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**PROCEEDINGS OF THE WORKSHOP ON ISSUES IN  
THE PRIVATIZATION OF WATER UTILITIES IN THE AMERICAS  
(Santiago, Chile, October 4-6, 1995)**

Contributions to the Workshop on Issues in  
the Privatization of Water Utilities  
in the Americas

Addendum 1\*

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\* This report contains the papers presented in English at the "Workshop on issues in the privatization of water utilities in the Americas", organized by the Privatization Task Committee member of the American Society of Civil Engineers (ASCE), International Water Resources Activities Committee, Water Resources Planning and Management Division and the United Nations Economic Commission for Latin America and Caribbean (ECLAC), Santiago, Chile, 4-6 October 1995. The views expressed in this document, which has been reproduced without formal editing, are the sole responsibility of the authors and do not necessarily coincide with those of the Organization.

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## Contents

	<u>Page</u>
Abstract .....	1
1. "An overview of the British water privatisation" by John Keith Banyard .....	3
2. "Environmental conservation, water management, and privatization: identifying win-win situations" by Gonzalo Castro .....	10
3. "Toward the privatization of water utilities in the Great Lakes region of North America" by Harold J. Day .....	22
4. "Latin American cleanwater privatization: one North American operator's interest and concerns" by Hampton D. Graham .....	27
5. "Alternatives for private participation in the provision of water services" by Terence R. Lee .....	38
6. "Privatization law and water institutions" by Walter A. Lyon .....	45
7. "Canadian municipal water utilities and private partnering" by James W. MaClaren .....	52
8. "Privatization of services in the Great Lakes basin" by Douglas A. McTavish .....	60
9. "Florida's Two Devices for Water Management" by Allan Milledge .....	64
10. "SAUR UK Group privatisation of UK water" by John C. Mitchell .....	72
11. "Privatization as a means to achieve Great Lakes commitments" by Geoffrey Thornburn .....	79

## Abstract

*This report contains the papers presented in English at the "Workshop on issues in the privatization of water utilities in the Americas", organized by the Privatization Task Committee member of the American Society of Civil Engineers (ASCE), International Water Resources Activities Committee, Water Resources Planning and Management Division and the Economic Commission for Latin America and Caribbean (ECLAC), Santiago, Chile, 4-6 October 1995. The papers focus on the following issues:*

- the benefits of the privatization of water-related services, the range of alternatives available for private sector participation, and the need to regulate the private provision of public water-related services, discussed in "Environmental conservation, water management, and privatization: identifying win-win situations" by Gonzalo Castro, "Latin American cleanwater privatization: one North American operator's interest and concerns" by Hampton D. Graham, "Alternatives for private participation in the provision of water services" by Terence R. Lee, "Privatization law and water institutions" by Walter A. Lyon, and "Agua potable y saneamiento: aspectos legales" by Miguel Solanes;*
- the experience of England and Wales with the privatization of drinking water supply and sewerage services, discussed in "An overview of the British water privatisation" by John Keith Banyard and "SAUR UK Group privatisation of UK water" by John C. Mitchell;*
- the experience of Chile with private sector participation and water markets, discussed in "Conceptos básicos en políticas de agua basadas en el mercado" by Renato Gazmuri and "El mercado del agua y el caso de Chile" by Fernando Peralta;*
- the experience of Venezuela with private sector participation in the drinking water supply and sewerage sector, discussed in "Privatización de sistemas de agua: experiencia en Venezuela" by Alberto Levy and Marcos Cornejo;*
- the experience of Argentina with irrigation management transfer, discussed in "Reorganización y transferencia de la administración del agua a los usuarios. Experiencia de la provincia de San Juan (Argentina)" by Daniel Oscar Coria Jofré and "El riego en Tucumán (Argentina): proyecto de transferencia" by Juan Eduardo Taboada; and*
- experiences of Canada and the United States with private sector participation, discussed in "Toward the privatization of water utilities in the Great Lakes region of North America" by Harold J. Day, "Canadian municipal water utilities and private partnering" by James W. MaClaren, "Privatization of services in the Great Lakes basin" by Douglas A. McTavish, "Florida's Two Devices for Water Management" by Allan Milledge and "Privatization as a means to achieve Great Lakes commitments" by Geoffrey Thornburn.*

*Papers presented in Spanish are published separately in LC/R. 1733.*



## 1. An overview of the British water privatisation

by *John Keith Banyard*<sup>\*</sup>

The British Water Industry was privatised in 1989. The paper considers the background to that privatisation including the economic arguments that led to the decision. The progress of the industry since that time is explained and illustrated by a reference to the author's own experience within Severn Trent Water Ltd, one of the largest UK water companies. Finally the paper considers future challenges following the recent review by the economic regulator at the completion of the first five years in the private sector.

### Introduction

The modern British Water Industry developed out of the squalor of the Industrial Revolution and the cholera epidemics of the 1820's and 30's. The responsibility was scattered among numerous municipalities and private water companies. Rationalisation occurred with various reorganisations of Local Government and by 1973 there were approximately 160 water undertakings and 1 300 sewerage authorities in England and Wales. There was a radical change in 1974 when these undertakings were replaced by ten regional water authorities whose boundaries were based on the catchment areas of major rivers. In addition there were 29 private water companies who had no responsibility for sewage treatment and who continued their separate existence in parallel with the regional water authorities.

The ten regional authorities were privatised by the Conservative Government in the Autumn of 1989. At the same time a number of the 29 private water companies were purchased by French water companies and this led to a degree of rationalisation so that now only 22 of these water only companies exist, together with the 10 privatised companies.

It is helpful to understand the scale of these new private water companies. Severn Trent Water is the second largest company serving a population of 8 million. It operates 25 water treatment works, 180 borehole sources and over 1 000 sewage works.

It is responsible for 90 000 Km of sewers and water mains.

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It has approximately 6 000 employees and annual revenues of \$ 1.6 billion, and based on market capitalization of \$ 3.3 billion is the 816th most valuable company in the world.<sup>1/</sup>

### **Why privatise?**

The regional water authorities created in 1974 had been extremely successful in improving the quality of drinking water and of sewage effluent within the financial constraints permitted by the Government of the day. They had certainly demonstrated that there were genuine economies of scale to be gained from rationalisation of the large number of small organisations that had preceded them.

However, in the mid 1980's the UK Government faced the twin problems of needing to reduce the public sector borrowing requirement (PSBR) in order to improve the economic position of the country; at the same time it recognised the growing pressures to meet higher environmental standards that were being imposed by the European Union. The increased demands for infrastructure investment could not be met by increasing water charges alone, and thus increased borrowing was inevitable. The Government was thus on the horns of a dilemma, it needed to reduce public sector borrowing and at the same time finance the higher environmental standards demanded by its membership of the European Union.

The problem was solved by privatising the water industry, thus removing the financing of the new obligations from the PSBR.

Transfer of the ownership of the assets to equity shareholders together with the freedom to borrow in the open market was an essential element of the plan. In developing the detailed provision it was essential to ensure that the income stream that would be received from the water charges would be sufficient to fund the large debts that would inevitably be incurred in financing the capital programme.

At the time of privatisation it was forecast that the industry would need to invest \$ 45 billion before the turn of the century at 1989 prices. Ever increasing environmental standards have now increased that figure to well over \$ 50 billion at the same price base.

This increase in capital investment was to be funded partly by increased charges and partly by increased borrowing. The increase in borrowing was to be high in the first half of the decade but would taper off and reach equilibrium by the turn of the century.

### **Financing the investment**

The UK Government decided to adopt the so-called "Austrian" model of economic regulation rather than the rate of return model normally adopted in the USA.

The Austrian model, relies on a price cap approach for a specific period rather than an annually fixed rate of return. The benefit of this is that it provides an incentive for the water company to minimise both capital and operating costs to the benefit of the customer.

The approach for rate of return regulation requires the operator to determine his investment needs and then agree a rate of return on that investment with the regulator. Normally this exercise is carried out every one or two years. There is no efficiency driver and in fact the operator is encouraged to maximise expenditure in order to maximise his return.

The price cap regime operates differently. Again a model is produced of investment needs and operating costs and the operator agrees these with the economic regulator. However, a price cap is determined for a longer period, say five years. This is usually determined on the basis of historic capital and operating costs. If the operator can then deliver the necessary outputs for less money than has been assumed in the model, he is permitted to keep the difference as profit for his shareholders. There is thus a driver to maximise efficiency. The other side of the equation is that at the next periodic review when the price cap is re-set, the historic unit costs will have reduced because of the efficiencies that have been introduced and therefore the price cap is lowered benefitting customers.

In the UK the price cap is expressed in the formula  $RPI + K$  where K is the increase or decrease in charges above or below the retail price index. Each of the water companies has its own price cap and hence its own "K".

## **Regulation**

Having put in place the satisfactory means of funding there was a need to ensure that the investment was actually made and the new enhanced quality targets met.

The criticism has sometimes been made that the privatised water companies have no proper accountability now that they are no longer nationalised industries, nor subject to municipal control.

Nothing could be further from the truth. They are undeniably monopolies, but as such they are subject to a regulatory regime which is far stronger than any that had been implemented in the past.

Financial and commercial regulation is carried out by the Director General of Water Services who is head of the Office of Water Services (OFWAT). He reports to the Secretary of State for the Environment, a Government Minister. The Director General requires companies to make annual returns of not only financial data but also statistical measures representing the quality of service. These include properties experiencing water

pressure problems, supply interruptions, sewer flooding and even the speed of response to customer enquiries. He also requires regular asset surveys to be undertaken to check the asset condition and appropriateness of the company's investment levels. All of these returns have to be verified by independent engineering certifiers. The company's accounts are subject to the usual statutory audit requirements.

The quality of water and sewage effluents is subject to strict legal controls with even criminal sanctions against the Directors of the Company in the event of neglect. Water quality is monitored for bacteriological safety at the works, in the distribution systems and at the customer's tap. Chemical quality is monitored against over 60 parameters. Performance is subject to an annual audit by the Drinking Water Inspectorate who again report to a Government Minister and each company is required to maintain registers of analytical results that are open to public scrutiny.

The quality of the sewage effluent is independently monitored by the National Rivers Authority for BOD, suspended solids, ammonia and other parameters such as metals and colour. There are individual consents for each sewage works and the companies are required to achieve a 95% compliance with the consent standards. At some works there are in addition upper tier standards which cannot be exceeded at any time. The National Rivers Authority is totally independent of the water companies and is probably the strongest water pollution monitoring agency in Europe.

The customer service dimension is reinforced by the existence of separately constituted customer service committees which function under the umbrella of OFWAT. These committees are made up of members of the community who have no association with water companies, boards or management. They exist to investigate complaints from customers and if necessary recommend compensation be paid by water companies. They also advise the Director General on the customer dimension of various proposals such as increased charges, levels of service, etc.

### **Has it worked?**

In economic terms the privatisation has certainly been successful. It has provided the necessary capital investment funding to permit all of the water companies to meet the requirements of the EU Drinking Water Directive and to address the dereliction arising from years of under investment which arose from governments of both political colours.

As far as the customer is concerned, this has been associated with a doubling of water charges since the investment has been financed from a combination of increased charges and borrowing. This has produced adverse comment particularly in the popular press, who do not acknowledge that cost increases are inevitable to meet higher standards. The industry is belatedly addressing the need for public relations strategies.



In terms of quality the report of the Drinking Water Inspectorate for the year ending December 1994 shows that the overall compliance with drinking water parameters across the industry as a whole is 99.3%. For Severn Trent it is 99.8%.<sup>2/</sup> Severn Trent's own internal figures for 1995 indicate that the first six months' compliance is even higher.

In terms of sewage treatment the position is equally good. The 1994 National Rivers Authority report indicated a 15% improvement in the quality of rivers. In Severn Trent 99.3% of our sewage effluents now comply fully with sanitary standards compared to only 81% in 1987. In the intervening years there has been a significant tightening of the sanitary standards.<sup>3/</sup>

In addition to these quality improvements Severn Trent has renovated or replaced 8 500 Kms of water main over the last five years; eliminated 326 unsatisfactory storm overflows on the sewerage system; eliminated 1 862 incidents of foul flooding from properties and over 100 000 incidents of unsatisfactory pressure in the water distribution system. In terms of customer service we have improved our response rate in answering both letters and telephone calls so that we are now classified as "very good" in the OFWAT categories.

Severn Trent was proud to be awarded the Charter Mark in 1992 for excellence in the provision of public services.

Overall therefore the privatisation has led to improved standards of water supply, sewage treatment and customer service.

### **The future**

Severn Trent believes that the recipe for continuing success in the future rests with two principle strategies:

- (a) Customer Service
- (b) Infrastructure (asset) management

Customer service has already played a large part in the transformation of a nationalised industry into effective commercial companies. Customer expectation increased markedly on privatisation and there was an expectation that the water companies would transform themselves. This has proved to be painful and the journey is not completed.

Customers will not accept standards of water quality or sewage treatment below those now being achieved, it is unthinkable that any fall in standards could be contemplated. At the same time customers expect an immediate response to queries, and Severn Trent recognises the need to match the highest levels of customer service if it is

to achieve the goal of satisfied customers. To this end, it has benchmarked itself against external organisations and utilised the latest technology in striving to achieve these ends.

Infrastructure management is a relatively new concept which takes account of the potential life of an asset. It recognises that all assets deteriorate and depreciate with time and therefore provision must be made for their eventual replacement. Using sophisticated computer modelling techniques it has been possible to construct robust computer models that allow the rate of deterioration of all assets to be predicted and hence the amount of money required in the future to replace existing plant with Modern Equivalent Assets (MEA).

This rigorous approach now allows Severn Trent to plan its future capital investment with a degree of certainty that has never been possible in the past. The model indicates time when a new asset will be required based on predictions of deterioration of existing assets; future demand forecasts, and future quality standards. It also provides a cost estimate of the future asset which can be used as a target to control contract expenditure.

Infrastructure management therefore provides a means of ensuring;

- (a) That the existing high quality of product is maintained.
- (b) That the serviceability of the asset base does not deteriorate with time.
- (c) That target costs are established for each scheme.

It appears that the future success of privatised utilities will depend on their ability to provide high quality customer service and at the same time preserve the integrity of their asset base in a cost effective manner.

### **Conclusion**

#### **Has the UK water privatisation been a success?**

On 13 June 1995 the Director General of OFWAT addressed a group of MPs in the House of Commons. He stated that the water industry had improved efficiency considerably since 1989. His calculations show that the annual costs of the water industry were \$ 320 m (£ 200 m) pa less by 1995 than they would have been without privatisation. The new obligations should have raised bills by \$ 71 (£ 44) per customer per year but the actual increase had been held to \$ 33 (£ 21) per customer.

In addition to meeting new obligations there have been dramatic improvements in the customer service provision.

Overall this appears to support the view put forward by Gary S. Becker, a professor of economics of Chicago University, who having studied privatisations around

the world concluded that even where there is no competition, the private sector appears to be far more efficient than the public sector.<sup>4/</sup>

Despite a hostile UK press, the UK water privatisation is commercially a resounding success and an endorsement of the principles of privatisation.

### **References**

- 1/ Worlds Top 1000 Companies - Business Week July 1995.
- 2/ Drinking Water 1994 - A report by the Chief Inspector of Drinking Water Inspectorate - HMSO.
- 3/ Quality 94 - Severn Trent Water.
- 4/ Surprises in a world according to Adam Smith - Prof Gary S. Becker - International Business Week 17 August 1992.

## **2. Environmental conservation, water management, and privatization: identifying win-win situations**

by *Gonzalo Castro*<sup>\*</sup>

The water cycle tightly connects the availability of water for human societies and natural ecosystems. Currently, there is a social imperative to provide water and sanitation to tens of millions of people lacking these services. These needs will be exacerbated in the coming years by growing human populations, especially in urban areas. These factors combined put an enormous pressure on the water cycle with potential devastating consequences for natural ecosystems and ultimately for mankind.

Fortunately, the political will exists for incorporating conservation and the maintenance of ecosystem functions as a pre-requisite to make new water developments sustainable. The private sector is playing a much stronger role as government intervention rapidly decreases. These new challenges need to be turned into opportunities for environmental conservation. Private capital could be levered to ensure that ecosystem conservation is incorporated as a cornerstone of sustainable development.

This paper examines the inter-relations between water use and the function of natural ecosystems, and proposes guidelines to achieve sustainable development of water resources while preserving the functions and values of freshwater ecosystems. A system that is sustainable over the long-term is ultimately best for investors, ecosystems, and societies at large.

### **Introduction**

Aquatic ecosystems are an integral component of the water cycle and are thus inextricably linked with the management of water resources. Given the variety and importance of the services that natural ecosystems provide to societies, their conservation must be a central component of any rational strategy for the long-term utilization of water. The conservation of aquatic ecosystems can only be achieved by maintaining the integrity of the water cycle. Correspondingly, maintaining healthy supplies of clean water can only occur if the integrity of aquatic ecosystems is preserved.

Traditionally, however, many aquatic ecosystems, such as wetlands, have been considered useless. Widespread ignorance about the important benefits that wetlands

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provide to human societies has promoted their destruction and degradation throughout the world. The conterminous U.S., for example, has lost an estimated 53-55 percent of its original wetlands (Dahl, 1990). This loss is equivalent to an area larger than the state of California, and translates into a loss of one acre every single minute for the last two hundred years. Although reliable figures are not available for other countries in the hemisphere, evidence indicates that wetlands are rapidly being destroyed and degraded everywhere.

Despite the substantial progress achieved in the environmental conservation field during the last two decades, it has also become clear that the enormous degradation of our natural environment is the result of forces that are orders of magnitude stronger than any individual conservation project. Population explosion, poverty, and political instability all have lasting negative impacts on the environment. A comprehensive approach to conserving water and aquatic ecosystems must therefore take into account those forces that shape the fundamental changes in land-use patterns and development.

### **Ecosystem Benefits**

Freshwater ecosystems are critical habitats to a very rich and highly threatened biological diversity. In general, however, the richness of freshwater biodiversity is poorly known. Land vertebrates have been well described: 2 new species of birds are described on average every year. On the other hand, about 200 new species of freshwater fish species are described each year, suggesting that at least half of all vertebrates might be fish (WRI, 1994). Some of the most unusual freshwater species occur in the Amazon and its tributaries, including seed-eating fish that forage in seasonally flooded forests, the world largest freshwater turtle, and the half-blind boto dolphin, which hunts its prey by echolocation (Goulding, 1993).

The high productivity of aquatic ecosystems allows them to support very large numbers of birds, especially during breeding and migration (Myers et al. 1987). Wetlands' unique importance for bird diversity is further illustrated by the very high dependence of threatened and endangered species present on them. In the United States, for example, even though wetlands comprise less than 5% of the total land area, 70% of federally listed threatened species, and 40% of all federally listed endangered species are wetland dependent (Feierabend, 1992). Fully one fifth of all freshwater fish in the world are either extinct or endangered. This figure in the LA/C region approaches 10% (WRI, 1994).

