

DEVELOPING BEST PRACTICES
FOR PROMOTING PRIVATE SECTOR
INVESTMENT IN INFRASTRUCTURE

WATER SUPPLY

The views, conclusions, and recommendations presented here are those of the study consultants, and should not be considered to represent the official views of the Asian Development Bank or its member governments.

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FOREWORD

This report is one of a series of five commissioned by the Asian Development Bank (ADB) to identify and recommend best practices to be followed and specific steps to be taken, by ADB's developing member countries in order to encourage both private sector investment and competition in infrastructure development. The study was financed through a \$600,000 regional technical assistance grant - RETA 5753: *Developing Best Practices for Promoting Private Sector Investment in Infrastructure*. This report focuses on the water sector; the other reports cover the power, road, airport and air traffic control, and port sectors.

Water is an important resource that is essential for human existence. An efficient and competitive water sector reduces water losses and improves the quality of water supply. This benefits water users and enhances economic activity. The report examines the features of water supply, the need and options for private sector participation, and the institutional structures and incentives. It also recommends a framework for moving to private sector participation in water supply. It is hoped that the report will help ADB's developing member countries attract well managed and cost-effective private investment in the water sector.

The five reports have benefited from the support of and valuable contributions from many individuals, both inside and outside ADB. The reports were prepared by a team of individual consultants: Water Supply - Michael Porter of Tasman Asia Pacific; Power - Elliot Roseman of PricewaterhouseCoopers; Ports - John Arnold, an independent ports specialist; Airports and Air Traffic Control - Ian Jones of National Economic Research Associates; and Roads - Roger Aliport of Halcrow Fox. In ADB, Sean O'Sullivan, Senior Public/Private Sector Specialist managed the technical assistance implementation with the help of Marcelo Minc, Project Economist. ADB staff in the Energy; Transport and Communications; and Water Supply, Urban Development and Housing Divisions as well as the Private Sector Group helped in guiding the direction of the study and in reviewing the outputs. In December 1998, a workshop hosted by ADB as an integral component of the study, provided a forum for the exchange of ideas and experiences. Participation and contributions of delegates from many developing member countries and representatives from the private sector in the workshop were very much appreciated by ADB.

The publication of the five reports is especially timely as it coincides with the introduction of a new strategy for private sector development by ADB.

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ABBREVIATIONS

ADB	-	Asian Development Bank
AFIC	-	Asian Finance and Investment Corporation Ltd.
BOO	-	build-own-operate
BOOT	-	build-own-operate-transfer
BOT	-	build-operate-transfer
CSO	-	community service obligations
DMC	-	developing member country
EPA	-	extra-ordinary price adjustments
ESCAP	-	Economic and Social Commission for Asia and the Pacific
FIC	-	Foreign Investment Committee
FOREX	-	foreign exchange
GDP	-	gross domestic product
IFC	-	International Finance Corporation
JV	-	joint venture
JWC	-	Johor Water Company
MIGA	-	Multilateral Investment Guarantee Agency
MWC	-	Manila Water Company
MWSC	-	Macau Water Supply Concession
MWSI	-	Maynilad Water Services Inc.
MWSS	-	Metropolitan Waterworks and Sewerage System
NIA	-	National Irrigation Administration
NRMS	-	natural resource management strategy
NRW	-	non revenue water
ODA	-	overseas development assistance
OFWAT	-	Office of Water Services
PHED	-	Public Health and Engineering Department
PPA	-	power purchasing agreement
PRC	-	People's Republic of China
PSP	-	private sector participation
PUC	-	public utility commission
PWA	-	Provincial Waterworks Authority
ROT	-	rehabilitate-operate-transfer
SAAM	-	Sociedad de Abastecimento de Aguas de Macau (Macau Water Supply Company)
SCADA	-	Supervisory Control and Data Acquisition
SCI	-	Statement of Corporate Intent
SOE	-	state-owned enterprise
SOERU	-	State-owned Enterprise Reform Unit
UK	-	United Kingdom
US	-	United States
WSMC	-	Water Supply to Macau Company

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EXECUTIVE SUMMARY

A Introduction

This report reviews issues related to best practice in delivering water supply, including preferred forms of private sector participation (PSP). However, the goal of PSP begs the question of why, given the alternatives, the private sector should seek to invest in a sector with so many uncertainties, natural, governmental, and financial? The commodity water is far from homogenous, but occupies a continuum including apparently pure but practically unsafe drinking water, through to obviously contaminated sewage. What is unevenly supplied as rainfall is wrongly deemed a free public good, despite the costs of treatment and retail supply. Thus, there is often an ill-informed community constraint against private sector involvement in water supply, which in most countries has prevented the sorts of best practice referred to below.

This makes the point that when it comes to best practice in the case of water supply, most of the messages are for government to implement, in particular:

- Sound and independent regulatory regimes.
- Catchment management policies.
- Enforceable laws on tariff setting and collections.

Once these are in place, best practices such as competitive water supply concessions can be implemented. If these structures are not in place, then best feasible practice may simply relate to contracting out some services under government guarantee, or build-own-operate-transfer (BOOT) of bulk supply to public sector water supply companies. It follows from this that since the particular features of the water supply situation and regulatory and privatization policies differ greatly across countries, so too will the feasible best practice.

