

## **PART TWO**

# **WATER SUPPLY SECTOR REPORT**

## I. INTRODUCTION

This report aims to identify steps leading to best practice for promoting private sector investment in the water supply sector covering:

- Pricing and pro-competition (for entry or operation) policy.
- Legal and regulatory frameworks — to support various types of private financing modes.
- Risk unbundling, mitigation, and management.
- Transaction cost reduction.

The generic issues considered include:

- Key sectoral issues and constraints.
- Target models and conditions.
- Intermediate strategies and steps to achieve target conditions.
- Contractual modalities.
- Risk Sharing/allocation between concerned parties.
- Assistance/expertise and resources required.
- Planning issues (if required).
- Role for Asian Development Bank (ADB) intervention.

The experiences of private sector investment in water supply in Macau, China; Johor Bahru in Malaysia; and Manila in the Philippines have been chosen for three in-depth studies with the aim of identifying best practices that can be replicated in ADB's other developing member countries (DMCs).

### A. The Need for Private Sector Investment

Fresh water has no substitutes in many of its uses and is critical to human existence. Unlike many other necessities, the provision of water is often associated with monopoly provision, raising concerns about monopoly power and in some minds leading to a preference for public sector provision. These essential service aspects of water supply have made the provision of potable water at a reasonable tariff a concern of governments around the world. Unfortunately, these concerns have not typically been translated into efficient or reliable state sector provision — except in countries where there has been a strong tax base (Japan, Korea, etc.), the public sector model has been failing in the mega cities and indeed, in most urban communities in Asia.

The main problem with water supply in most DMCs is that the piped water is not drinkable, or available 24 hours a day, leading to expensive storage and cartage systems, plus creating a reliance on bottled water which is about as expensive per liter as gasoline! The quality of service is generally low, and the direct and indirect costs of inadequate service are extremely high.

The potential problems of monopoly supply (which fascinate economists) are real, but public sector provision in most DMCs has far from solved the problem. Indeed, understanding the lack of accountability in many public sector systems in comparison with what can be contractually binding on the private sector, has now led many independent observers to seek answers in private sector participation (PSP) in water infrastructure and water supply. In this

sense, monopoly concerns (public or private) are seen as second order, relative to the opportunity costs of not having safe supply for the bulk of the society — since this holds up many other aspects of social and economic development.

If PSP in water supply can be increased, to achieve Macau, China like outcomes in the cities of Asia, the potential monopoly and regulatory problems in each location become interesting but manageable challenges – with workable role models now in evidence.

## **B. The Public Sector Model of Water Supply**

Governments have reacted to concerns over the essential service dimension to water supply in various ways. As already noted, one approach has been for water to be supplied by public owned utilities. However, this approach has not always led to the most desirable outcomes. For example, it is quite common in many developing countries for public water utilities to have low coverage, high volumes of unaccounted-for-water, minimal metering, and tariffs which do not reflect costs or use.

Typically, the urban poor are not connected to the reticulated water supply system. It is well documented that these urban poor pay considerably more than their wealthier counterparts for vendor supplied water. This water is often untreated, has to be carted and involves time and health costs far in excess of efficient commercial water supply.<sup>1</sup>

While governments have generally had policies and institutions aimed at meeting urban water demands, the reality is that the substantial unmet demand for water supply in many developing countries cannot be satisfied by the public sector. Typically, the public sector in these countries is constrained by:

- a lack of finance;
- limited access to or knowledge of the latest technology;
- minimal in-house expertise in best practice water management and treatment; and
- higher than necessary cost structures.

Publicly owned water enterprises are often dependent on general government finances as a source of funds for investments. The ability of these utilities to attract finance depends on the macroeconomic environment faced by government and the range of competing demands. Applications for even urgent investment expenditures may be turned down for budgetary reasons.

The incentive structures in many publicly-owned and traditionally-operated water utilities, in developed and developing economies, are generally not conducive to cost minimization. Public sector managers, typically receive smaller rewards for making good decisions than they are paid for — decisions that, with hindsight, turn out to be mistakes. Such mistakes are to be avoided, almost regardless of the cost. Public sector managers also generally do not benefit to the same degree as their private sector counterparts from taking risks that improve profitability by lowering costs, or raising service quality. There is also a tendency for public sector managers to invest in system (and political) security by gold plating investments.

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<sup>1</sup> See Arthur Macintosh, *Women and Water: Domestic Shallow Well Water Supplies The Family Handpump Scenario*. Asian Development Bank. 1989.

Further, there is an understandable tendency for those on the public payroll to seek and obtain a security of tenure that would not be possible in more competitive enterprises. This security of tenure can diminish incentives to perform. It will also create difficulties in the shedding of surplus labor resources.

Private sector involvement and investment in water supply is now seen as an option to overcome the investment, technology and expertise gaps. The incentives associated with private rather than public sector participation can also lead to improvements in the operational efficiency of water supply utilities.

Whilst there are benefits associated with private sector investment in water supply, there is a justifiable concern that there are costs, or at least risks, as well. Governments reflect community concerns that a privatized water supply will abuse its monopoly powers. They are also concerned, among other things, that they will lose control of a valuable resource, that water quality and quantity will not improve and that the financial burden for water supply investments will remain with government. In addition, the private sector has concerns in relation to the risks of private sector provision. These vary from contract to contract, but include the risk such as the volume and quality of bulk supply, the capacity to adjust tariffs to cover changing costs, foreign exchange risks, and asset condition — e.g., is the water supply system in which they are to invest in worse shape than indicated in the tender documents? Concern about force majeure (riots, earthquakes, El Niño, etc.) and sovereign risk (expropriation, changing laws and regulations) can also be obstacles to signing concession or management contracts for water supply.

This report advances options for private sector investment, which recognize and take into account the special characteristics of water supply and the risks that can arise for all parties concerned. The ultimate aim is to find a pathway to the best possible practice for DMCs and their urban communities. The precise steps to be taken will vary by country and region — and will depend on hydrological, institutional, economic and historical situations and opportunities. The goal is not so much to provide a rigid template applicable to all — such a template probably does not exist for the water supply sector as it does for electricity supply or telephone systems. Rather, an approach to private sector investment in water supply which is capable of leading to improvements in the standards of living — such that water itself will not be a bottleneck to economic and social development, is presented. The section below outlines the structure of the remainder of this report.

### **C. Report Structure**

The following section considers the features of water supply. The discussion considers the social, environmental and economic characteristics of water supply as well as the monopoly characteristics of water supply infrastructure, water supply market structures, and the potential for competition in those markets. The report then goes on to consider some institutional structures and a number of incentives issues which can improve the efficiency of water consumption and water production as well as future water infrastructure investments. The report follows with a consideration of a range of PSP options and examines pro-competitive and monopoly control strategies, and risk allocation and mitigation policies. Finally, the report puts forward a range of strategies and processes which should help move ADB's DMCs towards best practice approaches. Country detail on water supply privatizations and reforms are presented in Appendix 1 and Appendix 2.

## II. FEATURES OF WATER SUPPLY

### A. Social, Environmental and Economic Characteristics

Water, even when available in relatively large quantities, is a limited resource that is critical to human existence. Indeed, in some communities, water not only gives and maintains life but water resources, catchments and rivers form integral parts of the social, recreational, economic and even religious fabric of society.

Water's use by one consumer group, say farmers, will impact on its use by others. Thus, consumption of water by communities in the upstream regions of a river or catchment area means less water is available for down stream users. If substantial quantities are used upstream, water quality, as well as water quantity, can be effected. However, the gradual nature of some ecological changes, such as salination of groundwater, means that the costs of present actions are not always readily identifiable. Often the costs associated with a particular (intensity or pattern of) use of water are not appreciated until some time in the future.

Water supply to households and firms also creates a need for water discharge. These water cycle issues and indeed many discharge effects on the quality of the water resource are generally out of the direct control of the water supply utility. There are also complex chemical and physical interactions which create problems — e.g., low water pressure can suck unwanted material into pipes and so contaminate otherwise safe water. Industrial and human wastes dissolved in water are sometimes difficult to detect and treat and often the culprit polluter cannot be identified. The most recent challenge to water treatment is the microscopic parasite called *Giardia* — a water borne source of a flu-like infection which does not respond to chlorine and requires finer filtration (membrane) techniques than are typically used even in advanced systems.

### B. Significance to Urban and Economic Development

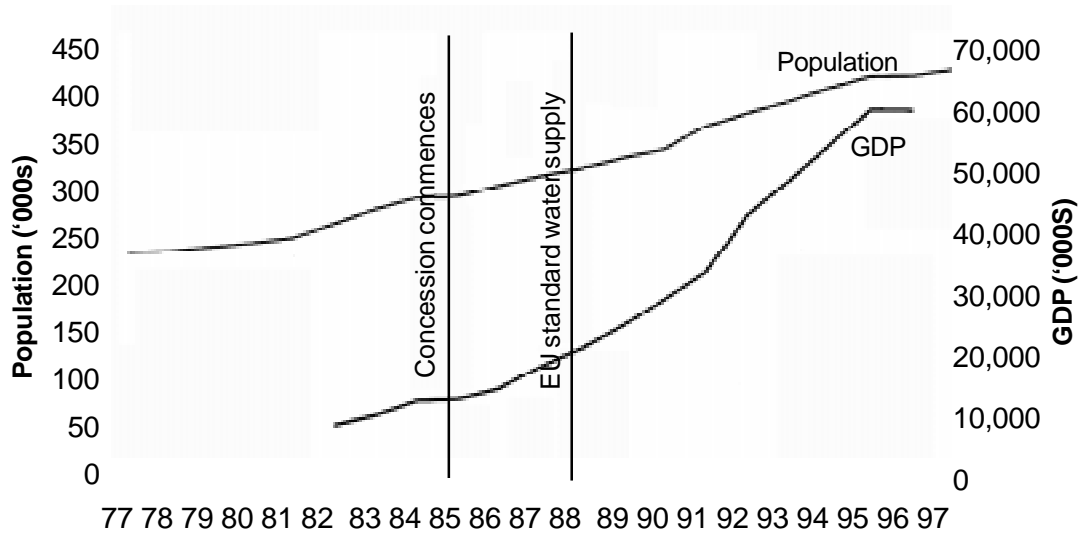
The manner in which we use and dispose of water impacts on virtually all aspects of our society and environment. For example, the availability of an adequate water supply impacts on the viability of agricultural and, particularly, industrial development. The internationalization of business and industry means that investors and entrepreneurs have more freedom and flexibility to locate some distance from markets choosing cities or countries where the infrastructure most suits their requirements. A good quality reliable water supply is an important consideration in their location decision.

Macau, China is an example of a country where the achievement of a reliable good quality water supply has led to dramatic improvements in the level of economic activity. Prior to the signing of a water supply concession contract in 1985, Macau, China had a poor quality (high salinity and turbidity) and unreliable water supply, albeit, despite private ownership. Water was only supplied to some areas of Macau, China at night (see Appendix 2). The island country now has an abundant, reliable, high quality water supply, drinkable from the tap. It is notable that Macau, China's water supply reached European Union Standards of quality within three years of the implementation of a new concession contract.

While it is not possible to attribute a single causal factor in any economic upturn, it is true that Macau, China has experienced substantial growth in Gross Domestic Product (GDP) and population since its water supply improved (Figure 1). The standard of living of Macau, China's citizens is now among the highest in Asia. It is highly unlikely that Macau, China's current

economic circumstances and population growth would have been achieved if water supply had remained at the pre-concession levels of quantity and quality.

**Figure 1: Macau, China - An Example of the Link between a Quality Water Supply and Economic Activity<sup>a</sup>**



<sup>a</sup> GDP data not available prior to 1982.

Source: Macau Department of Statistics.

The adequacy of the water supply also impacts on the health-morbidity (disease) levels and mortality — of the population. Many deadly diseases, such as cholera, and many other nonfatal, though nonetheless serious, complaints such as intestinal disorders, are spread through contaminated water supplies. Other diseases, such as hepatitis, are spread as a result of an inadequate sewerage system. Modern water supply and sewerage systems are critical in securing the superior health outcomes for people living in more developed parts of the world.

While the body can adjust, to a limited extent, to contaminated water sources, diarrhea and gastrointestinal diseases afflict large numbers of indigenous Asians on a regular basis. In a review of 100 health impact studies (Lindstrom, 1991) estimates that of 900 million people suffering from diarrhea, improvements in water quality and or sanitation had dramatic effects on disease incidence (see Table 1).

**Table 1: Water Supply Improvements and Reduction in Diarrhea**

Type of Improvement	Median Reduction in Morbidity (percent)
Quality of water	16
Availability of water	25
Quality and availability of water	37
Disposal of excreta	22

Source: World Bank, World Development Report 1992.

Paradoxically, in some of the very poor countries there is a link between poor water quality, poor health, and increased population levels. A United Nations study explains this link as follows:

“ . . . water-borne pathogens — which contribute in particular to typhoid, cholera, amoebic infections, bacillary dysentery and diarrhea — account for 90 percent of the 13 million child deaths each year. Directly, this has a horrendous impact on the attainment of desired family size, whereas indirectly it prompts couples to have even larger numbers of children just to compensate for the premature deaths of their children.” (*United Nations Population Fund, 1991, p.36*)

Thus, an adequate water supply for the population at large has important ramifications for economic development and growth. The management of the natural water resource can have important implications for quality and quantity of water available for the community's use.

### **C. Natural Resource Management Strategy**

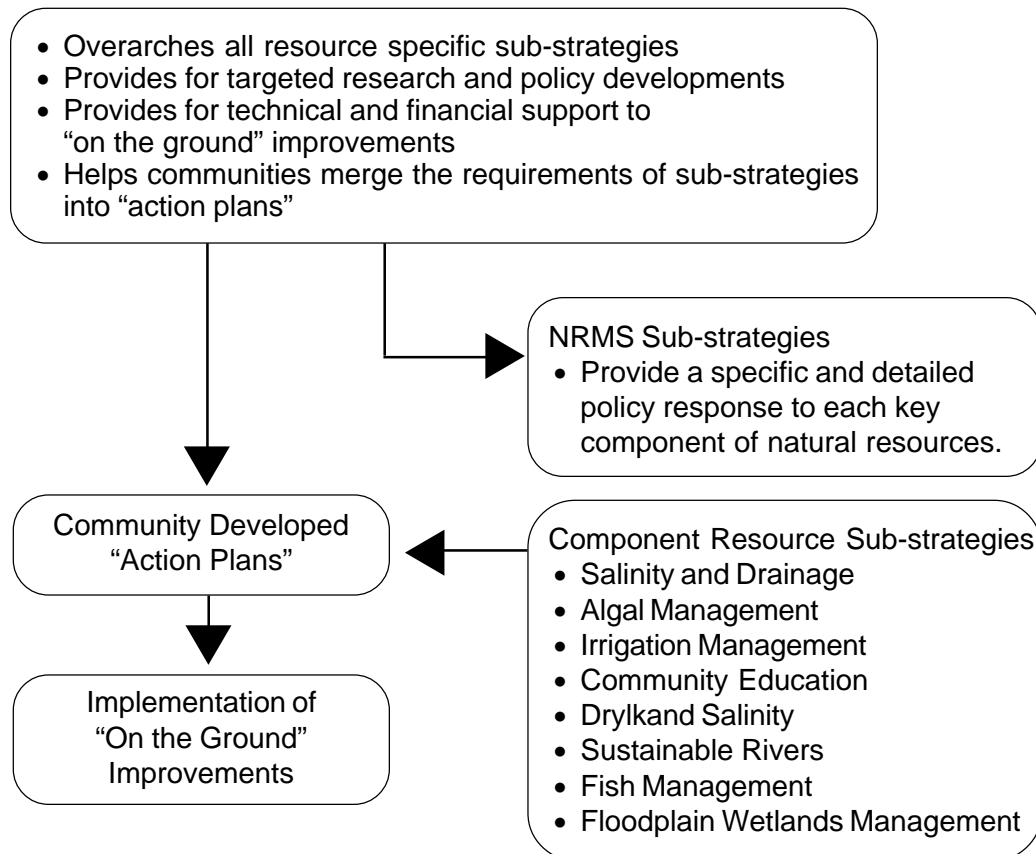
A natural resource management strategy (NRMS) provides a framework within which water resource issues can be addressed. The strategy operates in tandem with principles or policies developed by government. To facilitate community support the strategy should be developed in consultation with the community. Millington (1996) correctly argues that to be successful an NRMS requires two key elements:

- A delivery mechanism.
- Sufficient financial resources to support change.

Change is supported by research as well as on ground programs and activities which are also supported by the community.

The NRMS is, in essence, an umbrella for a wide range of sub-strategies and action plans. Figure 2 describes the NRMS used in Australia's Murray-Darling Basin. While the detail behind this strategy reflects the needs and requirements of this particular basin, the broad framework is a useful starting point for the development of a country. For example, the strategy covers all components of the natural resource cycle and includes a community education program.

**Figure 2: Natural Resource Management Strategy (NRMS) — A Framework**



Source: Millington (1996).

#### D. Property Rights — Tradability and Vesting Issues

In many developed and developing countries water supply has been allocated among competing uses by administrative means, often on a first-come-first-served basis. In many instances, the allocation is once off and cannot be traded or can only be traded with the land to which it is often attached. Such allocation methods do not or cannot specifically recognize the economic value of water. Failing to recognize the economic value of water can lead to conflicts between user groups and inappropriate uses of water (see Box 1).

A water property right can, but does not necessarily, confer ownership. Ownership, if desired, can remain with government. Regardless of the owner, a water right creates a real interest in property which allows the holder to impound, divert or use water. The holder of this right may also transfer the right in whole or part on a permanent or temporary basis.

### Box 1: Warangal Municipality in Andhra Pradesh, India

A major problem with the present system in the Warangal Municipality has been that supply from the canal system during the wet months is jeopardized by illegal upstream irrigators. The irrigation area may be between 20 to 300 percent larger than planned, as it is gravity-fed and very hard to police. The city water supply allocation is, therefore, sometimes put at risk. The administration has to negotiate with the irrigation department to get much larger dam releases than what is allocated legislatively. They also build *bandhs* (i.e., dams) with sandbags to raise the water level at the intake. However, downstream irrigators then get annoyed and take away the sandbags at night.

If property rights in water are well-defined and legally enforced, then the holders of those property rights have an incentive to ensure that the water is directed to its highest value use (Coase 1960). Chile experience highlights how the introduction of tradable water rights can direct scarce water supplies to higher value uses and help resolve water shortages and improve the efficiency of farms and water utilities (Box 2).

### Box 2: Tradable Water Rights and Resource Allocation - Chile's Experience

Chile has been a pioneer in the introduction of tradable water rights, in 1981 Chile's water code allocated property rights to existing users of water free of charge. Property rights for new rights were sold by auction. The property laws in the country's Civil Code cover property rights. Subject to regulation, they are freely tradable on the open market and are legally recognized as having an economic value. Property rights can, for example, be used for loan collateral. Property rights were assigned for consumptive and non-consumptive (primarily hydroelectricity) uses. Agriculture was and remains the largest consumptive use.

There have been some dramatic re-alignments in water rights holdings since 1981. For example, the city of La Serena initially planned to construct the Puclara dam to satisfy its rapidly growing water requirements. With the introduction of the water code, many farmers in the region recognized that the water rights they held had a higher value than in their current agricultural use. Farmers put in place more efficient irrigation systems requiring lower water volumes and sold all or part of their water rights to the city for a good price. The transfer of water rights from the agriculture sector to La Serena has led to the indefinite postponement of the dam's construction. The reduction in water usage in the agriculture sector has helped control salinity which was primarily caused by excessive use of water (Thobani 1995).

Introducing an economic value for water rights has also had positive impacts on the efficiency of water utilities. For example, Chile's main water company EMOS chose to invest in a program to reduce its unaccounted-for water rather than pay for additional water rights to meet its customers growing demand<sup>2</sup>.

The Chilean experience with tradable water rights has not been free from problems. However, many of the problems that have been identified have been considered as fine tuning (Brehm and Castro 1995).

However, it is essential that infringements of property rights are rigorously prosecuted so they can retain their value, and serve their allocative purpose. Enforcement will still usually leave an important role for government. Typically, infringement will simultaneously affect a number of owners. The costs of monitoring to detect abuses, and taking legal action, will tend to be large relative to the benefits to be gained by any single owner. Thus, some form of joint action may therefore be needed to ensure efficient levels of enforcement — a regional or national cooperative water association with the regulatory backing of government could undertake this enforcement role.

<sup>2</sup> Holden, P. and Thobani, M.: *Tradable Water Rights: A property rights approach to resolving water shortages and promoting investment*, World Bank Policy Research Working Paper No. 1627 (1997).

Appropriate legal and institutional frameworks are necessary aspects of a system of tradable property rights for water. The legal framework should not only establish the property right but also have mechanisms to police such rights, and deal with infringements, e.g., through pre-defined penalties. A well-designed institutional framework is important so that rights can be registered and confirmed on their initial allocation and with trades recorded. If property rights are to be successfully exchanged it is important that transactions costs associated with the legal and institutional framework be kept to a minimum. Experience in Chile also indicates that transactions costs associated with changing existing infrastructure in some regions, such as water channel flow dividers in the Maipo river near Santiago, to facilitate trading, can be prohibitive.<sup>3</sup> Brehm and Castro (1995) in the examination of the water rights in Chile believed that three features assisted with the country's successful implementation of the system. These features were:

- A tradition in water trading prior to the implementation of the 1981 water code.
- The regulatory framework.
- The particular geographic characteristics of the country.