In addition to serving as crucial habitats to biological diversity, freshwater ecosystems provide a great variety of other benefits to society. According to Adamus and Stockwell, wetlands alone provide about 75 characteristics that can be considered beneficial (Castro, 1994). For purposes of clarity, freshwater ecosystem benefits can be classified as functions, products, and attributes:

#### Functions

- **Water Supply.** Includes direct extraction of water by people, water supply to an aquifer (groundwater recharge), groundwater discharge, and water supply to another wetland. The value of these functions is illustrated by an example from the state of Massachusetts (USA), where 60 communities, a total of 750 000 people, depend on groundwater supplied by wetlands to fulfill their water needs. Conversely, intensive mariculture in Malaysia that relies on groundwater, coupled with a high rate of wetland destruction, has depleted groundwater supplies to local communities.
- **Flood regulation.** This function occurs both through flood water storage, and through flood slow downs by wetland vegetation. The disappearance of millions of acres of wetlands along the Mississippi River watershed played a critical role in amplifying the magnitude of the 1993 floods, with the ensuing loss of lives and property, estimated at more than 10 billion dollars. In a similar fashion, the Pantanal in Brazil and Bolivia slows the flow of water in the Paraguay river, thus avoiding catastrophic flooding downstream. It is well documented that the loss of this "sponge" function would produce extensive damage to rich agricultural areas in Argentina. Another study showed that if 40% of the wetlands along the Charles River in Massachusetts (USA) were drained, flood damage would increase by a minimum of \$ 3 million/year. If they were completely drained, however, the damage would have been \$ 17 million/year.
- **Prevention of Saline Water Intrusion.** This function is especially important in coastal areas where saline intrusion negatively impacts the availability of fresh groundwater. This function also occurs at the surface, where water flow usually limits seawater entry.
- **Protection from Natural Forces.** This includes shoreline protection from storms and stabilization, the provision of windbreaks, and erosion control. The destruction of coastal wetlands often results in tremendous loss of life and property. Where bankside vegetation has been destroyed along rivers in England, the cost of reinforcement is estimated at \$ 425 per meter. In Bangladesh, tens of thousands of people are killed periodically by storm surges that could be prevented through the conservation of coastal wetlands.
- **Sediment retention.** This function benefits communities downstream by maintaining water quality, and benefits agriculture by renewing nutrients and soil.
- **Nutrient retention and toxicant removal.** This function maintains water quality by absorbing excessive nutrients and removing toxicants from the water. In the Florida (USA) cypress swamp, 98% of all nitrogen and 97% of all phosphorus are removed from wastewater this way. In Massachusetts (USA), a study showed that the cost of replacing the tertiary waste treatment services provided by wetlands was \$ 123 000 per hectare.

- Biomass export. The high productivity rate in wetlands yields biomass that is often exported and utilized, especially by fisheries downstream.
- Micro-climate stabilization. As part of their role in the hydrological cycle, wetlands equalize climate, especially rainfall and temperature.
- Global Carbon Sink. Many wetlands hold large amounts of carbon as peat, that if released, could significantly add to the global carbon problem and thus to global warming.
- Water transport. This is an important function, especially in rural areas where wetlands serve to transport people and products between adjacent communities.
- Tourism. Wetlands support a heavy recreational industry that includes opportunities for hunting, fishing, birdwatching, etc. In Canada, for example, the value of wetland recreation is estimated at U.S.\$ 4 billion/year. The overall tourism industry provided \$ 55 billion to developing countries in 1988.

#### Products

- The high rate of primary productivity in wetlands results in the availability of a variety of products, including forest resources, wildlife resources, fisheries, forage resources, agricultural resources, energy resources, etc. The value of these products is often measured in millions of dollars annually for any given locality, and represents an important source of income for rural communities.
- Two-thirds of all fish caught commercially depend on wetlands at one point or another of their life cycles. This percentage increases in some fisheries, such as the Gulf of Mexico, where 90% of the fish harvested (worth \$ 700 million annually) consist of species dependent upon coastal mangroves.
- Peat is used as an energy source in many rural areas. In Peru, peat, called champa, is regularly used as a household fuel, especially for cooking.

#### Attributes

Although it is often difficult to assign a monetary value to wetland attributes, these benefits nonetheless represent an important resource that needs to be conserved for ethical, aesthetically, cultural, and biological reasons.

- Gene Bank. The use of genes from wild species occurring in wetlands is an important way of improving cultivated varieties of plants. In addition, wetlands can host inordinate amounts of the genetic composition of some species. In

some migratory shorebirds, for example, up to 60%-90% of all individuals are sometimes found within a single wetland.

- **Socio-cultural Significance.** Wetlands are significant components of the landscape providing aesthetic values; are associated with religious and spiritual beliefs and activities; help maintain important cultural elements; and are often sites of historic importance. According to tradition, the first flag of Peru was conceived by General San Martín while observing flamingoes in Paracas, Peru. This historic event helped in the creation of the Paracas National Reserve in Peru and adds to its importance as a site of national heritage value.

### **Freshwater Ecosystems in the LA/C Region: Very Rich, Highly Threatened, and Poorly Understood**

From the coastal estuaries and deltas of Mexico, the lakes of Central America, the rivers and ox-bow lakes of Amazonia, and the Pantanal of Brazil, Bolivia, and Paraguay, to the freshwater marshes of the Argentine pampas and high Andes, and the mudflats of the Suriname coast, LA/C is a region of vast and diverse freshwater ecosystems (Wetlands for the Americas, 1993). The Directory of Neotropical Wetlands (Scott and Carbonell, 1986) provides an inventory of sites known or thought to be of greatest importance according to the Ramsar criteria. It lists more than 500 such sites in the LA/C region.

Evidence indicates that freshwater ecosystems are rapidly being destroyed and degraded everywhere. The primary cause of this loss is habitat alteration, fueled by rapid population growth and unwise development trends, both planned and unplanned. Urban development and tourism, for example, are having devastating effects on many coastal areas, such as the province of Buenos Aires in Argentina, southern Brazil, and parts of Ecuador, Colombia and Venezuela. Rural development is affecting wetlands in the whole region. In southern Brazil, northeast Argentina (Entre Ríos and Corrientes provinces) and Uruguay (Bañados del Este), for example, extensive wetlands are being transformed into rice fields. In Argentina, one of the few remaining native wet grasslands in the Pampas region (Bajos del Salado, Province of Buenos Aires) may soon disappear as new technologies are introduced to drain the area for eucalyptus plantations, with little consideration for the long-term groundwater needs of the regions. Shrimp farms have replaced once-extensive mangroves in many coastal areas, particularly in Mexico, Central America, and Ecuador. The unfortunate irony is that healthy mangroves are nurseries for the shrimp larvae that the shrimp industry depends on, to say nothing of their importance for coastal fisheries and nutrient capture, and in preventing coastal erosion (Wetlands for the Americas, 1993).

Dams and channelization are also potentially undermining important wetlands resources, with little consideration given to important fisheries and other wetland resources that local communities depend on. There are already 885 dams over 15 meters high in South America, of which 516 are in Brazil. The Paraná River has 23 dams



constructed or under construction. Plans for making the Paraná and Paraguay rivers navigable for large ships (the Hidrovia Project) may result in the complete alteration of the rivers' hydrologic regimes and serious degradation of wetland resources (Wetlands for the Americas, 1993).

To quote *Our Own Agenda*, "Latin America's main hydrographic resources are today chemically and biologically contaminated. Several rivers in Colombia, among them the Medellín and the Bogotá, are biologically dead (totally lacking dissolved oxygen); large agricultural zones have been biologically and chemically contaminated by coffee residue and pesticides, as is the case in the Quindío, Antioquia, Tolima, and Risaralda coffee-growing regions and the Meta rice-growing region; and waters in the Sogamosa Valley and the Magdalena, Dagua and Nechi rivers have been contaminated by industry and mining. Large quantities of agricultural contaminants are disposed of in streams flowing into the Caribbean Sea in which there is clear evidences of phosphorus, nitrates potassium, pesticides (DDT, DDE) and highly organic effluents that are used in an indiscriminate fashion and are highly contaminating. Similar conditions prevail through Latin America". River contamination is also widespread in major industrial cities such as Buenos Aires, Bogota, Lima and Sao Paulo. Important oil spills may be causing insidious problems along the coasts of Patagonia, Venezuela, Colombia, southern Brazil and central Chile. The recent cholera outbreak in Latin America demonstrated the magnitude of problems that can be caused by the lack of clean water and contaminated wetlands. These losses erode many important benefits and impinge upon their ability to serve as critical habitats for biodiversity.

### **The Water Cycle**

Freshwater ecosystems, by definition, depend on water to maintain their ecological integrity. The water cycle renews the flow and quantity of water in rivers, aquifers, lakes, and all other freshwater ecosystems. The actual run-off from these sources is calculated at between 31 000 and 47 000 cubic kilometers (WRI, 1994). Water is not evenly distributed all over the planet, however, and its availability is in many places unpredictable at best. To buffer such regional and seasonal fluctuations, humans have devised many different ways to alter the water cycle. Dams currently hold more than 5 000 cubic kilometers of water, and agriculture uses roughly 3 000 cubic kilometers more (WRI, 1994).

Sandra Postel reminds us in *Last Oasis* (Postel, 1992) a citation by Parakrama Bahu the Great, twelfth-century king of what is now Sri Lanka: "Let not even a small quantity of water obtained by rain go to the sea, without benefiting man". Because the amount of freshwater on earth is finite, any increase in water use through diversions and dams reduces the availability of water for freshwater ecosystems. Similarly, and because water flows from one potential user to the next, simply increasing efficiency of use upstream to meet new demands actually decreases water availability downstream, producing the counter-intuitive outcome of no net savings (Moore and Seckler, 1993).

Because water uses by humans and ecosystems can potentially conflict, there is a need to look at the water cycle as a whole while devising a strategy for the sustainable management of water resources. As such, the logical unit of water management is the drainage basin (i.e., the catchment approach, Beazley, 1993). At the same time, maximizing the use of the societal benefits provided by natural functioning freshwater ecosystems provides additional arguments for conserving them.

### **Meeting Human Needs**

Over 1 billion of the world's 5.4 billion people lack access to safe drinking water, and 1.7 billion lack access to adequate sanitation (Feder and Le Moigne, 1994). This is responsible for the 900 million cases of diarrheal diseases every year, which cause the deaths of more than 3 million children; 2 million of these deaths could be prevented if adequate sanitation and clean water were available (World Bank, 1992).

In Mexico, 90 percent of all waste water treatment plants are nonfunctional (EI Ashry, 1994). Overall, 80% of all urban areas in Latin America have access to drinking water, but only 55% in rural areas. Variation by country is very striking, going from a low of 34% (Paraguay) and 41% (Haiti) to a high of 100% (Barbados) and 98% (Suriname, IDB, 1994).

In the LA/C region, 49% of the population have adequate sewerage treatment in urban areas, but only 32% in rural areas (Dixon, 1993). This lack of basic water infrastructure fuels larger social problems. In just the first ten weeks of the cholera epidemic in Peru in 1990, losses from reduced agricultural exports and tourism were estimated at \$ 1 billion - more than three times the amount that the country had invested in water supply and sanitation services during the 1980s (World Bank, 1992).

By the end of the century, nine of the world's 37 cities larger than five million will be in Latin America. Ninety percent of the region's poor will be in cities (Latin American and Caribbean Commission on Development and Environment, 1992). Unless adequate water supply and sanitation are provided to these people, serious problems will occur.

### **The LA/C Region: Too Much and Too Little Water**

When annual renewable freshwater availability falls below 1 700 cubic meters per person per year, a country will experience periodic water stress; below 1 000 cubic meters, a country will experience chronic scarcity (Feder and Le Moigne, 1994). The LA/C region has 10 579 cubic kilometers of annual internal renewable water resources. Of these, only 173, or 2% is withdrawn annually. Per capita, this translates to 24 390 cubic meters (compared with 7 744 for the world).

Although at first glimpse, the LA/C region seems to be endowed with extremely rich water resources, its distribution is very uneven. Growing populations coupled with no new

water development projects translates into less water availability, and could result in water shortages. Peru is a good example of this: in 1955, it had 4 500 cubic meters per person per year; in 1990, this figure fell to 1 900 (which is barely sufficient); If current trends continue by 2025 this figure will fall to 1 000, producing a country with severe water shortages. Thus, in a country like Peru, the pressure to develop new water sources is tremendous.

### **Water: A Social Imperative**

Widespread pollution and the specter of severe water shortages make the development of new water projects a social imperative. If not properly developed, however, massive mega-projects could have a tremendous toll on freshwater ecosystems, and could further elevate the cost of water to the poor. The following two examples from the World Bank illustrate this point (World Bank, 1994):

Lima, Peru. During 1981, the average incremental cost of a project to meet short and medium term needs, based in part both on a surface sources from the Rímac River and on groundwater supplies, was \$ 0.25 per cubic meter. Since the aquifer has been severely depleted, groundwater sources cannot be used to satisfy transfer beyond the early 1990s. To meet long-term urban needs, a transfer of water from the Atlantic watershed is being planned, at an estimated average incremental cost of \$ 0.53 per cubic meter.

Mexico City, Mexico. Water is currently being pumped over an elevation of 1 000 meters into the Mexico Valley from the Cutzamala River through a pipeline about 180 kilometers long. The average incremental cost of water from this source is \$ 0.82 per cubic meter, almost 55 percent more than the previous source, the Mexico Valley aquifer. The aquifer has been restricted due to the problems of land subsistence, the lowered water table, and the deteriorated water quality. The newly designed water supply project for the city is expected to be even more costly, since it will have a longer transmission line and water will be pumped over an elevation of 2 000 meters.

Latin America possess 19.5 percent of the world's hydroelectric potential, but only 21 percent of the energy consumed in the region is produced by hydro-power (Latin American and Caribbean Commission on Development and Environment, 1992). More pressure to develop these resources is imminent, and is fueled by the advantage of these energy sources over fossil-fuels and nuclear energy: no pollution, no radioactive waste, no greenhouse gases, fully renewable sources, etc. Once again, if not properly developed, these projects could negatively impact on the water cycle.

### **Assigning a Proper Value to Aquatic Ecosystems**

Many societal functions provided by freshwater ecosystems can be considered public goods (above). Typical examples include the functions of flood control, and recreational (or amenity) uses (World Bank, 1994). Market failures in these cases occur because of very low subtractability (i.e., the goods can continue to provide the same benefits to everyone as long as they are not damaged or congested) and very low excludability (i.e., the public cannot be easily excluded from these benefits).

Until now, these functions have been assumed to be free, thus the incentives for their conservation have not been present. This is further complicated by the fact that these functions cannot be freely bought or sold, thus market transactions cannot be used to estimate their value (The Economist, 1994). How can these values be estimated?

A whole new field of ecological-economics is developing to provide answers to this crucial question. The importance of assigning economic values to ecosystem functions lies in the fact that society will be more likely to conserve ecosystems if they are perceived to be valuable in economic terms. Although several approaches have been tried to estimate these values, to date very little progress has been achieved in estimating the economic values of freshwater ecosystems in the LA/C region.

A broader understanding of development that incorporates social, equity, and environmental concerns is greatly needed. Finding ways to account for environmental degradation when calculating true economic growth of a nation is a promising new direction (green accounting, Seragelding and Steer, 1994, 1995). Estimating the economic value of freshwater ecosystem functions is thus required to place them within the appropriate "pecking-order" when developing public policy.

Public policy therefore requires economic valuation of the public benefits of aquatic conservation. Since most wetlands provide several of these benefits simultaneously, the total value of a wetland thus cannot be accurately estimated unless all functions, products, and attributes are incorporated into the calculations (James, 1991). Quantification at the local scale for the harvestable products such as food and fuel is straightforward. Recreational and aesthetic values, and diversity of plants, fish, and wildlife can also be approached with conventional economic methods based on the businesses supported by recreational experiences, or based on willingness to pay for the recreational experience (Castro et al. 1994).

Higher ecological values are external to the market system because the benefits are accrued by society as a whole. Attempts have been made to assign economic value to these functions based on what it would cost to replace the function, or by depreciating the natural capital that is eroded when a natural resource is depleted (Solórzano et al. 1991). Regardless of the method utilized, it is clear that these valuable benefits must be somehow incorporated within national accounting schemes in order to change the perception that these ecosystems are useless, and to promote their conservation.

## **Privatization, Water, and Ecosystem Conservation**

The decade of the 1980s was the lost decade in the LA/C region. GNP growth in the 1980s was only 1.2%, with several countries, including Argentina, Bolivia, Nicaragua, and Peru, showing net negative growths for the whole decade. Huge bureaucracies and very inefficient state enterprises were partially responsible for this. The debt crisis and political unrest resulted in severe shrinking of domestic and foreign investment. Overall, net negative transfers of financial resources away from the LA/C region occurred almost every year. As expected, inflation in several countries became out of control, taking a severe toll on the poor and fueling social discomfort.

A wave of democratization swept through the region, and with it, a miraculous economic transformation is taking place. Trade liberalization and the adoption of free-market economies reversed these trends, lowering inflation and bringing the debt crisis under control. In 1993, the region grew at an average of 3.3 percent (IDB, 1994). Not surprisingly, foreign capital is once again flowing into the region, creating new jobs, and providing new hope for the poor. Several countries in the region are showing the fastest growing economies in the world, among them Peru, which grew at an astonishing 11% in 1994. The direction in capital flows has been reversed, with net foreign capital flows of U.S.\$ 50 billion in 1992 and U.S.\$ 65 billion in 1993 (IDB, 1994, The Economist, 1994). Once again, the LA/C region is one of the most attractive regions to invest.

These fundamental changes create two immense challenges to the sustainable management of water resources:

Substantial investment is occurring in the region. What are the effects of this investment on the environment?

The private sector will play a stronger role than ever, while Governments will shrink. How does conservation adapt to positively influence the private sector?

### **Identifying Win-Win Situations**

The privatization of water utilities in the region provides an excellent opportunity to achieve sustainable water resources management. The following suggestions can be considered at the policy level:

The inter-relations between the health of aquatic ecosystems and the sustainable availability of water resources must be understood on a case by case basis. Water management must be approached from a basin approach where ecosystems conservation is an integral part of it.

The value of aquatic ecosystems must be understood and incorporated in cost-benefit analysis of water resources. Conserving aquatic ecosystems must be seen as an investment in ensuring sustainable supplies of water.

Financial resources resulting from the privatization of water utilities can be seen as a one-time opportunity to attain sustainable water management. A portion of privatization funds can be used to conduct studies, increase public awareness, and create new areas to protect watersheds.

The establishment of Trust Funds for the long-term management of aquatic ecosystem must be explored. Trust Funds can be established with a portion of the privatization resources. Trust Funds can finance the recurring costs necessary to manage protected areas and other ecosystems crucial to the maintenance of sustainable water supplies and other ecosystem functions.

### References

- Adamus, P.R., and L.T. Stockwell. 1983. A Method for Wetland Functional Assessment. Vol 1: Critical Review and Evaluation Concepts. U.S. Department of Transportation, FHWA-IP- 82-83. Washington, D.C. 178 Pp.
- Beazley, M. 1993. Caring for the Earth. A strategy for survival. IUCN, UNEP, and WWF. Reed International Books, Ltd.
- Castro, G. 1994. Conserving Aquatic Ecosystems for Sustainable Development. Pp. 162-167 in: Palombo, A.J., J. Marban, V. Floris, and S. Light, Eds. Proceedings of the Inter-American Dialogue on Water Management. Miami, Fl.
- Castro, G., et al. 1994. Wetland and bird conservation in North America. American Ornithologists' Union Wetland Conservation Sub-Committee. Ms. in preparation.
- Claridge, G.F. 1991. An Overview of Wetland Values: A Necessary Preliminary to Wise Use. PHPA/AWB Sumatra Wetland Project Report Nº 7, AWB, Bogor.
- Dahl, T.E. 1990. Wetland losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 13 pp.
- Dixon, J. 1993. The Urban Environmental Challenge in Latin America. LATEN Dissemination Note Nº 4. The World Bank.
- El-Ahsry, M. 1994. Water resources management for the next century. *Interciencia* 19: 117-119.
- Feirerabend, J.S. 1992. Endangered species, endangered wetlands: Life on the edge. National Wildlife Federation, Washington, D.C. 50 pp.
- Feder, G., and G. Le Moigne. 1994. Managing water in a sustainable manner. *Finance and Development* 31: 24-27.
- Goulding, M. 1993. Flooded Forests of the Amazon. *Scientific American* 268: 117-118.
- Inter-American Development Bank. 1994. Ninety-ninety-three Annual Report. IDB, Washington, D.C.
- James, R.F. 1991. The Valuation of Wetlands: Approaches, Methods, and Issues. PHPA/AWB Sumatra Wetland project Report Nº 29, Bogor. 95 Pp.
- Latin American and Caribbean Commission on Development and Environment. 1993. Our Own Agenda. Published by the Inter-American Development Bank and the United Nations Development Program.