One misunderstanding regarding the scope for bringing commercial practices to water supply is with regard to the issue of affordability. Much research, including by Asian Development Bank (ADB), e.g., *Women and Water*, by McIntosh et al, has documented the fact that it costs even the poorest families far more to have unsafe water than to meet the costs of efficient commercial piped supplies.¹ Surveys of consumer preferences in Andhra Pradesh, India (undertaken for the World Bank) found that many poor households could somehow afford cable TV but could not pay for water supply connections. It is also clear from direct experience that low-income families will pay for quality water supply - and are not averse to PSP - if the water utility delivers reliable water supply. Often such families already pay far more for often unsafe and unreliable well water — even meeting the required capital costs of shallow or sometimes deep wells. It is also noteworthy that the world's largest and most recent contracts for private sector water supply are in relatively poor cities — Buenos Aires, Casablanca, Jakarta, and Manila.

¹ *The Water Utilities Data Books* (Volume 1, June 1993 and Volume 2, October 1997), ADB, are also key references on the many issues on water supply raised in this paper.

B. Major Issues and Best Practices

Fresh water, even when available in relatively large quantities, is a limited resource that is critical to human existence. The adequacy of the water supply impacts on the health and morbidity (disease) levels. The availability of an adequate water supply also impacts on the viability of agricultural and, particularly, industrial development. A reliable quality water supply can lead to improvements in the level of economic activity in developing member countries (DMCs).

In many DMCs, piped water is neither drinkable nor available 24 hours a day. The quality of service is generally low, and the direct and indirect costs of inadequate service are high. This situation has produced reliance on bottled water, which is about as expensive per liter as gasoline, and has created a need for high cost storage and cartage systems.

The underlying concern of this paper is to facilitate a sharp increase in the capacity to provide potable piped water in the urban centers across Asia. Ideally, there would be a template – an action plan for government and the private sector – which could both increase efficiency and facilitate higher levels of investment. While we believe there are workable PSP templates in the areas of electricity, airports, and transport for example, water is different. Nevertheless, we see all countries as needing to commit to a process of water supply reform that will facilitate private sector investment in water supply. A checklist of key milestones is listed in Box 1.

The process we envisage is one in which the highest levels of government commit to development of sound water supply policies, including regulatory and catchment management policies and mechanisms for securing PSP in socially beneficial ways. But governments are not being counseled by this report to hand over all water responsibilities to the private sector. On the contrary, the strategy is to strengthen regulatory powers, to carefully define standards and coverage sought, and to seek contractual and competitive processes whereby the best of private and public sector practice - management, investment, and regulatory - can be applied to improved water supply. The kick-off point in this process, apart from enabling legislation, would be the formation of a reform unit to drive the process — a unit which could also have responsibilities going beyond the water supply sector.

1. The Reform Unit

The formation of a state-owned enterprise reform unit is an important first step towards water supply reform and the introduction of private sector investment in water supply. The unit should consist of a team of specially trained individuals with expertise in areas such as economics, management, and finance. The unit should also have skills specific to water supply as well as skills in negotiation. The unit would report to a key minister and have the endorsement of the prime minister or cabinet. It would be responsible for coordinating and facilitating the entire reform and PSP process.

Box 1: Check List – Water Supply Reform and Privatization

- Set up a state-owned enterprise reform unit with expert staff specializing in state enterprise reform and privatization. This unit reports to a key economic minister with the endorsement of the president, prime minister, or cabinet.
- Commission a scoping study of the water utility — its actual and potential operations — on the basis of maximizing economic value to the community. Review earlier studies and proposals for similar entities. Prepare action plans for government, utility, and the sector. The scoping study and related activities would be in collaboration with, or through, the reform unit of government.
- Explore, as part of the scoping study, the costs and benefits of separating natural monopoly businesses (pipelines, key plant, etc.) from parts of the utility that can be made competitive or contestable.
- Identify and rank risks and assess the best way of mitigating and managing them.
- Advise government on the most suitable PSP option. Lay groundwork for privatization tenders — including preparation of scope of markets and business operations.
- Review laws, regulations and other factors affecting possible re-organization of water supply utilities. Prepare draft documentation of required legislation and amendments to existing legislation and regulatory arrangements.
- Support for capital market reforms — these enable lengthening of the terms of local finance — thereby reducing the need for foreign exchange (FOREX) exposure.
- Assess water resource issues, basin management, and general review of issues affecting watersheds and water sources. Prepare water resources management strategy — overseen by a key minister and the policy unit. Consider feasibility of facilitating a system of entitlements to water — tradable water rights.
- Assess data on non-revenue water, scope for revenue increase with new assumptions regarding maintenance and investment.
- Review tariff structures, cost breakdowns, profit and loss accounts, and balance sheets. Ideally, assess these data by smallest feasible business unit.
- Assemble financial model of utility, capable of answering a range of alternative questions on revenue with and without efficient management of bulk and retail distribution systems.
- Review the quality and quantity of bulk supply and develop a feasible time scale for meeting international standards.
- Implement sound commercial tariff structures, billings, and collections.
- Define scope of market, component businesses, areas to be covered include: quality standards, targets to reduce non-revenue water, investment obligations.
- Implement an independent regulatory authority to monitor contract performance, tariff structure, and indexation arrangements. Ensure authority's staff has the necessary training and expertise.
- Commission advisers to prepare bid information documents, scopes of works, tender documents, basis for bids (tariffs or concession fees). Use contingent or success fees for consultants, as an incentive to timely delivery of quality outcomes (as in Manila).