Countries other than Chile are also, to varying degrees, having success with the implementation of tradable water rights. These countries include Mexico, some states and hydrological basins in Australia, and some states in the United States (US). Holden and Thobani<sup>4</sup> in their analysis of tradable water right regimes found that while the design and implementation of tradable water rights needs to be tailored to the specific circumstances of each country, the following guidelines may be useful during the transition:

- Stakeholder support for the new legislation is important in achieving a successful outcome. This can be facilitated by a vigorous information campaign that explains the arrangements and identifies beneficiaries. Drafts of the water law should be circulated for comment and public debate. Governments should show a willingness to accommodate community reaction to the draft water law in the subsequent amendments.
- Institutions, with capable staff with a high degree of integrity, should be established to draft the necessary regulations and to implement the law efficiently. These institutions must be allocated sufficient budgetary resources to function effectively.
- When deciding on rules for the initial allocation of water rights, government should be careful that the poor (e.g., many irrigators) receive rights at the outset. For existing users, there should be consideration of converting *de facto* water rights into *de jure* rights — i.e., granting water rights without charge, in part as recognition that existing water rights are already embodied in the value of their land. The fact that the government is unlikely to recover the capital costs of water infrastructure investments should not necessarily be used to impose charges on existing users —they are sunk costs, not marginal costs.
- New and unallocated rights should, ideally, be auctioned in an open and transparent manner. (In theory, the initial allocation of water rights is inconsequential because the market will ensure an appropriate allocation will come about — i.e., trading should ensure that the most valued uses attract the scarce water resource. Different

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<sup>3</sup> Holden, P. and Thobani, M.: *Tradable Water Rights: A property rights approach to resolving water shortages and promoting investment*, World Bank Policy Research Working Paper No. 1627 (1997).

<sup>4</sup> Op. cit.

methods of allocating the initial water rights will only lead to different groups earning the rent from the water resource, rather than differences in the ultimate allocation of water. However, the method suggested by Holden and Thobani creates a greater acceptance of the shift to tradable rights among stakeholders.

- Care should be taken to make sure that the allocation of non-consumptive rights does not prejudice others' consumptive rights.
- Water associations, if they exist, should be institutionally strengthened with assurances that officials are elected in a fair and transparent manner. Water rights should be "block titled" with rights first assigned to the regional water associations which allocates at the individual level where trade occurs.
- The potential for water trades to infringe upon the rights or water availability needs to be well understood and addressed.

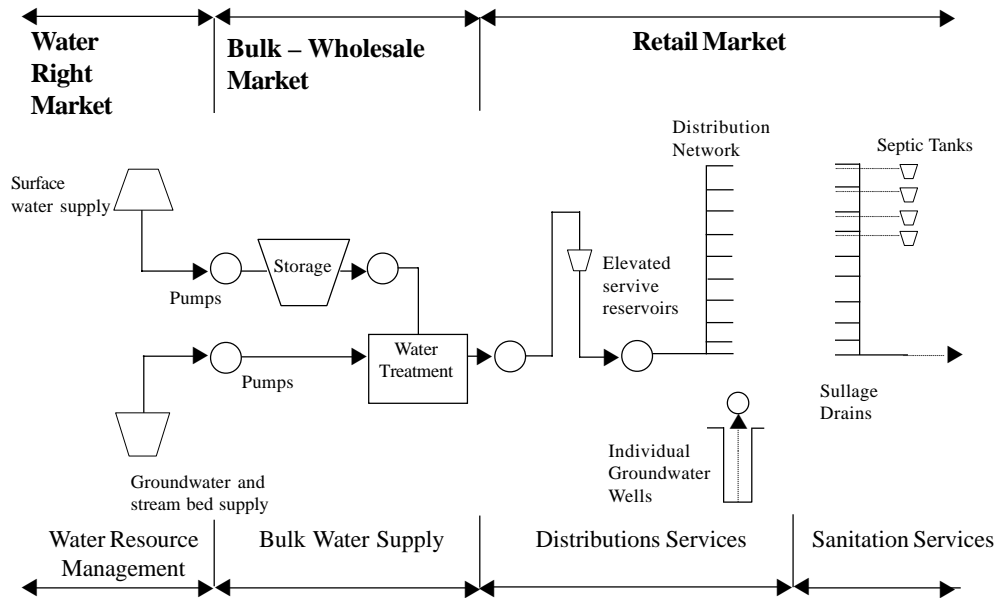
A private market approach to water, if it can be implemented properly, will ensure that water is not wasted and is directed to its most appropriate uses. This is because waste means lower profits. This incentive applies to all segments in the water supply chain. For example, as illustrated in Chile (Box 2), local water supply utilities will aim to minimize water loss as the loss of water is a cost to the utility and a loss of revenue to the shareholders. Thus, there is a strong incentive to improve water supply networks.

Putting in place a set of tradable property rights for water is a major step in achieving best practice in water supply when water is scarce relative to demand or is costly to access. However, a decision either not to introduce or to delay the introduction of tradable property rights should not stall the implementation of other water supply reforms. Preferably, other water supply reforms such as the implementation of an NRMS, institutional strengthening and commercialization and, if considered necessary, privatization, would run parallel with the implementation of tradable water rights. Benefits will come from these wider reforms even if water rights reform does not take place. Nonetheless, the successful implementation of tradable water rights would reinforce the other reforms and allow greater gains to be made by the whole community.

## **E. Natural Monopoly Characteristics**

Water supply involves a network of inter-connected systems and components (see Figure 3). It is common for many infrastructure networks to be able to take advantage of economies of scale and/or scope in all or part of the network. These economies can mean that one network can supply the whole market cheaper than can two or more competing providers. In these circumstances, the part of the network that displays substantial economies is known as a natural monopoly (Box 3). The existence of a natural monopoly means that one firm is large enough to raise concerns about monopoly power, non-competitive price behavior, and under provision.

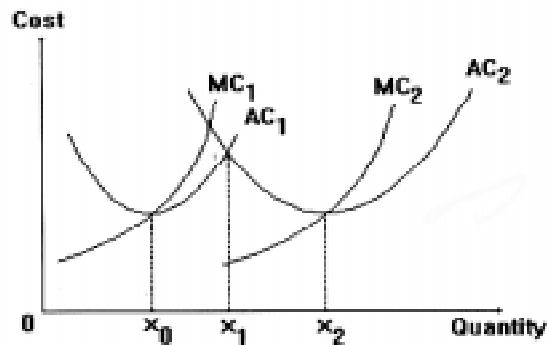
**Figure 3: Representation of a Municipal Water Supply and Sanitation System**



**Box 3: The Characteristics of Natural Monopoly**

A natural monopoly firm can supply a whole market more cheaply than two or more firms. Natural monopoly depends on the technology, the cost of supply, and the level of demand. Changes in any of these factors can impact on the continued existence of natural monopoly.

In the past, the analysis of natural monopoly tended to ignore the importance of the level of demand in determining whether a firm displayed natural monopoly characteristics. The importance of demand is highlighted by the following stylized example. In the figure below, all firms have identical average cost curves represented by  $AC$ . If there are two producers in the market, the average and marginal cost curves for the industry would be represented by  $AC_2$  and  $MC_2$ . If total demand is for an output no greater than  $x_1$ , then the industry is a natural monopoly. One firm can produce more cheaply than two. Note that in the output range  $x_0$  to  $x_1$ , there are rising average costs, but one firm can still produce more cheaply than two (this is known as subadditivity of the cost function). For output ranges above  $x_1$ , such as  $x_2$  two firms can produce more cheaply than one firm. Thus, with the prevailing technology and cost structures the higher level of demand has moved the industry away from being a natural monopoly.



In a single product firm the presence of substantial economies of scale allow us to identify a natural monopoly. Economies of scale are often associated with large, often sunk, fixed costs and relatively low operating costs. Technically, they exist if marginal production costs are lower than average costs - often average costs are decreasing over the relevant production range.

Many firms produce more than one product or output. For example, a water supply utility may provide bulk untreated water for irrigation purposes as well as treated water for industrial and also residential uses. Economies of scope mean that a firm can jointly produce two or more goods or services at a lower cost than individual specialist firms' each producing one of the particular goods or services. A multi-product firm will have the characteristics of a natural monopoly if it displays economies of scale and economies of scope (Baumol, Panzar, and Willig (1982)).

The existence of natural monopoly in water supply is an empirical question — in many urban areas there is problematical competition from private shallow and deep wells. High water tariffs, in combination with unsafe piped water, create a situation where many prefer not to connect or to make limited use of piped water supply. In general, economic and environmental considerations point to a single producer as the most efficient outcome — with well closure usually justified on environment grounds — i.e., preserving the aquifers.

Quantifying the existence of economies of scale and scope requires information that is often difficult to collect and analyze on a consistent basis. Kim and Clark (1988) argue that many of the studies of water supply costs suffer from severe shortcomings in methodology and specification employed. They argue that very few studies recognize that water supply involves the supply of a number of outputs.

Traditionally, water supply systems from water harvesting to local distribution, have been considered natural monopolies. Following this view, most assessments of economies of scale in water supply and wastewater have focused on the entire operations of a network. Some engineering based studies using this approach suggest that economies of scale in water supply persist over a utility's entire operation. Many of these engineering cost studies pointed to unexhausted economies of scale in water treatment (Kim and Clark ). However, based on recent evidence in other infrastructure sectors, an analysis of the potential for natural monopoly in the different segments of the water supply network can be justified.

#### **F. Rivers, Catchments, Ground Water**

Rivers, naturally occurring water catchments and ground water are all critical inputs to the water supply system, their existence is primarily determined by nature — landscape characteristics and subterranean formations, etc. — rather than by man. For purposes of our analysis, these critical components of the water supply system are naturally occurring resources rather than natural monopoly resources. As discussed above, the rights to the water held in these natural resources should ideally be allocated and be tradable between conflicting uses. The development of a national water resources strategy and implementation policy is also of critical importance.

#### **G. Dams and Bulk Transmission Pipelines**

The cost structures of dams and other water catchments can vary considerably from region to region and are dependent on a range of factors, including geography. In some instances, there may be substantial cost differences between the first and subsequent facilities in the same region. For example, the first dam constructed has the choice of the lowest cost site. The traditional view is that there are strong economies of scope between individual catchments. It is often argued that the optimal management strategy in water systems is to draw on water contained in the smallest/shallowest reservoirs first (where relative evaporation is highest). However, water from smaller reservoirs generally costs more per unit than water from larger reservoirs. If reservoirs were managed individually and competed for sales into a pool arrangement, the largest reservoirs would win the first supply contract. This could lead to suboptimal usage of the water supply and higher costs than if the catchment was operated by one entity.

The economies of scope for dams and other catchment management systems are restricted to the water supply system. They also play a crucial role in limiting the damage from excess rainfall and flooding.

In theory, competition between individual dams and water supply catchments is possible. The geography and topography of the land and thus the availability of alternative water supplies will determine the potential for such competition, in large part. Competition between alternative sources of supply would be viable if the underlying costs are not prohibitively different.

In the United Kingdom (UK), third party access provisions are expected to encourage newcomers to develop new water sources. This suggests that economies of scope between individual water catchments may not be as great as once thought. Even if sole management of water harvesting and collection facilities is considered most efficient, it is feasible for multiple firms to bid for the right to own the capacity of these facilities.

There is also a strong relationship between head works and transmission pipelines. For example, if a pipeline business was denied access to the upstream water supply, the pipeline assets dedicated to that particular water supply would have little value. The opposite may also be true if the water provider has no alternate use for its water supply. Water quality may also be an issue if these functions are separate. Traditionally, such concerns have been alleviated by vertical integration of the upstream water supply and pipeline utilities. However, if these operations were separate, parties could overcome or reduce these risks by long-term contracts to carry a particular volume of water exceeding a particular quality standard.

There is evidence to suggest that transmission pipelines enjoy substantial economies of scale. However, we are not aware of any studies that have examined water transmission in isolation from distribution. Bruggink (1982) examined water transportation and found significant economies of scale in water supply and distribution utilities. The largest utility in his data sample supplied 605.6 ggaliters of water per annum. The mean utility supplied 39.7 ggaliters of water per annum.

As transmission pipelines are likely to enjoy substantial scale economies, direct competition will only be possible for the initial ownership of the pipeline. Competition could also occur if another transmission pipeline, transporting water from another head-water, serviced the same downstream market.

## **H. Water Treatment and Retail Distribution**

Water treatment and retail distribution traditionally have been considered as natural monopolies. However, there are relatively few studies that have examined the natural monopoly characteristics of water treatment or retail distribution together or as an integrated system.

Kim and Clark (1988) analyzed a cross section of sixty community drinking water systems in the US. The utilities in the study undertook water treatment and distribution to residential users and a range of non-residential users including users in industrial and commercial and wholesale businesses. None of the systems covered by the study included reservoirs or dams. The study was the first to examine the cost structure of water utilities in the context of their multi-product outputs. The study found that large utilities exhibited considerable

economies of scale in water treatment. However, the large utilities that distributed water over a substantial distance also suffered from diseconomies in distribution. These diseconomies, in some instances, offset the economies achieved in water treatment. This suggests there are inefficiencies in increasing water distribution networks beyond a certain size. This finding supports other studies that identified that the characteristics of the areas being served can have important implications for economies of scale (see, for example, Dajani and Gemmel ).

As might be expected Kim and Clark (1988) identified economies of scope in the joint production and distribution of residential and non-residential outputs. However, they also identified that, through the observed output range, marginal costs for residential supply were higher than average incremental costs. This suggested diseconomies of scale in residential supply. On the other hand, substantial economies of scale were identified in non-residential supply. When the outputs of residential and non-residential supply were considered together there was evidence of economies of scale in supply. However, the degree of economies of scale varied considerably with output and tended to be exhausted as the size of the utility grew. "Small utilities exhibit rather marked economies of scale, while large utilities exhibit moderate diseconomies of scale. The average utility appears to produce under constant returns to scale" (Kim and Clarke 1988, p. 495).

In summary, the work of Kim and Clark (1988) suggests that:

- There are substantial scale economies in water treatment.
- There are economies of scope associated with the joint production of residential and non-residential water supply.
- There are substantial economies of scale in distribution to non-residential users, particularly when distances are relatively short.
- There is evidence of scale diseconomies in residential supply.
- When residential and non-residential supply are treated as a single output there are overall economies of scale in the combined supply. However, these economies are exhausted as the utility grows in size.

These results suggest that water treatment is likely to be a natural monopoly. However, the existence of natural monopoly in retail distribution will depend on the characteristics of the particular network. For many existing networks that cover large areas (e.g., Manila and Jakarta), more than one distribution utility may be a viable and preferred option. Putting in place regulation or contracts for supply that encourage or require a single retail supplier could unnecessarily hamper competition.

This analysis suggests that there is no prima facie case for allowing a single retail water utility to supply large areas such as an entire country or a state, or even a large city. Going further, the evidence from satisfied municipal governments in France, which have private water concession for many quite small towns, suggests that the economies of scale are not a dominant consideration in determining arrangements for water supply.

## **I. Market Structures and Competition**

Recent experience with networks such as telecommunications and electricity has shown that not all the components of infrastructure in the network are necessarily natural monopolies. As a consequence, the potentially competitive market segments of the network can be vertically separated from the natural monopoly market segments. After separation, competition has been shown to work successfully in the provision of generated electricity and in certain parts of the telecommunications network. The previous discussion suggests that the existence of natural monopoly in water supply is most likely restricted to parts of the network and may be dependent on size. Thus, it is feasible that the water supply network can be unbundled and operate in distinct markets.

Evidence from a range of countries indicates that within water supply businesses there is often structural or even legal separation of bulk supply and retail supply functions. Figure 3 highlights that there are at least three markets within the water supply system. These are the water rights market (discussed above), the bulk or wholesale market and the retail sector, which comprises potentially separate markets for water distribution, drainage and sewerage. The following discussion considers the markets for bulk and retail water supply and the competition, real or potential, that might occur.

## **J. Bulk (Wholesale) Water Markets**

Bulk water supply conflicts are either apparent or likely to become a key issue in the future for many Asian communities. This makes planning of investment difficult, and can limit the capacity of current or new water enterprises to meet the demands of their customers. The quality of bulk water is also increasingly under threat from urban development and pollution. There are a variety of options for dealing with the bulk water supply issues. These include ways of recognizing differing security issues — e.g., municipal water supply demands. Say, 95 percent probability of supply, irrigation and hydro-electricity rights which may be acceptable at 75 percent levels or lower. The pricing arrangements should reflect these differing security considerations.

As noted above, if property rights in water are well-defined, tradable and legally enforceable, then a market for water rights will develop. The water right holders will have an incentive to ensure that the water is directed to its highest value use whether that use be bulk supply for metropolitan markets or irrigation. The water rights market would, in theory and practice, involve many sellers and purchasers and thus is highly competitive. However, in some countries there may be a number of political, social and legal barriers to the introduction of water rights. Other market options include establishing:

- Regionally based catchment authorities to manage water allocation and pollution concerns.
- Contracts in relation to bulk water supply and retail water entities, setting out water quality parameters and quantities.

Another option is to establish an ownership structure for bulk water supply which allows all downstream water enterprises and other entities, such as farmer based regional water associations, to establish or have equity in a bulk water company. The bulk water entity would operate like a cooperative and supply raw water in bulk for irrigation and to retail companies

within a region in accordance with contractually binding conditions. The central objective of the Bulk Water Corporation would be to improve raw water supply generally in terms of reliability, quantity and quality, and to do so on a long-term basis. Any concerns about monopoly in bulk supply are removed or at least diluted as all retail users of water have an interest in the bulk water supply company.

#### **K. Retail Water Market**

It is important to consider the market in which retail reticulated water competes, regardless of whether or not there is natural monopoly in retail distribution. In principle, reticulated water has several substitution possibilities including: bottled water; water obtained from private wells, bores, dams, and rainwater tanks; carted water; and recycled wastewater. However, some of these alternative sources are not strong substitutes for potable reticulated water or for the large quantities of water often required for non-residential use.

If the water supply network is vertically or horizontally disaggregated there is also potential for competition in the supply of retail reticulated water. The nature and source of this competition could vary depending on the circumstances. For instance, competition for new customers would be facilitated when more than one water utility operates in a city. This competition may be once off. For example, a factory's choice of location could be influenced by another utility's water prices. However, if bypass of the existing network is a viable option or if third party access to a competing utility's pipelines is permitted by regulation, then competition need not be limited to new customers but could take place over all customer groups. Vertical disaggregation of water supply would facilitate competition between bulk and retail suppliers. For example, a large water user, such as a soft drink manufacturer, may be in a position to bypass the reticulated network and thus choose between a bulk supplier and a retail supplier to meet their water requirements. Alternatively, if there is regulation permitting third party access to the retail utility's infrastructure, the bulk supplier might supply the soft drink manufacturer through the retail network rather than by-pass the network. The issue of third party access is discussed in more detail in Section V.

For many water utility customers, the potential for competition in water supply is small. Residential customers, and even small to medium/large commercial customers have few alternatives to commercial water supply from a single local distributor. While some may choose, subject to environmental regulation, to sink their own wells, build their own dams, re-process their own waste water, or re-locate to areas of better water quality; in practice they usually are captive of the particular supplier. Supply of non-potable water, withdrawal of water services or supply at exorbitant tariffs can be catastrophic to consumers and hence, the monopoly powers of water utilities are of vital concern.

#### **L. Shortage of Water**

In many developing countries the major problem has been not so much a lack of water *per se*, but rather, the quality of available water supply and, in urban areas, a dearth of household piped water connections. For example, the supply of water in the People's Republic of China (PRO) and India that is potentially available for domestic and industrial consumption appears to be plentiful (see Table 2). Of course, the data in Table 2 do not take into account that in some regions, and at certain times of the year or in periods of drought, water is scarce or the cost of accessing some potentially available water may be high. Nonetheless, the methods

used currently in many countries for allocating available water supply among competing uses are not always best practice.

**Table 2: Water Withdrawals Compared with Potentially Available Water Resources**

Country	Total (Billion m <sup>3</sup> )	% of Water Resources
People's Republic of China	460	16
India	380	18
Pakistan	153	33
United States	467	19
Australia	15	4

*Source: World Bank (1996)*

A 1995 survey of 50 water utilities in 31 ADB developing country members found that in 32 of the 50 cities surveyed, unaccounted-for water was greater than 30 percent of water production (ADB 1997). Only two of the cities surveyed had unaccounted-for-water levels of less than 10 percent. The levels of unaccounted-for-water were particularly high in a number of cities with less than 150,000 connections, these included Rarotonga (70 percent), Hanoi (63 percent), Phnom Penh (61 percent) and Lae (61 percent). Unaccounted-for-water in the cities with larger utilities ranged from a low of six percent in Singapore to a high of 53 percent in Jakarta. Metering of all production and consumption, and regular maintenance, repair and replacement of meters does not take place in many Asian cities.

### III. INSTITUTIONAL STRUCTURES AND INCENTIVES

Given the complex and interactive nature of water-based environmental economic systems, and the important roles of water quantities and qualities in human life, it is commonly argued that water supply, as well as sewerage and drainage, are too important to be determined in the marketplace.