- Moore, D., and D. Seckler. 1993. *Water Scarcity in Developing Countries. Reconciling Development and Environmental Protection*. Winrock International Institute for Agricultural Development, Washington, D.C.
- Myers, J.P., R.I.G. Morrison, P.Z. Antas, B.A. Harrington, T.E. Lovejoy, M. Sallaberry, S.E. Senner, and A. Tarak. 1987. Conservation strategy for migratory species. *Am. Sci.* 75: 18-26.
- Postel, S. 1992. *Last Oasis. Facing Water Scarcity. The World Watch Environmental Alert Series*. W.W. Norton Company. New York and London.
- Scott, D., and M. Carbonell. 1986. *A Directory of Neotropical Wetlands*. IWRB, Slimbridge, and IUCN, Cambridge.
- Serageldin, I., and A. Steer, Eds. 1994. *Making Development Sustainable. From Concepts to Action. Environmentally Sustainable Development Occasional Paper Series Nº 2*. The World Bank, Washington, D.C.
- Serageldin, I., and A. Steer. 1995. *Valuing the Environment. Proceedings of the First Annual International Conference on Environmentally Sustainable Development. Environmentally Sustainable Development Proceedings Series Nº 2*. The World Bank, Washington, D.C.
- Solórzano, R., R. de Camino, R. Woodward, J. Tosi, V. Watson, A. Vásquez, C. Villalobos, J. Jiménez, R. Repetto, and W. Cruz. 1991. *Accounts Overdue: Natural Resource Depreciation in Costa Rica*. World Resources Institute, and Tropical Science Center. Washington, D.C., and San José. 110 pp.
- The Economist. 1994. The price of imagining Arden. December 3, 1994.
- Wetlands for the Americas. 1993. Strategic Plan. Unpublished.
- World Bank. 1992. *World Development Report 1992*.
- World Bank. 1995. *Water Resources Management. A World Bank Policy Paper*. Washington, D.C.
- WRI. 1994. *World Resources 1994-95*. Oxford University Press, N.Y. and Oxford.

### **3. Toward the privatization of water utilities in the Great Lakes region of North America**

by *Harold J. Day*<sup>\*</sup>

Some issues associated with possible privatization of water utilities in the Great Lakes region are presented. Comments about expected difficulties in maintaining voluntary community based environmental programs with privatized utilities are made. A theoretical framework along with some practical reasons used in privatization decision making is presented. The paper concludes with the suggestion that policy makers in the Great Lakes region should carefully review experiences elsewhere in the world, especially in Latin America, England and France before privatizing their water utilities.

#### **Introduction**

The privatization of water utilities in the Great Lakes Basin of North America is a subject which has not drawn much attention. The general subject of privatizing public enterprises is not discussed very much yet in this region. The lack of interest can be expected to change in the next few years as federal and state/provincial funding of many public enterprises continues to decline. The strong public mandate to reduce public spending will direct more attention to this subject. It seems appropriate, therefore, to review experiences elsewhere, especially in Latin America, where major privatization activities have been underway since the late 1970's.

Public enterprises providing a variety of water resources related services have existed throughout the world for centuries. The types of services have included irrigation, flood control, navigation, hydroelectricity and both potable and waste water treatment and collection/distribution systems. For many years most societies accepted the premise that only the state was able to handle the large investments and associated management involved with water projects. The economic problems during the late 1970's and early 80's in many parts of the world highlighted the lack of funds and management institutions to provide adequate capital, operation and maintenance for public sector services. Both long, up to 50 years, and short term, often ten years, contracts involving various combinations of capital investment and operation and maintenance paid for by revenue collected from the users have been used. The outright sale of the utility has occurred in some instances.

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Most of these private sector contracts have been for a particular water use in a particular location where a related revenue stream existed. Few have included the complex regional environmental problems present in the Great Lakes region. This region contains one fifth of the world's liquid surface fresh water. Yet, less than one percent of the world's population live within the drainage basin. The existence of the International Joint Commission, a binational agency with overview responsibilities for the water resources of the region, and two national regulatory agencies, Environment Canada and the US Environmental Protection Agency, complicate the circumstances.

This paper is a brief presentation of some of the issues and challenges that lie ahead in the Great Lakes region as the option of privatizing public enterprises in water and waste water becomes more popular. Although the focus is on the Great Lakes region, these comments apply to other parts of North America, especially the land east of the 100th meridian which is often identified as the line dividing the humid East from the arid West.

The paper has been divided into four sections: Introduction, Theoretical Framework and Typical Reasons for Privatization, Challenges to Privatization in the Great Lakes Region and Conclusions

### **Theoretical Framework and Typical Reasons for Privatization**

A theoretical framework for considering the decisions of whether, or not, public enterprises should be privatized has been presented by Jones, Tandon and Vogelsang (1990). They suggest that privatization should occur if a positive net change in social welfare results from the action. A word equation may be written to be more specific. Privatization should occur if:

Social Value of the Privatized Firm + Social Value of the Public Sector Receipts from the Sale Social Value of the Public Firm

This equation is simple as a framework statement. The task of estimating the social value of a firm is complex. It depends upon the use of many indicators of social welfare, e.g., per capita income, infant mortality rate, per capita fresh water available and percentage of population that is literate.

The actual use of this theoretical framework seldom occurs. Neither the data nor the time and human resources are usually available for such a calculation. Other reasons, usually a combination of philosophy, economics and politics are present when the privatization of a public enterprise occurs. Devlin (1993) has discussed this subject. He has suggested that some of the reasons are:

Ideology. An ideological shift away from the public toward the private sector has occurred in recent years. The view today is that the public sector should be limited to

essential activities that the private sector cannot or will not perform. The English privatization programs during the Thatcher government stimulated this shift.

**Internal Efficiency.** The argument is made that a privatized firm can be operated more efficiently than a public enterprise. This position has been taken even though public enterprises are managed efficiently in many countries.

**Political Credibility.** Some governments have privatized to demonstrate their commitment to the new ideology. This action has been motivated sometimes to improve the government's credibility in the eyes of domestic and international investors. Argentina, in its first round of privatization during 1989/90, is cited as an example.

**Fiscal Crisis and Stabilization.** The sale of public enterprises is of interest sometimes when a government is unwilling or unable to either increase taxes or reduce revenues. The revenue from privatization, if used to finance current expenditures, is analogous to borrowing. This action only delays, but does not eliminate, the need to reduce expenditures or increase taxes.

It seems apparent that many reasons exist for the privatization of public enterprises. Although a theoretical framework for use in the decision making process has been developed, it is not used much. Rather, a combination of more practical reasons has been used by various governments in recent years. Most of the recent privatization has been in sectors other than water, although some activities such as long term leases for potable water systems in Lima, Peru and in Mexico City have occurred. All of these activities are information sources of value to policy maker in the Great Lakes.

### **Challenges to the Privatization of Water Utilities in the Great Lakes Region**

The potential of privatized water utilities in the Great Lakes watershed raises new questions usually not seriously considered in other, less water rich, regions. The size of the drainage basin, 300 000 mi (1 000 000 km) is much larger than those in England and France where privatized systems are frequently found. The population density in the European watersheds is much higher than found in most of the Great Lakes, e.g., compare the Severn Trent basins in central England and Wales, 8 000 000 people in 8 000 mi, or 1 000 people per square mile to the Fox Wolf basins in Wisconsin, 800 000 people in 6 000 mi, or 130 people per square mile. The travel time for most major European river basins (Rhine and Danube excepted) is much less than those present in the Great Lakes. All rivers in the United Kingdom and most in France have travel times of a few days. The travel time for the Fox Wolf River in Wisconsin to reach Lake Michigan exceeds ten days; the time for water from many areas of the Great Lakes to reach the St Lawrence River and the Atlantic Ocean is measured in weeks and months. The lakes, themselves, have residence times, i.e. volume/ ave. flow rate, of many decades.

Combined with these hydrologic and demographic contrasts is the difference in public mandate for pollution control in the river basins. The citizens of the US and Canada living in the Great Lakes basin have supported a variety of binational efforts to control and improve the water quality and quantity for almost a century. The International Joint Commission, IJC, established in 1905 by treaty, has the responsibility to review and recommend changes to the policies used to manage the water resources located along the border in common, with special attention to the Great Lakes.

During the early years the focus was on human health problems caused by water borne diseases, both parasites and bacteria. Later, the scope expanded to include water levels and the aquatic ecosystem in general. Knowledge of the importance of phosphorus from municipal waste water treatment plants and from urban and rural non point sources was one factor in the expanded scope. Knowledge of the bioaccumulation of persistent toxic substances was another factor. Today, the IJC is active in reviewing new knowledge of the Great Lakes ecosystem and in making recommendations to the two nations for continued improvements. The virtual elimination of toxic substances, especially those associated with chlorine, is a new focus. Attention has also been drawn to estrogen mimicking compounds, e.g., nonyl phenol, that are reported to threaten mammalian reproduction through a reduction in the sperm count.

Many of these recent expansions in knowledge are not yet a part of the regulations for land and water use in the Great Lakes. The strategy of encouraging local community participation in developing and implementing pollution abatement activities was initiated in the mid 1980's. Today, there are 42 communities identified by the IJC, known as Areas of Concern, AOC, where formal abatement plans, known as Remedial Action Plans, RAP, exist. These plans have been endorsed by and are partially funded by local organizations, including local governments that own and operate potable and waste water treatment utilities.

What would happen to the long term, ecosystem based, water quality improvement activities if a local water utility was privatized? The motivation for internal efficiency would most likely result in a management decision to eliminate all expenditures not explicitly required for plant operations to meet the legal requirements of an operating permit issued by the regulatory agency. Many elements of voluntarily funded programs for a RAP would not survive very long unless they were explicitly included in the discharge permit, i.e., they were no longer voluntary. This type of an expanded permit would be very controversial and not likely to occur soon.

One expected effect of privatization activities throughout the Great Lakes, therefore, would be a significant decline in the success of IJC developed pollution abatement programs. Some communities, probably a minority, would value their own local part of the Great Lakes enough to support continued voluntary long term programs. Others would cancel most, or all, voluntary programs until some local disaster, e.g., a fish

kill or a chryptosporidium outbreak, came along to raise the local level of attention and support.

### Conclusions

The privatization of water utilities in the Great Lakes can be expected to accelerate in the immediate years ahead. The acceleration will be caused primarily by the rapid decline in public spending. Some communities can be expected to choose privatization as a short term solution to generating revenue and reducing water and sewer rates. Others will have more concern for the longer term ecosystem based implications and, if they choose to privatize, will use the revenue from the sale to set up a reserve for long term improvement activities.

The range of options for privatization is large. The privatization experiences of municipalities in other nations of the Americas, and elsewhere around the world, especially France and the United Kingdom, will be a valuable resource for the people of the Great Lakes region. These experiences may be combined with the unique regional features, geopolitical and environmental, to develop wiser policies for sustaining the Great Lakes ecosystem.

### References

- Anonymous (1987), *The Great Lakes. An Environmental Atlas and Resource Book*, U.S. Environmental Protection Agency, Great Lakes National Program Office, Chicago, Ill. and Environment Canada, Toronto and Burlington, Ont.
- Anonymous (1993), *Water Resources Management: A World Bank Policy Paper*, World Bank, Washington, D.C.
- Devlin, R. (1993). "Privatization and Social Welfare", United Nations Economic Commission for Latin America and the Caribbean, UNECLAC, *Review 49*, 155-180, Santiago, Chile.
- Jones, L., Tandon, P. and Vogelsang, I. (1990), *Selling Public Enterprises*, MIT Press, Cambridge, MA.

## **4. Latin American cleanwater privatization: one North American operator's interest and concerns**

by Hampton D. Graham\*

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In the United States, the leaders of the "cleanwater" - potable water and sanitary sewerage services - industry have considered it a very domestic business. Few North American cleanwater CEOs think that the term "internationalization" applies to them personally or even to our industry in general. Perhaps we, the leadership of Jamaica Water, are a little unusual in that we believe "internationalization" applies to us. We believe this because we recognize that the need exists worldwide for the knowledge and skill we have to offer.

Because we are the exception, we will state at the outset of this paper that we are not presenting the views of all North American cleanwater operators in this paper. We shall speak for only ourselves, and for those other operators who may share our vision of international privatization.

Since cleanwater privatization is such a domestic business in the US, perhaps the first question that comes to the reader's mind is:

***Why would a private-sector North American cleanwater operator be interested in Latin American privatization?***

***Pride in service:*** As those familiar with the cleanwater industry know, many cleanwater operators consider what they do more of a "calling" than a commercial enterprise. Jamaica Water's motto is "proud to serve" and, since its founding in 1887, it has contributed greatly to building the communities it serves in New York. The new management team, which took the helm of the company in 1992, has magnified this calling. In a recent brochure, the CEO stated:

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\* Chairman & CEO, Jamaica Water Supply Company and Sea Cliff Water Company.

*We believe that by improving the cleanwater systems we operate - through the infusion of both the needed financial capital as well as our management and technical expertise - we directly improve the communities we serve. Improved potable water and sanitary sewerage services not only enable economic development that permits a rising standard of living for the residents but also directly improves their physical health and well-being.*

While water mains may not cross oceans and collection systems remain fairly local, improving the lives of people through better access to clean water and through efficient collection and treatment of sanitary sewerage is a global theme, often requiring more resources than are available in any one locality. This is true in North America, and it is certainly true in Latin America.

**Commercial reasons:** The management and employees of Jamaica Water have a strong commitment to serving the citizens of our communities. At the same time, Jamaica Water is a private-sector company and, as such, has a responsibility to provide its owners a market competitive return on their investment. The Company currently supplies potable water to 100% of the 650 000 people in a low population growth territory. Consequently, the traditional growth options - increasing coverage within the existing system and/or expanding the system to reach new communities - are not present. The three avenues available to Jamaica Water for increasing earnings are:

- Improving the current business;
- Acquiring other private companies; and
- Participating in the privatization of government owned and operated systems.

The management team of Jamaica Water has focused itself on each of these avenues. These three areas of opportunity are:

- **Improving the business:** During the past three years, the management team of Jamaica Water has restructured and re-engineered the business, changing it from a well-intended but rather inefficient and insensitive (to its customers) "utility" into a first-rate customer services company. In July of 1992, the regulating body the New York State Public Service Commission stated: *Nearly every function at Jamaica Water is plagued by major inefficiencies and problems.* In early 1995, however, the Chairman of the same regulatory body wrote "The turnaround at Jamaica Water has been among the most outstanding utility management achievements that I witnessed as a regulator".

*The key to this "turnaround" was the management team's inclusion of the customers and key public officials in the process of change at the Company. The customers, directly and through their advocates, worked hand in hand with the Company to improve its services; and to establish a new level of mutual respect*

with the regulatory body. The Company management has been able to substantially lower costs through a number of effective initiatives.

While the management team continues to improve the day-to-day business operations and to train a new generation of management, much of the "low hanging fruit" has been picked - many of the restructuring and re-engineering goals at Jamaica Water now stand accomplished.

- **Acquiring other private companies:** The US cleanwater industry is highly fragmented: there are only nine water supply companies (including Jamaica Water) serving populations of over half a million.<sup>1/</sup> The industry is under increasing economic and political pressure to consolidate: small, contiguous public water districts are merging; and larger private water companies are acquiring smaller ones around the country. Jamaica Water has acquired one such system, Sea Cliff Water, on Long Island, and we are considering acquiring others that would benefit from the economics of scale, and technical, management and financial resources that the Company has to offer.
- **Participating in the privatization of government owned and operated systems:** Government cleanwater systems are contracting their operations to the private sector at an increasing rate. The US market for Operating and Maintenance (O&M) services and equipment is growing by an estimated 8% per year<sup>2/</sup> and could reach over \$ 72 billion by the year 2000. With perhaps the best-run operation in the US and ample management talent, Jamaica Water is poised to enter this contracting market as well as acquire the assets of the government cleanwater systems that are sold.

**Privatization is privatización:** To us, the privatization market in Latin America is a natural extension of the US privatization market. The needs of the municipalities are similar, operating skills are portable, and financial resources are mobile. Moreover, the returns on capital investment and management time are competitive with opportunities in the US and elsewhere. Serving the ethnically diverse New York City area, we are more than used to working with a multiplicity of cultures, including Latin American. Indeed, there are many Latin American water systems of about our size, which need improved and expanded transport and distribution infrastructure, effective billing and collection practices, productive use of employees, and accurate long-term planning, that would be ideal candidates for the operating management services of our team.

Obviously, if we were not interested in Latin American cleanwater privatization, we would not be participating in this workshop. So, perhaps a more important question is:

**What does a private-sector operator; in particular, a North American private sector operator; in particular, THIS North American private sector cleanwater operator have to offer privatizing Latin American communities?**

The economist's goal of private sector ownership and operation of heretofore public utilities is a "more efficient allocation of society's resources". An experienced private-sector operator such as Jamaica Water provides the privatizing community the opportunity for:

- Improved system operation through management-led initiatives;
- Improved coverage and quality through system buildout and plant improvement; and
- Improved credibility with financiers and lenders to access the capital needed for the first two objectives.

***Raising the capital needed by the system:*** Perhaps we should deal with the last item first, since an influx of capital is the foremost, or at least the most strongly recognized, need of many community cleanwater systems. Globally, the World Bank estimates the capital needed to improve cleanwater systems at around \$ 700 billion.<sup>3/</sup> Here in Chile, CORFO estimates that \$ 4 billion will have to be raised from the private sector to raise its sanitary sewerage treatment to levels necessary to be admitted into the NAFTA circle, and an unidentified amount to improve and expand potable water systems. In neighbouring Argentina, it is estimated that \$ 8 - 10 billion will be required to raise its potable water and sanitary sewerage coverage levels to its target ranges of around 90% and 70%.<sup>4/</sup> from the current levels of 70% and 30%, respectively.

There is no shortage of worldwide capital to make the necessary investments and loans. There is, however, a shortage of confidence. Investors and lenders place their financial resources where they are "confident" that they will receive the benefit of their investment bargain. Their confidence need is only satisfied where there is a strong, experienced team who is going to manage the client business. Private sector operators inherently instill more confidence in private sector financiers. Indeed, we have recently been seeing more and more examples, such as Monagas in Venezuela, Asunción in Paraguay, or Misiones in Argentina, of a lending institution such as the World Bank requiring the privatization of the cleanwater operation to qualify for a loan.

Because of its direct contact with the customer, the operating company is considered to be the critical ingredient in the industry in the US. In Latin America as well, in many of the *pliego* we have seen, the role of the private sector operator, working with or without a consortium, is central.

With a high level of credibility in the United States as a very successful "turnaround" team, the management of Jamaica Water brings to a cleanwater privatization the level of comfort required by US lenders and investors. The investments and loans from North American sources are predicated upon, at a minimum, the private sector operation of the targeted cleanwater system, and in many cases private ownership as well.



The systems inevitably must be fixed and expanded, whether by the municipality or by the private operator. The benefit to the community of private operation and ownership is usually lower cost of operations and lower cost of capital - from lower lending rates reflecting more lender confidence and from more competitive equity financing terms. This lower cost of capital is factored into lower rates than the community would have otherwise.

I might add that while a cleanwater operation need not be recapitalized, i.e., "sold", to be privatized, there have been several examples of former public utilities successfully privatizing via equity participation. Here in Chile, for instance, the price:earnings ratio of the four electric companies, ENDESA, CHILGENER, CHILQUINTA, and ENERSIS have all risen four to five times in as many years as the public markets, including foreign investors, gained increasing confidence in Chile's economic policies and in the management of these companies.<sup>5/</sup> Bolivia is following a pattern of selling half the ownership and control of its state-owned utilities to the privatizing consortia with the option of selling part or all of its retained equity in the future at appreciated values to the public markets, after the systems are improved. This model makes sense not only because of the financial benefits to the community but because broad public ownership of a cleanwater system is ultimately the best assurance of long-term private ownership and operation.

***Improved operation of the existing cleanwater system:*** During our visits to various Chilean and Argentinean cleanwater systems, and during the visits of our associates to cleanwater systems in Bolivia and Peru, we noticed a wide range of operational efficiency issues. Some systems were modern and run very efficiently, by any international standard; some systems were only surviving day-to-day from massive subsidies from the central government. It is safe to say, however, that those systems that are looking at private sector operation, i.e., privatization, are generally systems with operational problems. Obviously, an experienced international operator is able to bring substantial managerial and technical knowledge to bear in these situations.