If the reform unit is not infrastructure specific, it should include a water supply branch capable of leading a process of reform and restructure. As detailed in Box 1, the unit would initially undertake a scoping study of the water utility and examine the scope for wider sectoral reforms and, if government agrees, the introduction of PSP in all or part of the sector. It would drive the reform process. For water supply, this process should include the development of a natural resource strategy and the consideration and, ideally the implementation, of vested and tradable water rights.

2. Natural Resource Management Strategy and Tradable Water Rights

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. It is, in essence, an umbrella for a wide range of substrategies and action plans. The strategy should be developed in consultation with the community to facilitate community support and ownership of the strategy.

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. 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. Chile's experience highlights how the introduction of tradable water rights can help resolve water shortages and improve the efficiency of farms and water utilities. Like the NRMS, stakeholder support and an understanding of the new arrangements is important in achieving a successful outcome. Appropriate legal and institutional frameworks are also necessary aspects of tradable property rights for water. This framework should not only establish or vest the property right but also have mechanisms to police such rights, and deal with infringements, e.g., through pre-defined penalties.

While the implementation of tradable water rights has important implications for efficient resource use, a decision either not to introduce or to delay their introduction should not stall the implementation of other water supply reforms. Ideally, other water supply reforms such as the implementation of an NRMS, institutional strengthening and commercialization and, if considered necessary, PSP, could run parallel with the implementation of tradable water rights. Benefits will come from these wider reforms even if tradable water rights reform does not take place.

3. Sectoral Reforms

There is a strong case for introducing wider sectoral reforms such as commercialization and/or corporatization of water supply utilities - particularly if the introduction of PSP in water supply is to be a phased or staged process. 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. Tariff reform is an integral part of both commercialization and corporatization.

4. Tariff Reform

Tariff reforms are essential if the scarcity value of water and efficient usage of water is to be achieved. If water tariffs fail to reflect the costs, then householders when deciding to use water — say to wash dirt off a path rather than sweep it off; 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. Major river diversions to meet irrigation needs or for hydro schemes will only make sense if all potential uses of the water are factored into the calculations. In some cases, closure of irrigation schemes and generous compensation of farmers may be attractive to all. This is because the new water released may permit industrial and residential expansion and exports of goods and services far more valuable than some grain foregone. As in other markets, appropriately set water tariffs will operate as signals for efficient water consumption, production, and investment in water supply. Thus, tariff reform is of critical importance for public and private sector suppliers of water.

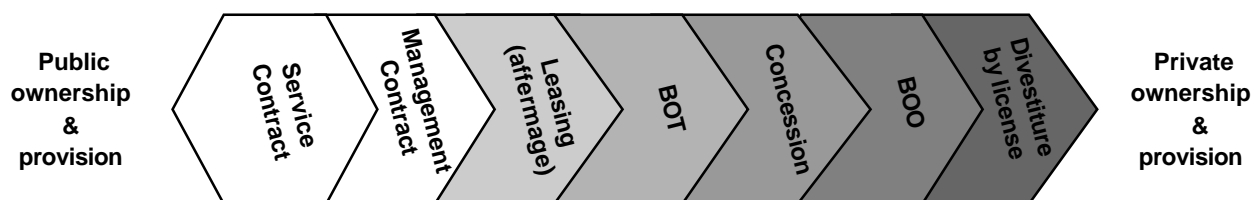
In general, it is a sound principle for the full costs of water to be the basis for customer tariffs. However, there is no need for an automatic rejection of all cross-subsidy arrangements, given that water is an essential service. If strategic low-income groups are ignored, the politics of reform may not be feasible. If a community service obligation is maintained after a process of review, it should ideally be quarantined from the commercial aspects of the utility. Community service obligations should be funded in a transparent manner.

Tariff reforms should be a precursor to PSP in the water supply sector. Without tariff reform water supply investments will not be financially viable from the private sector lender's and investor's point of view. If private sector investment goes ahead without tariff reform, DMC governments will need to fund the difference between the low water tariff paid by consumers and the higher payment made by DMC governments to the private sector. This situation is unlikely to be sustainable in the long-term.

5. Private Sector Participation

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 (see Figure 1).

Figure 1: PSP Options — A Continuum



The choice of the most appropriate PSP option for a particular country or region at a particular point in time will depend on a number of factors. These include:

- The support for commercially viable tariffs.
- The predictability of the regulatory regime governing project income.
- The level of government and 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.
- The private sector's perception of the risk associated with individual projects.

All of the PSP options can play a role in bringing private sector expertise and incentives into the water supply sector. Table 1 sets out the potential benefits of the private sector options. It should be noted that the quality of the contract would play an important part in determining the benefits from all PSP options. Good quality contracts will, amongst other things, encompass an appropriate allocation of risks. Further, except for service contracts, a transparent and well-considered regulatory framework is important in securing the benefits of PSP. As discussed above, and highlighted in Box 1, the reform unit plays a critical role in all of these areas.