Yet the complexity of the linkages between water and the impacts on people suggest that, in the absence of markets, public decision makers and planners will have great difficulty identifying the true costs and benefits of their decisions to invest in and operate water supply facilities. The absence of a market price for water also means that householders, when deciding to water the lawn or wash every load of clothes in fresh, rather than recycled water, do not know the value of that water in its alternative uses. The same is true for the irrigation farmer and the industrialist whose profits vary with their water use.

By the same token, although a public sector manager is responsible for cost-effective provision of water and sewerage, his/her incentive to do so is diluted in comparison with that of a commercial manager facing profit goals as a bottom-line performance requirement.

Markets are effective instruments for mobilizing information about cost and benefits. By and large these costs and benefits are known to large numbers of separate individuals, but are unavailable to bureaucratic planners. Even if known to planners, the computations necessary

accurately to compare costs and benefits, in order to allocate goods and services to those who value them most, are too complex to be efficiently performed centrally.

In countries such as New Zealand and Australia, actions encouraging private sector investment in infrastructure often are accompanied by wider sectoral reforms. These reforms create an incentive structure that, to varying degrees, mimics the market structures evident in the private sector. They also put in place mechanisms that facilitate the move to private investment as well as supporting the new regulatory and competitive framework. A phased program of reform commencing with existing government-owned infrastructure often precedes the introduction of private sector investment in an industry. This reform process typically includes commercialization and/or corporatization. Tariff reform is an integral part of both of these reform options. The following sections discuss commercialization, corporatization, and tariff reform.

## **A Commercialization**

Commercialization is an administrative reform, which aims to create a more commercial incentive environment for the existing government owned and operated water utility. Commercialization covers a range of initiatives that reduce government involvement in the day to day running of the utility.

An initial step in the commercialization process is often a requirement that the water utility document its objectives and prepare a business plan. Such seemingly simple activities help clarify the role of the utility, in the minds of the government and the public servants who operate the utility. These activities also create a sanity check on past and future developments. The development of achievable qualitative and quantitative targets in the business plan creates another discipline for the utility and helps to produce incentives for institutional reform. If possible, rate of return targets should be included among the quantitative measures.

Community service obligations (CSOs) should also be identified and assessed for their continued validity (see Box 4).

In general, it is a sound principle for the full costs of water to be the basis for customer tariffs, however, there is no need for an automatic rejection of all cross-subsidy arrangements, given that water is an essential service. If strategic low-income groups are ignored, the politics of reform may not be feasible. The political nature of cross-subsidies should not be a basis for criticism - politicians are elected to serve community interests. If a CSO is maintained after a process of review, it should, if possible, be quarantined from the commercial aspects of the utility. Further, it is important that the cross-subsidies or transfers across groups be transparent. If they are not, then the corporatized water utility and the government as its owner are not capable of being judged in an informed manner by the very constituencies to whom they should be accountable.

### Box 4: Community Service Obligations

Governments as infrastructure owners often direct water utility managers to provide services to certain groups in the community on a non-commercial basis. These services generally arise because there is some community view or political judgment that some groups should receive water services at zero or subsidized rates. The provision of such non-commercial services is commonly known as community service obligations (CSOs).

Often the decision to provide CSOs was made in the early years of the water utility's operations. In many cases the requirement to continue its provision has never been reviewed and often the rationale for their provision is not clear. Nevertheless, they are continued because of historical obligation.

Because CSOs are generally financed through cross-subsidies or even non-price rationing, their true cost to the community is often not clear to the water utility or the government as owner. For example, if a government often attempts to force a publicly-owned water utility to provide a CSO and a cross-subsidy which will not fully cover the costs of the CSO, the utility may respond by limiting the quantity or quality of services it supplies to the subsidized group. The resulting non-price rationing of demand is likely to be less efficient than higher prices. When demand is reduced by increased prices, the least valuable uses of the good or service are eliminated first. All consumption that is valued at less than the price being charged is voluntarily foregone. With non-price rationing, however, there is no guarantee that the least valued demand is eliminated first. Some of the demand that is rationed could actually have a very high value to the very consumers the government wished to assist.

The lack of transparency associated with cross-subsidies means that it is often difficult to identify the actual costs of providing the CSO. Failing to account directly for CSOs makes it much more difficult to monitor the performance of water utilities and make them accountable for outcomes.

There are a number of alternative methods to cross-subsidies for funding CSOs. These include:

- Transparent levies on users.
- Direct cash payments to targeted users.
- Direct funding by government of the CSO.

The introduction of a tariff structure which reflects the opportunity costs of water supply inputs is a cornerstone of any infrastructure reform program, including commercialization. If prices fail to reflect costs, then the utility cannot, by definition, have a commercial focus. Reforming tariff structures will also facilitate an incentive structure that facilitates efficient consumption, production, and investment in water supply (see Section III.E).

Tariff reforms are an important precursor to encouraging PSP in the water supply sector. Without tariff reform water supply investments will not be financially viable from the private sector lender and investors' point of view. Section III.E considers some alternative pricing strategies for water and explains why the implementation of efficient water tariffs creates incentives for appropriate levels of investment, consumption, and production of water.

## **B. Corporatization — A Means for Facilitating Restructure**

Corporatization is another administrative means of introducing the discipline of market forces to publicly owned and operated utilities. It is introduced often as the next step after commercialization. However, governments may choose to by-pass commercialization and move their water supply utility directly into a corporate structure. In these instances, the corporatization process will include spelling out objectives, the identification and quarantining of CSOs and tariff reforms, as discussed above.

Corporatization introduces a new relationship between the government and the manager-operators of the utility. After corporatization, the relationship is governed by legislation specifying the powers and responsibilities of the parties. The relationship mimics the private sector, with the utility operating under a board of management with the government acting as the shareholder. Corporatization involves the introduction of the following four principles which change the relationship between the government and utility:

1. Clarity of objectives.
2. Management autonomy and authority.
3. Strict accountability for performance.
4. Level playing field.

Although the government's relationship with the water utility changes, it continues to control areas such as water resource allocation and management, environmental quality as well as safeguards on monopolistic behavior. Indeed, the shift to a corporate model means that the regulations over such issues should be well-specified and transparent in their operation. Like tariff reform, the development of these regulations for water allocation, quality, and monopoly control are important precursors to the introduction of private sector investment.

As part of the commercialization and corporatization process, governments should also review the institutional structure of the water supply utility. In many countries the water supply utilities operate as an integrated operation which operates the headworks, bulk transmission and treatment as well as the retail distribution of water. As noted above, this integrated structure often related to the belief that the whole of the water supply network was a natural monopoly. More recent experience suggests that only segments of the industry have natural monopoly characteristics. Vertical and horizontal separation of the utility introduces an element of contestability in the water supply sector. The same level of contestability would not be achieved if the network, which incorporates natural monopoly elements, remained integrated. The potential for vertical and horizontal separation of the water supply network is discussed in detail in Section II.

In some countries the institutional structure of the utility is not solely limited to an integrated water supply network but also includes activities which are regulation and public policy oriented. For example, the large water commissions and other water sector institutions in PRC, presently undertake a range of diverse functions such as power supply, water supply, and irrigation operations and engineering design and construction and resource management. In these instances, it is desirable to separate institutionally the commercial activities from the government or public policy activities. Such separation is an important element of corporatization and a critical element before the introduction of PSP in water supply.

### C. Practical Aspects of Corporatization

Once government has made a commitment to corporatize a water utility it will be necessary to put in place a number of new institutions and arrangements to ensure that the process goes smoothly and produces the desired outcome. An important first step is the creation of a reform unit. This unit, which may be specific to water reform or public infrastructure reform more generally, will be responsible for the corporatization process.

The need for some form of regulation will remain as the water utility shifts from an uncommercial to commercial to corporatized and perhaps privatized organization. Water is an essential product, and thus, regardless of the details of ownership of water sector assets, there is a need for assurances of customer protection. At present, most water supply utilities are both owner and regulator — poacher and gamekeeper — and the roles need to be separated even under the 100 percent government owned model. Once utilities are more commercial, albeit with government shareholders, the perks and financial incentives will be such as to demand an independent government watchdog or regulator. The reform unit may ultimately take on the role as regulator of the corporatized utility. However, if this occurred, it would be important that the regulator remain independent of government and the utility (the issue of regulation is discussed in detail in the latter part of the report).

In addition to undertaking the corporatization process, the reform unit will also need to consider the implications of the corporatization for the legal environment faced by the utility. For example, in many instances, the existing legislation or regulation was drawn up in expectation that a government authority would perform the water and sewerage functions, rather than a corporate entity. Amendments may be required to give the corporate entity necessary powers; for example, the power to enter land to perform legitimate corporate functions.

Another important step in the corporatization process is the appointment of a board on a commercial rather than an *ex officio* basis (i.e., appointments must be independent of government). The role of the board is central to successful and effective management of water enterprises. The success of this assignment of responsibility depends critically on appointing people with proven managerial and water sector skills, and with incentives to devote the same level of effort to this task that is required of a private sector company.

The following tables identify the four principles discussed above and set out the key elements necessary to put in place these principles as well as the processes that allow them to be achieved.

**Table 3: Principle One — Clarity of Objectives**

<b>Element</b>	<b>Application Process</b>
<p>The utility should operate with clear commercial objectives as a successful business and be as profitable and efficient as comparable businesses that are not owned by the State.</p>	<p>Government policy formation and regulatory functions should be identified by the utility in conjunction with the reform unit and the appropriate body to take over these functions should be identified.</p> <p>Activities to be undertaken include:</p> <ul style="list-style-type: none"> <li>• An economic appraisal.</li> <li>• A review of business constituents.</li> <li>• Reallocation of non-core functions including regulation to other agencies as required.</li> <li>• Review and value asset register - In some cases, the asset register may need to be cleaned up to remove or revalue under performing assets — particularly where such assets have resulted from poorly conceived investment proposals outside a water utility's control.</li> <li>• Transfer assets and liabilities.</li> <li>• Establish capital structure/funding.</li> <li>• Determine tax/liability rules.</li> <li>• Prepare Articles and Memorandum of Association.</li> <li>• Prepare Statement of Corporate Intent (SCI).</li> <li>• Register corporatized utility under Companies Code.</li> <li>• Draft amending legislation as required.</li> </ul>
<p>Any non-commercial obligations must be:</p> <ul style="list-style-type: none"> <li>• Clearly identified in an SCI; and</li> <li>• Separately costed; and</li> <li>• Include transparent compensation</li> </ul>	<p>The utility in conjunction with the reform unit should:</p> <ul style="list-style-type: none"> <li>• Identify non-commercial obligations for inclusion in an SCI (where appropriate)</li> <li>• Establish that non-commercial functions are not in the commercial interests of the company arrangements.</li> <li>• Cost non-commercial functions — costing should ideally be calculated by an independent expert</li> <li>• Negotiate a contract to deliver community service obligations (CSOs) — including arrangements for transparent funding of these non-commercial activities.</li> </ul>
<p>Accounting and management functions should mirror a private sector model.</p>	<p>The utility in conjunction with the reform unit should:</p> <ul style="list-style-type: none"> <li>• Develop a corporate plan.</li> <li>• Review accounting procedures/implement effective procedures.</li> <li>• Define a financial model.</li> <li>• Develop business plan and budget plan.</li> <li>• Review office systems/requirements.</li> </ul>
<p>Financial and non-financial performance targets for commercial and non-commercial activities must be specified.</p>	<p>The utility in conjunction with the reform unit and independent experts should:</p> <ul style="list-style-type: none"> <li>• Identify performance targets.</li> <li>• Identify measurement techniques; and</li> <li>• Undertake the necessary training to implement performance measurement.</li> <li>• Identify and account for any interaction between these targets and the compensation for non-commercial activities; and</li> <li>• Incorporate targets and compensation implications in the SCI.</li> </ul>

**Table 4: Principle Two — Management Autonomy and Authority**

Element	Application Process
Establishment of a board of directors	<p>A board of directors should be appointed by the government or a representative of the government. For example, the minister responsible for corporatization, at the commencement of the corporatization process, should:</p> <ul style="list-style-type: none"> <li>• Appoint a Chairman.</li> <li>• Appoint other board members.</li> <li>• Appoint Chief Executive Officer.</li> <li>• Determine structure of Board remuneration.</li> </ul>
The board must use best endeavors to ensure that performance targets are met.	<p>In many jurisdictions, the general legislation covering companies would require directors to comply with this rule. The requirement to use best endeavors can also be included as a term of each director's terms of engagement.</p>
The board must have autonomy and authority to make commercial decisions.	<p>In some countries, the corporatization legislation provides exceptions to this rule. For example, in Fiji's corporatization legislation, the minister has a reserve power to give directions to a Government Commercial Company where, in exceptional circumstances, it is necessary in the public interest.</p>
The role of the government and the relevant minister as a representative of the government must be clearly defined.	<p>See Principle 3 for "accountability". The minister can determine the content of the Statement of Corporate Intent (SCI) and can direct the payment of dividends.</p>
Staff issues.	<p>Options will need to be developed to ensure that:</p> <ul style="list-style-type: none"> <li>• Staff can be legally transferred to the new company.</li> <li>• Redundancies can be offered.</li> <li>• Conditions of employment (including wages/salaries) must be established.</li> <li>• Staff are trained to operate in the new organization.</li> </ul>

**Table 5: Principle Three — Strict Accountability for Performance**

Element	Application Process
Company must be accountable to the government via the minister acting as a representative of the government for the company's performance.	<p>Initially, the utility and the reform unit should prepare the following publicly available documents:</p> <ul style="list-style-type: none"> <li>• Corporate Plan.</li> <li>• Statement of Corporate Intent (SCI).</li> <li>• Half-yearly Reports.</li> <li>• Annual Reports.</li> <li>• Audited Financial Statements.</li> <li>• Employee and Industrial Relations plan.</li> </ul> <p>The utility will be responsible for producing these documents in subsequent periods.</p>
The SCI forms the basis for accountability	<p>The SCI will include the company's objectives, performance targets, etc.</p>
Performance will be monitored by government against performance targets specified in the SCI.	<p>The SCI will specify performance targets, and these targets will be reported again to government. The government's monitoring of the company to compensate for increase in company's autonomy.</p>

**Table 6: Principle Four — Level Playing Field**

Element	Application Process
Where the company has excessive market power regulatory reform will be necessary.	<p>Whether the utility will have excessive market power will depend on a number of factors and should be considered on a case by case basis. The reform unit should:</p> <ul style="list-style-type: none"> <li>• Analyze regulatory options.</li> <li>• Choose the most appropriate regulatory framework.</li> <li>• Review existing tariffs.</li> <li>• Set up a separate independent regulatory authority charged with independent oversight of the regulatory processes relating to the water supply sector. The main responsibilities of the regulatory authority would include: (i) overseeing pricing principles and price adjustments (escalation) in relation to bulk and retail water supplies; (ii) review of compliance by government agencies and enterprises to their obligations; (iii) it is recommended that the regulatory environment be light handed, with responsibility for day to day activities being left to the water utility.</li> </ul>
Competitive neutrality	Advantages and disadvantages arising from government ownership should be identified, and where practical, removed

#### **D. Private Sector Investment and Efficiency**

Privatization, although a major step politically, represents a more modest organizational change from corporatization. The roles of the board and chief executive remain the same. Individual investors replace ministers as shareholder-monitors and the SCI and reports to parliament are replaced by reports to the stock exchange.

However, the emphasis on a simple commercial objective will increase, since private and institutional investors, unlike shareholder ministers, profit directly from increases in enterprise value. The stock market also provides a continual, and readily observed, measure of how well management is performing. Investor monitoring of management performance will therefore be more intense. Finally, a major difference in objectives is that management now has an incentive to maximize *market valuation* of the firm rather than *accounting value* calculated according to the SCI tabled in the legislature.

Many of the processes required to commercialize or corporatize a water utility should also be followed if governments elect to set in train a privatization process. In all cases, government initially should set up a specially trained expert task force or reform unit (see Box 5). The unit will be responsible for coordinating and facilitating the entire process. The role of key economic ministers and the ministry of finance should also be considered. Other countries' experience with the reform process indicates that where there has been major state-owned enterprise (SOE) reform, including restructure, unbundling and privatization, these key individuals and their departments are usually key players; at the end, if not at the beginning.

### **Box 5: Driving Reform — A State Enterprise Reform Unit (SOERU)**

Most state enterprises — whether in water, electricity, transport or other forms of urban infrastructure — are rarely capable of driving the reform process. There are internal, human resource and other constraints on being “one’s own surgeon”.

Where there has been major SOE reform, including restructure, unbundling, and privatization — the key economic ministers and the ministry of finance are usually key players; at the end, if not at the beginning.

Often there is a need for prime ministerial/cabinet endorsement of such a unit and its agenda— which also requires due process involving key economic ministries.

This SOERU , which contains a specially trained and expert group, is also a useful focal point for international development agencies and banks, public and private sector agencies and others interested in participating in the process of restructure of utilities.

This need for a well supported driver reflects the fundamentals of cabinet governance systems — since typically large capital sums are involved — either in terms of new investment or asset sale. This means the ministry of finance must finally sign off on any transaction.

Where the sector ministry or utility alone drives the reform and restructure process, there is a danger of non-completion, or non-closure.

This reform unit would usually report to a minister or committee of ministers, usually involving both finance and the relevant infrastructure minister.

The process that seems to work best, involves development of a key expert group — which we label SOERU with economic, institutional, and financial expertise, together with legal and sectoral experts. The early stages of development of an independent regulator will also require leadership and drive which can be provided by a SOERU.

The main task of the SOERU would be to manage or commission scoping studies in collaboration with line agencies. These studies would review issues, options, and strategies that could lead to reform and restructure.

A SOERU could also advise on formation of specialized task forces, regulatory units and generally be a source of expertise across sectors. Technical agencies (e.g., on water quality monitoring) that feed into monitoring of contract performance would also interface with a SOERU.

## **E. Other Incentive Issues**

Introducing reform into the water supply sector creates a number of incentives which will have important implications for the efficiency of the water supply sector pre and post private sector entry. These incentive issues as they relate to water tariffs and vesting tradable water rights are discussed below.

### **1. Prices, Tariff Reform and Incentives**

Prices are a central mechanism for allocating resources in an economy. For example, consumers’ responses to changes in the price of water tells water utilities how much they value the service. Prices reflect opportunity costs, they provide signals — incentives — to change consumption and production patterns and indicate when it is appropriate to undertake investments which make the best use of the community’s scarce resources.

In a competitive industry, firms will price to reflect their marginal costs of production. Pricing at a level lower than marginal cost will lead to losses and firms will exit the industry as the losses signal to firms that consumers do not value the good as highly as its marginal costs of production. Conversely, if firms can price at a level above marginal cost, this signals that consumers value the good more highly than its marginal production costs and some consumption and the benefits it brings must be foregone. In this instance, firms will earn above normal profits, which sends signals for other firms to enter the industry until the marginal costs of production equal the marginal benefits of consumption.

As in other markets, appropriately set water tariffs and access charges will operate as signals for efficient consumption, production and investment in water supply.

Reform of water tariffs is a critical move to best practice in water supply provision and investment. However, in many cities, institutional and technological changes need to be put in place before measures to implement pricing reform can be introduced. Charging tariffs to reflect use of the water supply system would first and foremost require the installation and on going maintenance of metering systems. A recent survey of 50 cities in 31 ADB DMCs found that metering was:

“ . . . perhaps the single most important area requiring improvement among water utilities. Half the utilities do not have 100 percent metering of production and consumption (let alone regular replacement of meters). Eight have incomplete metering, six some metering, ten very little metering and one (Calcutta) no metering at all. About 82 percent of house connections, 17 percent of public taps, 97 percent of industrial connections, 80 percent of commercial connections, and 88 percent of institutional connections are metered. In all, 83 percent of all connections are metered. If one assumes only 60 percent of meters are functioning correctly, (an optimistic assumption) then only 50 percent of all connections are adequately metered. There is a great room for improvement here.” (ADB 1997, p. 14)

If budget constraints prohibit an immediate full-scale introduction of accurate meter reading, the process should be introduced on a phased basis. Large volume customers should be the first customers to be supplied with accurate meters and charged water tariffs reflecting cost. As funds permit, smaller users should be progressively metered, with tariffs charged on the basis of use. Thus, the introduction of pricing based on use may take some time to implement. However, recognition by the utility and by users that water tariffs should ultimately reflect costs of use is an important first step in the reform process.

## **2. Bulk, Irrigation, Commercial, and Residential**

Ideally, all water customers should, at a minimum, pay a price for their water supply that covers their marginal costs (see Box 6). However, some commentators may argue that this economic principle should not apply to water supply because water is regarded as an essential or merit good, to which users have some inherent rights. Clean water is undoubtedly an essential good. Lack of water can lead to dehydration in warm tropical countries within a matter of hours. Where drinking water is polluted it can result in serious health problems, but the capacity of individuals to measure water quality is limited to taste and smell. Taken together, these two characteristics of water could imply that at least a minimum lifeline amount of clean water should be made accessible at a zero or minimum price to those in the community whose resources are minimal. However, it should also be recognized that the essential need for water is quickly satisfied. There is little reason to support zero or subsidized charging for water over

and above a lifeline amount. Further, in many cases it is the very poor who have little or no access to the reticulated water supply network.