As often as not, however, those systems with the greatest need for private capital to remain viable have capable engineers and line managers, and dedicated employees. Our own engineers have been impressed by how certain creative engineers in Argentina, for example, have been able to continue to provide cleanwater services with only a modicum of equipment and material resources.

Therefore, perhaps the most important contribution an international operator can provide is the management regimen of the private sector. Three specific areas in which the discipline of the private sector is particularly effective are: revenue management (billing/collection), long-term operations and systems planning, and operational independence. Privatization requires discipline in all three areas: a non-subsidized private sector operation cannot afford to long provide water services to those who will not pay for it; it must plan carefully to generate the capital internally to maintain and build-out its

system; and it must insist on the exclusion of counter-productive political intrusion into its day-to-day operations. A private operator, free of political interference and working with the community directly under fair regulatory oversight, can make and implement some of the "hard" decisions, such as "right-sizing" the organization and billing tenable rates, that are difficult for a government entity.

The benefits to the community are a more effective and more responsive cleanwater system, able to provide a better product at a lower cost for the value provided. The benefits of privatization, sometimes DRAMATIC benefits, have been documented in other former state industries that have privatized in recent years, such as the electric power distribution and telephone companies of Chile, Peru, and Argentina. Indeed, the cleanwater privatizations completed to date in Argentina have had a generally very positive customer response and Mr. Menem's government was reelected largely on the basis of its policies in support of the private sector, including the privatization of cleanwater services.

***Increasing coverage and improving treatment.*** The economic development in Latin America is putting increasing pressure on the region's cleanwater systems. Even those communities considering privatizing their cleanwater systems and have adequate systems for their current customer base are concerned about reaching more of the population in their communities and about providing adequate systems for the future. There is a particular interest in providing a much greater percentage of the population with sanitary sewerage service and with collecting and treating the resultant wastewater. Wastewater treatment in particular is relatively new in much of Latin America and plant design and operating skills are in demand.

In addition to providing the "comfort" needed by tenders and investors to finance large-capital items like treatment plants, the international operator is able to muster the technical expertise to design, build and operate the wastewater systems. Jamaica Water's president and chief operating officer, incidentally, has been responsible for the largest private sector wastewater operation in the United States and would be able to bring substantial experience to bear for a Latin American community.

The benefit to the community of increased coverage and/or improved treatment is obvious: those who do not now have adequate access to disease-free potable water or to sanitary sewerage see an immediate improvement in the quality of their lives. This benefit ripples through the community as the overall economic base and general health improves. The private sector, working closely with the regulators and the community, is able to provide these benefits faster and more cost-effectively than has the public sector been able to.

We have discussed why a cleanwater company such as Jamaica Water would be interested in participating in Latin American privatizations, and we have discussed what

sorts of benefits it would bring to the communities it served. We now need to look at the other side of the coin:

***What are the concerns of a North American cleanwater operator regarding its participating in privatizations in Latin America?***

The private sector routinely identifies and quantifies business risk for projects. In the domestic cleanwater industry, this risk is primarily “operating risk” - the normal risk from operating a business. “Marketing risk” - the risk associated with not attracting, or losing, customers and sales - is not an issue for most cleanwater operators given their legally protected franchise service territories. The lack of this market risk is reflected in the rate structure and in the regulatory relationships. This is no different from the situation of many cleanwater operations in Latin America. However, Latin American cleanwater privatization poses other risks not present or less significant for the operator in the US that we must address:

- Country risk
- Legal and regulatory risk
- Community risk
- Transaction risk
- Lack of operational control = more operating risk

***Country risk:*** The operation of a cleanwater system should be a long-term commitment. As we look at which countries in which we wish to pursue privatization opportunities, we consider carefully the underlying political stability and commitment to democratic and free-market principles. There must also be a commitment to freedom to invest by non-nationals and the free movement of capital. While no country with a floating exchange rate can fully control the value of its currency relative to the value of other currencies, sound economic and fiscal policies allows currency risk to be managed within reasonable parameters. Chile, Argentina, Bolivia and Peru are particularly attractive from a country risk standpoint, but we continue to watch each country closely.

***Legal and regulatory risk:*** Since it is equally important to fairly protect the rights and clearly mandate the responsibilities of both the cleanwater customer and the cleanwater operator over the long term, it is crucial that the country, and the province or district in which the system is operated, be one of law and not decree. Likewise, it is important that the regulatory body established to oversee the operations of the cleanwater operator, to mediate when necessary between the operator and the customer, and to work with the operator and the community to establish a fair rate structure be independent. The risks to an operator are unacceptable where decisions affecting the operator and the community are arbitrarily made and enacted by decree.

***Community risk:*** One of the key areas of potential risk for a customer-centred cleanwater operator such as Jamaica Water is the service territory community. Lessons

have been learned the hard way in the US and in Latin America by ambitious operators who have not gained the prior support of their community. Before we enter a community, we must be sure that the community welcomes privatization, understands the benefits and costs associated with improving the cleanwater system, and is willing to work with the new local and non-local operators. The employees of the cleanwater system are also very much part of the community. Their understanding of the changes that must occur and their willingness to support the new management are crucial.

**Transaction risk:** Privatization transactions, like any business transaction, have risks associated with them. To keep transaction risk at acceptable levels for an international operator, the “playing field” must be level - local or certain international operators should not receive favoured status, and all facets of the bid and/or negotiation process must be transparent. Without these assurances, the undefined risk to a North American operator such as Jamaica Water is too great.

**Operating risk - management control:** Operating risk, as I mentioned earlier, is an accepted risk of doing business. However, this risk is acceptable only when management has the ability to control the operations of the cleanwater system. A half-approach - privatized risk without privatized control - is not viable. The cleanwater operator must have a clear charter to operate the system free of political intrusion and undo regulatory constraintment.

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A successful cleanwater privatization is made possible only by the conscientious effort of all parties to it: the community, the government overseer, and the operator. The final question is therefore:

***What are the key ingredients in a successful cleanwater privatization?***

A successful cleanwater privatization requires mutual:

- Clarity;
- Commitment; and
- Flexibility

Each party needs to address itself to the following questions:

***Questions for the community and its advocates:***

- Clarity
  - What do we want from the privatization?
  - Do we understand the costs and benefits of the subsequent changes?

- What is our desired relationship vs. the cleanwater operator?
- Commitment
  - Are we willing to support privatization?
  - Are we willing to pay for our cleanwater services and for system improvements?
  - Are we willing to accept some short-term pain for long-run benefits?
- Flexibility
  - Are we willing to make unforeseen adjustments in lifestyle to make the privatization work for the operator?
  - Are we willing to trust the operator and the regulators?

***Questions for the privatization committee:***

- Clarity
  - What are the bid decision criteria? Emphasis on price or quality?
  - What is the decision process? How transparent is it?
  - What is the risk/reward profile desired for the transaction?
- Commitment
  - Are we willing to support privatization?
  - Are we willing to allow some short-term pain for long-run benefits?
  - Are we willing to make a long-term commitment (i.e., 30-year concession)?
- Flexibility
  - Among our decision criteria, are we willing to consider the unique attributes and value provided by interested operators vs. a decision based solely on price?

***Questions for the (subsequent) regulatory body:***

- Clarity
  - What is our role vs. the cleanwater operator? vs. the community?
  - What levels of profit are we willing to offer the cleanwater operator for its dedication and risk?
  - How will we handle changing situations?

- Commitment
  - Are we committed to remaining independent and impartial?
  - Are we committed to the best interests of the community and the operator above all else?
- Flexibility
  - Are we willing to consider unforeseen adjustments in policy application to make the privatization work for the community and the operator?
  - Are we willing to trust the operator?

***Questions for the international cleanwater operator:***

- Clarity
  - What are we willing/planning to do for the community?
  - What resources are we willing to apply to accomplish our goals?
  - What do we want in return for our dedication and risk?
- Commitment
  - Are we committed to privatizing this community's cleanwater system?
  - Are we willing to make a long-term commitment (i.e., 30-year concession)?
  - Are we willing to trade immediate risk for long-run benefits?
  - Are we committed to remaining community focused?
- Flexibility
  - Are we willing to make unforeseen adjustments in operating goals and tactics to make the privatization work for the community?
  - Are we willing to trust the community and regulators?

If each party can each answer "yes" to a large majority of these questions, the situation is ready for success. The management of Jamaica Water, and of North American cleanwater operators like us, has the resources to successfully privatize Latin American cleanwater systems. We are dedicated to using our accumulated experience and capabilities to improve the standard of living of Latin American communities who are ready to support the privatization process. We are willing to be clear, committed and flexible in our endeavors. We only ask that the communities to be served, and their representatives and advocates be equally clear, committed and flexible. Working together, we can, one community at a time, make an important difference.

**References**

1/ US Environmental Protection Agency data.

2/ Linton & Associates, 1995.

3/ World Bank press announcement, August 1995; this figure includes irrigation. Net irrigation, the figure is around \$ 500 billion (also World Bank).

4/ Approximations. Each province will have slightly different goals.

5/ Private Solutions To Public Problems (1991), Cristian Larroulet editor; Instituto Libertad y Desarrollo, Santiago, Chile.

## **5. Alternatives for private participation in the provision of water services**

by *Terence R. Lee*<sup>\*</sup>

In recent years there has been a region-wide movement towards widening private participation in the provision of infrastructure and other public services. This paper discusses and illustrates the alternatives available for private participation in water-related public services.

Since the 1970's, and beginning in Chile, the governments of Latin America and the Caribbean have been transferring in one form or another public companies and other state institutions to the private sector. Such transfers have been especially marked in manufacturing and other directly productive activities, but privatization has extended now to almost all sectors of the economy, including the provision of water services.

Privatization is often conceived of in terms of the sale of public property to a private investor. There are, however, many other forms of transferring activities from the state to the individual and not all of them involve the transfer of physical assets. A change in the law may do as much or more to reduce the role of the state in the economy as any transfer of physical assets. For example, the removal of exchange restrictions or restrictions on the transfer of land received through a process of agrarian reform may greatly extend the area of the economy in which the market rules. In water management, the most significant act of privatization may be the recognition water-use rights as real property.

In most countries of the region, there has been a wholesale shift in the line dividing the public or state from the private or individual. The nature of the change depends on the previously prevailing situation, but even in Cuba the shift has been significant. Water management, the water resource and the services based on water have not been excluded from this process. On the contrary the transfer of the responsibility for water-related goods and services and their management has formed in many countries an important part of the total privatization process.

There are a number and variety of alternatives available for structuring private participation in the management of water services. A discussion of these alternatives is

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justified, and of particular importance for the water sector, because the development of the idea or concept of water management in Latin America and the Caribbean has occurred within a context where the major users of water were within the public sector. The privatization of the basic water services 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. Too often, the discussion of the role of privatization is limited by the inherited framework for water management which hampers innovations in structural arrangements beyond the mere transfer, in one form or other, of institutions from public to private management.

The privatization 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 from previous activities and requiring different skills and knowledge of the public sector personnel. In water resources, all the experiences show that privatization does not just stop with the transfer of assets, but requires continuing managerial actions within the public sector.

This can mean, and has meant, the restructuring of ministerial responsibilities - for example, the transfer of the supervision of water supply and sanitation companies from the Ministry of Health or Public Works to Economics or Finance in the line with the new role of government in the supervision of registered private companies instead of operating state-owned services. It can mean the disappearance of activities from the public sector, as private operators take over responsibilities, for example, energy planning when the supply of new facilities is left to be determined through competition and the market, the supervision of cultivation plans for irrigation districts when the individual farmer decides his own production or the determination of release schedules for reservoirs where the operators are privately-owned electricity generating companies.

Before, however, discussing the available alternatives, it is necessary to give some consideration to why governments in Latin America and the Caribbean provide water services. Historically, many water-based services were provided through the private sector, especially electricity generation, but, also both water supply and irrigation. It is only this century, and since the 1920's, that governments decided that water services should be provided by the public sector and only since 1945 that such 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 services are complex, but basically arose from the decision of governments and international institutions that decisive government intervention in the economy was required to maximize economic welfare through economic growth. Since the 1970's, however, opinion has changed to place emphasis on maximizing the role of the private sector (ECLAC, 1994). Again, the reasons advanced are varied. A recent study by

ECLAC advances nine arguments used by governments, both structural and pragmatic for undertaking privatization programmes (ECLAC, 1994). The basic reason is a change in ideology and it is now accepted that the private provision of productive services is the more effective tool for bettering economic welfare. It is the general opinion that the replacement of public monopolies by regulated private monopolies can significantly both increase economic efficiency and have a positive impact on social welfare.

### **Alternative arrangements for private participation in the provision of water services**

Water services, especially the provision of water supply and sanitation, tend to be natural monopolies. The management of monopoly services by the private sector raises, therefore, the need for control or regulation by government. There are several options open:

- a government might decide that monopoly rents are worth accepting and do nothing. Even though this approach implies that society will sustain a loss in economic welfare, there may be cases where this loss is worth taking and users may prefer paying monopoly prices for a high quality service;
- a government might decide to continue the provision through a public enterprise, although this option is likely to be unattractive under present circumstances;
- cooperatives are potentially an interesting option, but they seem to work best only for smaller systems in rural areas and small towns.
- a government might decide, as most governments in the region now have, to transfer services to private management and to use regulatory policy and an appropriate system of incentives as a means of influencing private sector behaviour.

In deciding to involve the private sector, governments have many options. This paper reviews the variety of forms which are available, and which are being applied in the region, to attract and regulate private participation in water-based services.

Most attention in recent discussions on the private sector participation in water resource management has been devoted to the benefits of "formal privatization", i.e. sale or transfer of state owned enterprises to private owners, or to the problems which are likely to emerge as a result of such a sale. However, this emphasis obscures the many ways in which the private sector can participate in the water sector.

The options for private sector participation fall along a continuum between the extremes of almost completely public sector responsibility (e.g. management and service contracts) through joint responsibility (e.g. leases, joint public-private arrangements) to completely private responsibility (divestiture). Obviously, these options may overlap or be combined. Three broad models can be distinguished, however, through which the private sector can participate in the water sector: full privatization or divestiture, fixed-term

franchises and similar concession arrangements and specially negotiated contributions and other joint public-private arrangements.

### **Divestiture**

The theoretical arguments and the practical benefits of divestiture are strongest in tradeable goods industries operating in competitive markets free from substantial market failures. In such cases, market liberalization, restructuring and reduced transaction costs can be counted on to supply the beneficial pressures of direct price competition. Contestability will autonomously perform a major part of the regulatory function and reduce the need for the more detailed and intrusive forms of conduct regulation.

In the water sector, this includes many irrigation projects and electric power generation. These activities produce tradable outputs for which there is a wide range of substitutes. Their divestiture will generally have a positive impact on economic efficiency, and may be welfare improving, because it enables benefits to be realized from the strengthening of private rationality under competitive pressure. Argentina, Chile and Peru are selling or have sold nearly all electricity generation companies to private investors.

The benefits of divestiture are more questionable in the industries which do not operate in competitive markets or have substantial market failures. For example, at the current stage of technology, the supply of drinking water and the provision of associated sewerage services to a given area constitute a local natural monopoly. The scope for direct product market competition is, therefore, limited.

Transfers of natural monopolies to the private sector call for permanent and detailed public regulation. Regulation is, however, intrinsically imperfect largely because of the basic asymmetry in information between the regulator and the firm. Studies of industries with natural monopoly elements and other market failures provide some indication that the regulation of private firms is, in itself, imperfect and can distort incentives causing their performance to fall short of that of corresponding public enterprises.

These considerations help explain, for example, at least in part, why complete private ownership of drinking water supply and sewerage systems is still mainly limited to small enclave systems serving high-income residential, tourist or industrial complexes.

### **Franchising and related arrangements**

A franchise or concession agreement is a means, through a competitive qualification process, of awarding a fixed-term monopoly right to provide a service within a geographical area to a private firm. Franchising attempts to harness market forces through an auction of the right to operate a natural monopoly.

Franchises offer important advantages over divestiture. It can provide a means to institute regulation gradually, a factor particularly important in countries with little experience in formal regulation. It allows incremental private sector participation while the uncertainty about the future regulatory framework and other risks can be addressed through a series of long-term contracts between the government and the contracting companies (Liétard and Santos, 1994). Franchising, also, reduces the need for the most intrusive forms of regulation.

Franchising is very flexible and can be adapted to virtually any situation. Franchises can range from contracts which are fairly limited in scope and cover a specific activity, e.g. data processing or equipment maintenance, to comprehensive contracts which transfer responsibility for operation, maintenance and even for major investments to the private sector. Franchises can last from a few days or weeks to several decades.

The effectiveness of the provision of water-related goods and services under a franchise is closely related to successful functional separation, since many franchise arrangements are probably more appropriate where a natural monopoly has been “unbundled” (vertically or horizontally separated) because it is better, in terms of efficiency, to have small rather than large monopolies operated by the private sector.

No one contractual arrangement is clearly superior or is right in all circumstances. Each has its own advantages and disadvantages which depend on the incentives imbedded in the contract design that make them suitable to particular circumstances. The variety of alternatives is very large.

The actual choice of the most appropriate institutional arrangement will depend on three factors: effectiveness, which depends on the comparative advantages and disadvantages of individual institutional arrangements vis-à-vis each other and on the strength of the managerial and technological skills supporting the particular arrangement; availability, because the most effective institutional arrangement may not be available; and acceptability, which depends on a number of factors, including government policy towards private sector participation, the nature of the enterprise, its importance, responsibilities and political visibility, identity of prospective private sector purchasers or investors, etc. (Hegstad and Newport, 1987).

### **Joint public-private arrangements**

Joint public-private arrangements are based on commercial principles, like private enterprises with more or less complete autonomy, where public sector administrative and financial regulations do not apply, but where the government retains the ability to guide and to control activities to ensure that the public interest is served.

Such arrangements offer a number of advantages. Firstly, they provide the potential to improve efficiency through the introduction of the business-style management,

private sector capital, particularly when the private partner can readily raise bonds or issue notes, and know-how and expertise, e.g. in raising project finance, in business management and in the assessment of project risks and market feasibility.

Secondly, they enable the public sector to act more flexibly than if a service were entirely in the public domain (OECD, 1987). In addition, they may provide a means of avoiding public sector borrowing controls, although this would not probably be possible in countries which operate centralized controls on public borrowing, because in these countries mixed enterprises would probably be classified as public sector organizations (OECD, 1991).

A possible shortcoming is the risk for governments of conflict of interest problems (World Bank, 1995). Particularly, if it is simultaneously regulator and owner. On these grounds, leases, concessions or full divestiture, that provide for the separation of responsibilities have considerable advantages.

The Bolivian "capitalization" programme is one of the most recent and interesting innovations in joint public-private arrangements in Latin America and the Caribbean. The plan has aspects of privatization and of joint venture, but it applies a unique approach.

The sale to private owners of a minority share of an enterprise can provide positive incentives for efficiency and have a powerful behavioral effect on the firm's performance. It fosters independent decision making and compels management to be more accountable for its performance. Furthermore, in order to be listed on the stock exchange, the enterprise may have to introduce important changes in internal operations e.g. in accounting practices.

Even selling very small proportions of companies can be beneficial. Less than 1% of the shares in the two largest drinking water supply and sewerage utilities in Chile are traded on the stock exchanges. The Companies are, however, registered companies and managed under such rules rather than as public enterprises. They are both profitable and generally considered to be among the most efficient companies of the region.

Some Latin American and Caribbean countries require developers to bear the costs of local infrastructure. In practice this has been applied to developments for middle and upper income housing, but the same approach has been applied to low-income areas, particularly in sites and services projects. The volume and extent of the contribution to water-related infrastructure development that can be extracted from the private sector is, however, potentially large.

## Conclusions

The transfer of water-based services to the private sector, with the exception of electricity generation in Chile, is too recent a phenomena to be evaluated as to its levels of achievement. It is generally accepted that the transfer of public companies to private ownership can bring substantial welfare gains. Recent empirical research by the World Bank and Boston University in which twelve cases of privatization were comprehensively analyzed in four middle-income and developed countries indicates that privatization did bring substantial welfare gains. In eleven of the twelve cases, the gains were both positive and large, amounting to an average 2.5 per cent permanent increase in national income (Galal and Shirley, 1994).