To some extent, community concerns about private sector investment in water supply can be addressed through community education programs. For example, governments should explain how private sector commercial investments in water supply would lead to tangible benefits to all people who consume water. Less public funds for water supply can release more for important but non-commercial projects. Where there is government or substantial public concern about private sector investment in water supply, clear communication of other countries' experience with some of the options can help allay concerns. PSP options towards the public sector end of the continuum, such as a management contract, may be the preferred initial approach in these circumstances. This option may also be the preferred approach if potential private sector investors consider that the risks associated with a higher level of private involvement are too high. However, in these circumstances care should be taken to ensure that the move towards private sector provision does not stop there. Sunset provisions reviewing the arrangements may facilitate moves forward.

On the other hand, if there is strong government and public acceptance of the need for private sector investment and the private sector is conducive to sharing the risk, then the private sector concession model is most likely to achieve the greatest benefits for the community and the economy as a whole.

However, full concession models may not often be politically practical. As an alternative (transition) strategy, build-operate-transfer (BOT), BOOT, and rehabilitate-operate-transfer (ROT) arrangements can relatively quickly bring expertise and finance to a water supply project if investments in new sources of bulk water supply are required within a tight time frame. Effective implementation of these contracts requires careful attention to the design of tender documents and care should be taken to ensure that contracts do not become an unnecessarily expensive way of substituting private debt for public debt. They should also leave the way open for contracting out full service delivery (distribution) down the track.

Table 1: Potential Benefits of Various PSP Options

Service Contracts	Management Contracts	Lease	Concession	BOT/BOOT/ROT	Divestiture
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 duration - if problems with contract — can easily commercial risk	Reduced risks to concession contract responsibility and private sector	Reduced government risk management and investment goes to bulk assets transferred	Relieves government of operations, capital raising operating efficiency of water utility	Full responsibility for improvements in operating efficiency of	Full responsibility for improvements in re-tender
Easy/Simple contractual form	Potential for setting performance standards (with incentives to achieve standards)	Incentives for contractor to minimize costs, provide reliable services and maximize revenue collection	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		Full private sector incentives across utility	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 private sector ownership
	Potential for utility to bring in competition				Private water company would have clear incentives and achieve full cost recovery

BOOT = build-own-operate-transfer; BOT = build-operate-transfer; ROT = rehabilitate-operate-transfer.

When considering BOT type contracts the costs and benefits of alternative private sector options should also be examined. It is important to recognize that the BOT type contracts, which cover supply of bulk water, are supplying an intermediate input. In the absence of major new economies, these contracts can be expected to lead to an increase in the retail utility's costs. This potential cost increase needs to be recognized by the utility and the government and ideally, retail water tariffs should be adjusted to account for this change.

Concession contracts should be considered if governments are committed to private sector investment but are not prepared to consider full divestment. Concession contracts often apply to the water supply distribution (retail) end of the water supply system. However, they can be equally applied to an integrated water supply system from bulk through to retail. Concessions 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 and BOT arrangements involve 100 percent private sector ownership and operation of the water supply infrastructure. A government joint venture with the private sector is a variation to both of these arrangements. These forms of PSP require a strong commitment from government, a well-researched and negotiated contract and a strong regulatory and institutional environment.

6. Competition Options

In the absence of some regulatory or sectoral intervention, such as unbundling, the supply of water to a particular area will be by a regional monopoly. The potential to increase competition within the market is, in most cases, relatively limited. However, competition for the market itself is possible and desirable.

Competition for the market requires the private sector, through a process of competitive tendering, to bid to provide water supply services. Competition for the market cannot occur through one-to-one direct negotiations.

Structural reform, by breaking up water utilities vertically or horizontally into smaller business units, can also 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 outweigh any unbundling costs.

Third party access regimes seek to increase competition by allowing businesses, other than the owner of a water supply network, to utilize those infrastructure services of the network which are crucial for achieving competition in another market. Access can generate real competitive pressure in upstream or downstream markets. This pressure will encourage water supply companies to minimize their costs and charge competitive water tariffs.

7. Risk Mitigation and Management

The specificity of assets, histories, political climate, regulatory frameworks, environmental factors, and differing capital market situations means that optimal risk allocation is likely to vary between countries and even between different water utilities in the one DMC.

That said, an in principal starting point for risk allocation is that:

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

Ideally, there should be a balancing of risks and penalties. Table 2 sets out an indicative allocation of risks for a hypothetical private sector investment in water supply.

Careful identification, analysis, and ranking of risks by an expert team before competitive tendering is a key to best practice in risk mitigation and management. Risks should be carefully identified, analyzed, and ranked. The reform unit, if necessary in consultation with independent experts, can undertake this process. Ideally, the information gained should be published as part of the tender process. This will allow the parties to devise and/or negotiate strategies to resolve or avoid most, if not all, risks.

8. Economy Wide Reforms

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.

The development of local DMO capital markets is a high priority for the facilitation of PSP, particularly foreign participation, in water supply or for that matter in any major infrastructure investment. A better developed capital market in many DMCs would facilitate a match of the currency of borrowing with the revenue stream from the investment. 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 and the World Bank and overseas development assistance 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.