### **Box 6: Some Alternative Approaches to Efficient Water Pricing**

#### **Marginal cost pricing**

The marginal costs of supply are the costs involved in supplying an additional unit of output. The supply costs that are relevant for efficient infrastructure pricing, are opportunity costs or shadow prices — i.e., the returns that could be earned by using inputs in their next best use. If they have no value, then the past costs are sunk and are of no relevance to future pricing decisions. It is important to note that the concept of opportunity cost conflicts with traditional accounting approaches which seek to recover historical costs (i.e., the purchase price of capital equipment such as plant and machinery). The cost that is relevant to efficient pricing is the value of the inputs in their next best use. Another important class of costs that can be associated with water supply and sanitation are negative externalities — such as water pollution. Ideally, the costs associated with such externalities should be reflected in prices.

#### **Ramsey pricing**

Ramsey pricing in its simplest form involves a schedule of single part tariffs based on use. It relies on the ability of a water utility to price discriminate between different customers or customer groups. Under Ramsey pricing, customer groups are charged different prices, for notionally the same product, depending on their responsiveness to a change in price.

Consider a hypothetical over simplified situation where a water utility is faced with two different consumer groups; residential customers and industrial customers. Assume the residential users have the ability to convert readily to tank and bottle water, whereas the industrial users do not. These two groups have different demand characteristics and can be charged different prices.

The price charged to residential consumers, those whose demand is more responsive to a price change (due to the availability of substitutes), will be closer to marginal cost than the price charged to industrial consumers. Overall, the prices charged to the two groups will be sufficient to cover total costs.

In order to price discriminate effectively, the ability to resell must be limited. In the above example, the individual residential customers would not be able to resell their reticulated water to an industrial customer at a profit.

#### **Multi-part tariffs**

Multi-part tariffs are commonly used in water supply industries. A two part tariff is a simple form of this pricing approach. A two-part tariff involves an up-front or fixed charge plus a variable consumption charge, which ideally reflects the marginal cost of the water used. The rationale behind this approach is that the upfront entry fee covers the difference between the water supply utility's average and marginal costs. Because this entry fee is a sunk cost, the consumer's decision to use the water supply system is based on the marginal cost of its use, and so consumption decisions are efficient. Thus, consumers and producers react to the incentives normally associated with marginal cost pricing.

A problem with multi-part pricing is that some consumers may opt out of the market because their valuation of the service is less than the upfront charge, even though they value the service above the marginal cost of provision. This problem is a major issue for the urban poor in developing countries. One way around this problem is for different upfront fees to be charged to groups of consumers with different characteristics and valuations of the service. In the extreme case, the upfront fee for the very poor could be close to zero.

Declining block tariffs are a more complex form of multi-part tariff which may also include an upfront or fixed charge. A declining block tariff structure could, in theory, be designed to conform with efficient pricing if a consumer's decision to purchase the last unit of water is solely based on the price paid for the last block consumed. In this case, the initial units consumed in the billing period could be priced above marginal cost to recover fixed costs and the last units consumed could be priced at marginal cost. In this instance, the block structure would need to be designed so that all customers' consumption exceeds the higher priced blocks.

Failure to follow a marginal cost-pricing approach will lead to inappropriate incentives for consumption, production, and investment. However, the introduction of such an approach for water supply is not as simple as basic economic pricing textbooks might imply. This is because a water supply system entails large up-front costs and relatively low operating costs. A pricing system based on marginal costs alone will not recoup all the costs of even an efficiently operated system. In the absence of a subsidy from government, the water supply utility must consider a number of alternative pricing strategies so that all the costs, including environmental costs, of using, operating, and maintaining the system are recouped.

The various pricing strategies vary in their ease of implementation and in the effectiveness of the incentives they provide. For example, a simple easily implemented approach to pricing is a once off connection charge and periodic fixed charge. This pricing strategy ranks highly in terms of its ease of implementation but, as it has little relationship with cost or use, it ranks poorly in terms of incentives to conserve water. Such a pricing strategy also ranks poorly in terms of equity as the poor can be effectively priced out of the opportunity to be connected and consume reticulated water.

Ramsey prices and multi-part tariffs or combinations of these two pricing approaches are consumption based pricing strategies which limit the costs associated with departing from pure marginal cost pricing (see Box 6).

In Australia, it has been generally acknowledged since the 1980's that a two-part retail tariff structure for water will help facilitate an efficient allocation of water resources and recover efficient costs of production. For example, since 1993-94, the Sydney Water Corporation's approach to the pricing of retail water has been to use a two-part tariff where the variable tariff path over a period of years is based on the cost of producing the last (or marginal) increment of output (water). A fixed annual access charge is then determined to generate the difference in revenue expected to be generated through volumetric sales based on the variable charges. Thus, the access charge for water becomes a residual. Similar arrangements apply to nonresidential sewerage charges. Since 1996, the Corporation's regulator has determined this price path. Table 7 sets out the price stream for Sydney Water's charges over the period from 1995 to 2000 — the regulated prices are currently the subject of a mid-term review. The table highlights that although pricing reforms are well under way, Sydney Water's pricing structure continues to involve cross-subsidies through property-value based charges for non-residential consumers.

**Table 7: Sydney Water's Regulated Service Charges (A\$ of year)**

	1995–96	1996–97	1997–98	1998–99	1999–2000
<b>Water</b>					
–service charge per annum (\$)	80	80	80	80	80
– usage charge (c/kl)	70	76	80	85	90
<b>Sewerage</b>					
– service charge per annum (\$)	263	272	280	286	290
– non-residential usage (c/kl)	83	87	90	93	96
Stormwater drainage area					
– charge per annum(\$)	16	16	16	16	16
Non-residential property-value based charges (\$m)	141	121	101	81	61

Source: *Independent Pricing and Regulatory Tribunal* (1996).

The Victorian Government has also recently introduced corporatization and pricing reforms in its water utilities. Prior to 1995, Melbourne Water, a Government owned utility, was responsible for providing both wholesale and retail water and sewerage services for the Melbourne Metropolitan region. In 1995, the retail functions of Melbourne Water were broken up into three utilities servicing separate geographic areas. These separate utilities are wholly government owned companies established under the *Victorian State Owned Enterprises Act 1992* and incorporated under the Corporations Law. Melbourne Water, which is also corporatized, now provides bulk sewerage treatment and bulk water supply services to the water retailers and also provides metropolitan drainage services. A system of two-part pricing applies for its corporatized water supply utilities.

The Victorian reform process has seen extensive changes in the way water supply services are charged. Until 1 January 1998, water and sewerage rates were based on property values, regardless of whether water and sewerage were connected to the property. The new tariff structure has abolished water and sewerage rates.

The tariffs, which are only applied to properties connected to the water and sewerage systems involve:

- The introduction of a flat fixed fee for each connected property.
- Full application of consumption-based charges to the non-domestic sector.
- Introduction of a sewage disposal charge for non-domestic customers.
- An increase in the domestic sewage disposal charge.
- A small increase in water usage charges.
- Each retail business charging different prices to reflect their separate costs more closely.
- Abolition of the sanitary service charge for non-ratable customers liable for usage charges.
- Reform of trade waste charges.

Table 8 details the new tariffs applying in the three retail utilities supplying the Metropolitan Melbourne region and the previous charges which applied across the entire region. As an interim measure, the Treasurer regulates these new tariffs. However, the Office of the Regulator General, an independent body, oversees the other aspects of the regulatory regime.

**Table 8: Melbourne's New Water and Sewerage Prices**

Tariff Schedule	Prices pre-1998	New Prices from 1 January 1998		
		South East Water	City West Water	Yarra Valley Water
<b>Domestic Water</b>				
Fixed charge(\$ per property)	N/A	33.00	75.60	52.80
Usage charge (\$ per kl)	0.65	0.72	0.71	0.69
Water rate (c per\$ NAV)	1.118	N/A	N/A	N/A
<b>Domestic Sewerage</b>				
Fixedcharge(\$perproperty)	N/A	116.10	81.60	112.50
Usage charge (\$ per kl)	0.15	0.77	0.81	0.80
Water rate (c per \$ NAV)	4.216	N/A	N/A	N/A
<b>Non-Domestic Water</b>				
Fixed charge(\$ per property)	N/A	37.50	112.20	75.00
Usage charge (\$ per kl)	0.65	0.70	0.69	0.67
Water rate (c per \$ NAV)	2.585	N/A	N/A	N/A
<b>Non-Domestic Sewerage</b>				
Fixed charge(\$ per property)	N/A	190.00	144.00	175.00
Usage charge (\$ per kl)	0.00	0.76	0.79	0.78
Water rate (c per \$ NAV)	4.216	N/A	N/A	N/A

NA V = Net Annual Value; kl = Kiloliter (1,000 liters); N/A = Not available.

### 3. Some Complications in Water Pricing

Setting prices for water involves considerable information demands to determine the costs of supply and customers' willingness to pay. The collection of this information is straightforward for many inputs used in water supply such as labor, building rental, electricity, and chemicals. However, determining the cost of using infrastructure assets with a much longer life is more complex. For example, a water treatment plant is more difficult as assets often last for decades and the task of identifying the cost of using them in any one year is problematic. The first step in this process is to establish their current market value. However, in some instances, the assets are so unique that a market value can only be determined through their sale. In this case, proxies for their value should be established to provide a basis for estimating the costs associated with their use. In many cases trade-offs will need to be made and pragmatism will be an important ingredient in efficient infrastructure pricing. Expert advice should be sort in the valuation of such assets.

The augmentation of water capacity also presents problems for water pricing practices based on marginal costs. Water supply infrastructure like many other investments involves large capacity augmentations that take a number of years to be fully utilized. Strict applications of marginal cost pricing will lead to a saw-tooth pattern of prices over time and may raise concerns about inter-generational equity (Ng 1987). Generally, this approach to pricing is considered as unacceptable to consumers and politicians alike.

Commenting on the introduction of efficient water pricing based on water use rather than water rates (upfront fixed payments or taxes based on land values) in Australia's Hunter District water utility Paterson (1991, p.1) noted with regard to the application of marginal cost pricing:

“Unfortunately, reality always complicates the application of marginal rules and we are then transported from the world of science to the world of art. This is because any real world system of production and consumption has literally scores of variables in its production function and hundreds of marginals. We must choose, at most, a handful of these to price on... In that choice we express a quite subjective vision of what is considered to be both important and suitable

#### **4. Vesting Water Rights as a Means of Reducing Water Losses**

Introducing a system of tradable water rights allows a price and accordingly an opportunity cost to be assigned to the value of the water right. The operation of the competitive market will lead to the most efficient allocation of these water rights. As noted in Part 2, B., there is evidence from Chile which highlights that once water utilities are forced to pay for the water they use, they will become more concerned about the unaccounted-for water lost in their networks. Thus, there is an incentive to repair pipes and monitor and meter all those who are connected to the water supply network.

Vesting of tradable property rights in water resources also produces incentives for the agricultural sector to review irrigation methods and reassess the benefits and costs of the existing approaches to water use.

It should be stressed, however, that a water right, whether purchased or allocated free of charge, does not mean that the holder obtains free access to the water supply network. As Holden and Thobani<sup>5</sup> explain:

“Many confuse the water charge with the price of water rights. Under a tradable water rights regime, the water charge should equal the operations and maintenance cost of the infrastructure, whereas the price of water rights would be the market price for the ... right to use the water. To use an analogy from the condominium market, the water charge is equivalent to the condominium fee whereas the price of water rights is analogous to the sale price of the condominium. Under an administrative water rights regime, economic efficiency requires that the water charge should equal the opportunity cost of the water, which in our analogy, would correspond to the market rental price of the condominium — usually several multiples of the condominium fee. Whereas this price is difficult to set and enforce administratively, the sale or lease price under a tradable water rights system automatically reflects the opportunity cost of water.”

Thus, even the holders of water rights must contribute to the costs of the water supply system.

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<sup>5</sup> Holden, P. and Thobani, M. (1997) *Tradable Water Rights: A property rights approach to resolving water shortages and promoting investment*, World Bank Policy Research Working Paper No. 1627 (p. 13).

#### IV. PRIVATE SECTOR PARTICIPATION

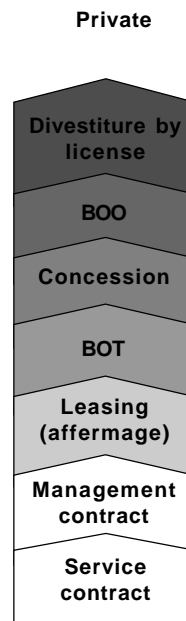
In many countries, PSP is a key requirement for meeting growing demands for water supply services. The private sector is an important source of new investment capital that is relatively scarce for many economies. It also brings management expertise and, in the case of foreign private investment, technologies and know how which may not be presently available.

The range of PSP options is quite broad. PSP in water supply involves a continuum of options ranging from options with a relatively low level of PSP to those with a high level of PSP. These are:

- Service contracts.
- Management contracts.
- Leasing — affermage.
- BOT type contracts.
- Concessions.
- Divestiture under license, or new entry of private sector participants through build-own-operate (BOO) arrangements.

Guislain and Kerf (1995) group these options into three categories, depending on the level of private sector involvement (see Figure 4).

**Figure 4: Options for Private Sector Involvement in Water Supply**



Source: Based on Guislain & Kerf (1995)

The World Bank (1994) discusses these approaches and variations on them in some depth. It identifies service and management contracts with the private sector as potentially useful precursors to more comprehensive PSP. Porter (1996) provides detailed analyses of all of these approaches with particular reference to international experience in the water and sanitation sectors. More detailed discussion of the various options is available in the above-

mentioned reports. The following subsections present a brief summary of the principal techniques.

## 1. Service Contracts

Service contracts include supply and civil work contracts, technical assistance contracts, plus sub-contracting or contracting out aspects of the water supply service. These contracts involve a water utility contracting with a private contractor for the provision of specific services such as tariff collection, tunneling, design cum information technology, operations and maintenance, and construction. In its simplest form, the private contractor provides agreed services to the public authority under the public authority's general control and supervision.

Service contracts are a potentially beneficial form of PSP where there is strong political or community opposition to wider involvement of the private sector and if there is opposition to water tariff increases which are generally required for many of the other forms of PSP (e.g., lease contract). The Johor Water Company (JWC) has implemented a service contract to help reduce leaks in the Johor Bahru network (see Box 7).

### Box 7: An Example of a Service Contract

Like many water utilities in developing countries, the publicly owned Johor Water Company (JWC) has relatively high unaccounted-for-water and non-revenue water. The JWC owns and operates the water supply network throughout the state of Johor in Malaysia. Johor Bahru is the capital of Johor state. Johor Bahru's bulk water is supplied under contract by a privately built, owned and operated water production and treatment plant. The JWC under this contract must pay for all water supplied to the utility, even unaccounted-for-water which is lost through the utility's leaking pipes. The need to reduce leaks is clear. In response to this need the JWC awarded a service contract to a third party. Payment under this contract is linked to performance.

In 1995 the level of non-revenue and unaccounted-for-water in Johor Bahru was 21 percent, this compares with 29 percent in the remainder of the state (ADB 1996).

## 2. Management Contracts

A management contract is a more comprehensive form of service contract, under which the public authority appoints a private contractor to manage all or part of its operations. Under such contracts, the bulk of the commercial risk and all the capital and investment risks remain with the government.

Responsibility for all investment remains with government under a management contract. These contracts are useful if the core objective is to increase a utility's technical efficiency for performance of specific tasks. If management contracts include clauses which link the contract payments to utility performance they come closer to the lease and concession arrangements discussed below (Guislain and Kerf 1995).

Like service contracts, management contracts can lead to improvements in service for those customers who are connected to the network but they provide little potential for improved access by those potential customers who are not connected to the network.

Management contracts are a potentially beneficial form of PSP when there is strong political or public reluctance to water tariff rises or there is concern about handing over more

control to the private sector. Management contracts may also be the preferred approach if potential private sector investors consider that the risks associated with a higher level of private involvement are currently too high. If this course is followed, the government over the duration of the contract can seek to address some of the risk factors. For example, the government may implement changes in tariff and regulatory structures to facilitate a greater preparedness for private sector risk taking in the future.

### 3. Lease Contracts

Under a lease contract, a water utility leases the full operation and maintenance of its facilities within an agreed geographic area to a private operator for a period of time, say, ten years. The contract grants the operator the right to invoice and collect charges from customers within that area. The public utility would own the assets and remain responsible for major extensions and upgrades. The operator would be consulted on all major works, especially when the continuity of service is involved, and may participate in tender evaluation or submit its own tender. Box 8 presents an example of a lease contract and some problems that can be encountered.

#### Box 8: An Example of a Lease Contract

The Kelantan Water Company was the first water supply utility to be privatized in Malaysia. The arrangements do not amount to a full in perpetuity divestiture but are more in line with a lease contract. At the outset the privatized Kelantan Water Company owns all equity. However, equity is to be transferred to the state over the life of the contract. By year twelve, 50 percent of the company's equity will have been transferred to the State, by the end of the concession the State will own 70 percent of the equity.

The contractor leases the existing assets at zero cost. Under the contract, the water supply company has responsibility for water production and distribution; operation and maintenance; billing and collection with payment into an escrow account.

Fees are paid from the escrow account on the basis of production, number of connections and reduction in non-revenue water.

The water tariff is determined by the Government. According to newspaper reports, the Government raised water tariffs to a level sufficient to pay the contract service fee. However, the level of public resistance to this increase led to the Government revoking the tariff rise. As a consequence, the Government incurred a deficit to pay the service fees.

Under a best practice lease contract, the private operator would take the full commercial risk on all operations within its lease area, with its remuneration directly linked to the charges it collects from customers. From these charges, it would pay the public utility a rental fee intended to cover the public utility's capital costs in extending or upgrading the facilities.

Under a lease contract, the operator is usually required to finance the renewal of plant and equipment. At the termination of the contract, the government would compensate the operator for the works it had financed that had not yet been fully amortized. The management of such works (preparation, procurement, and supervision) would be the operator's full responsibility. Best practice lease contracts have built-in incentives that encourage the private operators to:

- Update customer files and implement efficient collection procedures to improve the collection ratio from customers (including government agencies).
- Implement an aggressive commercial policy aimed at servicing more customers to increase the revenue base.
- Reduce operating costs to maximize profits.
- Carry out regular maintenance to increase the reliability of plant and equipment and postpone their renewal.
- Make decisions, not only on day-to-day management issues, but also on improvement of the facilities for which the operator is responsible.

#### **4. BOT Type Contracts**

BOT, build-own-operate-transfer (BOOT), and ROT schemes are a variety of adaptations of leasing contracts specifically designed for greenfield water supply projects or investments in water supply infrastructure which require extensive rehabilitation. The nature of these contracts makes them particularly amenable to new sources of bulk water supply. Under these arrangements, the private sector typically designs, constructs and operates facilities, and provides services to municipal or government owned water utilities. Generally, any existing underlying assets are leased for a limited period, often 15 to 30 years. Contracts should be designed to allocate risks between the private operator and the public utility, preferably according to capacity to manage and minimize risk.

In contrast with lease contracts, BOT type contracts allocate much more of the commercial risk for specific projects to private parties rather than governments. They can also provide a relatively quick method for mobilizing project based non-recourse finance for new capital investment in developing countries, particularly where capital markets are poorly developed (see Box 9).

Because BOTs are associated with greenfields investments in water supply, they have generally been production or bulk supply focused (see Box 9). Such bulk water supply investments cannot deal with the major problems of high unaccounted-for-losses in water distribution systems. Nor do they allow private operators to seek out new customers and expand their operations where it is commercially viable. In general, BOTs are not likely to remedy a utility's faulty (leaking) distribution system or its poor collection processes.

BOT schemes, because they do not involve management of distribution systems down to the household or business meter, are easier to implement than more comprehensive private sector models such as retail concessions, which require more extensive negotiation of contracts. In economies with poorly defined regulatory and legal structures and emerging capital markets, BOT schemes can be implemented relatively quickly and provide a building block for subsequent PSP in the rest of the distribution system. The lessons from Johor are of value to other nations in the region faced with water supply problems.

It should also be noted that in application, or through extension of the contract, a ROT type contract could cover bulk or retail distribution. Thus, it can be very similar to a concession, delivering services to household customers, with the private sector assuming demand risk.

### Box 9: An Example of a BOT Contract

Johor Bahru is a southern city in the state of Johor. The city, like the remainder of the state, is being supplied with water by the Johor Water Company (JWC). A study undertaken by the company in 1991 found that water shortages were imminent unless bulk water supplies could be expanded, particularly in the capital Johor Bahru. As funds were not available to resolve this problem the state and federal governments decided to seek PSP in the supply of bulk treated water.

Tender documents for the Johor Bahru bulk supply project were issued in August 1991. The three bidders for the project were pre-qualified consortia made up of local and international companies. Competing bids were submitted by December 1991.

Since June 1992, Johor Bahru's bulk water has been supplied under a BOT/ROT contract. The contract requires a three-stage rehabilitation and construction program. Stages one and two have been successfully completed. Commencement of the third stage will be triggered when consumption reaches a prescribed level.

The successful completion of stages one and two has resulted in a substantial increase in the quality and quantity of bulk water supplied to the city of Johor Bahru. The bulk water supply capacity had increased by 75 percent within 30 months of signing. By 1996, capacity had more than doubled. The volume of bulk water supplied under the contract had increased from 30.4 MGD in 1992 to 65 MGD in 1996. Until the recent Asian economic downturn, production continued to grow, with demand increasing by approximately 11 percent in 1997.