As this brief review shows the means for incorporating private enterprise into the provision of water services are very varied. The most appropriate selection will depend entirely on circumstances, but there is considerable evidence that in the case of natural monopolies some type of franchise arrangement is easier to manage than direct divestiture.

None of the alternatives, however, eliminate the need for regulation completely. Unless entry costs are low, a franchisee is in a strong position either to amend the contract or disregard it. Close monitoring is required to ensure that private providers meet their obligations under all alternatives. This a considerable challenge for the public sectors of the countries of Latin America and the Caribbean.

## References

- Galal, Ahmed and Mary Shirley (1994), "Overview", ***Does privatization deliver? Highlights from a World Bank conference***, EDI Development Studies, Economic Development Institute of The World Bank, Washington, D.C., The World Bank.
- Hegstad, Sven Olaf and Ian Newport (1987), "Management contracts. Main features and design issues", "World Bank Technical Paper", N° 65, Industry and Finance Series, Washington, D.C., The World Bank, July.
- Kay, John (1993), "Efficiency and private capital in the provision of infrastructure", ***Infrastructure policies for the 1990s***, Paris, Organization for Economic Co-operation and Development (OECD).
- Lee, Terence Richard (1990), "Water resources management in Latin America and the Caribbean", ***Studies in Water Policy and Management***, N° 16, Boulder, Colorado, Westview Press.
- Liétard, Philippe and Everett J. Santos (1994), "On the move. Privatizing Latin American infrastructure services", ***Privatization in Latin America. 1994*** (A Supplement to LatinFinance), Coral Gables, Florida, LatinFinance Special Projects Ltd., March.
- OECD (Organization for Economic Co-operation and Development) (1987), ***Managing and financing urban services***, Paris.
- \_\_\_ (1991), ***Urban infrastructure: finance and management***, Paris.
- ECLAC (Economic Commission for Latin America and the Caribbean) (1994), "La crisis de la empresa pública, las privatizaciones y la equidad social", Serie Reformas de Política Pública, N° 26 (LC/L.832), Santiago, Chile, April.
- World Bank (1995), ***Staff appraisal report. Paraguay. Asunción sewerage project***, Report N° 13028-PA, January, Environment and Urban Development Operations Division, Country Department I, Latin America and the Caribbean Regional Office.

## 6. Privatization law and water institutions

by *Walter A. Lyon*<sup>\*</sup>

The paper examines and categorizes privatization law as it applies to water management in Europe and in the United States into three categories: Institutional, Management and Product Law. It discusses the success of privatized systems. In general privatized systems seem to perform well when there is flexibility at the local level and where National or State governments set a framework which assures financial integrity, reasonable charges and profits, good service and water which meets environmental standards. There is a need for better information about the performance of privatized systems.

### **Privatization is Broadly defined**

My purpose is to discuss laws which create and regulate water institutions which are not owned by traditional units of government. I will limit my discussion to laws that are unique to water institutions and not discuss other privatization laws such as corporate, labor and tax laws.

My definition of privatization is intentionally broad. It includes private corporations and public corporations (or authorities) which are not part of general government, but are designed and authorized to provide water, water management, and wastewater service. I include public corporations or authorities; because I believe that in the water field they have more in common (particularly in the financial area) with private institutions than they do with traditional public works organizations. The manner by which they participate in capital markets has some similarities to private enterprises (i.e. Pa Municipal Authority Revenue Bonds).

### **Europe and the United States have extensive experience with private water organizations.**

Privatization is not a new concept. Private-investor owned water companies serving drinking water existed in the United States and Europe before the turn-of-the-century. Changes during the last century have occurred largely as a result of changing water needs and creative forms of institutional design. The French water companies rarely own the system but compete for contracts to operate them. American investor-owned water

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companies own and operate their system in a regulatory setting where their rates are regulated by State public utility law. The State and Federal governments regulate drinking water and effluent quality. The most dynamic changes have occurred in the UK where a few private water companies have always existed side by side with publicly owned enterprises, but in 1989 nearly all water management was privatized. This is the first form of privatized water management in the UK to reach beyond the drinking water service to include other functions such as wastewater service.

**The laws regarding privatized water institutions emphasize governance, finance and service. Their scope has gradually been broadened to cover an increasing list of water management functions.**

The laws that created and governed these water institutions regulated ownership, financing and services take many forms. They create links between government and water institutions that are designed to control the cost and quality of water and wastes in a setting that, for the most part, separates them from conventional domains of public finance such as taxation and government budgets for public works. In many ways, the financial side of these laws keeps water institutions safely away from the political process and the cycle of elections. In the United Kingdom, France and Germany the scope has been gradually broadened to cover more elements of water management such as wastewater management and pollution control.

Shortly after the turn of the century came the German Basin Authorities (Genossenschaften). They are responsible for all water management functions within their basin. They are public corporations created by German law. Water users form an Assembly whose votes are weighted by the size of their water bill. (Although there are some limitations), These assemblies appoint an Executive Committee which sets the policies of the organization, including the construction and operations programs. State laws of the German Laender separately regulate drinking water and environmental standards (Lyon, 1974).

In France, beginning with the Water Pollution Act of 1964, Basin Agencies were created to overcome fragmentation among agencies dealing with water quality and to separate financing and implement the "polluter pays" principle.

The most dramatic changes have occurred in the UK. The Water Resources Act of 1963 created 29 River Authorities which helped to reduce the over 1 000 local water and sewer authorities to 200 by 1971. The UK Government after a careful study decided that there was still too much fragmentation and in 1973 created ten regional water authorities which were nationalized in 1983 and privatized in 1989. Thus in 26 short years UK water institution law carried the system through four dramatic changes (Thorpe, 1986). Clearly scale economics played an important role but the question of which form of privatization is best, remains unclear.



There are three major forms of law related to privatization of water services:

1. **Institutional law** that *creates* or *changes* the institution. This type of law can be categorized into three sub-categories:

- Generic organizational law, such as the Pennsylvania Municipal Authorities Act which authorizes the formation of various special-purpose authorities throughout Pennsylvania. Decisions regarding whether or not to set up the organization; scope of service, area served, and inter-municipal governance are left to local decision.
- Specific organizational law designed to create specific organizations, such as the Emscher-Genossenschaft, The Ruhr Verband, the Tennessee Valley Authority, and the Ghana Water and Sewerage Corporation. These laws provide for highly centralized decision-making and severely limit local options (Boadu, 1994).
- Divestiture Law is law typically designed to facilitate and regulate the transfer of utilities from the public Sector to the private Sector. Such law provides the government with the power to sell, provide warranties, limit foreign ownership, establish financial requirements such as accounting standards and the form of payments (cash Vs debt instruments) as well as market and financial incentives. Transfer laws often specify the substance and nature of state supervision to the transfer and subsequent to it such as the UK, Senegal, Turkey and Brazil. It may also provide for the retention of some sovereign power such as the "golden hare" and the "KIWI share" in New Zealand (Guislain, 1992). Divestiture law is very common in Eastern Europe.

2. **Management Law** is law which designs and circumscribes functions of *existing* institutions and there are two broad sub-categories:

- Prescriptive laws, such as the French law which delineates four broad categories of contracts between French municipalities and the private water companies that service them. These laws specify the scope of contracts but leave the choice to municipalities.
- Laws that impose broad management requirements, such as elements of the Pennsylvania Municipal Authority Act regarding such items as appointments to boards, financing requirements, bonding requirements and the UK's law governing the management and scope of the UK's water companies.

3. **Product Law** is product-related in a sense that it regulates the quality of output in the form of product and services of privatized water systems. Examples include state public utility law, and state and federal drinking water laws in the United States. In Europe the European Commission regulates health and environmental issues in accordance with Treaties which govern the European Community, as do National health and environmental ministries under the laws of each Country. In the UK The Office of Water Services

coordinates a broad range of agencies and regulates private water companies with respect to rates, health and environmental issues (Byatt, 1991).

**There has been significant growth in privatization of water institutions, but information about them is limited.**

Depending on the country and on the situation, the above categories may on occasion overlap. The greatest area of overlap relates to finance and governance, but generally there have been great successes in the gradual expansion of privatized water service operations throughout the world. What is urgently needed is a compendium of such laws, an evaluation of their performance in terms of economic efficiency, service to the public, and some understanding of what it takes in terms of staffing and budget to operate them effectively.

My general impression is that the laws relating to privatization and the organizations which are governed by those laws have on the whole done a good job. In many instances they have been able overcome the problems of a highly, politicized context. Water projects, because of their health and economic implications often serve as powerful political tools. They can make a difference in the support for the elections of public officials. Too often there is a negative correlation between the utility and success of water projects and the political process. The two need to be separated and privatization law appears to have helped address that issue. What I have said is not meant to imply that there are not many purely public water service organizations that operate under general governmental requirements very successfully, but the political season and the temptation to reshape a water project into a political instrumentality is often removed when privatized water management is practiced.

## **Conclusions**

**1. *For water institutions the term "privatization" is unfortunate and misleading.***

My first observation relates to the term "privatization". It is perhaps unfortunate, because it leaves the false impression that we are talking about a process by which organization (in this case a water institution) is completely removed from the public domain. This survey of privatization law convinces me that this is far from true. If anything, the opposite is true, privatization law in many instances triggers an even greater and more intrusive connection to the public domain than is the case with public water facilities which are owned and operated by general government.

**2. *Privatization is at its best when it allows flexibility and local choice.***

My second observation relates to the great diversity, range and scope of concepts and concerns that are expressed in some laws which relate to the privatization process.

My favorite examples are the French law governing contracts and the Pennsylvania municipal authorities Act. Those laws remind me of a cookbook and suggest that their greatest utility lies in the opportunity for local people to shape things to the occasion and to the taste of the customer. These differences in degree of flexibility have in part to do with the original purposes of the privatization movement and in part with the economic history and traditions of the country.

**3. *French water law and its implementation is a good example of how water service can be marketed and still serve the public interest.***

Much of the recent dialogue about privatization has been shaped by dramatic efforts in Eastern Europe to move entire economies from almost exclusive government ownership to the market economies. That experience, in my view has very little to do with the privatization of water institutions. Water, per se, is a public good and therefore generally not a marketable product. Water institutions are monopolies and therefore require additional regulation not appropriate to companies which offer marketable products and services. On the other hand French water law specifies several levels of water service which serve as a basis for competition. That creates a workable market for water services, a market that works so well that regulation of water rates, which is a big item in the UK and US is virtually non-existent in France (Ionesco, 1995).

**4. *Privatization is not an end in itself.***

My fourth conclusion is one from John Nellis Paper (1991) on Socialist Economies but it applies to our field as well: ... "privatization should not be viewed as an end in itself; that it is but one weapon the arsenal of the policy maker searching for ways to enhance efficiency in the enterprise sector".

The UK experience does raise questions about the wisdom about a privatization process that is based on a law that gives local people little choice (Kinnersley, 1995). Apparently rates have risen more rapidly than in France and a recent PA News story by Trevor Mason (1995) highlights the failure of UK water Companies to prepare for droughts and fix leaks.

**5. *Non-Viable small systems need special attention.***

In the US and probably in other countries there is another issue which has never been adequately addressed by any law and that is the creation of small and non viable water and wastewater systems. These systems are too small to sustain themselves in a modern industrial society which insists on high quality water. This is probably the toughest issue of all to solve. It will either require a strong connection between land-use decisions and decisions about water infrastructure which carefully anticipates per family cost. In Pennsylvania among private systems this problem has been partly resolved by the Public Utility Commission by encouraging investor-owned water companies to acquire these

small systems and then level the rates offered by a single company throughout the state so that the burden of allowing these to be started is shared on a statewide basis.

#### **6. *We need to learn much more about this process.***

My last observation combines my first four observations into the conclusion that experience with privatization law provides us with an opportunity to bring to water projects the very best in water management experience from both the private and the public sector and to shape each project to a prescription that is responsive to the uniqueness of the local situation. To do this successfully requires much more information, study and analysis not only about the recipe and the ingredients but also about the taste, the culture and the experience of the customer.

We also need more information about finance, unit costs, efficiency and responsiveness to public complaints, needs and concerns. The lack of such information makes it very difficult to learn from the experiences of others in the successes and failures of privatized water institutions. There appears to be a significant difference between public attitudes about privatized water services in the UK and France but there is rather little data-only hearsay about the basis for this. We clearly need more information about that subject too.

If I were asked about the matter of privatization and how to implement it effectively I would, based on the limited information available to me, urge: 1) that national laws should not be too prescriptive such as the UK law but present local authorities with a wide range of options, such as the French law and the Pennsylvania Municipal Authorities Act; 2) that in a highly developed areas basin-wide comprehensive water institutions should be encouraged; 3) that all water institutions be financially independent of general governments or that operation and maintenance be based on competitive contracts; and 4) regulated nationally or by the state to assure reliable service, reasonable rates and prudent financing as well as sound reinvestment and maintenance and 5) that the regulation of health and environmental standards be separate.

### **References**

- Boadu, Fred O. (1994), "Policy on Private Water Sales in Rural Ghana", ASCE, *Journal of Water Resources Planning and Management*, 120 (6), 944-961.
- Byatt, Ian C.R. (1991), "Privatization - A U.K. System of Regulation", *Water Environment and Technology*, (October) 94-96.
- Guislain, Pierre (1992), "Divestiture of State Enterprises", *World Bank Technical Paper N° 186*, The World Bank, Washington, D.C.
- Ionesco, Dinu (1995), Personal Communication.
- Kinnersley, David (1995), Personal Communication.
- Lyon, Walter A. (1974), *New Developments in Water and Water Quality Management in Some Western European Countries*, Pennsylvania Department on Environmental Resources, May 15.

- Mason, Trevor (1995), "We Spent too Little Time on Water Leaks, Says Water Boss", *PA News*, September 4.
- Nellis, John (1991), "Privatization in Reforming Socialist Economies", *Privatization in Eastern Europe: Current Implementation Issues*, Andreja Bohm and Vladimir G. Kreacic ed., International Center for Public Enterprises in Developing Countries, Ljubljana, Yugoslavia.
- Thorpe, B.R. (1986), "River Basin Management in England and Wales", *Proc., 4th International Conference On River Basin Management*, IAWPRC, Sao Paulo, Brazil, 231-237.

## **7. Canadian municipal water utilities and private partnering**

by *James W. MaClaren*\*

The paper describes the current state of Municipal Water and Waste Water Utilities in Canada and the need to upgrade and refurbish these systems. It proposes utility revenue dependency and public private partnering as a means for meeting the needs. It further describes recent specific examples of utilities partnering with the private sector.

### **Background**

In Canada there are more than 2 500 municipal water supply systems and about 2 150 corresponding sewerage systems. Many of these systems or significant components of many of these utilities are reaching an advanced age. Some have pipes that are older than the founding of our country - 1867. Their current physical condition represents a developing crisis in one of Canada's significant industries, currently having a capital replacement value of \$ 110 billion (U.S.) and representing in annual spending for operation, restoration and expansion, more than one percent of Gross Domestic Product.

Canadian municipal water and waste water utilities must increase their annual spending in capital and operations by at least 50 percent now; otherwise these utilities will face substantial replacement of their systems, especially the 70 percent serving populations of less than 2 500 persons.

In addition, most systems face immediate capital outlay for improved drinking water supply and treatment, toxic chemical removal from waste water including pollution prevention at the source and combined sewage and storm water management. This represents a further requirement estimated to exceed \$ 37 billion (U.S.) over the next 15 years independent of the previously listed investment. So where the average Canadian household pays after subsidies \$ 250 (U.S.) annually for water and sewage service, the real cost within 15 years will reach \$ 1 000 (U.S.) per household or about two percent of average annual gross household income.

### **Current progress**

But the fact is that in Canada we are continually falling back on meeting our environmental improvement goals. As an example in Ontario which contains 40 percent of the Canadian population (10.5 million) the Great Lakes Water Quality Agreement between the United States and Canada called for all directly discharging industries as well

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as municipalities to treat their waste waters to Best Available Technology Economically Achievable (BATEA) by the end of 1982. It further required the parties involved to "provide financial resources to ensure prompt construction of needed facilities".

None of the eight American States or the Province of Ontario have achieved their pollution control objectives. Ontario by the end of 1994 had finally put into place nine separate industry-type regulations requiring its 335 direct discharging industries to conform to BATEA not later than 1997. But there is even now in October 1995 no announced program in Ontario to improve municipal water-related infrastructure. Systems continue to deteriorate in the average municipality, despite some excellent examples of sound rehabilitation in some cities. But Safe Drinking Water Standards have yet to be enforced and municipal regulations for waste water cleanup have yet to be released for public comment.

And the Ontario example mirrors equal conditions at best in the nine other provinces and the territories of Canada. Indeed the situation has reached crisis proportions within a Provincial and Federal, political and bureaucratic morass that has continually failed to take action across the country. So there is little doubt that with our "bankrupt" and "over spent" senior governments and our municipal utilities providing more water per capita at a cheaper cost than in any other country in the world, we have hit the bottom of the well.

### Solutions

Two major changes in water policy are required now.

1. Provincial governments must immediately institute municipal water conservation programs. The details of the program are set out in a recent report of the Canadian Council of Ministers of the Environment adopted May 31, 1994 and entitled "A National Plan to Encourage Municipal Water Use Efficiency". The implementation of a conservation plan automatically engenders conservation of the use of water and of a municipal utility's physical state as well as its future needs and capacity. That Plan and the Report of the Ontario Fair Tax Commission released in March 1994, make clear that the onus for the financing of rehabilitation, expansion and upgrading of municipal water-related infrastructure, as well as its operation, rests squarely on the shoulders of the water user. Therefore we don't need anymore studies. We need a commitment now to a public information and awareness program directed to enforcing conservation including full cost pricing on a metered basis (revenue depending utility) in all Canadian municipalities by the end of the century and completion of the upgrading program by 2010. **No studies - action!**

Household water bills will increase from the current \$ 250 (U.S.) annual average at an eight percent compounding rate annually reaching four times that figure when the job is finished (2010) still only \$ 0.70 (U.S.) per day per person served.

2. The other major change relates to private sector involvement - our primary reason for gathering at this seminar. Municipal water-related infrastructure in this country is almost universally publicly-owned and operated and faces little capital-market competition and cannot go bankrupt. As a result municipal and provincial water utilities lack incentive to operate efficiently.

On the other hand private sector involvement in the form of ownership, long-term competitive franchise agreements and/or operation and maintenance contracts can generate incentives for improved and more efficient water supply and waste water management. Moreover Canadian municipalities have no alternative but to seriously evaluate private sector involvement. The program ahead in sustaining the municipal environment in the face of development pressures and the need for system refurbishment, far exceeds the ability of Canadian municipalities to finance it. Whether private sector participation is popular or not, it will be required - our governments simply haven't the fiscal resources to support it.

### **Experience in private partnering**

Until the end of 1994, there was less than 20 municipal water-related utilities under private sector operation across Canada. Fifteen of these were in the Province of Quebec where a six billion dollar (U.S.) government supported building program for municipal waste water treatment facilities has been underway for more than five years and is now about 75 percent complete. With so many new facilities being created the opportunity for private sector operation and maintenance has been considerable. However the willingness to accept the private sector in this role has been resisted by labour and the competition has been keen with the manner of balancing the traditional approval versus the private sector offer in question. Probably the greatest difficulty for the private sector in making further inroads into a traditional municipal field has been the unwillingness of the Quebec provincial government to enact legislation to promote the opportunity for the private sector approach.

More than ten years ago the Capital Region Sewage Commission of Alberta which provides service to 150 000 persons in 12 separate municipalities surrounding the City of Edmonton contracted out the operation and maintenance of its new waste water treatment plant. Here has been an interesting experience of the original designer becoming the operator in the first instance in a series of contract terms starting with month to month arrangements and graduating after several years to a three year contract. The successful contractor had submitted a proposal on a cost basis for reimbursement of direct staff costs, direct staff overheads and expenses plus a fixed monthly fee to cover the contractor's indirect overhead and profit.

To provide a bench mark for cost negotiation, an independent management consultant was retained to evaluate the cost of direct hiring. The contract was later expanded to include five system pumping stations. In terms of maintenance, it was in the



contractor's best interests to maintain a high level of preventative and corrective service, as the expenses were directly reimbursed.