C. In-depth Country Studies

The Consultant has undertaken three in-depth studies of the experiences of private sector investment in water supply in Macau, China, Johor Bahru in Malaysia, and Manila in the Philippines. These case studies help to identify best practices that can be replicated in ADB's other DMCs. Appendix 1 presents details of these three in depth case studies and Box 2 summarizes some key lessons learned.

**Table 2: 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
<i>Choice of Private Sector Investor</i>			
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	
<i>Design/Development Risk</i>			
	Fault in tender specs	Use specialized consultants	Government
<i>Construction Risk</i>			
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
<i>Operating Risk</i>			
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 2: Examples of Risks, Possible Approaches for the Mitigation and Allocation in a Privately Funded Water Supply Investment (continued)

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
Revenue Risk			
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
Financial Risks			
Exchange rates	Exchange rate fluctuations	Hedging or pass on through 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
Force Majeure Political (Sovereign) Risks			
	Floods, earthquake, riots	Investment insurance, government guarantee, ADB guarantee	Shared
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
	Restrictions on overseas remittance	Government guarantee — establish an escrow account	Government/Investors
Institutional legal Risks			
	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
Environmental Risks			
	Site remediation, pollution/discharge	Ensure environmental regulations are well specified and transparent	Operator/Government
	Pre-existing liability	Clearly define and where possible quantity pre-existing liabilities	Government

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

Box 2: Water Supply Case Studies — Some Key Lessons

The Macau, China — Water Supply Concession

- The existence of a new high quality and abundant source of raw water helped contribute to Macau, China's water supply achievements.
- The removal of water supply bottlenecks assisted economic growth and development in Macau, China.
- It was possible to keep costs below those indicated by indexation of water tariffs to general costs in Macau, China.
- Increased economic activity upstream from a high quality raw water source can put the resource in jeopardy and this risk needs to be managed.
- Macau, China's long history of PSP in water supply and the Macau, China government and citizens' acceptance of continuing need for private sector investment in water supply facilitated the transition to a concession arrangement.
- Private sector investment does not in itself ensure success — the earlier privately-owned system failed to perform satisfactorily.

The Johor Bahru — Bulk BOT/ROT

- BOT/ROT contracts can be a successful approach to increase supply of bulk water when faced with escalating retail demand and limited public sector funds for investment.
- Contracts with the private sector to undertake bulk water investments often can be negotiated more quickly than contracts for retail concessions.
- Contracts for private sector investment in bulk water supply will generally lead to an increase in the retail utility's costs. This needs to be recognized and ideally retail tariffs should be adjusted to reflect the cost increase.
- Bulk water is an intermediate good; hence the private sector investor in bulk water supply does not address the retail supply issues.
- Bulk water contracts have only limited potential for facilitating improvements in the efficiency of retail distribution systems. These contracts, unlike concession contracts, produce no incentives for the retail distribution utility to reduce or minimize sources of inefficiency associated with the general operation and management of the utility.
- Demand management is an important element of the water market which can be easily dismissed in favor of increasing supply.
- The use of BOT type contracts for bulk water supply makes the demand management of drought more complicated.

Box 2: Water Supply Case Studies — Some Key Lessons (continued)

Manila — Water supply concessions

- Most agree that the privatization strategy, the bidding process, the selection process and the transition have been highly successful in increasing the capacity to meet water supply needs in Manila. It can be argued that the speed of the process helped to lead to successful takeover.
- The use of tariff per cubic meter as the bid item, rather than the concession fee, could have been a mistake, as the resulting lower than expected tariffs may have increased wasteful consumption of water in Manila. A concession fee bid at designated (higher) tariffs could have generated funds for upgrading bulk supply and quality improvements.
- Holding a tender over tariffs has not precluded subsequent tariff upward revisions - in response both to depreciation of the Peso and inadequate volumes of water available to the Metropolitan Waterworks and Sewerage System and the concessionaires.
- The speed of the entire process from public ownership and provision to provision under concession contracts has meant that many issues had to be covered in a very short span of time. According to the concessionaires, a number of problems in the arrangements have appeared, e.g., in ambiguous rights to bulk transfers.
- There were unresolved issues between the concessionaires regarding the physical boundary definitions of the concessions and the completion of the interconnection agreement. Ideally these issues should have been resolved before contracts were negotiated.
- There may be a case for allowing the extra FOREX cost of borrowings to be passed through in tariffs over a period shorter than the full 25-year concession period.
- In light of the wasteful use of water by many consumers in Manila, it would have been preferable to have had a higher tariff structure, either through a concession bid at designated tariffs (as noted above) or through an environmental levy. Tariff structures should preferably reflect the true costs of provision including demand management costs.
- The allocation of water across bulk uses should be a priority item for the Manila concessions.
- A regulatory body should have been properly in place before the concessions were let. This body should be independent and be able to build on skills from other regulatory exposures.
- It is critical that in devising a contract, DMC governments have capable advisers to obtain a fair contract with private operators. A strong public relations campaign is also mandatory.
- The introduction of the private sector in water supply can lead to a huge cultural shift in the operations of a water utility.
- Private investment in water supply infrastructure can be achieved with transparent and fair tendering processes.
- Tax incentives can be a significant incentive for the private sector — whether they were necessary in Manila's case is uncertain.
- Employee participation in the process was encouraged and facilitated the change.

