTs. Their application is being reviewed for some projects.<sup>14</sup> Nevertheless, the author believes that their relevance can be extended to other infrastructure privatisation processes in other countries.

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# The Law for the Regulation of Public Water-Related Utilities

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## Abstract

Latin America has kept in step with the worldwide trend towards the privatisation of public utilities. Motivation for doing so stems from a number of factors including: economic philosophy, quest for greater efficiency, macroeconomic situations, debt-equity swaps, and need to bring private capital and management into public utilities at a time of fiscal limitations, and others. The report analyses the characteristics and components of public utilities. It also examines some regulatory concepts, such as administrative controls, the notion of reasonable charges, holding companies, monitoring, and terms and conditions of service, including water use and public utilities. Among specific cases reviewed, particular attention is devoted to the case of the United States and the United Kingdom.

The author suggests that the countries in Latin America should take comparative legislation and the experience of other nations into account, to set up suitable regulatory and monitoring systems prior to privatisation.

Much of the ongoing political and legal debate in the Region is related to the privatisation and regulation process and the conditions, quality of service and level of returns under which public utilities currently operate. Argentina, Chile, and, although to a lesser extent, Peru, are presently discussing the conditions under which public utilities perform and the need for improved regulation.

A global economy can be expected to expand well-being under certain commonly accepted rules. The analogy with the Roman "*ius gentium*" is tempting. The *ius gentium* was a liberal and progressive element in Roman Law, which was believed to be of universal application, its principles being regarded as so simple and reasonable that it was assumed they must be recognized everywhere and by everyone. Later, the concept was reinforced by the concept of "*ius naturale*", incorporated into the teachings of Thomas Aquinas.

The intent of this paper is to bring some concepts of comparative law, particularly American and English Law, into the discussion of public utilities, with a view to provide information to practitioners and governments.

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