On the other hand since the contract had been negotiated with the designer there was no assurance that it was the most cost effective since it had not been subject to competitive bidding. Also the contract offered no incentive for cost efficiencies other than the contractor's desire to establish a good reputation.

As a result it was determined that at the expiry of the first contract for operations, the Commission would request formal proposals from the current contractor, three major local engineering firms and five international companies with global experience in water-related infrastructure operation. Again a management consultant was retained to evaluate the costing of direct hiring as the bench mark cost. Eventually a fixed cost contract was awarded to one of the four bidders but not at any significant savings over direct hiring. The savings in the five year contract have come from the benefits that the Commission shares with the new contractor in any optimization to improve plant efficiency and reduce costs of operation.

Staffing issues at the transition between contracts were severe but eventually resolved by the new contractor guaranteeing continued employment to the original staff.

Continuing in the same province, Canadian Utilities Ltd., a major natural gas and production company and one of Canada's largest investor-owned utilities, determined to enter the water business by unravelling a complex political problem of six municipalities and their councils attempting to build a water supply system.

The system described locally as the "Highway 14" water supply takes its water from the city of Edmonton on its easterly boundary and transmits it through a new pipe line, 68 kilometres to the various municipalities and several consumers enroute. The Province provided \$ 4.9 million of the \$ 12 million capital cost while CU provided the remainder. CU owns and operates the system and provides water to the towns under long-term contracts. In some cases the local town purchases the water wholesale and operates its own distribution system; in other cases the utility has taken over the local system entirely and bills customers directly.

The system is regulated by the Public Utilities Board of the Province of Alberta which means it controls water rates, service regulations and operating procedures. The rates are set based on normal utility costs of service criteria and the new regional water commission can buy back the system after twenty years.

So interest is growing in Alberta and British Columbia in the use of public private partnering in water-related infrastructure but the interest will not reach beyond that point until both Provinces regulate a higher standard of service in drinking water and waste water control.

In Manitoba and Saskatchewan, the presence of a Crown Agency of each Province that will provide municipal utility service has impeded any trend to privatization in municipal utilities in these provinces. However current fiscal restraint may force these provinces to withdraw or curtail the services of these Agencies.

Certainly the City of Winnipeg in Manitoba is seriously considering public private partnering in respect of its proposed water treatment plant.

In Ontario, other than a limited contract awarded to a major multi-national company with global operations for the operation and maintenance of the sludge disposal section of the waste water treatment plant serving our nation's capital, little had occurred in public private partnering until 1994. Incidentally that contract has recently been cancelled by the municipality.

In that year the Province created a Crown Agency to take over its responsibilities in owning and operating 77 municipal water treatment plants, 153 municipal sewage treatment plants as well as operating 36 water treatment plants and 80 sewage treatment plants. In total this agency is involved in 10 percent of the water treatment capacity and 10 percent of the sewage treatment plant capacity among municipalities in Ontario.

It was intended that the Agency would work with the private sector to develop partnerships to share responsibilities, develop expertise and promote export. Instead its legislation has directed it away from such cooperative efforts and freed it to compete directly with the private sector to ensure survival.

At the time of creating this Agency the Province enacted legislation that provided greater flexibility to municipal councils to develop municipal capital facilities with the formation of imaginative public private partnerships. Now an Ontario municipality may provide assistance, financial or otherwise, that may include lending, guaranteeing or borrowing of money, forgiveness of taxes and even the provision of municipal employees. The legislation permits for the sale of certain assets such as a water treatment plant and generally encourages private involvement in designated municipal responsibilities including water-related infrastructure.

The interest created during the first eighteen months among Ontario municipalities as a result of these two events has been considerable. It has been further heightened by the presence of a strong corps of the larger multi-national private water companies who have been making strong appeals to municipalities to consider their alternative.

One of the first and major breakthroughs was the securing of a ten year contract by Philip Utility Management Corporation (PUMC) for the management and operation of the water and waste water treatment facilities of the Regional Municipality of Hamilton-Wentworth whose population represents 450 000 persons.

The facilities to be managed include a major waste water treatment plant treating 409 ML (108 US MGD) of waste water per day plus two smaller plants and an 890 ML per day (235 US MGD) water treatment plant. The contract resulted from an unsolicited proposal by a locally based company and the contractor, Philip Utility Management Corporation (PUMC) assumed operations on January 1, 1995 of these plants considered by many to be among the most efficient in the province.

PUMC 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 changes 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.) PUMC has agreed to share additional annual cost savings over \$ 1 243 000 (U.S.) with the Region on a basis of 60 percent PUMC and 40 percent Region.

PUMC 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/purchase control systems.

The contract has been structured in such a way that the Base Budget can be adjusted for changes in water quality at the water treatment plant and quality of influent and effluent at the waste water plant.

PUMC limits the Region's risks in the transaction 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 preselected arbitration panel.

An economic incentive plan is included including PUMC establishing its global head office in the Region, maximizing local procurement, establishing an international operator training centre in the Region and a program to establish 100 new jobs in the Region with related operations.

Finally the PUMC contract offers employment to all existing part-time and full-time employees (182) who work at the facilities at the same terms of their current union contract and to include in addition bonus performance arrangements.

The Regional Municipality of Hamilton-Wentworth's arrangement with PUMC has encouraged a score of municipalities to invite proposals from the private sector for a similar service including where applicable, competing with their current arrangements with the Crown Agency.

Also several other regions are requesting levels of interest from the private sector in producing new capital facilities for long range water supply as well as waste water service. Programs valued at \$ 350 million (U.S.) in individual cases are being contemplated.

In our Atlantic Provinces, the Federal government has encouraged the provinces to consider private partnering in new capital facilities including water supply and waste water treatment.

Typical of the developments occurring are new water treatment plants for the City of Dartmouth N.S. (population 90 000) and the City of Moncton (population 85 000). Here impounded water supplies now require treatment to meet new drinking water standards. Plants of 70 ML per day (21 US MGD) are being contemplated valued at approximately \$ 22 million (U.S.) each. Requests for qualifications have been processed and a select list of three proponents are being paid to submit formal proposals to build, own, operate and transfer a plant after 20 years.

Proposals will be evaluated against each City's shadow bid for the capital investment and annual operating costs. Contract arrangements include for monthly payment for debt retirement, fixed operating costs and variable operating costs with a price index for varying base costs.

Both contracts should be awarded by the year's end.

### **Conclusions**

So the inertia toward private sector partnering in Canada has been overcome and the trend is showing an accelerating rate of not only interest but action. More provinces must pave the way by removing legal obstructions to the flexibility that municipalities may exercise in creating arrangements that are "win-win" to both partners.

One critical issue in arranging private sector contracts is to assure the financial interests that an irrevocable stream of revenue is available from the users to ensure payment for the services provided. This cannot be done without the province enforcing not only water conservation but revenue dependency on the municipal water-related utilities where the users pay the full cost of service on a metered basis.

Unfortunately the politician is terrified that a program embodying full cost pricing will create a violent public reaction, be considered as a tax grab and a sell out. Therefore

his or her unwillingness to accept the inevitable and tell the public the real facts and the truth is jeopardizing the public's health, its environment and its employment.

Actually it's an incredible situation. In Ontario, a province of 11 million people, the enforcement of full cost pricing to the user and the economics of private sector participation in water-related infrastructure would:

- permit upgrading and rehabilitating of municipal water-related utilities to meet current and future standards
- safeguard the public health
- create 2 500 jobs annually over the 15 year program
- make a clean water environment and a restored ecosystem a reality
- conserve on water use and thereby reduce demands on water resources and capital spending on future infrastructure
- eliminate a \$ 265 million (U.S.) conditional annual grant program for water-related infrastructure that the provincial government cannot afford
- reserve funds dedicated to rehabilitating infrastructure that would finally permit us to set in place a system restoration program

Hopefully there is a trend in our country finally to conserve - to conserve on spending and to conserve on resources. That trend should finally provide the catalyst toward the user pay philosophy and to speed the opportunity for public private partnering.

## **8. Privatization of services in the Great Lakes basin**

by *Douglas A. McTavish*<sup>\*</sup>

### **Background of the Great Lakes Basin**

The Great Lakes basin is located in the approximate middle of the North American continent. These five lakes represent the largest system of fresh surface water on earth. This immense drainage basin of approximately 527 000 square kilometers is the home of 37 million people and has become an important industrial sector for both the U.S. and Canada.

The flow-through time for the lakes ranges from a high of 200 years for Lake Superior to three years for Lake Erie. This feature has made the Great Lakes susceptible to the discharge of persistent toxic substances and provides an important indication of what can be expected in other fresh-water systems exposed to persistent toxic substances.

The Great Lakes basin has experienced problems of eutrophication attributed to phosphorus discharge from point sources such as sewage treatment plant discharges and from surface runoff particularly from agricultural lands. Currently, there is concern regarding the buildup of persistent toxic substances in the lakes reflected in high concentrations of these compounds found in Great Lakes fish. In addition, the lakes have a number of areas identified as Areas of Concern where desired beneficial uses such as fishing and swimming have been curtailed.

### **International Joint Commission**

The Boundary Waters Treaty of 1909 provides the principles and mechanisms to help prevent and resolve disputes, primarily those concerning water quantity and water quality along the boundary between Canada and the United States. This treaty established the International Joint Commission. The Commission is composed of six Commissioners, three on the part of the United States appointed by the President and three on the part of Canada appointed by the Governor in Council. Decisions of the Commission require the concurrence of at least four Commissioners. The Commissioners have acted as a unitary body and seldom have experienced the situation where a split vote along national lines has occurred.

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In 1972, Canada and the United States executed an Agreement on Great Lakes Water Quality. In that Agreement, the subsequent Amendment of 1978, and the Protocol of 1987, the two countries made a number of commitments regarding protection and enhancement of water quality throughout the Great Lakes. This Agreement reaffirmed, in a spirit of friendship and cooperation, the rights and obligation of both countries under the Boundary Waters Treaty of 1909. The Boundary Waters Treaty, in Article IV includes a clause that "it is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other." That commitment served as an important basis for the Great Lakes Water Quality Agreement.

Through the Great Lakes Water Quality Agreement, the Commission was given the responsibility of monitoring the progress of the two countries in meeting the commitments contained in the Agreement and in offering advice to the two countries on how they might meet those commitments.

### **Factors Encouraging Privatization in the Basin**

A number of pressures on governments within the basin have led to a growing interest in privatization of water and sewage services. In addition, there has been some experience with the provision of these services through the private sector or a commission. As an example, in the province of Ontario, in Canada, a crown corporation was formed in the 1950's to meet the high demand for water and sewage service resulting from the rapid growth and development following World War II. The province, at that time, had many municipalities requiring the service but lacking funding and expertise to complete the work. A large number of water and sewage facilities in municipalities throughout the province were constructed, owned, and operated by the Ontario Water Resources Commission. In the early 1970's, the crown corporation was incorporated into a provincial government department and attempts were made to return the facilities to the municipalities. Many municipalities were reluctant to take on the responsibility of these facilities and, as a result, by 1993 another crown corporation was established to manage the facilities and to attract private funding and partnerships with the private sector.

In the United States some private operating firms were established during the '70s and '80s partly in response to a similar larger-scale approach taken in France and the United Kingdom.

During the 1980's, financial pressures on governments encouraged more and more of the costs of water and sewage services to be paid direct by the user of those services rather than them to be hidden within the tax structure. The user-pay principle was promoted to all municipalities. This approach often included the consumer of the water service paying for both the supply of the water and the ultimate treatment of the sewage resulting from the water use.

Governments were also faced with large debts and rising deficits. The transfer of some of this debt to the private sector was viewed as an attractive mechanism for lessening the debt load. In addition, there was a growing feeling that private-sector operation would be more efficient than that of governments (municipal, state, or provincial).

As a result of these pressures, the interest in privatization has increased and is expected to grow over the next few years.

### **Issues Relevant to the Great Lakes Water Quality Agreement**

The International Joint Commission has an interest in the trend toward privatization. Privatization has the potential to impact on the ability of Canada and the United States to meet their commitments under the Great Lakes Water Quality Agreement. Some examples of the relationship of the trend to privatization and the Water Quality Agreement are as follows.

The Parties in Annex 11 make commitments for surveillance and monitoring to ensure the general and specific objectives of the Agreement are met and to evaluate water quality trends. This program of monitoring is to include baseline data collection, sample analysis, evaluation and quality assurance programs. There is a need, therefore, to ensure that these commitments can be met through the contractual arrangement that is made with the private firm which operates or owns and operates the facilities. How will these commitments be met?

One of the major issues first dealt with by the Commission under the Agreement was that of the control of phosphorus to address the problem of eutrophication. Annex 3 of the Agreement outlines, in some detail, the requirement to control the loading of phosphorus to the Great Lakes including the commitment that municipal waste treatment facilities discharging more than 1 million gallons per day are to achieve an effluent concentration of 1 milligram per litre total phosphorus or less on a monthly average (as stipulated in the Agreement). In addition, the annex calls for municipal waste treatment facilities designed, built, expanded, or modified after October 1983 to allow for later modification to provide for greater removal of phosphorus. How will this commitment be met if the service is privatized?

Article VI of the Agreement commits the parties to providing financial resources to ensure prompt construction of needed facilities and to other programs that are to ensure the specific and general objectives of the Agreement are met. Again, consideration needs to be given to this aspect of the Agreement when the service is to be provided by the private sector.



### Implication for Governments

The legislation in other countries may contain some of the obligations and responsibilities reflected in the Great Lakes Water Quality Agreement. The privatization of water and sewage services should be completed in a manner that recognizes the regulatory system and legislation in place in that country. The requirements for reporting information, financial obligations and other areas dealt with by the legislation may need to be addressed as privatization becomes more the norm. Operator certification, as a program, is also developing and this aspect, too, may need to be reflected through the arrangements for privatization.

The degree to which these aspects are affected will also depend on what is privatized. Is it operation? is it ownership? or a partnership arrangement?

### References

- Canada Water and Wastewater Association, June 1995. Bulletin Vol. 9 No. 5.
- Environment Canada, Water and Habitat Conservation Branch, February 1994. ***National Municipal Water Use Data Base.***
- International Joint Commission, 1909. ***Boundary Waters Treaty of 1909.*** Ottawa, Canada and Washington, D.C.
- International Joint Commission, 1987. ***Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987.*** Washington, D.C. and Ottawa, Ontario.
- Ontario Clean Water Agency. ***Annual Report 1994.***

## 9. Florida's Two Devices for Water Management

by *Allan Milledge\**

Florida is a state which was once mostly lakes, rivers, and wetlands. Its history has been, until recently, a continuous effort "to drain the swamp".

In this enterprise Florida principally has used two types of organizations. The first are called 298 Districts (authorized by Chapter 298 Florida Statutes) and the other, organizations with broader jurisdiction over a larger geographic area called now simply Water Management Districts. This paper will discuss the natural conditions requiring modification for human use and the structure and utility of these two types of organizations.

### I. Background

#### Pre-Development Florida

Though Florida was discovered by Spanish Explorer Ponce de Leon in 1513, colonization did not quickly follow. Most of the peninsula was covered by wetlands. Average yearly rainfall ranges from 55-60 inches. The peninsula is bordered on three sides by ocean, and the climate is primarily humid subtropical. There are two seasons: the five-month rainy season, from June through October, when 70% of the year's rain falls, and most hurricanes occur; and the seven month dry season, from November through May.

The state is actually the exposed portion of the Florida Plateau, a mass of rock nearly 500 miles long, and from 400 to 250 miles wide. Atop this rock base is more than 4 000 feet of highly porous sedimentary rock, chiefly limestone, formed over millennia of deposits of shells and the bones of marine animals. Topographically, elevations in most of the state are less than 100 feet above sea level. Variations are the result of wave action and sea level changes.

The most porous upper levels of this geologic formation are two primary aquifers, the Floridan and the Biscayne, which store about 90% of the state's groundwater. Florida's drinking water supplies are stored predominantly in aquifers, which are recharged by rainfall. The Floridan underlies the entire state, at varying levels, from 100

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\* Milledge, Iden and Held, Miami, Florida.

to more than 1 000 feet below sea level. The water stored in the south Florida section of this confined aquifer is stored at very deep levels, and is salty.

In lower southeast Florida, the Biscayne Aquifer is the primary source of fresh water. one of the most productive aquifers in the world, the Biscayne lies very close to the surface, and is easily recharged. It covers most of southeast Florida. In southwest Florida and the upper northeast of the district, small, usually isolated aquifers which are not quickly recharged dominate.

In South Florida, elevations average just under seven feet above sea level. There is a very gradual reduction in elevation from central Florida south, creating a gravity-assisted southward flow to Lake Okeechobee, and even more gradually south in a broad 60-mile wide "river" over the flat grasslands of the Everglades, eventually emptying into Florida Bay. This "River of Grass" covered two thirds of the southern half of the peninsula. Along the region's east coast, a narrow coastal ridge of uplands separated the sandy beaches and coastal areas from the Everglades. South and west of Lake Okeechobee, higher land levels in the upland plains of the Big Cypress mark the boundary between it and the Everglades.

This watery, inaccessible landscape remained untouched by development until after Florida became a state in 1845. For the next 100 years, it was subjected to increasingly sophisticated attempts to drain and develop millions of acres which were seen as useless in their natural condition. The new state was rich in land, but cash poor, so the state sold land at prices as low as 25 cents an acre to encourage development.

Thus the first wave of "water management" in Florida was an alliance between the state and the private sector, with its primary aim to drain and reclaim land for agricultural and urban development. The state's involvement usually terminated at the sale of land.

### **The First Wave of State Involvement**

In 1913, the state authorized the formation of drainage districts for water management purposes by state statute (Chapter 298). This was the first significant attempt at water management in southeast Florida. The Everglades Drainage District was created in 1913 to provide drainage and flood control. From 1913 to 1927, the Everglades Drainage District built six major drainage canals, 440 miles of minor drainage canals, and 47 miles of levees - with 16 navigation locks and dams.

However, in 1926 and 1928, hurricanes struck, killing 2 500 people who had been living around Lake Okeechobee. The U.S. Congress was urged to prevent future disasters like these. In 1929, the state created the Okeechobee Flood Control District to work with the U. S. Army Corps of Engineers to construct a dam around the perimeter of Lake Okeechobee.

Like hurricanes, droughts proved to be crises for the developing region of southeast Florida. In 1931 through 1945, a series of droughts brought saltwater intrusion to wells and ruined crops, showing that the drainage systems built thus far were unable to protect water supplies.

### **Hurricanes in the 1940s Foster Large-Scale Flood Control**

Back-to-back hurricanes struck south Florida again in 1947 and 1948. More than three million acres of land were under water for months. Flood damage estimates totaled \$ 150 million. The state asked the federal government to build a comprehensive regional system which would make continued drainage and development possible, but would also provide flood control and water supply protection.

In 1948, the U.S. Congress approved the U.S. Flood Control Act and the first phase of a massive \$ 70 million public works project, the Central and Southern Florida Flood Control Project, which would be designed and built by the U.S. Army Corps of Engineers. In 1949, the state created the Central and Southern Florida Flood Control District to work with the U.S. Army Corps of Engineers in the construction of the federal project, and operate and maintain it once it was completed.

The district would be administered by a five-member governing board of landowners who would be appointed by the governor with senate confirmation. This unique blend of government and nonpolitical administration was created to ensure that varied local interests were represented. A consensus between those often varied interests would help to creative a regional perspective. Appointment by the governor and the need for senate confirmation of members was designed to guarantee autonomy while also making the agency accountable to the state.

### **The Central and Southern Florida Flood Control Project**

Over the next more than twenty years, the U.S. Army Corps of Engineers and the Central and Southern Florida Flood Control District worked to complete what would become one of the world's largest public works projects, with about 1 400 miles of canals and levees, 200 water control structures, 19 major pumping stations and huge water storage/conservation areas.