Contracts for private sector investment in bulk water supply will generally lead to an increase in the retail water utility's costs. This cost increase needs to be recognized by the utility and the Government and to prevent the utility from making losses this situation needs to be addressed. Unfortunately, measures were not put in place to address this problem in Johor. The JWC's water tariffs have not changed since 1991. However, the bulk water costs associated with supplying retail water have increased in nominal terms. This is because under the BOT/ROT, the price of the bulk water purchased increases annually. In 1995, for example, Johor Bahru's average bulk water tariff was RM0.96 per cubic meter, whereas the average retail water tariff per cubic meter for domestic consumers was RM0.6 and RM1 .6 for industrial consumers. It has been reported that the JWC has not been profitable in recent years. The failure to link retail water tariffs to the bulk water charge has contributed to this situation.

Appendix 1 presents more detail on the Johor Bahru contract, outcomes and lessons learned.

Effective implementation of BOT/ROT type contracts requires careful attention to the design of tender documents and can involve a relatively lengthy bidding process. Experience with some BOTs shows that they have achieved some savings in capital construction costs and have facilitated more rapid investment in infrastructure. However, they can also have a downside in that they can be an expensive way of substituting private debt for public debt, if there is an expensive take-or-pay contract for sale of bulk water to the retail utility. Many BOTs have failed to deliver optimal outcomes for government or consumers. This is because the government's agency responsible for negotiating allowed too much of the risk to remain with government - especially where (foreign exchange) guarantees on commercial risks are provided or where take or pay contracts are signed.

Concern about the effectiveness of BOT type contracts has seen a number of governments ban or at least put restrictions on their use. For example, the Government of Malaysia has decided that it will no longer use this form of PSP. Similarly, in 1993 the PRC Government imposed a freeze on rates of return for BOT contracts. This effectively halted foreign projects for over two years. These controls have now been eased and BOTs are to be considered on a case by case basis.

## 5. Concession Contracts

Concession contracts combine elements of operation leases for existing assets and BOT contracts for greenfields or ROT contracts for major rehabilitation investments. Under concession contracts, a private operator is given a contractual right to use existing infrastructure assets to supply customers. However, the concession contract also includes obligations to finance extensions and upgrades to the existing water supply. This tends to result in concession contracts being of longer duration than lease contracts to enable the operator to recover its capital and financing costs. Management of all capital extensions and upgrades, as well as normal maintenance, is often entirely the responsibility of the operator. Procurement, in particular, could follow acceptable commercial practices that are often different from those required of public agencies. Box 10 presents details of two concession contracts recently awarded in Manila.

In comparison to single project BOT type schemes, concessions leave greater flexibility in the hands of the operator in determining the nature and timing of the investments they make to achieve contractual supply obligations. Typically, under a concession agreement, the constructor and operators also are given the right to supply retail services direct to customers.

For some water supply networks, for example those spanning an entire state or large city; it may also be possible to have a number of concessions operating at the one time. This would have the potential advantage of enabling government to compare the performance of concessionaires, to assess the price and quality of their services, and to evaluate the adequacy of investment programs for meeting community needs. There may also be potential to allow some level of competition between concessionaires, say, for large commercial customers using third party access arrangements.

The rights to provide services under concession arrangements can be awarded through a process of competitive tendering for the concession contract or through direct negotiation. An advantage of competitive bidding for concession contracts is that it limits the scope for monopoly pricing, and thereby avoids the requirement for heavy-handed industry regulation. However, there can be trade-offs when the competitive bidding process determines the successful tender with reference to the lowest supply price to consumers. This is because low prices are not always conducive to efficient demand management of the water resource. If the competitive bidding process involves a range of quantitative variables, such as reductions in unaccounted-for-water, increased use of meters, etc., the selection process becomes more complicated as these qualitative variables are likely to differ between bids.

Thorough preparation and negotiation of scopes of works are required for all concessions to prevent experienced concessionaires extracting advantageous terms. In all cases, the regulatory framework for the concession will be important in determining its success.

### Box 10: An Example of a Concession Contract

To address the entrenched problems of low coverage and high unaccounted-for-water losses in metropolitan Manila, the Government initiated a process of contractual negotiations with the private sector to operate, maintain, upgrade, and augment Manila's water supply and sanitation system. This process has led to the selection by competitive bidding of two private water concessionaires to supply east and west Manila in January 1997.

The design of the Manila water supply concession contracts reflect rigorous preparation in defining rights, responsibilities, and relationships. The two 25-year concessions were granted for water supply and sanitation for east and west Manila. They have been in operation since August, 1997.

Under the concessions, the Metropolitan Waterworks and Sewerage System (MWSS) still owns the assets, but transfers operations and investment responsibility to the private sector.

The two private concessions are geographically separated into east and west zones, but vertically integrated (they include water and sewerage, headworks, distribution, and retail). The concessionaires are required to have a minimum 60 percent Filipino ownership.

The concessionaires have rights to the local water source (Angat) but must supply all additional bulk water needs. The standards and targets for improved service and coverage are stipulated in the concession agreement. The targets include:

- Universal water services for population of MWSS service area within 10 years — without an increase in real water tariffs.
- Non-revenue water (NRW) to decrease by 24 percent in the first 10 years.
- System to address one third of service area population who are poorest and unable to afford piped water.
- Uninterrupted 24-hour service, meeting World Health Organization (WHO) standards, within three years to all connected customers.
- Wastewater to attain over 80 percent coverage within concession period (25 years).
- US\$7.5 billion investment to improve and expand system over the concession period.

Tariff adjustments are subject to review and approval by Government. In the contract, the concessionaires should not adjust the tariffs for the first 10 years. However, petitions were presented to the regulatory office for substantial tariff increases to take effect on January 1, 1999.

There are two subsidiary agreements to the concession agreement. Firstly, a joint venture (JV) agreement for common facilities and secondly, an interconnection agreement — covering metering points for the pipelines crossing each concession.

Within the MWSS a unit, with five members, has been set up to regulate, monitor and enforce the concession agreement. Outside of the MWSS, an arbitration panel of three members has been formed with the mandate of resolving any disputes between the regulator and concessionaires.

At the time of writing this report, both concessionaires had applied to the MWSS for a tariff review to help offset the dramatic decline in the exchange rate. At the time of writing this matter had not been resolved. Appendix 1 presents more detail on the Manila concessions.

## 6. Divestiture and Build Own Operate

PSP in infrastructure can also be achieved through the direct sale of infrastructure assets to the private sector. Private ownership of assets may be achieved through either 100 percent private ownership or JV5 with public sector corporations. In either case, government retains the regulatory role.

Divestiture can be by way of sale of assets, sale of shares or management buy-out. Like divestiture, BOO contracts require removal of constraints to private sector entry in water supply and the introduction of competitive market structures or regulation by government.

In a full divestiture or BOO arrangement, the private sector has full responsibility for operations, maintenance, and investment in a utility. In contrast to a concession, these arrangements transfer assets to, or permit greenfields water supply investments by, the private sector. In a concession, the government continues to own the utility's assets and is therefore responsible for ensuring that the assets are used efficiently and, in particular, returned to the government in the appropriate condition at the end of the concession period. Furthermore, the government needs to ensure customers are protected from poor service and monopolistic pricing. Under divestiture or BOO, it should be the private company's concern to operate, design and maintain the asset base. The government, on the other hand, would concern itself with the regulation of the water utility, which commonly involves a license to operate a water supply system.

Guislain and Kerf (1995) point out that although the private company has ownership of the water supply assets, these arrangements do not necessarily mean permanence. Typically, the government only allows the right to supply water under an operating license. This license can include a clause that permits its revocation or a not to renew clause. In England and Wales for example, the Government may terminate the privatized water utilities' licenses after twenty five years with ten years notice. Thus, Guislain and Kerf claim that the difference between a traditional fixed term concession and indefinite divestiture with a license may not be as significant as it might first appear.

The following two tables (Tables 9 and 10) allow comparison of the institutional arrangements under each type of PSP and highlight the potential benefits of each form of PSP.

**Table 9: Main Features of Private Sector Participation Options for Water Supply**

<b>PSP Option</b>	<b>Service Contract</b>	<b>Management Contract</b>	<b>Lease Contract</b>	<b>Build Operate Transfer (BOT)</b>	<b>Concession Contract</b>	<b>Full Divestiture</b>
Financing investments	Public sector	Public sector	Public sector	Private sector	Private sector	Private sector
Financing working capital	Public sector	Public sector	Private sector	Private sector	Private sector	Private sector
Contractual relation with retail customers	Public sector	Private sector (on behalf of public sector)	Private sector	Public sector	Private sector	Private sector
Private sector responsibility and autonomy	Low.	Low	Low to medium	Medium to high	High	High
Need for private capital	Low	Low	Low	High	High	High
Financial risk for private sector	Low	Low	Low to medium	High	High	High
Duration of contract/ license (years)	1-2	3-5	5-10	20->30	20-30	License may be in perpetuity with provision to withdraw or revoke
Ownership	Public sector	Public sector	Public sector	Private then public sector	Public sector	Private sector
Management	Mainly public sector	Private sector	Private sector	Private sector	Private sector	Private sector
Setting retail water tariffs	Public sector	Public sector	Contract and regulator	Public sector	Contract and regulator	Regulator
Collecting retail water tariffs	Public sector	Private sector	Private sector	Public sector	Private sector	Private sector
Main objective of PSP	Improve operating efficiency	Improve technical efficiency	Improve technical efficiency	Mobilize private capital and/or expertise	Mobilize private capital and/or expertise	Mobilize private capital and /or expertise

Source: *Idelovitch and Ringskog (1995) and Tasman Asia Pacific.*

**Table 10: Potential Benefits of Various Private Sector Participation Options**

<b>Service Contracts</b>	<b>Management Contracts</b>	<b>Lease</b>	<b>Concession</b>	<b>BOT/BOOT/ROT</b>	<b>Divestiture</b>
Promotes competition in area of contract	Can improve service	Can increase efficiency of asset management – increases profits	Takes over management of operations from government	A fast option for improving bulk water supply	A fast option for improving bulk water supply
If contract fails, risk is relatively low	Reduced risks to government and contractor	Reduced government risk of not collecting adequate tariffs	Relieves government of need to fund investments	Full responsibility for operations, capital raising and investment goes to private sector	Full responsibility for operations, capital raising and investment goes to private sector
Contracts of short duration - if problems with contract — can easily re-tender	Potential first step to concession contract	Proportion of management responsibility and commercial risk transferred	Full responsibility for operations, capital raising and investment goes to private sector	Potentially large improvements in operating efficiency of bulk assets	Potentially large improvements in operating efficiency of water utility
Easy/simple contractual form	Potential for setting performance standards (with incentives to achieve standards)	Incentives for contractor to minimize costs, provide reliable services	Potentially large improvements in operating efficiency	Full private sector incentives in bulk supply	Full private sector incentives in bulk supply
Potential starting point for PSP	Scope to introduce private sector management skills	Incentives across utility and maximize revenue collection	Full private sector	Attractive to private financial institutions	Attractive to private financial institutions
Can increase utility's focus on core business	Limited commercial risks		Attractive to private financial institutions	Mobilizes private finance for new investments	Mobilizes private finance for new investments
Potential for efficiency gains in the area covered by contract	Can revert to in-house management or contract may be re-tendered if problems arise			Addresses funding shortfall	Addresses any funding shortfall. Could be successful where there is good track record of
	Potential for utility to bring in competition				private sector ownership Private water company would have clear incentives and achieve full cost recovery

## V. PRO-COMPETITIVE AND MONOPOLY CONTROL STRATEGIES

As a general principle, it is better to regulate competition and industry behavior under a minimal set of common rules that impose similar standards without discriminating between industry sectors or ownership categories. However, in the water industry, there are no obvious means for removing public sector inefficiencies and encouraging private sector investment without generating a need for some specific regulation or sectoral strategies to control monopoly power. Ideally, these strategies should enhance competition and improve the cost effectiveness of private sector involvement. Strategies to increase the potential for competition and/or regulate monopoly power include:

- Competition for the market — a form of competition when competition in a market is not feasible.
- Networks and comparative competition - techniques to facilitate competition in a market.
- Third party access to infrastructure — a technique to facilitate competition in a market.
- Rate of return regulation — a technique to control monopoly power.
- Cost-plus pricing — a technique to control monopoly power.
- Price cap regulation — a technique to control monopoly power.

### A. Competition for the Market

The characteristics of waste water and water supply infrastructure mean that in the absence of some regulatory or sectoral intervention, such as unbundling or third party access discussed below, the supply of water to a particular area will be by a regional monopoly. While the potential to increase competition within the market may be relatively limited, competition for the market itself is possible and desirable.

Competition for the market requires the rights for the private sector to provide water supply services to be awarded through a process of competitive tendering, rather than through one-to-one direct negotiations. Competition for the market is feasible for most of the PSP options discussed in the previous section — the exception being service contracts which can also be let on a competitive basis but are not necessarily for a market.

Competition for the water supply market can take a number of forms. At one extreme, the rights to supply water are sold to the highest bidder. In this case the government would maximize its return from the sale of the rights, as bids would reflect any monopoly rent expected to be earned from the water utility. However, water prices in this case would be set at a monopoly level.

An alternative form, at the other extreme, is for the competitive tenders to bid an average price for supplying water over a specified period — say, the life of the concession or the BOT/ROT. In this case, the lowest bidder receives the water supply right. In a market with good information and many bidders, this approach should lead to an efficient price being charged for water supply as the monopoly rent has been competed away through the competitive tender

process. An advantage of this form of competitive tender is that it limits the scope for monopoly pricing, and thereby reduces the need for heavy-handed day to day regulation.

Competitive tenders may also involve a multi-part bid, with payment of an up-front fee and/or an annual rental fee as well as the average water supply price. However, in this case bids could feasibly include a monopoly rent component. The selection of the winning tender also becomes more difficult.

However, thorough preparation of the tender including documentation of the regulatory framework and careful negotiation of scopes of works are required to prevent experienced concessionaires extracting advantageous terms.

To ensure a satisfactory outcome, it is also important for all parties that the competitive tendering process is transparent. In this regard care should be taken to ensure that there is a level playing field in the treatment of all tendering firms. In addition, the system for contractor selection should be documented and made available to all parties prior to the commencement of the bidding process.

Competitive tendering for private sector provision of water supply is relatively new in the East Asian context. A major recent example has been the selection by competitive bidding of two private water concessionaires to supply east and west Manila in January 1997 (see Box 11).

#### **Box 11: The Tender Process for the Manila Concessions**

The competitive tender process for the Manila concessions was comprehensive and included a detailed study process and the actual bidding process.

A feasibility study covered the form, extent, process and guidelines for privatization and took eight months to complete. Detailed information for prospective bidders was made available. The study analyzed the advantages and disadvantages of partial or full privatization, and recommended the latter option. The study drafted a 25-year concession agreement.

The International Finance Corporation (IFC) assisted the MWSS and the Government of the Philippines throughout the bidding process. Specific criteria were specified for bidders, including a requirement for a 60 percent minimum Filipino shareholding with a maximum foreign shareholding of 40 percent. A pre-qualification process in itself ensured the bidders were technically and financially capable. Four consortia pre-qualified.

Bid documents and guidelines and the draft concession agreement were circulated prior to bidding. The consortia were required to bid for the two concessions (east and west zones). However, a winning consortia was to be awarded only one concession. The bidding for both concessions took place at the same time.

A technical committee reviewed the bids — which took nine months for the bidders to complete. Two separate bids were required from each bidder (technical and financial proposals). The bids were required to be based on average tariffs to be charged. All four pre-qualified bidders submitted proposals which met the specific technical requirements. A formula and procedure was adopted to determine the best combination of bidders.

The process was competitive, in that it included public notification, circulation of the draft concession agreement and bidding documents to the pre-qualified bidders, and a formal process for screening leading to pre-qualification.

## **B. Unbundling and Comparative Competition**

Unbundling or breaking up water utilities into smaller business units is a structural reform which can directly or indirectly lead to increases in competition. Central to any analysis of structural reform is the notion of whether it would be worthwhile to move away from a unified entity towards a set of separate companies with separate boards and legal accountabilities. Ultimately, judgments must be made on whether the competition gains will outweigh any costs associated with the loss of economies of scale or scope and the additional transactions costs of using the contractual process.

Depending on their size and topographical conditions, it is often feasible to break up the distribution system into defined geographical areas. The private sector investments in the Manila water supply sector have been implemented using this technique.

Whether the water distribution enterprise boundaries should be contiguous with local government boundaries does not seem to be a key matter. In general, in seeking competitive tenders for water supply services, the boundaries drawn should be those which make commercial sense.

Once a water supply network is broken up into discrete business operations in a geographical region, the regulatory framework would prevent reintegration to ensure that the industry retains a number of unbundled firms. If the utilities are to remain in public hands, a commercialization or ideally a corporatization process, such as discussed in Section III, should be introduced as part of the package of pro-competitive reforms.

The geographical disaggregation of a water supply network cannot facilitate strong direct competition. Consumers and producers would, in most instances, find it too expensive to relocate to a lower cost or higher quality area in order to choose one supplier rather than another. Thus, direct competition from disaggregation would generally be limited to competition for new customers or for customers who decide to relocate for reasons which are primarily not related to water cost or quality. Nonetheless, these water-related aspects will be factored into their location decision.

On the other hand, indirect competition such as yardstick or comparative competition, is facilitated by unbundling. Comparative competition, like unbundling, is implemented as part of the regulatory framework. The industry regulator can then compare performance of the separate companies. Performance comparisons can cover a range of variables including water tariffs by customer class, operating costs per property, operating costs per cubic meter of water, and unaccounted-for-water and may be undertaken for the utility as a whole. Similarly, comparison can be made for segments of the utilities' operations such as pumping stations, bill collection, etc. As well as being a surrogate for market competition, the information gain from comparative competition gives the regulator more transparent information on the relative performance of similar companies if other forms of monopoly regulation such as price cap regulation are also used.

Comparative competition is used in the UK's privatized water industry in two ways. First, the information is published in tables of performance against key indicators. Second, the comparative unit cost information is used in quantitative analysis by the regulator to help make

decisions about the potential for cost reductions in the price cap formula - Office of Water Services (OFWAT) 1998.

Australia also uses comparative competition in the regulation of its water supply and sewerage utilities. Performance comparisons are made across a range of financial variables. Although participation is voluntary, most regional water utilities participate in the comparisons. However, participation has been anonymous and results are aggregated. Hence, the usefulness of the information in encouraging competition must be questioned.

### **C. Third Party Access to Water Supply Infrastructure**

Access regimes seek to increase competition by allowing businesses other than the owner of a water supply network to utilize those services of the network which are crucial for achieving competition in another market. The following hypothetical example illustrates the access regime concept.

The Left Bank Water Supply Company, as its name implies, operates on the left bank of a river which divides a large city. The Right Bank Water Supply Company operates on the other bank of the same city. Both companies operate as regional monopolies. An access regime could facilitate competition in the retail water market. By mandating third party access to the services of certain essential water supply infrastructure, such as pipelines, each company can, on payment of an access fee, compete in the retail water market on the opposite river bank.

Thus, access regimes are about legislation and/or regulation enabling competition which would not otherwise occur. Certain water supply facilities in Australia and the UK are now subject to this threat of competition from third party access. However, at this stage, no actual competition through third party access to water supply infrastructure has occurred (Box 12).

Access which generates real competitive pressure in upstream or downstream markets will encourage water supply companies to minimize their costs and charge competitive water tariffs. It will also limit opportunities to cross-subsidize and reduce or eliminate the potential for labor and capital to enjoy monopoly rents.

While access regimes can bring competition to markets which would otherwise be monopoly markets, they can involve some costs. One potentially major cost is the risk of undermining incentives for the private sector to invest in infrastructure assets. Unless access regimes are tightly controlled and only used in circumstances where the infrastructure has natural monopoly characteristics, and where access to the services of that infrastructure is essential for competition to occur in another market, the costs allowing access may outweigh the competition benefits. Firms may cease to invest in or upgrade networks (pipe mains, etc.) if other parties can easily and cheaply piggy-back on the investments.

### **D. Rate of Return Regulation**

Rate of return regulation aims to control monopoly behavior by limiting maximum allowable profits. The approach emerged in the United States more than 50 years ago, following public concern over the large profits being earned by some monopoly public utilities and the (perceived) excess prices charged to achieve those profits (Sherman 1989).

## **Box 12: Third Party Access to Water Supply Infrastructure in Australia and the United Kingdom**

### ***United Kingdom experience***

In April 1996 a proposal was put forward by the Environment Department to increase competition in the UK's privatized water supply and sewerage industry by introducing common carriage arrangements — a form of third party access.

The proposal recommended legislative changes to allow any existing water undertaker (including new appointees) or a new supplier holding a direct supply license from the Director General, to supply customers by means of common carriage across any water undertaker's system. In the absence of agreement between a prospective incoming supplier and the incumbent undertaker, the Director General would have the power to determine the terms on which water should be supplied.

The Competition Bill through its prohibition of abuse of a dominant position will enable common carriage to be developed. However, the Director General of OFWAT has stated that the passing of this Bill may not be sufficient and that further legislative changes will need to be made to facilitate common carriage. By September 1997 OFWAT had received two applications for common carriage of water.