PART ONE

STUDY OVERVIEW

I. INTRODUCTION

An Asian Development Bank (ADB) regional technical assistance was approved with the aim of developing sector specific best practices for promoting private sector participation (PSP) in key infrastructure sectors in ADB's developing member countries (DMCs). The sectors studied included power, water supply, roads, ports and airports and the best practices covered: (i) sector policy issues relating to pricing and competition; (ii) conducive legal and regulatory frameworks; (iii) the unbundling, mitigating, and management of risks; and (iv) mechanisms to reduce transaction costs. Five individual experts were engaged to undertake the study, one for each sector. A two-day regional workshop was held at ADB on 9-10 December 1998 for the experts to present their findings and validate them with an invited group of experienced senior government and private sector individuals, together with ADB staff. These volumes represent the final outputs of the study.

A summary of the expressed views in these volumes in relation to preferred forms of PSP in infrastructure, informed by the currency crisis, is that it is "best practice" to have a customer focus and a well structured regulatory environment around infrastructure projects, in part since this can allow domestic financing. In other words, it is financially and economically sensible to utilize the essential and often monopoly status of efficient infrastructure services in creating, in effect, a *customer finance* model of PSP. Under this customer-focused concession or franchise model, government provides the regulatory and legal framework that can satisfy customer and investor alike, with the securitization of customer accounts (say via an escrow account) or insurance techniques underpinning financing arrangements. Investors will always seek to mitigate uncertainties, but many of the privatization models to date have done so by way of government guarantees which have undermined the process in the longer run.

Regulation by entities appointed by the government is still required in the new model, given that monopoly provision of key network assets is often the only efficient option. For example there is a need to regulate access charges for connection to network assets such as pipelines, high voltage wires and port channels. But where competition can be achieved in the product market, as with electricity generation selling into a power pool, then this competition is generally the best mechanism to achieve good outcomes for customers. Realistically, in much of Asia, there is little experience with these new pro-competitive models of regulation and thus there is an expectation, on the part of the experts, of a substantial phase-in to this regulatory element of best practice in the future.

The challenge as we enter 2000 with its information-rich possibilities, is to learn from the 1990s infrastructure experience on investor-to-government build-operate-transfer (BOT) deals and concession transactions so that DMCs can benefit from the adoption of best practices in the various infrastructure sectors.

The following presents an overview of the study, including a discussion on the growth of private sector infrastructure investment in Asia, a review of the cross-sectoral issues, a summary of the sectoral best practices for each sector and suggestions on the role of ADB in supporting private sector investment in infrastructure. Part 2 comprises the specific sectoral report.

II. THE GROWTH OF PRIVATE SECTOR PARTICIPATION

A. Expansion and Contraction of Private Sector Investment

The last decade, and notably the period to 1996, saw both the rapid expansion of private investment in public infrastructure and a sharp increase in private management of the services associated with this infrastructure. The investment was fuelled by the development of new forms of PSP including varying forms of public/private partnerships: BOT, build-own-operate, build-own-operate-transfer (BOOT), and concessions.

New financial instruments, especially project finance, and the globalization of private investment funds, played a major role in the expansion of the infrastructure sectors in most countries. PSP in infrastructure, and in particular power generation, was supported enthusiastically by the multilateral development banks and bilateral development agencies, as well as by the international financial community. But fewer transactions were completed in the more complex and customer-focused areas such as water, electricity distribution and transport infrastructure. Early successes involved financial transactions without major organizational restructuring; later transactions focused on major infrastructure in mega-cities such as Manila, Jakarta and Shanghai. For example, water treatment plants, bulk water supply, individual power generation units, container terminals, passenger terminals, and airport toll roads.

In the first half of the 1990s, investment requirements for infrastructure in Asia were seen to be on a scale that dwarfed earlier projections and experience. Asian tiger economies were growing rapidly, and demanding massive investments in power, roads, telecommunications and other infrastructure. In most Asian economies, there was also a sense that development was being hindered by bottlenecks in power (e.g., the Philippines), transport (e.g., Thailand), water (most of Asia) and telecommunications. Since government infrastructure spending, international aid, and official sector lending could not be on a scale sufficient to meet requirements, the private sector was the focus of attention.

The new infrastructure investment requirements were estimated by ADB to be of the order of US\$1,000 billion for the 1990s for East Asia. Subsequently, they were estimated by the World Bank to be of the order of US\$1,500 billion for the decade 1995 to 2004. Such projections were useful as a means of highlighting the scale and structure of the huge infrastructure requirements of a growing and increasingly prosperous and urbanized Asia. They helped make clear the need for a major shift of focus towards PSP in infrastructure, to some extent motivated by efficiency considerations, but mainly reflecting the view that public sector financing for this scale of infrastructure requirements was neither feasible nor desirable.