The project begins at the Upper Chain of Lakes, a series of eight lakes in central Florida which are linked by canals. The Kissimmee River, a 56-mile "improved" canal flows south to Lake Okeechobee, a 730-square-mile shallow lake. The 67-mile Caloosahatchee River runs west from Lake Okeechobee to the Gulf of Mexico. The lake's eastern outlet, the St. Lucie Canal, flows east about 25 miles to the St. Lucie River and the Atlantic Ocean. South of the lake are three Water Conservation Areas, which with Everglades National Park preserve close to 50% of the original Everglades. A network of

major canals run southeast through the Water Conservation Areas and through the southeast coastal Palm Beach, Broward and Dade counties.

By moving or holding water within canals, saltwater intrusion and other water supply problems can be prevented. At the same time, the system can quickly alleviate flooding. The system's massive pumping stations can move hundreds of thousands of gallons of water each hour.

The U.S. Army Corps of Engineers establishes schedules which specify water level ranges for the lakes, rivers and canals of the system. Those schedules were designed to eliminate the highs and lows created by the region's natural pattern of flood and drought.

The Central and Southern Florida Flood Control District was responsible for operating and maintaining this public works plumbing project. From 1949 until 1969, as construction continued, the system successfully mediated seasonal extremes and provided flood control and water supply protection for a rapidly growing population. Beginning in 1970, the agency's role in water management has expanded far beyond drainage, flood control and water supply protection - fueled by drought, and by a recognition that the state's resources were showing signs of stress.

## **II. The Foundation Of Modern Water Management 1972 Florida Water Resources Act**

The worst drought on record in 1970 and 1971 once again focused the attention of Florida's policy makers on water resources. In 1971, Governor Reubin Askew convened a conference on water resources which concluded that land use, growth policy and water management were inseparable, and that water use, water quality and regulation of water resources needed to be managed regionally. Those conclusions laid the foundation for fundamental and sweeping changes in water resource law with the Florida Water Resources Act of 1972, now codified as Chapter 373, Florida Statutes.

The act created five regional water management districts, under the general direction of a new state agency, the Department of Natural Resources. The boundaries of the regional water management districts were based on hydrologic features. The districts were granted ad valorem (property) taxing authority, and the right to collect fees for permits. The act also formalized the notion that water resources were public resources, and that public interests should override the interests of individual landowners. This underlying philosophy represented a fundamental change in the state's approach to water resources.

The act was based largely on a Model Water Code developed by Frank Maloney, dean of the College of Law at the University of Florida. The Code advocated the eastern approach to water law, in contrast to western water law, which gives primacy to private

ownership of water. Eastern water law assumes that water resources are in the public, not the private, domain.

Each district is administered by a nine-member citizen Governing Board, appointed by the governor with senate confirmation, for terms of four years. Board members are not paid, and represent specified geographic regions within the district. With no other specific criteria for the selection of board members, governors have made efforts to ensure that all interests within the community are represented. The independent non-elected citizen boards serve as a direct link to local and regional interests, while the agency and agency actions are accountable to state-level review and supervision.

The board is authorized to employ administrative, professional and legal staff; enter into contracts; issue orders and implement rules; acquire lands and exercise eminent domain powers and enforcement powers. The board is also authorized to investigate water supply resources; cooperate with other agencies; replenish groundwater; buy, sell or exchange water; store, transport, reclaim, purify or treat water; build district works; buy, lease or receive land for flood control, water management, water storage and preservation.

The act authorizes the districts to regulate water use, to place controls on the quantity of groundwater which could be withdrawn by any user. Surface water management regulatory authority requires builders and developers to get permits from the districts for any construction which alters existing surface water flows. And anyone storing water on or beneath land needs a district permit. The districts also regulate the construction of water wells and the licensing of water well contractors and drillers. Districts also have the authority to declare water shortages, and issue emergency orders apportioning or prohibiting water use.

Today the Water Management Districts are agencies which bear the principal responsibility for assuring that the natural systems will continue to function in the future. These districts now provide long-range planning including water supply plans, broad-based research and monitoring of the environment, and conduct advanced modeling efforts. In addition they institute programs to reduce wasteful use of water and to alter landscaping practices (xeroscape), and have elaborate programs to control exotic plants such as Maleluca, Australian pine and Brazilian pepper.

### **III. The 298 Districts**

Most 298 Districts did not grow to become regional agencies. Most stayed small geographically and small in the scope of their responsibilities.

Under Chapter 298, these districts exist within Water Management Districts and are created for the sole purpose of providing the ditches, canals, swales, and other physical and mechanical works needed for water control. These districts today are often

said to be providing "secondary" drainage; that is, their more local systems connect to the primary drainage systems of the Water Management Districts.

To effect its general purpose of drainage, irrigation, or water control, a 298 district may exercise the following powers:

- Develop and adopt a plan of reclamation for all lands within the district.
- Manage all surface waters and watercourses within the district through water storage and impoundment, stream diversion, and canal construction, operation, and use.
- Construct and maintain works, including wells and pumps necessary to operate the district.
- Assess and collect reasonable fees for the connection to and use of the works of the district.
- Condemn, purchase, or own property.

The board of a 298 District can only implement and authorize construction of improvements outlined in its plan of reclamation. However, it must comply with the applicable rules and regulations of Water Management Districts operating pursuant to Chapter 373. The 298 Districts do not have general police powers; they have only the authority specifically granted in Chapter 298.

Until 1979, a majority of owners of a contiguous body of land subject to overflow could petition a circuit court to form a water control district. Owners included only those persons who had a freehold estate. A single landowner could form a district. A contiguous body of land was deemed to be adjacent to or adjoining land even though it could be separated by a railroad or highway. After July 1, 1980, districts could be created only by special act of the Legislature. Districts created by special act must elect a board of three supervisors at a meeting of the owners of the lands in the district, noticed within 20 days after the district is organized and incorporated. As soon as the board of supervisors is organized, it is empowered to levy a uniform tax not exceeding \$ 1 per acre to pay the organizational and planning expenses of the district. Within 30 days after organizing, the board of supervisors must appoint a chief engineer who complies a plan of reclamation for the drainage of the lands within the district and determines the cost necessary to carry out the plan.

When the works of a district as set out in its plan of reclamation are found insufficient to properly reclaim all land within the district or to pay for the installation and operation of required reclamation improvements, the board of supervisors may petition the circuit court to modify the plan and make additional assessments.

A district may levy three types of taxes: uniform acreage tax, reclamation tax, and maintenance tax.

### (a) Uniform Tax

The board of supervisors may levy a uniform tax not exceeding \$ 1 per acre on each acre of land within the district. The funds from this tax can be used for present and future expenses. A landowner who shows that the land will not be benefited by the reclamation plan may seek a refund of the uniform tax.

### (b) Reclamation Tax

After the court's judgment creating a district is filed (or special act of the Legislature is passed), the board of supervisors must levy a tax on lands equal to benefits assessed. The board may levy an additional 10% for emergencies.

The primary purpose of the reclamation tax is to acquire funds to pay for the actual improvements to the property. Thus, the tax "must have fair relation to benefits that reasonably may be expected to accrue to the values or to the uses of the property so specially assessed". The amount of taxes that may be levied is restricted by the amount of benefits shown. The benefits received do not have to be direct. A parcel of property in the district that does not require drainage still may benefit from general, indirect benefits. The tax may be assessed uniformly with each landholder liable for a pro rata share of the total based on the amount of acreage owned.

### (c) Maintenance Tax

The board of supervisors sets and levies a maintenance tax to cover the costs of maintaining and repairing ditches, drains, and other improvements. Because the tax is apportioned according to the net assessment of benefits, the tax may be varied from year to year to discharge current expenses.

### Bonds

The board of supervisors may issue bonds in an amount not to exceed 90% of the total amount of reclamation taxes levied. The total amount of bonds to be issued must also not exceed 90% of the assessed benefits.

The district may petition the circuit court to validate the bonds pursuant to F.S. Chapter 75. Because the bonds are paid from special assessments, the bonds do not have to be approved by the electors under Florida law.

### Connection Fees

Chapter 298 also permits the assessment of reasonable fees for connection to and use of the works of the district.



### Board of Supervisors

Three district landowners constitute a board of supervisors to manage a district. The board of supervisors has only those powers specifically delineated by statute.

Each landowner is allowed one vote for each acre of land owned within the district. Landowners owning less than one acre are entitled to one vote.

### **Conclusion**

The management of both the regional Water Management Districts and the local 298 Districts has retained considerable independence from the normal political and governmental systems and pressures. Their boards of directors are generally non-political and non technical members of the community who undertake (for no salary and in addition to their normal occupation) to oversee these institutions. These systems are working well.

## **10. SAUR UK Group privatisation of UK water**

*by John C. Mitchell*

### **Previous Scenario**

Prior to privatisation in 1989 the Water Industry in England and Wales consisted of 10 Regional Water Authorities and 28 Water Companies providing between them services for the public of water supply, sewage disposal and river basin management. The Government agency of the National Water Council (led by the Chairman of the 10 main Water Authorities), together with the Government's Department of the Environment controlled activities.

The Regional Water Authorities were responsible for river basin management including water resources in terms of quantity and quality, water supply and sewage disposal. Funds for capital investment were obtained from Government loans and water prices were set at a lower level as possible. Levels of service were largely determined by the Regional Water Authorities themselves. The Regional Water Authorities had been formed previously from a connection of Local Authorities and Government driven River Authorities, having taken over the staff involved.

The 28 Water only Companies were led by Boards of Directors from local and business interest. Prices were set at as lower level as possible, and funds for capital investment were raised primarily by issues of fixed dividend stock from time to time. The Water only Companies areas of supply fell within the areas of the Regional Water Authorities who were therefore responsible for sewage disposal and river basis management in the area served by the water supply by the Water only Companies.

### **Privatised Scenario**

Following privatisation in 1989 the Government established a Directorate of Water Services to control prices and set levels of service for the industry. Water quality is controlled by the Drinking Water Inspectorate, also a Government agency. River basin management is under the control of the National Rivers Authority, also a Government agency, responsible for maintenance of rivers and for licensing of abstractions and discharges into rivers. The funding of the National Rivers Authority is obtained by means of license charges for these abstractions and discharges.

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<sup>\*</sup> Mid Southern Water plc, Surrey, England.

Water supply and sewage disposal is managed by 10 large companies whilst water supply only continues to be the responsibility of the 22 Water only Companies, in existence prior to privatisation. The 10 large companies were floated on the Stock Market and shares were available to the public and to business interest. Price of shares was assisted by means of a massive right off of £5.5 billion of debt carried by the previous 10 large companies following their prior capital investment.

The stockholding of the Water only Companies was unaffected by privatisation, although several take-overs took place mainly by French owned enterprises shortly before privatisation. This resulted in a grouping together of several of the Water only Companies and a reduction in numbers to 20. To date the 10 large companies are still also exist as separate entries.

### **Price Setting**

In order to establish the need for investment in the privatised Companies detailed Asset Management Plans were prepared for maintenance and enhancement of water supply and sewage disposal systems. These plans, together with complex details of historical operating costs and forecasts were submitted to the Government's Department of the Environment in order that prices could be set for a 10 year period post privatisation, with effect from 1 April 1990. The Asset Management Plans were examined by independent consultants and certified in terms of their necessity and viability in terms of costs. When setting prices the DOE considered capital expenditure needs, operating costs forecasts and combined them with an efficiency factor. A resulting formula was established for price rises each year, defined as the Retail Price Index (RPI) minus X plus K, where X was an efficiency factor and K a factor dependent on the capital expenditure leads. Detail studies were carried out by independent auditors ranking the efficiency of the various companies and subject to much robust discussion between this agency and the company concerned! At about this time in parallel with the floating on the Stock Market of the 10 Regional Water Authorities SAUR UK approached 4 companies in England and in all cases were successful in bidding to require a majority shareholding. Mid Southern Water was one of the company's concerned. Similarly Compagnie Générale des Eaux (CG) and Compagnie Lyonnaise des Eaux from France acquired other of the Water only Companies at a similar time.

The "K" factors which were eventually set by the DOE for the companies on privatisation, embody an efficiency adjustment.

### **Levels of Service**

In order to prevent the newly commercial companies from maximising profits for shareholders and increasing dividends and hence share prices, the Government put in place controlled levels of service which are monitored by the Director of Water Services on an annual basis. Several recent additions to these criteria for levels of service are also

shown. The levels of service include measurement of technical aspects of customer service such as pressure, continuity of supply and flooding of properties together with administrative efficiency in terms of speed of response to inquiries and complaints from customers whether in writing or by telephone. The provision of detailed information on these levels of service is an extremely onerous task and has driven companies to review in great depth their information systems. In almost every case highly sophisticated and complex information systems have been put in place using the latest information technology in order to make information available on a regular basis.

### **Water Quality**

The standards for water quality existing in the UK were traditionally those set by the World Health Organisation. Following privatisation the Government established a Drinking Water Inspectorate to control and report on the activities of the new Water Companies. European Community Quality Regulations have been progressively put into force raising the standards for water quality in many cases.

Where companies were in breach of the new EC Quality Regulations then the Drinking Water Inspectorate accepted undertakings from the Water Companies to carry out such works as are necessary to bring water quality into line with the standard. This, in effect, allowed sufficient breathing space for the Company to plan, organise and implement capital expenditure to treat or review the method of supply to comply with the limits.

The rate of progress towards higher standards has been the subject of much debate between the Companies, OFWAT and DWI, since there is a very considerable potential cost of the exercise and its inevitable effect on charges to customers.

In the case of the SAUR Group, it is anticipated that over the 10 year period commencing in 1990 some 30% of capital expenditure will have been directed towards water quality improvements. Particular cases which have required us to take action concern pesticide levels, renovation of distribution systems to avoid discolouration and disturbance of sediment, polyaromatic hydrocarbon (PAHs), stemming from bitumens linings of distribution systems, nitrate levels resulting from fertilisers etc., and lead pipework involved in communication and supply pipes to customers premises.

In the 10 year period from 1990 until 2000 Water Companies will have achieved:

- Construction of over 120 Pesticide Removal Plants and 30 Nitrate Removal Plants ensuring compliance of Water Quality Regulations
- The modification of over 70 Water Treatment Works to reduce the risk of cryptosporidium entering the distribution systems
- Treatment was introduced to approximately 100 water sources to reduce lead from piping to reduce the risk of contamination at the customers taps

- The renovation of over 25 000 km of water distribution mains (8% of the total system) to reduce the problems of manganese and iron discolouration, polyaromatic hydrocarbons (PAHs) and turbidity.

### **Charging for Water**

The national average water bill is a little over 1% of averaged household income in the UK. This, however, masks the problem of affordability for low income customers especially in areas where water bills are high. There is a balance between prices and environmental improvement and this is a difficult issue. The costs of meeting higher standards outweigh the savings which may be achieved through promoting greater efficiency and controlling rates of return on capital investment.

Once the overall income stream of the Companies is set by the Director General it is necessary to review the different charging categories of customer distinguishing between measured and unmeasured supplies for water supply in particular.

The Director General of Water Services has favoured a movement from unmeasured charging of customers towards a metered charge. At present approximately 7% of domestic customers in England and Wales are charged for water by metering. Most companies now meter all new customers and many are inviting customers to change to this method of charging, or endeavouring to introduce metering on a more compulsory basis. The latter has proved to be the most contentious issue with customers who in some cases have grouped together to create considerable resistance to the change.

The Director General has encouraged companies to balance tariffs between measured and unmeasured customers to mirror actual cost differences which apply.

### **Results of the First 5 Years**

The pressure from shareholders to achieve the best return on investment has placed great pressure on Company management to improve efficiencies as much as possible. Manpower has been cut either by natural wastage or more stringent measures in many cases. Parts of the business have been split from the core business and carried out by Companies outside this regulated area as part of a contracted service. Examples, in the case of the SAUR Group, are Consulting Engineering Services, Laboratory Services, Pipe Renovation Activities, and Process Design and Construction.

Capital expenditure has increased dramatically compared to the period prior to privatisation. The existence on an Asset Management Plan has resulted in very considerable increase in maintenance investment on renewal of the system as well as the improvements in water quality and water availability.

## **Price Review**

Each year the Water Companies are required to submit a detailed annual report to the Director General of Water Services detailing their performance on levels of service, operating cost and capital expenditure. The Director General considers the performance of the Companies year by year and has the right to review prices if considered necessary by the means of an "interim determination". This may be triggered by a significant shortfall in capital expenditure, or changes in the price of carrying out work compared to that embodied in the levels of prices previously set.

After 5 years of the regulated environment the Director General decided to carry out a "Quinannual" review of prices.

Companies were required to carry out market surveys to obtain customers views on the water service. These views were then taken into account when finalising a reviewed Asset Management Plan, or Strategic Business Plan, which formed the basis for the capital expenditure allowance when price setting for following the review.

The new Strategic Business Plans were based on experience gained in the first few years of regulated business and placed greater emphasis on maintenance of assets and improvement of water quality.

Judgments were made by the Director General of Water Services on the level of efficiency in operation attended by Companies. The operating costs already experienced and the associated levels of service allowed a better assessment of the degree of efficiency already attained and possible further efficiencies which were to be targeted.

The cost of capital investment in terms of return to the shareholder was reviewed in detail by the Director General and a level of return of 5-6% after tax was embodied in the calculations when price setting.

In the case of the Water Companies in the SAUR Group in the UK the price levels which resulted from the Director General's review embody a factor of 1% below the Retail Price Index for each of the next 10 years. This will be a challenging target to Managers as they strive to maintain and improve on profitability for shareholders, maintain their own improved levels of service to customers and sustain a real reduction in prices of approximately 10% over the 10 year period!

## **Customer Service Ethic**

The British Industry has, in common with many commercial and service industries in recent years, become far more aware of the need to raise the profile of customers service. The levels of service which are monitored by OFWAT reflect this trend.

In the case of the SAUR Group a fairly radical initiative has been taken to decentralise most aspects of our business and to base them on an area basis under accountable Area Managers who are responsible for income collection, financial control and engineering operation of the water supply system in their area. They are supported by central functions and separate Group Companies in specialised areas. We have opened High Street Offices at which the local Area Manager is located supported by customer services staff who are prepared to answer all types of inquiry on customers accounts and on matters concerning supply.

All staff are progressively being trained in accordance with a system of National Vocational Qualifications in a structured manner. A system of Quality Assurance is in place in the UK and the Operating Companies are progressing towards gaining certification under this scheme. We now have 12 Area Offices in the SAUR UK Group on the water supply service. Each serving on average around 100 000-150 000 population. Since the first office opened in September 1991 there have been more than ½ million visits to date.

Staff working in the decentralised environment are better motivated to serve customers and more aware of the costs of provision of that service. Head Office support and support from non core business Companies is provided in such fields as financial information, water quality control, information technology, transport management, and engineering consultancy services.

### **The Customers View**

It is unfortunate that the public relations profile of the Water Industry in the UK has reached somewhat of an all time low. There have after the last 5 years or so been regrettable examples of pollution incidents in parts of the Country which have caused much public concern. There have also been very considerable increases in price levels of water as indicated earlier in this paper. In the case of some Companies considerable increases in salary, together with significant share option schemes received very wide publicity in the subject of much public disquiet. Increases in profitability, necessary in order to be able to attract funds for capital investment have not been perceived in a favourable manner by the population in general.

### **Future Possibilities**

In the UK the possibility of a General Election is not far distant and the possibility of a change of Government is apparent. Should this occur then the re-nationalisation of the privatised Water Industry would be a possibility, although this is considered to be unlikely because of the massive amount of public funds which would be involved. It is more likely that a tighter regulation is liable to take place in the future and some control on profitability may be associated with this. In particular the possibility of control of dividends for customers could be experienced in order to ensure that operating profits are diverted

wherever possible into reinvestment in the assets of the Company - an approach which of course could benefit shareholders in the long term.

Recent discussion has centred on a sharing between customers and shareholders of increasing profitability, in spite of price levels having been set by the Regulator on the needs of the business. This is a matter of current debate.

Widescale water metering is advocated by the Government and by the Director General of Water Services as the way forward in the long term, but the process of moving to this method of charging is proving to be most difficult on account of resistance to customers in general to compulsory metering on accounts of its troublesome effect on charges for those customers currently on low water bills and low incomes who could be suffering very considerable increase in price as a result of the metered method of supply.