### ***Australian experience***

Since 1995, Australia has had a national generic framework for third party access to the services of certain infrastructure. Access may be achieved through three avenues:

- Declaration — an access seeker may request that the National Competition Council recommend to the relevant minister that the service(s) of a nationally significant infrastructure facility be declared. Declaration is subject to the service satisfying a number of criteria including that access to the service would promote competition in at least one market other than the market for the service and it would be uneconomical for anyone to develop another facility to provide the service and that access would be in the public interest. Once a service is declared, the infrastructure service provider and the access seeker are required to negotiate acceptable terms and conditions of access. If these negotiations fail, arbitration can be sought;
- Undertaking — any infrastructure provider may give an access undertaking to the Australian Competition and Consumer Commission. Acceptance of an undertaking is subject to a number of criteria being satisfied, including whether access would be in the public interest, If an undertaking is accepted then access terms and conditions are determined with reference to the undertaking; and
- Other regimes including state, territory and private sector regimes.

By June 1998 access regimes were in place for a range of infrastructure services including for third party access to services of certain railway lines and natural gas distribution networks. There are many services of water supply infrastructure which could satisfy Australia's national access framework. The consultant understands that negotiations are underway for access to certain trunk water mains services for the transport of irrigation water and there has been some interest by a number of retail water suppliers to obtain access to certain wholesale networks. However, no third party access to water supply infrastructure services had been negotiated by June 1998.

Under rate of return regulation, the regulator reviews the water utility's costs and sets a fair rate of return on assets. The utility then sets its prices to achieve that target rate, with the knowledge that it cannot retain any extra returns.

At first glance this approach to monopoly control seems a simple and sensible approach. However, setting the regulated rate of return to guarantee only fair profits is extremely difficult. If

the rate is set too high or too low, it can exacerbate any existing production and pricing inefficiencies. Usually, the regulator will not know *ex-ante* whether it has set an inappropriate rate of return. The valuation of the assets to which the rate is applied is also problematical particularly for water utilities that have been operating for long periods of time.

Even if regulators could set the regulated rate of return to guarantee only fair returns, the regulation itself can introduce market distortions. Possible distortions include:

- Using more capital relative to other inputs, even though this may not be consistent with least cost production. Averch and Johnson (1962) point out that this can occur because under rate of return regulation, the quantum of profit that a regulated firm is allowed to earn increases as more assets (i.e., capital) are used in production. In order to increase its level of profit it becomes rational for the utility to opt to pay higher rather than lower prices for assets that perform a similar function (i.e., gold plate) or install capital assets that do not contribute to production (i.e., cost pad).
- Reducing incentives to innovate and reduce costs. Innovation allows a firm to produce the same level of output at lower cost. Under a rate of return approach, if production costs fall, so does allowable profit. Where innovation does occur, it is more likely to augment non-capital inputs, even though this may not be consistent with least cost production.

Given these potential distortions, the application of rate of return regulation to water supply utilities should be considered on a case by case basis.

## **E. Cost-plus Pricing**

Cost-plus pricing aims to control monopoly power by restricting price increases to reflect changes in all or a selection of production costs. This approach has some similarities to rate of return regulation. This approach also has the potential to lead to inefficiencies. For example, there is little incentive to minimize costs if water tariff increases are always guaranteed to follow on from cost increases. If changes in total costs are used as the determinant for rises in water tariffs, then there will be an incentive to incur costs that do not necessarily add to the quality of the service. For example, excessive expenditure on training and attendance at conferences or unnecessarily heavy expenditure on advertising or public relations activities would fall into this category. On the other hand, if price rises are based on a selection of costs, such as labor and electricity, there is little incentive to minimize these costs but a substantial incentive to minimize other costs.

Cost-plus pricing places substantial burden on the regulator to get the initial base tariff correct. Determining the initial tariff rate will be made more difficult in instances where the water supply assets are greenfields or where the previous water utility operator had been heavily subsidized or earned zero or negative returns on assets. If this initial water tariff is set too high, then profits will be higher than required to justify the risks and the investment and this position will be maintained over time. If the initial tariff is set too low then the utility will not be profitable and rates of return and costs will need to be reviewed — in this instance cost-plus pricing becomes *de facto* rate of return regulation.

Linking water tariff increases solely to costs also limits the opportunity for water tariffs to reflect changes in the level of demand or supply. For example, if water prices can only change to reflect cost increases there is no opportunity to use the price mechanism to reflect seasonal factors or other demand management concerns.

This form of price regulation is used by the regulators of the Macau Water Supply Concession (MWSC) and the Johor Bahru BOT/ROT (Box 13).

### **Box 13: Water Tariff Regulation in Macau, China and Johor Bahru**

#### ***Macau, China***

The Macau, China water concession contract includes a form of cost-plus tariff regulation. Under the contract, there is an annual revision of the tariff based on a tariff formula. The formula allows for tariff increases based on changes in the costs of raw water, energy, labor, and a range of specified repairs and maintenance costs.

However, the tariff increases in Macau, China have been lower than those permitted under this cost-plus formula. This is because the substantial increase in Macau, China's population and economic activity have allowed the concession to enjoy greater economies of scale and consequently cost reductions not envisaged when the concession contract and the tariff formula were negotiated.

#### ***Johor Bahru***

Under the Johor Bahru BOT/ROT contract, bulk water is supplied to the Johor Water Company (JWC). Payments for bulk water are in two parts:

- a fixed monthly payment, determined on the basis of the contract's fixed costs; and
- variable charge on a decreasing sliding scale.

The fixed monthly payment is adjusted in line with inflation, subject to the minimum tariff increase being 4 percent per annum. The variable charge is adjusted annually. These tariff increases are determined by a tariff revision formula negotiated as part of the contract. Under this formula, tariffs increase in line with inflation but are also adjusted for costs of energy, chemicals, and labor.

## **F. Price Cap Regulation**

Price cap regulation aims to restrict abuse of monopoly power by constraining the water utility's future price increases by an index which is outside of the control of the firm. The index used in the price cap formula is normally a price index, such as a general measure of the rate of inflation in the economy. However, price cap regulation goes further than simply restricting tariff increases to the rate of increase in the price index (PI). The regulation also includes a negative factor (X), which reduces the rate of increase. The level of X is based on the share of expected or required cost savings to be passed on to customers. These cost savings may arise from increased productivity, technological change or changes in economies of scale or scope. Any cost savings in excess of X can be retained by the water utility as profits.

Thus, in its simplest form, price increases are capped by the formula  $PI - X$ . However, price capping formula can be much more complicated. For example, they can include multiple products and can allow for additional price increases to facilitate water quality improvements, or can over changes in costs of inputs which are outside the control of the regulated firm.

Price caps operate for a fixed period, say five or ten years, after which regulated maximum tariffs and the components in the formula are reviewed and reset.

In recent years, regulators in a number of countries have tended to use price caps rather than rate of return regulation or cost-plus regulation. Price caps have been chosen because they help avoid some of the pitfalls commonly associated with rate of return regulation. PI-X allows private sector managers to concentrate on minimizing costs rather than adhering to rules and regulations common to more heavy-handed forms of monopoly control. It also encourages firms to share cost savings with consumers.

PI-X regulation has been used extensively in the UK since the 1980s, and since 1989, it has been used by OFWAT to regulate the privatized water utilities (Box 14). PI-X regulation has also become common in other countries. For example, it is used in Australia to regulate Telstra, Australia Post, various state electricity utilities and the gas utility in New South Wales.

#### **Box 14: Price Cap Regulation in the UK Water Industry – An Opportunity to Learn From Another’s Early Mistakes?**

From 1973 to 1989, there were ten vertically integrated water authorities in the UK, each responsible for providing water, sewerage and drainage services in England and Wales. The assets of these water authorities were transferred to 10 subsidiary companies, which were sold to the private sector in 1989 as part of the conservative Government's wide ranging privatization program. At the time of privatization, the Government and the water supply purchasers recognized that substantial investment was required in the industry to improve drinking water quality and environmental quality to European Union Standard. A condition of the 10 sales was that the water supply companies should improve quality.

The Government introduced price-cap regulation in 1990. This action was in response to concern that the utilities would abuse their monopoly power. In 1989, companies were asked to provide estimates of their future costs with reference to an asset management plan. These costs were scrutinized by consulting engineers and then reduced on the basis of the potential for efficiency saving. This information formed the basis of the first price cap formula which was:

Price cap 1990 to 1995 =  $RPI + K$  where:

RPI represented the retail price index; and

K represented the incremental cost of quality improvements minus the efficiency element.

OFWAT, the UK's water supply regulator, believes, with hindsight, that the water companies were able to exert undue influence over Government in the setting of these initial pricing limits. The result of these limits was that water charges increased by about five percent per annum or 25 percent over the quinquennium, in real terms.

There was considerable customer unrest as the first periodic review of the price formula approached. Water affordability was becoming an issue for a number of low income customers. Further, the water companies return on investments was around 13 percent. As part of the review process, OFWAT it was later determined that the average cost of capital was five to six percent.

A more precise cost and output matrix was defined as part of the first periodic review and companies were requested to put forward an asset management plan for the second pricing period. OFWAT, on inspection of these plans, found them to be gold plated, being little more than overbids for resources to carry out dubious improvements. A process of cutting these bids and their costs down to size commenced. It was reported that the debate between the regulator and the companies about the cost of capital was intense and at times heated. The review outcome was that the escalator K in the previous price cap was reduced from five percent per annum to one percent. The K escalator was also broken down into its components of quality and efficiency as follows:

Price cap 1995 to 2000 =  $RPI + Q - X$  where:

+ Q is the incremental upward cost pressure of quality improvements and

- X is the forward looking efficiency improvement.

**Box 14: Price Cap Regulation in the UK Water Industry  
– An Opportunity to Learn From Another’s Early Mistakes? (continued)**

Consumer dissatisfaction continued after the 1995 periodic review. Customers and the [then] opposition party were dissatisfied that the water companies management were receiving large remuneration packages while water companies were earning large profits. With a change in Government in 1997 a special one-off tax was imposed on water companies. This tax was intended to redress the “bad deal” the new labor government considered its predecessor had struck on water utility privatization.

Preparation for the second periodic review of the price cap in the Year 2000 is now underway. The new price cap methodology is to be captured in the following formula:

Price cap 2000 to 2005 = RPI — P — X + Q ± V ± S where:

P is an initial reduction in prices for high performance (profitability?) in the previous period;

X is the forward looking efficiency improvement during the period;

Q is the incremental upward cost pressure of quality improvements;

V is to balance supply and demand pressures;

S is a service factor reflecting enhancements or controlled reductions in standards.

Unlike previous periodic reviews, companies will not be required to produce asset management plans detailing costs. This plan is to be produced after the review has concluded and the price cap variable have been determined. The plan is intended to become a monitoring document during the period 2000 —2005.

OFWAT’s director has indicated that he expects water prices, after the review and the introduction of the new formula, to be cut and then remain generally stable for the next four years — this means that X should be equal or greater than Q+V+S.

*Source: OFWAT (1998).*

A price cap can be applied generally or specifically. For example, it can be applied to all services offered by a firm; to a group of services; or to a particular service. However, if price caps are applied specifically (i.e., to prices in individual service areas in a multi-product firm), then there is a risk that the flexibility of a water utility to vary prices in response to changes in the market could be unnecessarily restricted. If the formula is applied to a basket of services, then the utility has the flexibility to rebalance prices of particular services in response to supply or demand changes. Nonetheless, care needs to be taken when deciding what goods or services are included in the price cap basket. For example, including competitive or potentially competitive items could unnecessarily restrict competition in the markets for those items.

When price caps are reviewed, it is common for the regulator to examine profitability and rates of return (see Box 14 regarding the UK’s experience in the water industry). For this reason, it has also been argued that, as price capping mechanisms evolve, they become profit-limiting mechanisms and can converge into rate of return regulation. This can occur where the regulator increases the value of X or some other variable in response to observed high profits earned in the period prior to the review. In this environment, firms may come to learn that increased efficiency will be offset by a higher X in the next period and they may alter their behavior accordingly. Thus, over the longer run, care must be taken to ensure that the utility does not have an incentive to gold plate investments or inflate costs (see Box 14 for the UK’s experience in this regard).

The UK’s experience with price cap regulation highlights that substantial care is required in developing price caps in the water supply industry (see Box 14). This experience

demonstrates the pitfalls that can be associated with this form of regulation and should therefore assist other regulators to introduce effective well-designed price cap arrangements.

King (1998) points out that if this form of monopoly regulation is applied carefully it can offer substantial benefits to all parties concerned. However, if price cap regulation is poorly designed or subject to arbitrary re-evaluation it may be worse than more traditional forms of monopoly regulation. He argues that to be effective, the regulator of price caps should

- Carefully consider the bundle of goods and services to be covered by the cap to avoid anti-competitive abuse but to permit flexibility.
- Design the review process so that information used in periodic price cap reviews is outside of the control of the regulated firm and is not based on past performance to avoid the cap degenerating into rate of return regulation. The use of industry performance data rather than firm level data could assist here.
- Maintain credibility of the system by not arbitrarily revising X factors midterm on the basis of current profit information.

## **VI. RISK ALLOCATION AND MITIGATION POLICIES AND MECHANISMS**

### **A. Identifying Risks**

Successfully implementing a framework for government private sector cooperation in infrastructure such as water supply is a time consuming task requiring considerable experience, and legal, financial, economic, and technical skills. Perceptions of risks in infrastructure projects, particularly in countries with limited governmental institutional capacities or rapidly changing regulatory and legal structures, can effectively preclude private sector involvement.

A key to best practice in project design is a careful identification, analysis, and ranking of risks by an expert team before competitive tendering is undertaken. It is also important that accurate information is published in sufficient detail and strategies are devised to solve or avoid most, if not all, risks (ESCAP 1997).

As Table 11 and the following discussion highlights, there is a wide range of risks associated with private sector investment in water supply.

#### **1. Sovereign Risk**

To a lesser or greater extent, sovereign risk is associated with private sector investments in any country. A number of Asian governments have a track record of renegeing on contracts, changing the rules of the game, expropriating assets, implementing exchange controls or enforcing other non-contractual disciplines which reduce the value of the project to the private foreign investor. It can be difficult to pin down all the risks in a contract or be confident that the contract is inviolable. This is particularly the case in transition economies where institutions of law and dispute resolution in a market economy are still developing.

One mechanism for addressing the increased sovereign risks of working in Asia is the guarantee mechanisms being developed by overseas lending agencies such as the World Bank. Rather than directly lending funds to infrastructure projects involving private sector

partnerships, the World Bank can act as guarantor to the private foreign party if the government defaults on any of the risks it is required to manage as part of the contract. Through its position as an international lending agency, the World Bank is then able to bring pressure to bear on the government to adhere to contract conditions.

**Table 11: Comparison of Financing and Political Risk Borne by Private Sector Under Alternative Participation Options**

Option	Ownership	Financing Risk	Political Interference Risk
Service contract	Public	Low	High risk of interference
Management contract	Public	Low	High risk of interference in management
Lease	Public	Medium	High dispute potential
Concession	Public	Medium-High	Medium — High
Joint ownership	Public and private	Medium-High	Medium
BOOT	Private, then public	High	Medium
Outright sale	Private	High	Low

*Source: Idelovitch and Ringskog (1995) World Bank (1997).*

## 2. Design and Construction

The private provision of water supply infrastructure typically involves the following stages, each of which has a different risk profile and associated financing requirements. The following points identify some of the key areas of risk for private operators:

- *Development phase.* The main risks of this phase of the project are that the operator will not obtain the necessary permits and will not be able to mobilize finance to initiate the project.
- *Engineering and construction phase.* This is when equipment is supplied and construction commences. Funding needs to be advanced progressively to meet these costs. This is a high risk phase due to the possibility of cost overruns and delays requiring large volumes of finance. Project financing or bond financing may be used to finance this stage of the project.
- *Start up phase.* The start up phase commences after practical completion and is concerned with facilities working at the costs and to the specifications planned when arranging finance.
- *Operational phase.* This phase has specific risks associated with the generation of cash flows such as decreasing unaccounted-for-water, improving tariff collections and expanding connections. A commercial operator should have a comparative advantage in minimizing and managing these risks. Cash inflows are generated allowing for the servicing of debt. Refinancing with bonds could be possible at this stage.

### 3. Foreign Exchange

Where risk trading is difficult, or where capital markets are deficient — as they are in many Asia Pacific countries (notably in relation to long-term debt and FOREX transactions) — private sector investors will seek other ways, including government guarantees, for shifting or sharing risks.

These models of trading and risk sharing are far from fully understood in many Asian countries and failure to address them has led to infrastructure projects not proceeding, or going slow. Many past infrastructure privatizations have been measured as successes - in terms of actual implementation or transfer of infrastructure service provision to the private sector. But these so-called successes have, in fact, left major risks with government — particularly in the case of depreciation of the domestic currency relative to major foreign currencies.

### 4. PSP Options and Risk Allocation

The alternative options for PSP in water supply discussed above involve different allocations of financial and political risk. The choice of a preferred option for PSP will be determined, in part, by the risk that the government and the private sector are prepared to take. The financial and political interference risks associated with the alternative options are shown in Table 11.

## B. Mechanisms to Reduce and Manage Risk

Governments, international development agencies, and local and foreign financial institutions have been working for a number of years to develop mechanisms that can lower the risks associated with investments in large infrastructure projects. These mechanisms include:

- Structured project finance.
- Government guarantees.
- Multi-lateral development bank guarantees.
- Specialized financial institutions.
- Commercial Institutions credit enhancement.
- Plan grants and loans.

As the following discussion highlights, some of these mechanisms are more successful than others in mitigating risk and thus, in attracting private sector investments in infrastructure.

#### 1. Structured Project Finance

Traditional approaches to investment finance are often inadequate for the risk characteristics and cash flow profiles of infrastructure projects. Consequently, complex project financing structures have been developed for many private sector infrastructure projects. Under these structured financing arrangements, a project sponsor contributes equity to a single purpose project company (often called a *special purpose vehicle*) that is set up solely for implementing the project. The equity contribution is typically about 15-20 percent of total capital costs for the project, with a variety of debt instruments providing the remaining capital through loans to the project company. The sponsor's equity in the project company provides the buffer from which variations in project returns can be paid to meet fixed debt obligations. The equity contribution also indicates commitment by the project sponsor who takes most of the

development risk. The sponsor not only has a vested and direct interest in ensuring the success of the project, but also has the knowledge and ability to ensure project success.

By lending to the special purpose vehicle, lenders obtain security over the assets of the project and its potential future income stream, rather than the sponsor's balance sheet. This is called non-recourse financing. Non-recourse project financing requires much closer attention to project financial forecasts and risks profiles than normal. To increase lenders' confidence in the project, all cash flows are carefully identified and the finance package is structured to make sure that debt obligations are met at each project stage. Long construction periods in infrastructure projects can make the task of meeting debt obligations difficult in the early stages of the project. In these cases, mezzanine financing is utilized, which entails packaging together a mixture of financing instruments whose composition changes as the project develops. For example, project sponsors may themselves bear a portion of project debt obligations in the construction period and the project may only move to full non-recourse financing after operations commence.

Because of the non-recourse nature of infrastructure project finance, a complex set of contracts, sub-contracts and guarantees need to be negotiated between the various parties involved in the project in order to reduce risks for lenders and provide alternative means of redress if the project should fail. These contractual arrangements carefully identify and allocate responsibilities to manage and bear project risks. The various parties involved can include the project sponsor, the project company or special purpose vehicle, the construction company, the eventual project operator, direct commercial and syndicated lenders, other equity holders, and the government and state owned utility contracting with the project service provider.

The financial contracts and guarantee arrangements are usually set up after the government has selected a project sponsor, but prior to construction commencing. The time between signing a private sector infrastructure contract with the government and eventual financial close, when financing arrangements are set in place, can be long and this is often a major source of delay.

Bringing a private sector infrastructure contract to financial close requires considerable time and energy and can significantly delay project implementation and raise the costs of a project. A number of issues will need to be addressed reflecting the particular circumstances of the project, its risk profile and the regulatory environment of the country where it is domiciled.

The World Bank (1995:15) suggests that the transaction costs of project by project financing (including bid preparation and setting up the financial arrangements) can range between US\$5 million to US\$10 million. Structured project financing provides a vehicle for mobilizing equity and debt in infrastructure projects. But there is a need for specialized training and skills development within the financial sectors and public utilities of developing economies to reduce the costs and time delays involved in setting up these financing packages. Transaction costs also can be reduced if standardized contracts and project procedures for the different contract models can be developed. Technical assistance from bilateral and international aid agencies may assist in this process.

## **2. Commercial Institutions - Credit Enhancements Mechanisms**

Banks and other commercial lending institutions, which are active in infrastructure finance, have developed a range of credit enhancement mechanisms that are also useful in reducing project risks and enhancing confidence for lenders. These include debt-subordination facilities and escrow accounts. Debt subordination facilities provide for different levels of return on debt in exchange for taking on different preference ordering in the paying out of liabilities from defaulting companies. Debt is classified into senior and junior levels. Junior level debt receives higher returns in exchange for absorbing the first losses. Escrow accounts are utilized to give lenders priority access to the cash flow receipts of project companies. Inflows from projects are pooled into separate escrow bank accounts managed by trustees and all debt service obligations must be paid first before releasing cash for other company obligations.