There had also been a shift in views as to the comparative advantages of governments and the private sector in performing the various roles related to the provision of quality infrastructure services. Increasingly, an expanded regulatory and restructuring role was seen for governments, with investment, construction, financing, and management viewed as best opened to competitive PSP. Risks should, under this approach, be assigned to the parties best able to mitigate them, and this meant a greatly expanded role for the private sector.

There was recognition that while many private sector investments of the BOT type were being completed, the assignment of risks in many of these projects left much to be desired. Government guarantees of bulk take-or-pay contracts (between utilities and investors), often

indexed to exchange rates, had created huge contingent financial obligations of the utilities and their governments.

As with many investment trends, optimism, a proliferation of Memoranda of Understanding and glossy investment announcements gradually replaced careful evaluation. Some early successes, under special circumstances, led to the assumption that this BOT approach could be universally applied. The expression BOT had become a shorthand for PSP in many countries by the mid 1990s; but by 1999 BOTs and often the associated power purchasing agreements had also become a shorthand for unacceptable government risk exposure, and of project isolation from customer and market pressures.

This optimism ended with the Asian financial crisis; itself brought on by a lack of sound investment policies, in particular, in relation to government guaranteed power purchasing agreements. The power purchasing agreements had inadvertently converted a shortage of power supply into an oversupply, secured by take-or-pay guarantees. The result of the crisis has been a sharp contraction in private sector investment and a significant exposure of government and private sector investors to contingent liabilities. This contraction not only limits the capacity of governments to stimulate economic growth but also has led to the deterioration or stagnation of many partially completed and privately financed public infrastructure projects. The rise and fall of private sector finance is clearly shown in the private finance data presented in Box 1.

The currency crisis has caused some dramatic revisions both to economic growth forecasts and to infrastructure investment programs. However, as the analysis in Box 1 shows that while forecasts for infrastructure are lower due to lower growth and the expected move to best practice, the magnitude of investment is still huge and efficient PSP will be required.

B. The Challenge for Private Sector Infrastructure Investment

As this difficult period unwinds, it is important to re-consider the comparative advantages of the public and private sectors and the critical role of improved regulation and governance — including transparency, enforcement of contracts, and the adoption of viable commercial tariff structures. There is a need to review, sector by sector, the strengths and weaknesses of the process that has been used to implement these investments. The opportunities and risks of new approaches need to be addressed – e.g., the case for expanding the emphasis on customer focused and privately managed concessions. There is a need to develop bankable versions of these models, ideally backed by the security of customer accounts rather than government guarantees or public sector assurances. This series of volumes addresses these and other sectoral best practice concerns.

There are major challenges for governments and investors alike, emerging from this shift to a new model for infrastructure development. The new best practice model does not mean a total retreat by governments; on the contrary, moving to best or better practice involves a shift to good governance, and requires an upgrade of regulatory, restructuring, and monitoring roles. Without greatly improved governance, the shift to increased PSP could just mean monopoly powers being shifted to the well connected in the private sector. Moreover, without improved governance, PSP would eventually flounder and the demands for infrastructure will not be met, as risks would become unacceptable.

Box 1: Past Project Finance and Future Infrastructure Demand — East Asia

Project Finance — Opportunity and Volatility

Figure 1 draws on a Euromoney (CapitalDATA) database and highlights the dramatic growth, and subsequent decline of infrastructure funded through project finance in selected East Asian countries. The pre-crisis level of nearly US\$41 billion for 1996, contrasts sharply with the estimated level at the end of the 1980s, when the total market for funding projects was less than US\$5 billion per annum, as well as with the crisis figure of US\$12 billion for 1998. Clearly, in the 1990s and well prior to the crisis, the importance of the private sector in infrastructure development was rapidly increasing. As a result of the crisis, the telecommunications sector has shown the most dramatic decline, reflecting the fact that such projects are typically purely privately funded, and bear demand risk in a newly open environment. The energy projects, on the other hand, appear more resilient, but mainly because they have had some form of government support, in the form of guarantees in relation to bulk sales through PPAs.

Future Demand for Infrastructure Investment

New infrastructure projections for selected East Asian countries: the People's Republic of China (PRC); Indonesia; Republic of Korea; Malaysia; Philippines; and Thailand for the period 1996-2005, adjusted to allow for both the phase-in of private sector market discipline/best practices and reduced economic growth. The revised projections are 23 percent below the pre-crisis (baseline) projections. They are based on establishing the value of the capital stock of infrastructure in each country and projecting infrastructure investments with varying gross domestic product (GDP) growth assumptions and varying infrastructure-to-output ratios. A summary is given in Figure 2. The pre-crisis projections are based on the 1996 GDP growth forecasts. Case 1 is based on the current GDP growth forecasts while Case 2 adds the impact of a transition to a lower infrastructure-to-output ratio and assumes a gradual 25 percent increase in efficiency in each sector in each country. An important factor to note in the projections for this region is that the PRC is assumed to maintain its relatively high GDP growth rate, which accounts for about two thirds of the infrastructure spending in the region. The results for Case 1 indicate a fall of 14 percent from the pre-crisis projections. If the PRC is excluded, the reduction is 33 percent. Case 2, which assumes a transition to best practices, with a resulting change in the underlying infrastructure-to-output and efficiency parameters, indicates further reductions in the level of needed investments. The analysis clearly shows the relative impact of lower growth and the potential benefits of moving to best practice models of infrastructure development. It also highlights the magnitude of investment requirements, in excess of \$120 billion per year, and the need for PSP.