### **SAUR UK Results**

The SAUR Group have established themselves in the UK with an image of high visibility for the customer in the way in which the businesses are conducted. The initiative of Local High Street Offices on the water sector has been of great interest for the rest of the Industry and is very much approved of by the Director General of Water Services and the Customer Services Committee.

Growth in the business in the UK has been primarily achieved by means of non-core activities including consulting engineering, pipeline renovation construction, laboratory services, information technology services, and environmental businesses.

The first 5 years have provided a sound base for development of the Group in the UK and have given a major contribution to the stability of the SAUR International Organisation.



## **11. Privatization as a means to achieve Great Lakes commitments**

by Geoffrey Thornburn\*

Commitments under the Great Lakes Water Quality Agreement present a major challenge to governments facing increasingly stringent pollution control needs, aging infrastructure and budget restrictions. Consistent with recent political pressures and trends in other economic sectors, the use of private sector capital, technical know-how, and management techniques to develop innovative water treatment and marketing practices may be a means to solving this conundrum in the Great Lakes and elsewhere.

The Great Lakes-St. Lawrence River ecosystem dominates the physical and socio-economic map of eastern North-America. It contains almost a fifth of the world's fresh surface water, sustains a wide variety of municipal, industrial, agricultural, recreational, cultural and transportation activities and is a priceless natural resource in its own right. It is at risk, however, from pollution and excessive use like most other water systems in the world. This reality was recognized by the Governments of Canada and the United States in 1972 when they signed the Great Lakes Water Quality Agreement (Agreement). Since renewed on two occasions, this international Agreement commits the two Governments, and indirectly state and provincial governments, to restoring and maintaining the integrity of the aquatic ecosystem of the Great Lakes basin.

The Agreement includes a number of commitments including programs for:

- the abatement, control and prevention of municipal and industrial discharges
- the control of phosphorus including ambient water quality objectives and related target loads for each of the Great Lakes, and specific effluent concentration limits for municipal waste treatment facilities discharging more than one million gallons per day
- control and prevention of persistent toxic chemical discharges to virtually eliminate them (with a philosophy of zero discharge), including reduction of their generation
- the designation of geographically-specific Areas of Concern where one or more of fourteen beneficial uses or the ability of the area to support aquatic life are impaired, together with Remedial Action Plans for their restoration and

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\* International Joint Commission, Ottawa, Ontario, Canada.

protection. Some 43 of these areas were designated (and one since eliminated), and many of these areas are plagued with contaminated sediment problems.

During the first decade of the Agreement, significant progress was made in controlling the eutrophication problem by a series of measures including the upgrading and new investments in sewage treatment plants. Some 8-10 billion U.S. dollars worth of treatment plant construction occurred in the 1970's and early 1980's. While the process was slow in some instances, especially the major metropolitan areas such as Detroit, much progress has occurred and, by and large, the problem of excessive phosphorous loads from point sources in the Great Lakes has been successfully addressed. More intractable problems remain, however, in that combined sewer overflows are still a major problem in some locations, as more generally are land run-off and atmospheric deposition of pollutants.

There are some major trends, however, that complicate what would already be a massive engineering and management challenge that goes far beyond that of the first phase of Great Lakes cleanup. I will identify five trends, the first two of which fall out from a dramatic change in the very nature of the pollution problem in the past decade, or at least in our understanding of it.

- We have come to understand that the relevant scope of impacts to be considered includes more than the surface water quality around outfalls which could be measured in terms of simple loadings, ambient concentrations and achieving water quality objectives. Now, water management must internalize an entire, intricate web of relationships between various parts of ecosystems that consist of the water, land and air as well as abiotic and biological components from protozoa to humans. In turn, the resolution of what used to be relatively straight-forward engineering problems and solutions must today take account of a range of human activities and values including economic, sociological, cultural and institutional issues. This is partly a socio-political phenomenon fuelled by the rapid growth in public participation and civic activism by many different interests. It is particularly important when more than one political jurisdiction is involved. It is also a "technical" issue, however, in that we really are coming to appreciate the many complexities of our natural system and its relationships with human systems as components of an interconnected ecosystem. The professional community is gradually adopting, therefore, what some call "the ecosystem approach".
- Since the 1970's, the major pollution issue in the Great Lakes has shifted from phosphorous control to toxic substances, particularly persistent toxic substances. These contaminants are being found throughout the system including in most living creatures. Their sources are widely dispersed, they are transported by a variety of means including water, air, and end products and most importantly they tend to remain in the system for very long periods of time, even if at very

low levels in conventional terms. There is an increasing body of information that demonstrates that exposure to a number of these substances (and perhaps others of the thousands of such chemicals found in the Great Lakes ecosystem) have serious health effects on living and future generations of a variety of species. Strong implications and increasing hard evidence are emerging concerning human impacts. These substances are often difficult or at least expensive to find in effluents and in some cases seem to be generated by mixing chemicals in the ambient environment. Even as the significance of these developments is being debated, however, and they probably always will be since the ultimate proof will certainly arrive too late to prevent disastrous results, governments and the private sector are moving to new programs of prevention and control. This situation will doubtless place increasing stresses on the ability of existing treatment systems to do the jobs required.

Thus, the pollution control problem has become much more complicated, expensive and controversial. This is not, of course, a problem only for the Great Lakes, although it is perhaps in this region that the issue has been most clearly identified, studied and debated. Whether this problem is addressed through remedial, pollution control measures or broader preventive programs (that eliminate the problems before they are created by changing product formulations and processes), there is little doubt that its resolution will be expensive. Either major new systems and technologies will needed quite urgently to be developed and applied, or societies will have to bear the costs... or at least the risks... of not acting. Assuming that governments and other parts of society will opt for preventing and remedying this potentially major public health issue which they are beginning to recognize, we need to address their capacity to do so.

The capacity to act is constrained by other realities that have emerged during the past decade and are becoming increasingly evident, factors that bring us squarely to the topic of privatization and the ability to implement the Great Lakes Water Quality Agreement, or any other commitment to environmental protection.

- Despite massive investments in sewage treatment plants over the recent past 25 years in the Great Lakes and elsewhere, infrastructure in general, and water systems in particular, are aging and therefore declining in efficiency and reliability. We are familiar with the problems of outdated infrastructure for transportation (roads, bridges, railways and bridges) but the problem of declining water distribution and collection systems is less visible and therefore less evident. Older systems are known to leak considerably, there are major CSO problems in the older, larger urban centres which will be very costly to replace, and equipment installed 20-25 years ago or more is reaching the end of its economic life and ability to meet changing performance standards.

- At the same time, technology has been changing rapidly. More up-to-date systems are not only considered desirable from both operational and environmental perspectives but in many locations are necessary to achieve increasingly stringent environmental standards. These technological trends are not only found in the processes specific to water treatment such as alternatives to chlorination and methods to address microcontaminants, but also in general technological progress that sets the context of modern engineering. Some examples are the major changes in communications and monitoring, computerization, durability of materials, that we have experienced since most of our systems have been installed. At the same time, there are significant needs for research and development that are not being captured by current technological advances. As a recent article in Scientific American states:

*"[Infrastructure] is the stuff we take for granted, at least when it works. Because this support is often out of sight, its essential role tends to be out of mind. For the most part it should be. As technology advances, however, infrastructure must evolve as well. Thus, now is the time to think about the enabling tools and underpinning technologies that will be needed in the next century"* (Prabhakar, 1995).

If our cities and rural areas are to achieve and maintain the standards for water supply and management being set out by new legislation, international standards and the expectations of their citizens, these issues will need to be addressed, even though the physical problem is not clearly visible and therefore will be less than politically enticing.

Interestingly, however, these challenges are similar to those set out by the United States National Research Council's Transportation Research Board (National Research Council, 1989) for refurbishing that nation's highways and bridges, a much more visible problem.

- With all of these compelling reasons for investment in infrastructure, why is it not occurring? Of course, there is a major pair of constraints, the twin blades of cost and lack of money. The inherent massive cost of infrastructure redevelopment and, more importantly, the severe limitations that are occurring in the traditional funding sources: the federal and provincial/state governments, are a severe constraint on even hoping to achieve progress as outlined above. These projects are clearly expensive by nature, often beyond the financial capacity of local governments. Furthermore, their rationale generally extends beyond the local interest. Many of the benefits are realized in other jurisdictions but the costs are borne locally. Major cutbacks are the reality of contemporary government in North America as governments fight against crippling deficits and increasing long-term debt. It is not unusual for the budgets and human resources of entire

departments of government to be cut back by 30 to 50, even 70 percent, with a cascading effect on lower orders of government that depend on economic transfers. The ability to fund the services that we know are important has been severely eroded if not eliminated. Environmental, social and cultural programs seem to be especially targeted. If our local authorities, whether municipalities or sewage or irrigation districts, are to provide for the needs of the next century, new creative ways of financing and operating water supply and treatment systems will be needed.

One route that holds promise is privatization. The term, "Privatization", has been used in various contexts and can be defined in various ways, including:

- private financing of public services through user-pay schemes of publicly-operated services (such as special tax assessments for local improvements and tolls or user fees for bridges, canals and recreational facilities)
- contracting out to private sector suppliers of the provision of public-financed services or the operation of public facilities such as camp grounds or sewage treatment plants contracting out of the provision of services to government such as research, cleaning and catering services
- private construction, leasing and/or operation of public facilities such as office buildings, bridges and water treatment plants whether or not user fees are charged
- the conversion of government services to quasi-commercial corporations (in Canada and Great Britain, these may be known as Crown Corporations such as the postal service and railways)
- the sale to private interests by public stock offering or outright sale of government-owned facilities, services or quasi-commercial operations.

For the purposes of this paper, I will define privatization broadly as "private provision of public goods and services", specifically water supply and treatment services, and will assume that the form of privatization of interest is one close to the bottom of my list, that is the construction, operation and maintenance of facilities using private capital and a commercially-viable rate of return to those interests.

A number of advantages to privatization have been enumerated. The basic advantage in both theory and practice is increased efficiency in operation in the face of competitive pressures whereby inefficient practices and firms are eliminated and new ones generated (Schumpeter's concepts of destructive competition and "leadership") through private sector competition, initiative and entrepreneurship (Schumpeter). Privatization also may bring greater incentives for research and development that could be applied or sold elsewhere, greater flexibility in mixing capital and labour inputs with changing technology, the offloading of personnel problems from the arena of public

debate including labour union issues, removal of political or bureaucratic interference and restrictions, and so on (Savas).

While a number of these points may be considered moot, one distinct advantage in the current economic climate is the ability to mobilize capital for new investments, subject to an acceptable rate of return. In an era of very limited resources, many legitimate competing demands on those resources, high debt-income ratios and debt-servicing costs, and aversion to mega-projects, the potential for creative financing of public utility projects is great. New public projects require not only an immense amount of debate and political energy to implement, but a strong, long-term commitment at both political and technical levels. Private sector leadership can also bring the energy and innovation needed to make these projects happen.

There are a number of potential disadvantages also. They include loss of governmental control of an important public service. Of concern in the contexts of the environment and the Great Lakes Water Quality Agreement, is the tendency for private industry to resist and avoid additional environmental requirements. While this is a generalization and many companies attempt to be good "corporate citizens", there is little doubt that environmental restrictions are still seen as a burdensome cost, perhaps even an unnecessary one, by the private sector whose primary objectives include lowering costs and ensuring profitability. Any arrangements for private sector management will need to be accompanied, therefore, with adequate requirements for meeting environmental and human health standards that will inevitably become increasingly stringent.

Privatization has been a popular subject for debate for at least a decade in Canada. Many government programs and facilities have been proposed for conversion to the private sector: airports, railway services, the post office, parks, manufacturing and marketing of various sorts ranging from forest products to petroleum and transportation systems and even liquor. These proposals are often very controversial and highly politicized, as someone is seen to be wanting to turn a profit. Yet, studies done in Canada about a decade ago as this issue came to the fore nationally showed that the public generally supports the idea of privatization for pragmatic, not ideological reasons. It was not a matter of neo-conservatism but straight-forward economics (James Gillies, in Stanbury and Kierans). In the same volume, Kierans noted that the Federal Government's options were being "strictly circumscribed by its diminished fiscal capacity". These observations are even more true today.

While household and industrial waste collection is often contracted out, private operation of water treatment facilities in the Great Lakes region is still unusual in most of Canada including Ontario. Virtually all municipal systems are municipally or provincially owned, and recently a new Crown Corporation has been established in Ontario. This organization is permitted legally to enter into "partnership" arrangements with private companies but there seems to have been no rush to do so.

The region of Hamilton-Wentworth is one exception on the Canadian side of the basin, with its sewage treatment plant operated and maintained by a relatively new company that is growing rapidly into a world-wide operation. This region is also at the vanguard of sustainable development planning and in the Remedial Action Plan program under the Great Lakes Water Quality Agreement due to its strong process of integrating all stakeholders in a clean-up of Hamilton Harbour, one of the Areas of Concern. It has been forward-thinking in its issues-analysis and its planning for restoration of the region that recognizes the need to integrate environmental, social and economic issues. As a result, it has been named as one of 21 sustainable development model cities world-wide under a United Nations program pursuant to Agenda 21. Public-private partnerships and funding arrangements are clearly seen as one element of a sustainable future.

In the United States, a number of municipalities are turning to the private sector for this purpose. Peterson reported a year ago that more than 350 contract operations now exist in the U.S. for plants over one million gallons/day and about a thousand in smaller plants, and that six wastewater facilities had been financed, designed and built by the private sector (Peterson). One major example is the wastewater treatment plant at Indianapolis, a 25 million U.S. dollar a year operation. Another example is the public-private partnership whereby a private firm is now provides the labour and management for a city-owned facility at Evansville, Illinois. Many other municipalities are understood to be investigating such arrangements including major cities in the Great Lakes basin.

Water utilities are one component of a much larger environmental market within which these companies will develop experience, markets and opportunities for multi-faceted servicing. It is an industry that is growing rapidly; even the estimates are increasing exponentially. The world market for environmental products have been estimated in the hundreds of billions of dollars (Environmental Science and Engineering, 1993), a turnover that generates a great deal of income, capital and entrepreneurial know-how. One recent study found that publicly traded water and wastewater goods and services firms had a 16% increase in revenues in 1994 as part of the estimated 60 million dollars U.S. water and wastewater market (Water Environment and Technology), with a trend to contracting to single firms for design, construction and operation.

What is the potential for privatization and its implications for the Great Lakes Water Quality Agreement? I would suggest that we are on the leading edge of a revolution in the construction and management of new and expanded water treatment facilities, as well as a great deal of other infrastructure that will be necessary for sustainable development. The task is potentially immense. A few illustrations will demonstrate its scope in the context of the Agreement.

From the beginning, this undertaking was constrained by funding, but eventually several billions of dollars were spent on sewage treatment plants and on many other programs by governments, and large sums on industrial treatment facilities and new processes. The cost-sharing of this water utility construction by senior governments has

now dwindled and appears unlikely to be restored under current fiscal conditions. Yet, the commitments of the Agreement remain while existing infrastructure is in many cases becoming increasingly antiquated and combined sewer overflows still need to be addressed in many older municipalities. The issue of adequate treatment as well as temporary storage is exacerbated by increasing urbanization and growth.

In Ontario alone, there are some 500 municipal water supply systems and over 400 sewage treatment facilities (not all in the Great Lakes basin). Almost half of the systems supply less than 5000 population with a limited tax base for infrastructure spending at the best of times, and as many again had no municipal sewer systems as of 1989 (Pollution Control Association of Ontario). These numbers suggest a large number of potential customers for private firms, and large quantities of capital needed for new and improved systems. The potential problems with private sector management can generally be resolved by ensuring there are adequate arrangements for such things as environmental and performance standards and the costs of changes in those standards, continuation of labour contracts, and dispute settlement arrangements.

One special aspect of the Agreement that will require massive expenditures is the restoration of the 43 Areas of Concern where beneficial uses of the water have been compromised. Massive expenditures over many years will be required even in the most straight-forward areas such as Collingwood Harbour (which has just been removed from the list due to progress in that location). A cost estimate for nine and another estimate for ten of the U.S. AoCs in 1990 ranged around three to four billion U.S. dollars (Center for the Great Lakes). An Ontario Ministry of the Environment estimate for the 17 Canadian AoCs (Gurtner-Zimmermann) came in at 5.5 billion Canadian dollars, just over half of it in the Toronto area alone. These estimates are provided to indicate an order of magnitude rather than a precise value as they incorporate many assumptions, are likely very conservative and are now some five years old.

Many of the problems in AoCs relate to the presence of toxic substances and nutrient concentrations in *in situ* sediments. How to deal with these sediments is a major concern, but if they are to be removed, treatment and other means of water quality protection again become issues. Also, in any event, a key element in all Remedial Action Plans is the prevention of further pollution as communities move towards ecological management and development and protecting the investments that are being made. In most cases, it involves the upgrading of sewage treatment and/or the relocation of outfalls. Another dimension of the prevention and sustainability paradigm is the need for a greater focus on water conservation and appropriate water pricing policies, to shift more responsibility on consumers for the costs of producing and preserving clean water.

For all of these programs, capacity-building, particularly financing but also managerial and other skills, has been identified as a key concern for the implementation of the Remedial Action Plans for these AoCs, just as it was in Agenda 21 for the global agenda for sustainable development. Yet, as with water treatment plants themselves, there seems to be an aversion to providing opportunities for the private sector to take on



the problem, enlisting its managerial, financial, marketing and other entrepreneurial skills. In the State of Ohio Guide to existing and potential financing, for example, there is a definite focus on state and federal grants and loans, local taxes and debt instruments (Apogee). To the extent that the private sector is considered, the document points primarily to the private foundations and trusts, rather than to the entrepreneurial engagement of private industry and the water treatment industry in particular.

In summary, the "golden era" of government funding for environmental protection and its associated infrastructure has, in my view, come to an end just as we are facing major new requirements for infrastructure development. If this is true in North America, it is surely true in less developed countries where neither the resources nor an existing infrastructure base have yet been available. There is a clear need for new sources for and methods of financing the massive amounts of capital investment and operating funds in the decades ahead the implementation of the Great Lakes Water Quality Agreement and environmental programs in North America general. The private sector can provide not only the access to capital and management skills, but the needed doses of efficiency, research, entrepreneurship and marketing tools. These capacities, with adequate provisions to ensure the meeting of environmental and other community standards, could best be provided by calling to a greater degree we have been accustomed, to private companies and consortia for the delivery of both the economic and environmental dimensions of the sustainable development of water treatment facilities in the Great Lakes basin and elsewhere.

## References

- Apogee Research Inc., *Ohio Guide to Existing and Potential Financing Sources for RAPs Implementation*, Bethesda: Apogee, 1992. Prepared for the U.S. Great Lakes Program Office and Army Corps of Engineers.
- Center for the Great Lakes, *Making RAPs Happen: Financing and Managing Cleanups at Great Lakes Areas of Concern*, Chicago: Center for the Great Lakes, 1991.
- Gurner-Zimmermann, Arnold, *Ecosystem Approach to Planning in the Great Lakes: A Mid-Term Review of Remedial Action Plans*, PhD Thesis, University of Toronto, 1994.
- National Research Council, Transportation Research Board, *Partnerships for innovation: Private-Sector Contributions to Innovation in the Highway Industry*, Washington, D.C., 1989.
- Peterson, W.A., "Privatization at a Crossroads", *Water Environment and Technology*, 6(11), November 1994, pp. 56-60
- Pollution Control Association of Ontario, *Survey of Municipal Sewage Systems in Ontario*, Toronto: PCAO, 1989.
- Prabhakar, Arati, "Technology Infrastructure: industrial advances will depend on setting new standards", *Scientific American*, 273 (3), Sept. 1995, pp. 192-4.
- Savas, E.S., *Privatizing the Public Sector: How to Shrink Government*, Chatham, N.J.: Chatham House, 1982.
- Schumpeter, J.A., *The Theory of Economic Development*, New York: OUP, 1961.
- Stanbury, W.T. and Kierans, T.E., *Papers on Privatization*, Montreal: Institute for Research on Public Policy, 1985.
- "Wastewater Industry Searches for New Growth Opportunities", *Water Environment and Technology*, 7(6), June 1995, p. 42.