## **3. Government Guarantees**

To encourage PSP, national governments have, at times, provided guarantees to lenders against certain policy risks. For example, the Thai Government set up the Thai Guaranty Facility to guarantee loans made by private financial institutions to municipalities and private operators of urban environmental infrastructure (World Bank, 1994:100). Where these guarantees are limited to the contractual obligations of Government and their utilities (for example, power and water purchases or fuel supply by state owned monopolies), they can be a useful transitional means of promoting private sector investment in infrastructure. (Of course, they are not capable of withstanding the pressures of the recent Asian currency crisis.) However, where the guarantee arrangements commit governments to provide a certain rate of return, or purchase a given volume of product (take or pay contracts) or pay a fixed price for a product, they transfer commercial risk away from private entities. Such arrangements can remove the private from privatization, in terms of risk-bearing.

In the short-term, if a government has no track record of credible reform and/or PSP in infrastructure, it may need to offer such guarantees to attract private sector investors. Indeed, success with early investment transactions can create more investor interest for future projects as the country and political risks become more readily understood. However, such government guarantees should not become a long-term alternative to sectoral reform or more transparent methods of mitigating risks.

Historically, government guarantees covering commercial risk appear to have led to project mismanagement and have had severe consequences for government finances when commercial infrastructure enterprises have become bankrupt (World Bank, 1994:94,100 and 101). Often governments do not account for the contingent liabilities that are incurred through guarantees in their fiscal balance sheets, as budgets are prepared on a cash basis. Thus, when defaults occur, they can create unexpected liabilities that blow out government deficits.

Building a secure income for the investor on the basis of agreed commercial tariffs and indexation formulae could substantially reduce the use of government guarantees. The fact that most infrastructure services have a monopoly element, and are essential, can be used to underpin a sound and bankable income stream with minimal guarantees.

#### **4. Specialized Financial Institutions**

Specialized financial institutions set up by government can help address shortfalls in a country's guarantee arrangements. These financial institutions explicitly value guarantees provided by governments and set aside funds to cover these contingent liabilities. The institutions should only be interim arrangements, for example, in the period between the introduction of a bulk water supply BOT project and full-scale privatization of retail assets. In this intervening period, the funds provide additional comfort to investors and lenders. The valuation of guarantees by the fund would also build transparency for government and provide signals as to whether guarantees should be given.

#### **5. Multilateral Development Bank Guarantees**

One mechanism for addressing the increased sovereign risks of working in Asia is the partial guarantee mechanisms being developed by overseas lending agencies such as ADB and the World Bank. Rather than directly lending funds to infrastructure projects involving private sector partnerships, the banks can act as guarantor to the private foreign party if a government defaults on any of the risks it is required to manage as part of the contract. Through their position as international lending agencies, they can bring pressure to bear on the government if contract conditions are not met (see Box 15).

#### **6. Plan Grants and Loans**

A number of governments have five-year and annual plans for distributing grant funds, soft loans and state loans for infrastructure to central government utilities and provincial and urban authorities. These plan grants and loans can crowd out private sector investment in infrastructure as they are an ostensibly cheap source of finance (loans are granted at concessional rates or rates lower than the market because of the government's high credit rating). In reality, such crowding out simply shifts the liability for infrastructure investments onto future governments' budgets rather than the market place.

A problem with discount windows for development aid funds is that they can add delays as infrastructure projects and ministries await approval for the cheap funds - this can, in fact, reduce the level of investment activity. It can also undermine private sector attempts to bring in funds. "Time is money", and thus anything that drags out the bureaucratic process may prove costly. It should also be noted that many cheap development aid loans have been in currencies such as the yen and the US dollar, whose subsequent appreciation can make, and has made, the funds more, not less, expensive.

As noted above, the choice of a PSP option for infrastructure projects can have important impacts on the management of risk. Instead of crowding out private sector finance, the plan loans and grants discussed above could be used as seed capital to provide government equity in private sector government partnerships during the high-risk initial years of infrastructure projects. In countries where there may be an initial reluctance to promote 100 percent private ownership of projects, governments can act as catalytic equity investments in private-public partnerships. These arrangements could be an improvement on direct grants and loans. This would be especially true if they are a successful part of an interim strategy to promote the development of local capital markets for infrastructure development. However, it should be stressed that history testifies that governments in most countries have been poor at

identifying winning business propositions. Further, there is need for care in development of any system which creates incentives to draw on the public purse.

### **Box 15: Multilateral Development Bank Instruments for Addressing Political and Country Risk**

#### ***World Bank Guarantees***

The World Bank guarantee is intended to act as a catalyst for private sector financing in developing countries. The guarantee covers risks that the World Bank is well-positioned to bear given its credit experience with developing countries and its special relationships with governments. The World Bank offers only partial guarantees and risks are clearly shared between the World Bank and the private lenders. The guarantee is a commitment to a lender that the World Bank will repay the guaranteed portion of the obligation if, under specified conditions, the borrower does not meet its obligations. The borrower may be the member country or a company. There are two guarantee products:

- Partial Risk Guarantees, which cover specific government obligations spelled out in agreements with the project entity. They guarantee payment in the case of debt-service default resulting from non-performance of contractual obligations by governments or their agencies in private sector projects. Partial risk guarantees also cover risks associated with FOREX transfer. They are particularly relevant to the growing need for private financing for infrastructure; and
- Partial Credit Guarantees, which cover all events of non-payment for a designated part of the financing. This instrument helps to extend maturity periods, which is often important for obtaining longer term financing for large-scale construction projects.

The Articles of Agreement require that guarantees receive a counter-guarantee from the national government. If the borrower cannot repay the debt, and the World Bank guarantee is called by the third party, then it will pay under the terms of the guarantee, and a new sovereign obligation is created between the member country national government and the World Bank.

#### ***Asian Development Bank***

In April 1995, Asian Development Bank (ADB) saw a need for expanded use of guarantee facilities in infrastructure project finance and modified its policy on guarantees to include partial risk guarantees. Guarantees can be offered in any currency for commercial debt to either public or private borrowers. ADB now offers three guarantee products:

- Partial credit guarantee to public borrowers with government counter-guarantee.
- Partial credit guarantee to private borrowers without government counter-guarantee. and
- Partial risk guarantees to private borrowers with government counter-guarantee.

#### ***MIGA and IFC's Guarantee Instruments***

In addition to the World Bank's guarantee program, both the Multilateral Investment Guarantee Agency (MIGA) and the IFC offer guarantee instruments:

MIGA provides non-commercial risk insurance, which guarantees equity and related debt investments against specific political risks, such as currency transfer, war and civil disturbance, and expropriation. There is a maximum dollar limit per project and per country.

IFC provides equity and debt financing on its own account and debt financing from commercial sources under its B-Loan Syndication. The latter provides coverage against transfer risks but not against expropriation.

*Source: World Bank, ADB, IFC and MIGA Homepages — [www.worldbank.org](http://www.worldbank.org), [www.adb.org](http://www.adb.org), [www.ifc.org](http://www.ifc.org), and [www.miga.org](http://www.miga.org).*

## **VII. TOWARDS BEST PRACTICE**

There is not one single answer or option that addresses the emerging water supply issues in Asia. Each country in Asia has its own special features, what may work in one political or institutional environment will not necessarily work in another. Hence, while the approach used in Macau, China was successful, the same approach cannot necessarily be transported to India, Indonesia, PRC, or Vietnam. However, it is apparent that some common themes are emerging. The sections consider these themes in some detail.

### **A. The Economy Wide Institutional Legal and Regulatory Frameworks**

#### **1. Legal and Regulatory**

The need in all water supply privatization initiatives is for an environment that enables private sector investment and lending to occur and for risks to be taken, over long time-frames. This demands that investors have faith in the future, through strong, believable and enforced laws (e.g., in relation to tariff levels and the right to collect) or that governments accept the risks to compensate for regulatory uncertainty. If the assurances are weak, or risks perceived to be high, then the water tariffs will also have to be higher and the fiscal equivalent of guarantees will be expensive. Evidently, governments that do not put predictable and sound regulatory structures in place will have great difficulty achieving PSP in water supply.

#### **2. Dispute Resolution**

It is noted often in the literature on the Asian business environment that court proceedings are not a common or preferred method of dispute resolution in many situations. Many Asian countries do not possess the type of court system familiar in western countries to which foreign investors may be more accustomed.

Concerns regarding dispute resolution can be particularly important for private investors in infrastructure projects. Perceptions regarding whether an appropriate system will be in place to address disputes that may arise many years into the future will be a significant feature in any risk analysis of the project. These perceptions can subsequently affect the ability to fund and finance the project. Clear specification of the dispute resolution process in the contract is an important part of the negotiation process that will help mitigate the risks associated with PSP in water supply investments.

However, creating a legal and regulatory environment which is conducive to attracting risk-averse infrastructure investors can also be of critical importance. Ideally, domestic judicial or arbitral forums should not only be in place, but should also have a track-record of predictability and fairness in decision-making. A consistent track-record can potentially produce significant reductions in the risk associated with projects and with the associated pricing of project delivery. Recognition of the decisions of foreign judgments or awards can also help. This can be promoted most appropriately through a country being both a party to the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards and through the introduction of appropriate domestic legislation to implement the Convention.

### **3. Investment Controls — Including Foreign Investment and Foreign Ownership**

Uncertain and penal laws in relation to foreign investment — or remission of profits from foreign infrastructure investment — will make PSP in water supply investment very difficult. The laws applying to foreign investment in water supply in both Manila and Jakarta — and certainly in Macau, China and Australia — have all been adequate to the task. The same cannot be said of earlier investments in many DMCs.

Countries as diverse as the Indonesia; Macau, China; PRC; and Philippines are all now showing that there is no reason why PSP cannot proceed — but governments have to explain the benefits of commercial investment in safe water supply. Safe water supply is something that has a tangible benefit to the lives of all people seeking to consume (local) water — whereas laws discouraging PSP in water supply offer no tangible benefits.

### **4. Capital Market and Foreign Exchange Issues**

The water sector is capital intensive and thus requires substantial capital funding, preferably of a long-term maturity that suits the long lived assets — pipes, dams, and treatment plants for example. The problem is that in most DMCs there is little depth in capital markets beyond five or ten year maturities. This gap in the domestic market creates a presumption in favor of FOREX denominated borrowings in the case of funding public or private sector water supply systems. One reason why ADB and World Bank loans are attractive in terms of financing infrastructure is not so much the FOREX dimension, but because they are long-term loans with substantial grace periods.

The difficulty, in the event that long-term domestic loans cannot be obtained and FOREX loans are used, is that the product earns local currency. This creates a substantial FOREX risk exposure — even for modest depreciations, but can be catastrophic for project finances when currency shake-outs occur — as in 1997.

A top priority, but hard to achieve, in promoting privatization of infrastructure such as water supply — is to develop the local capital market as much as possible — so as to be able to match the currency of borrowing with revenue. While this study is obviously not the place to present detailed proposals for capital market development — we would be amiss in not highlighting the fundamental contribution that can be made by advancing capital market reforms.

One mechanism that ADB, World Bank and overseas development assistance (ODA) support can advance to deal with the problem is a mechanism for enabling short-term debt to be stretched into longer maturities. This is an issue which deserves immediate attention.

## **B. General Water Supply Reforms**

### **1. Water Resources Management Strategy**

The characteristics of water resources, the importance of a quality water supply for life itself and for the further development of DMCs all call for a coordinated national management strategy. An adequately funded water resource management strategy with a workable mechanism for service delivery will provide the framework for the management of this scarce

resource. The detail behind any country's water resource management strategy should reflect the country's needs and requirements. However, as discussed in Part 2.B, any template used as a starting point should cover all components of the natural resource cycle and include a community education program.

## **2. Water Rights — Vesting and Trading**

Unless a community recognizes the economic value of water, governments run the risk of conflicts between user groups and inappropriate uses of water which do not maximize community well-being.

When property rights and liabilities are not clearly designated, there are few or no market signals indicating beneficiaries' willingness to pay for services that they no doubt value. Profit maximizing enterprises will have no incentive to provide these valued services. In the absence of market signals, people need to rely on the political system to signal their desire for alterations in resource use.

History tells us that signals from the political system often fail or are too slow in reacting, or indeed can over react, to a particular problem.

On the other hand, assigning water rights and creating a market for those rights will lead to clear signals about users' willingness to pay. As discussed in Section II.D these signals help resolve water shortages and improve the efficiency of farms and water utilities. Section II.D also sets out some guidelines which may be useful during the transition to tradable rights. These include:

- Gaining stakeholder support for the new arrangements.
- There should be consideration of converting *de facto* water rights into *de jure* rights.
- Taking care to make sure that the allocation of non-consumptive rights does not prejudice others consumptive rights.
- Institutionally strengthening water associations, if they already exist.

Putting in place a set of tradable property rights for water is a major step in achieving best practice in water supply when water is scarce relative to demand or is costly to access. However, a decision either not to introduce or to delay the introduction of tradable property rights should not stall the implementation of other water supply reforms.

## **3. Tariff Reform**

In many DMCs, water tariffs do not reflect the true costs of supply. Undertaking water tariff reform is critical to the long-term success of any private sector investment in DMCs water supply infrastructure. Without tariff reform, water supply investments will not be financially viable from the private sector lender's and investor's point of view. If tariff reform is not implemented, but private sector investment goes ahead then DMC governments will be left funding the deficit between the low water tariff paid by consumers and the payment made to the private sector to supply water.

If possible, prices paid by consumer groups should reflect the costs they impose. As in other markets, appropriately set water tariffs will operate as signals for efficient consumption, production and investment in water supply.

Charging tariffs to reflect use of the water supply system will require institutional and technological changes in many utilities. First and foremost tariff reform will require the installation and on-going maintenance of metering systems.

Community support will also be required if tariff reform is to succeed. An education campaign should help in this regard.

#### **4. Subsidies — Connection and Usage**

In general, it is a sound principle for the full costs of water to be the basis for customer tariffs. However, there is no need for an automatic rejection of all cross-subsidy arrangements, given that water is an essential service. In some DMCs, households earn such low incomes there is little margin for covering water utility costs. In these cases, there may be valid grounds for introducing a CSO.

DMC governments as owners of public water utilities have often responded to this CSO problem by charging water tariffs at rates which do not cover costs and which would not sustain private sector investment. Blanket subsidies generally fail in their objectives, as typically the very poor are not connected to the reticulated water supply system. These urban poor rely on vendor supplied water. They pay considerably more for their water than their wealthier counterparts who are connected to the network.

The use of cross-subsidies from affluent household, commercial and industrial users to the poor is one approach to overcome this problem. However, cross-subsidies are usually not transparent. This means that it is often difficult to identify the actual costs of providing the CSO and assessing whether the benefits outweigh these costs. Failing to account directly for CSOs also makes it much more difficult to monitor the performance of public water utilities and regulate the performance of private sector utilities.

There are a number of alternative methods to cross-subsidies for funding CSOs. These include:

- Transparent levies on users.
- Direct cash payments to targeted users.
- Direct funding by government of the CSO.

The latter two options can be a burden on public funds. However, transparent levies on users have some similarities to cross-subsidies without the efficiency costs. Transparent levies on users would involve charging more affluent households and commercial industrial users a separately identified up-front levy on a periodic basis — say monthly or annually. This premium should be clearly identified as a rebate for low income consumers. This rebate could, for example, be used to reduce or remove the connection fee in particular regions, subject to investigations of consumers' willingness to pay such costs. Alternatively, subsidies could be targeted according to income, or if there are areas where all are on a low income, they could possibly be targeted to those areas with subsidies. However, the subsidy would not be of a magnitude sufficient to deter persons from earning a higher income, thereby losing the subsidy. It should also be borne in mind that the subsidy need not necessarily cover all water used by the poor. There is little reason to support zero or subsidized charging for water over and above a lifeline amount.

In addition, commercial owners of water supply companies should be keen to connect new customers. Thus, as with mobile phones, we should expect rational incentives to connect with new systems and not the high up-front penalty charges which typically apply in public sector models. The shift to funding modest connection charges out of, say, access or flat charges or profits, is thus not something that should be resisted where it is deemed to make commercial sense.

If government seeks to encourage connections beyond that commercial approach, they should, in general, be funded through explicit CSOs.

## **5. Water Quality Regulation**

A major attraction of PSP in water supply is that it is possible to impose WHO or European standards, as part of a competitive tender, with incentives and penalties for compliance or non-compliance. The UK tariff escalations (the “K” factors which differed by plc according to environment requirements) were the mechanism by which the UK met European water quality standards — they financed the required investments. So, too, in water supply concessions — water quality is a central contractual issue — indeed, best practice water supply arrangements will always have achievement of water quality standards as a centerpiece of the cooperation agreement.

## **6. Environmental Regulation**

While this study is not directed at environment issues, it is worth highlighting that the contractual framework, which is at the heart of the privatization process, is one in which penalties and incentives apply to the private concessionaires. While, in principle, state owned entities can be fined or offered rational incentives for superior environment outcomes, in fact the minister responsible is usually unwilling to penalize another minister’s entity. Once a private contract has been written embodying water quality and discharge standards, for example, it is an easy matter to write in compliance and non-compliance incentives and penalties.

Another way in which privatization is environmentally friendly is that the vesting of water rights and water supply services in the private sector means that there is a natural tendency to charge tariffs for water which reflect the underlying scarcities. There is a tendency to conserve not just water but capital — and to create disincentives to environmentally unfriendly discharges into water sources.

## **C. A Framework for Moving to PSP in Water Supply**

### **1. Formation of Reform Unit**

Once government has decided to set in train a privatization process, or implement a commercialization or corporatization program, it should set up a specially-trained expert task force or reform unit. The unit, which would generally report to a key minister and have the endorsement of the prime minister or cabinet, will be responsible for coordinating and facilitating the entire process.

If PSP is under consideration the unit would, amongst other things:

- Identify and advise government on whether unbundling of the water utility is required and, if so, in what form?

- Be a focal point for international development agencies, banks and public and private sector agencies and others interested in participation in the change process.
- Identify and rank risks and assess the best way of mitigating and managing them.
- Advise government on the most suitable PSP option.
- Advise government on the most appropriate regulatory framework.
- Set up an independent regulatory entity for the long-term operation of the framework.
- Be responsible for negotiations with water enterprises and private entities.
- Ensure that the contract provides the necessary safeguards to manage risks.
- Where necessary, seek advice from independent experts.

If government is considering commercialization or corporatization as a total reform option or as a midterm option prior to privatization the reform unit would, amongst other things:

- Identify and advise government on whether unbundling of the water utility is required and if so, in what form?
- Undertake an economic appraisal of the utility.
- Be a focal point for international development agencies, banks and public and private sector agencies and others interested in participation in the change process.
- Review the business constituents.
- Reallocate non-core functions including regulation to other agencies as required.
- Review and value asset register.
- Assist in the preparation of an SCI.
- Review existing regulations and legislation and advise on necessary changes.
- Identify non-commercial activities and assist in a review to consider their continued existence.

## **2. New Regulatory Framework**

Prior to allowing PSP in water supply, it is vital for government to create a new regulatory framework within which the water utility must operate. This framework should cover issues such as water quality, water tariffs, service reliability, environmental standards, and the rights and obligations of customers. This framework should be overseen by an independent regulatory authority. This authority should have the ability and capacity to review and enforce the framework. Preferably, this framework should form part of the terms and conditions set out in water supply contracts.

Putting in place a system of regulation for the water supply utility prior to PSP will help reduce the risks and uncertainty associated with private entry. Ensuring that the regulatory agency is independent and has adequately trained regulators will also ensure that decisions/actions are not political but based on sound economic principals. This leads us to suggest two clear actions for governments intent on genuine water supply sector reform:

- Legislation to implement water supply enterprise reform (e.g., BOT procedures and laws).
- Well-defined tariff setting, review, and regulatory frameworks.

As noted earlier, there are a number of options for regulating monopoly power in water supply. These are: (i) rate of return regulation; (ii) cost-plus pricing; and (iii) price cap regulation. As discussed, all of these forms of regulation have benefits and costs. However, if price cap regulation can be implemented correctly, it is a preferred approach to regulating monopoly power, particularly monopoly power in profit maximizing firms. Price cap regulation is a light-handed form of regulation that encourages firms to operate efficiently. It allows regulated firms to benefit, in the short-term, from their improved efficiency through higher profits. After periodic reviews by the regulator, these higher profits are shared with the consumer through lower prices and the utility's profits are returned to normal rates commensurate with the level of risk, etc.

To operate effectively price cap regulators need to:

- Carefully consider the bundle of goods and services to be covered.
- Design the review process so that information used in periodic price cap reviews is outside of the control of the regulated firm and is not based on past performance to avoid the cap degenerating into rate of return regulation.
- Maintain credibility of the system by not arbitrarily revising the cap midterm on the basis of current profit information.

### **3. Institutional Restructuring to Facilitate Competition**

#### **a. Vertical and Horizontal Separation**

The vertical and/or horizontal separation of existing water utilities should be considered prior to any move to privatize or undertake other reforms.

As discussed earlier, both of these forms of separation have the potential to facilitate competition. However, the decision to unbundle will need to be taken on a case by case basis. At the heart of the issue is the nature and boundaries of the firm. For example, if the inter-linkages between the sewerage and the water industries are clear and easily defined, and readily made, the subject of contracts, then there should be little difficulty in separating sewerage from the remainder of the water industry. Similarly, if the provision of flood and drainage management systems is separable from the water distribution and sewerage transportation, then the use of contracts may make it efficient for these services to be provided by separate entities. This will depend on cost data and the size of benefits from specialization.

Furthermore, as discussed earlier, it is often feasible and desirable for pro-competitive purposes to break up the distribution system into defined geographical areas, or to franchise water distribution and sewerage processing systems into distinct commercial entities.

## b. Third Party Access to Monopoly Infrastructure

In many instances the potential for competition in water supply would be improved if certain parts of water supply infrastructure were opened to third party access. As discussed, third party access can help facilitate competition in unbundled water supply infrastructure. The introduction of third party access can be through a number of mechanisms. It may be introduced in a generic form, such as in Australia. Alternatively, third party access may be included as a contractual condition and/or part of the water supply institutional framework. This later mechanism may be required if, as part of a privatization or reform process, a government wishes to facilitate competition by unbundling a previously integrated utility into defined geographical areas.

### 4. Choice of Appropriate PSP Option

Governments have a number of options for PSP in water supply. These options range from fairly low levels of private sector involvement through service contracts to total private sector involvement through full divestment. The choice of the most appropriate PSP option for a particular country at a particular point in time will depend on a number of factors. These include:

- Government and the community support or the lack of support for private sector involvement.
- The nature of the problem at hand — lack of investment funds, lack of expertise, etc.
- The speed with which the problem needs to be resolved.

As noted earlier, service contracts and management contracts are both potentially beneficial forms of PSP if there is strong political or community opposition to wider involvement of the private sector. These forms of PSP can generally be utilized even if there is opposition to water tariff increases, which are generally required for many of the other forms of PSP (e.g., lease contract).

**Management contracts** can be a tool for government and the public to test out some of the benefits of PSP. Lease contracts and in some cases, service and management contracts have been, or have been intended as, precursors to more fundamental industry restructuring and reform. However, there is no guarantee that reform will go forward to the next step. Cowen (1997) suggest that if these contracts are intended as a stepwise approach to private participation they should include incentives for governments to move to the next step. These incentives could include sunset clauses - whereby the contract is evaluated and reviewed and trigger clauses - which relocate or review risks and responsibilities at some future point in time.

**Lease contracts**, when written correctly, create strong incentives to improve the operational efficiency of utilities. They are, therefore, particularly useful if investment funds are readily available but managerial expertise is in short supply. Under lease contracts, most of the financial risk remains with the government; thus they are not suitable if substantial funds for long-term investments are required.

**BOT and BOOT** contracts are particularly useful PSP options when investments in new sources of bulk water supply are required relatively quickly. BOT and BOOT, as well as ROT schemes, can bring expertise and finance to a water supply project. When a country has a

poorly developed capital market these contracts can provide a relatively quick method for mobilizing project based non-recourse finance for new capital investment.

BOT type contracts should be designed to allocate risks between the private operator and the public utility according to capacity to manage and minimize risk. In contrast, with lease contracts, BOT type contracts allocate much of the commercial risk for specific projects to private parties rather than governments. They can provide a reasonably quick method for mobilizing project based non-recourse finance for new capital investment in developing countries.

Effective implementation of BOT contracts requires thorough attention to the design of tender documents and, compared to service and lease contracts, a lengthy bidding process. Care should be taken in this negotiation phase to ensure that these contracts do not become an unnecessarily expensive way of substituting private debt for public debt. When considering BOT type contracts, the costs and benefits of alternative approaches, such as concession contracts should also be considered. Many BOTs have failed to deliver optimal outcomes for government or consumers because the government agencies fail to be able to write the appropriate contracts.

**Concession contracts** are particularly useful if governments are committed to private sector investment in water supply distribution but are not prepared to consider full divestment. They are also useful PSP options where the institutional, legal, regulatory, and financial structures have not developed sufficiently to support full-scale privatization with independent regulation. Concessions generally go beyond single project BOT contracts, in that they can provide incentives to expand the customer base, increase investment, maintain existing assets, and reduce technical and non-technical losses within water distribution networks.

**Divestiture** can be by way of sale of assets, sale of shares or management buy-out. In contrast, BOO involves the private sector in a greenfield project, which might have been in the past constructed and owned and operated by government. Both divestiture and BOO involve 100 percent private sector ownership. However, a variation to both of these is a JV with government.

All of these forms of PSP require:

- A strong commitment from government.
- A well-researched and negotiated contract.
- A strong regulatory and institutional environment.

In some cases, full privatization may bring larger and more immediate welfare gain than other private sector options (Cowen 1996). In countries where there is good information about the water utility's asset base and where the country risks are relatively low, divestiture may be the best private sector investment option. However, in countries where information on the water utility is low and risks are high divestiture may not be possible because the utility's valuation is low or even negative. In these circumstances, a government subsidy may be necessary to facilitate divestment.

This discussion highlights the fact that each of these options can play a role in bringing private sector expertise and incentives into the water supply sector. However, it should be borne in mind that the quality of the contract will play an important part in the ultimate success or

failure of all of these PSP options. Good quality contracts will, among other things, encompass an appropriate allocation of risks. Further, except for service contracts, a transparent and well-considered regulatory framework is important in maximizing the benefits of PSP.

## **5. Risk Mitigation and Management**

Optimal risk allocation under a private/public partnership is likely to vary between countries and even between different water utilities. This is because of the very specificity of assets, histories, political climate, regulatory frameworks, environmental factors, and differing capital market situations. Nonetheless, an in principal starting point for risk allocation suggested by the United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP 1997) is that:

- Risks should be allocated to the party that can minimize and manage the risk most effectively.
- Where no party has a clear comparative advantage in managing the risks they should be shared.

Preferably, there should be a balancing of risks and penalties.

A key to best practice in project design is a careful identification, analysis and ranking of risks by an expert team. Before privatization proceeds it is crucial that a team of experts carefully identifies, analyses and ranks the risks. As noted above, the reform unit, in consultation with independent experts, can undertake this process. This information should then be published in some detail as part of the tender process so that strategies are devised and/or negotiated to solve or avoid most, if not all, risks.

If clarity in risk allocation and minimization is achieved, it will encourage companies or consortia to make meaningful bids and lead to prices in those bids which are much more attractive to the final consumer than they would otherwise be. Table 12 sets out an indicative allocation of risks for a hypothetical private sector investment in water supply.

Risk cost minimization strategies include:

- Staged approaches using management contracts before implementing concessions or full privatization (such approaches are particularly useful where there is no tradition of charging for use and where tariff regimes need to be reformed before private investment is viable).
- An adequate regulatory system to monitor and control infrastructure providers that includes an independent regulator where monopoly elements remain and a dispute resolution process.
- Ensuring a level playing field in the treatment of all firms (state and private) competing in the same infrastructure services market. Including a transparent system for contractor selection.

**Table 12: Examples of Risks, Possible Approaches for the Mitigation and Allocation in a Privately Funded Water Supply Investment**

Type of Risk	Source of Risk	Possible Mitigation Approach	Risk Taken By
<b>Choice of Private Sector Investor</b>			
Bidders not competent	Future water supply services supplied below standard	Pre-qualify interested bidders	Government
Monopoly power in hands of private sector	A private operator could charge excessively high tariffs	Identify monopoly risks where appropriate unbundle vertically integrated utility Put in place an appropriate regulatory framework	
Cost of private provision too high	Private sector must charge a politically unacceptable price to earn a normal rate of return	Prior to bidding process, undertake an evaluation of technical and economic feasibility of venture. Make bidding process transparent and quality information freely available.	Government
Difficulty in establishing true value of existing water supply network	Contract price may not reflect assets' true value	Government should make available an economic and technical assessment of the assets	
<b>Design/Development Risk</b>			
	Fault in tender specifications	Use specialized consultants	Government
<b>Construction Risk</b>			
Cost overrun	Inefficient work practices and wastage of materials	Select construction company with a proven record; include penalties in contract	Construction contractor
Delay in completion	Lack of coordination of contractors, failure to obtain standard planning approvals Failure to grant contractual land use rights or rights of way	Select construction company with a proven record; include penalties in contract Ensure water supply operator/investor has sufficient rights and powers	Construction contractor Government
Failure to meet performance criteria	Quality shortfall/defects in construction	Select construction company with a proven record; include penalties in contract	Government/contractor
<b>Operating Risk</b>			
Raw/bulk water quantity	Poorly defined rights to water	Establish clear, legally enforceable water rights	Government
Raw/bulk water quality	Potential for pollution and salinity upstream	Prior implementation of an environmental impacts survey — government assurance to prohibit development activities in the headwater areas	Government
Operating cost overrun	Unexpected breakdown	Duplicate critical components	Project company/investors
	Industrial relations —friction caused by staff reductions	Introduce redundancy package and employment counseling	Operator
	Change to license conditions	Clearly specify rights and obligations under contract	Operator

**Table 12: Examples of Risks, Possible Approaches for the Mitigation and Allocation in a Privately Funded Water Supply Investment**

Type of Risk	Source of Risk	Possible Mitigation Approach	Risk Taken By
Interruption in operation	Operator fault	Rigorous training regime	Operator
	Interrupted electricity supply	Establish supply priority for water utility/install back up power plant	Operator
Shortfall in service quality	Operator fault	Allow for short-term reduction in water quality standards	Operator
<b>Revenue Risk</b>			
Increased operation costs	Increase in bulk water charges	Ensure regulated water pricing system allows all or partial pass through of costs	Government/operator
Bad debts	Non-payment by consumers	Advance estimate of probable scale of non-payment –if probability high negotiate government subsidy	Government/operator Project Company/Investors
Fall in revenue	Increase in water charges not accepted by regulator	Better transparency of water charge revision procedures, make provision for arbitration	Government/operator
Lower than expected demand	Incorrect demand forecast	Ensure an objective forecast by a third party is made prior to investment	Operator/Investors
<b>Financial Risks</b>			
Exchange rates	Exchange rate fluctuations	Hedging or pass on through increase in water charges	Operator/Investors or Government
Foreign exchange	Non-convertibility	Government guarantees free convertibility of foreign currency	Government
Interest rates	Fluctuations	Hedging and/or pass on through water charges	Operator/Investors! Government
<b>Force Majeure</b>	Floods, earthquake, riots	Investment insurance, government guarantee, ADB guarantee	Shared
<b>Political (Sovereign) Risks</b>			
Change in government	Unexpected change to contract	Clearly specify penalties in contract, ADB guarantee	Shared
Political interference	Cancellation of license	Clearly specify rights and obligations under contract	Government/Operator
Political interference	Restrictions on overseas remittance	Government guarantee –establish an escrow account	Government/Investors
<b>Institutional/Legal Risks</b>			
	Complex government bureaucracy	Clarification of institutional arrangements; assurance of government assistance; establishment of a regulator	Government
Legal risks	Contract dispute	Contract should clearly specify methods for arbitration and dispute resolution	Operator/Government
<b>Environmental Risks</b>			
	Site remediation, pollution/discharge	Ensure environmental regulations are well specified and transparent	Operator/Government
	Pre-existing liability	Clearly define and where possible, quantify pre-existing liabilities	Government

Source: Based on best practice models and examples in reports such as World Bank (1997b) and APEC Economic Committee (1996) and ESCAP (1997), Idelovitch and Ringskog (1995) and ECFA (1997).

## **6. Tendering**

### **a. Solicited Versus Unsolicited Bids**

In general, there appears to be a clear case in favor of governments soliciting bids for well-defined projects — BOTs, concessions, etc. There is a key role for a state enterprise reform unit to assist the government to define the scope for and detail of privatization projects, ideally reducing the need for consideration of unsolicited proposals.

Unsolicited bids, while they can bring new ideas and concepts to the government sector, should where possible, be subject to competitive tender. The party advancing the new proposal will have a timing and information advantage, and so long as there is no uncompensated hand-over of intellectual property to other bidders, the process can be fair. The BOT law in the Philippines has a process in early stages of application where the originator of an unsolicited bid gets matching rights in respect of otherwise preferred bids.

Where it is not clear “what the game is”, or what rules and market boundaries will apply to a new private sector management of a formerly public sector enterprise, there is scope for unsolicited bids actually slowing down the privatization process. Many Memoranda of Understanding and subsequent direct negotiations have proven slower by a large margin than, say, the privatization process in relation to Manila water supply concessions.

### **b. Transparent and Competitive Processes to Select Private Partners**

It is now far from controversial to state that the selection processes for PSP should be transparent and competitive. Comparison of the Manila water supply outcomes with some other direct negotiations processes e.g., Jakarta indicate there are timing and customer tariff benefits in the open competitive processes. While the speed of Manila c.f. Jakarta outcomes no doubt meant that some details were better handled in the lengthier process, community support should not be expected when all are not invited to tender.

One element of the selection process that deserves comment is the process by which:

- The list of all expressing interest is reduced to the long list of those deemed qualified.
- The long list is reduced to the short list of bidders.

There is much merit in not imposing large bidding costs on large numbers of players. Parties which are on a short list of two or three players are far more likely to give it their best shot, and cut margins so that they have a strong chance of winning. Additionally, where there are multiple private sector investments at stake, as with the Sydney water BOTs and Melbourne Docklands. There should also be in the coming years in most Asian countries, a batch of, say, five concessions could be put to a multiple or sequenced tender. This would allow ten firms to be short-listed, even though there were only two on a short list per concession.

## **D. Private Investment — Employment Impacts**

The public sector model of water supply has typically involved using water utilities as mechanisms for contriving jobs — where up to four or five people do the work of one best practice worker. This tendency to feather-bedding is not restricted to Asia — but is characteristic of most countries.

What is sought in best practice reform of water and other utilities, is that the total cost of infrastructure services are lowered, thereby making the cost of doing business much less than otherwise, while also improving the quality of life. Jobs are created by making the costs of doing business (transport, water supply, electricity and so forth) much less than otherwise.

While there is clearly a tendency to shift to fewer people working smarter, this may require substantial training – again, this is something the ODA and international development banks can support. Similarly, the staffing of SOERUs – including overseas experience – is a priority if reforms are to be well implemented.

While the evidence does not support the notion that feather bedding or contriving jobs in inefficient utilities is a sensible strategy, there are benefits in facilitating a transition to private sector practices which is not socially divisive. In general, there will be a case either for offering attractive retrenchment packages or for providing training opportunities for those being declared redundant. In addition, it is important to promote broader understanding of the benefits that can be obtained for the broader community in making the transition towards best practice.

### **E. Implications of Asian Currency Crisis on Private Sector Participation**

This is not the place to review the vast challenges emerging from the currency crisis in the region. However, to the extent that the Asian crisis is viewed as a consequence of poor institutional and banking arrangements – investments have often been based on privileged relationships with governments and financial institutions rather than on the overall returns from investments – then the issues we discuss are quite central to the problems of the day. The talk from the International Monetary Fund, is very much of the need for transparency, competition, and sound market principles being applied to economic decisions, particularly major infrastructure decisions. In this sense, the reforms advocated in this report are part of what can be seen as a strategic response to the economic problems of the Asian region.

Weak infrastructure is only going to be strengthened by improved management of capital, better incentives, and quality new investment – all targets of this shift to best practice. Additionally, governments are under pressure to avoid ballooning deficits – and this makes PSP in water infrastructure a higher priority than otherwise.

If infrastructure investment is to be sharply increased by the private sector, then it is critical that there are policies developed to deepen and lengthen the maturity of capital markets – so that the currency of income can increasingly match the currency of debt repayment – reducing FOREX exposure.

### **F. Examination of ADB and Other Lender Policies**

ADB and the World Bank Group<sup>6</sup> for some time sought to expand their role in assisting the financing of Asian infrastructure projects, including water. One of the stated goals of the World Bank has also been to maximize the amount of private sector financing which accompanies its involvement in a project. To this end, the World Bank has been prepared to underwrite political and even commercial risk in infrastructure projects, particularly in poorer Asian countries.

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<sup>6</sup> The World Bank Group includes the International Bank for Reconstruction and Development, the International Development Agency, and a commercial arm—the International Finance Corporation (IFC).

In recent years, ADB and the World Bank have increasingly recognized that in addition to assisting the financing of projects, they have a key role to play in providing assistance in improving the regulatory environment in Asian countries to promote private development of infrastructure.

ADB has been examining the role of the private sector in infrastructure, financing, construction and operations. Its new approach to private sector involvement in infrastructure development is summarized in *Private Sector Development: Strategy, Policies, Modalities*<sup>7</sup> ([www.adb.org/private/private.html](http://www.adb.org/private/private.html)). Significantly, the published list of loans from the private sector window of ADB does not include loans to water supply infrastructure — although there are significant loans to electricity infrastructure — e.g., in the Philippines. This is consistent with the view that the water supply sector is different — requiring substantial regulatory and other reforms before even the private sector group of ADB is able to take a lead role.

To provide support to private sector development, including infrastructure sectors, ADB has set up organizations such as the Asian Finance and Investment Corporation Ltd (AFIC). AFIC, was established in 1989, and concentrates largely on mid-sized projects and transactions that ADB would find too small, especially in sectors such as industry or manufacturing. Moreover, AFIC provides underwriting, syndication, and other merchant banking services with which ADB does not generally get involved, especially in market sectors, such as industry or manufacturing.

To “harness the power and dynamism of private capital”, the World Bank has established various structures and programs to facilitate private sector financing in its member countries. Organizations within the World Bank that assume significance in terms of facilitating PSP include the IFC (which played a key role in the Manila water concessions — although that could have been contracted out). The World Bank also has a potential key institution in MIGA (see Box 15). Risk guarantee mechanisms developed by these institutions to help mobilize private capital for infrastructure development were discussed in Box 15. Despite policy support for private sector investment in infrastructure, this accounts for only 17 percent of IFC investments to date (US\$45 billion) — of which water supply is only a part.

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7 To quote from ADB home page “The wide-ranging benefits that the private sector can derive from expanded and improved infrastructure facilities and the catalytic role for the Bank, justify the priority accorded to financing infrastructure projects in such sectors as energy, transport, telecommunications, water supply, urban development, education and health. Given the large capital requirements of infrastructure projects, a substantial portion of the Bank’s direct financing is allocated to these projects.

The Bank will assist in analyzing the feasibility and developing the structure of BOO/BOT projects and may provide financial support through direct equity investment and the provision of loans. The long-term funding that the Bank provides, with maturities stretching to 15 years, when blended with short term commercial financing, will result in well-balanced financial packages which meet the funding requirements of infrastructure projects, which tend to be long-term in nature. While the Bank’s financing will be modest in relation to the total financing needs of these projects, the Bank’s association will provide confidence and comfort for other lenders and investors, who may hesitate to participate otherwise, due to perceived risk or lack of familiarity with conditions in the host countries.

In selecting projects, the Bank will pay particular attention to the process of selecting the BOO/BOT developers and suppliers, to the BOO/BOT terms, and to the environmental aspects. The Bank will satisfy itself that host DMCs are not encouraged to pay uneconomic prices, providing excessive returns to BOO/BOT developers, in unequal bargains forced by severe shortages of infrastructure services. Equally important, the Bank will have to be assured that the host governments are committed and have the political will to fulfill their contractual obligations.”

The major international development banks and aid agencies now are keen to endorse PSP in water supply investment – but there is limited institutional expertise relating to the private sector outside the specialist sections of the development banks. The charters of the development banks typically restrict the bulk of lending to government-to-government transactions, with DMCs having to guarantee the borrowings. This creates a pre-occupation of all parties concerned with guarantees rather than the fundamentals of sound infrastructure finance.

The fact is that safe drinking water is essential, and efficient delivery is typically via a monopoly service – duplication is wasteful. This should mean that water supply businesses do not require government guarantees – since customers will be willing to pay for quality service. What governments should be doing is making sure that private sector investors are able to collect billings and that the regulatory processes governing tariffs are commercially and socially sound.

In the developed countries, water supply is often the basis for taxation (water rates and property taxation) because demand is inelastic and thus water taxes can raise a lot of revenue. These product characteristics also make for highly profitable water supply utilities – precisely because people will pay large sums for safe water supply – even if the utility is grossly inefficient. This is one reason why politically driven, inefficient and over-staffed utilities have survived – they can charge high tariffs and still have customers buying almost the same volume. The implications for water supply infrastructure finance of the essential nature of water, is that if the regulatory structures, rules restricting private wells and tariff arrangements are in place, then the take-or-pay style guarantees should not be necessary.

While the IFC – part of the World Bank Group, and the Private Sector Group of ADB have mandates to facilitate equity investments in infrastructure such as in water supply, the fact is that these funds are quite limited. There is a need to strike up strategic relationships with private banks and funds with substantial experience in funding infrastructure investments.

A particular reform which is required, is that loans should not be conditional on state sector investment – which seems to be the case with some loans from bilateral sources.

Another serious problem is that many agencies and departments of government queue up for what they feel to be soft loans from the low interest windows of the World Bank and ADB – but the process is slow and may, in many ways, actually reduce investment. Far better that the processes for ADB and the World Bank facilitating state sector and regulatory reform be put in place. The water supply utilities and the DMCs could then move to utilize private sector funding on a greatly expanded basis relative to current arrangements.

Water supply and sanitation lending from the World Bank and ADB over recent years has been declining, reflecting the difficulties of loans and projects in the sector. The extent to which PSP in water supply investment has been initiated, has been very small indeed.

Often there is frustration amongst many in the private sector that the government entities await ODA cheap money, even if it may end up being expensive because of currency depreciation, rather than get on with reform consistent with much higher levels of private sector investment.