Figure 1:
Project Finance

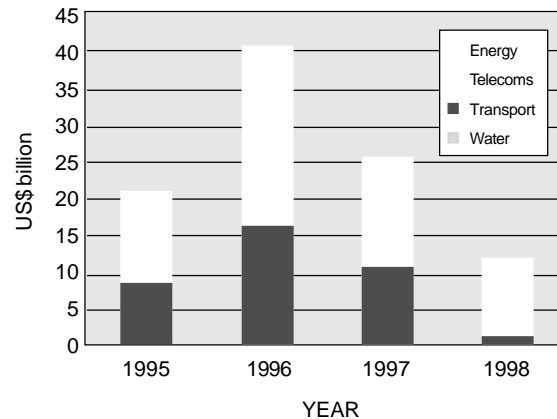
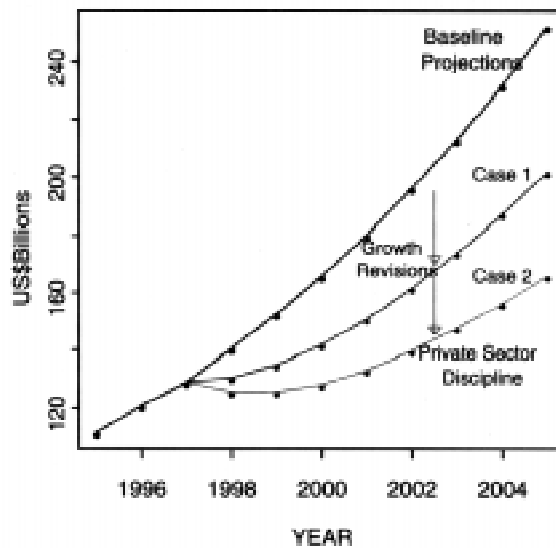


Figure 2:
1996-2005 Infrastructure Investment Projections

Scenario	US\$ trillion	%
Baseline	1.78	100
Case 1	1.53	86
Case 2	1.37	77



Source: "Private Sector Participation and Infrastructure Investment in Asia", Asian Development Bank paper prepared for the Finance Ministers Meeting, Asia Pacific Economic Cooperation, May, 1999; prepared by M.G Porter and C. McKinlay (Macquarie Bank and Tasman Asia Pacific).

III. CROSS-SECTORAL ISSUES FOR PRIVATE SECTOR PARTICIPATION

There are a number of cross-sectoral issues relating to promoting private sector investment in infrastructure that were identified during the study. The review of best practices in each of the five sectors highlighted the importance of competition, transparent tendering, and effective regulation. There was broad agreement that:

- Government should specialize in planning, structuring, and regulation while the private sector should specialize in management, investment, construction, and financing;
- The transfer of responsibility to the private sector should be accomplished through deregulation and open competition or well-established contractual arrangements including management contracts, capital leases, concessions, sale of assets and rights to operate;
- Economic regulation should be applied where there is insufficient competition but it should be transparent and predictable while still accommodating the concerns of the affected parties;
- Long-term domestic financing sources must be developed; and
- Commercial risks should be assigned to the private sector but other risks should be assigned according to which party is able to mitigate the risks.

The cross-sectoral issues are discussed in more detail below.

A. The Need for Reform and Role of Government

PSP in infrastructure development still requires the government to play a key role in planning, policy, and regulation. The reason that infrastructure industries have remained so long in the public sector is that they have components that are natural monopolies; e.g., the costs are lower with only one provider and the services are often essential (water, power and transport). These infrastructure monopolies also typically have a relatively high proportion of capital costs, have long-lived assets with low unit variable costs, and exhibit significant economies of scale. It had been a common judgement that state ownership of such monopolies, rather than state regulation of privately owned assets, was likely to deliver the best outcomes.

Existing service providers in these infrastructure areas have also had a considerable competitive advantage over potential new entrants, because of the relatively long time required to construct expensive new networks and to build up the market for their services. The scarcity of land, rights-of-way and airspace suitable for development of the network also act as an additional barrier to competition. Sites for airports and seaports, dams, power plants, and rights-of-way for roads, rail lines and transmission systems had become increasingly difficult to acquire. Another common argument for retaining these industries within the public sector was that they must provide common (or universal) access to their services and that subsidies are required.

It turns out that public ownership and management is neither necessary, nor the best way to ensure universal access. Subsidies can easily be a requirement of a competitive tender or can be directly financed by government. A key advantage of having the private sector provide public services is that it allows public administrators to concentrate on planning, policy and regulation. The private sector, in turn, is empowered to do what it does best (i) invest capital; (ii) manage the businesses; (iii) manage and create appropriate incentives for staff and management; (iv) deal with customers; and (v) improve the efficiency and quality of service; more recently, under the spur of benchmark competition — competition by comparison.

Governments should allow the private sector to provide infrastructure services to the maximum extent possible, with governments concentrating on planning, policy and regulation, and with the private sector on efficiently investing capital and improving the efficiency and quality of such services.

B. Institutional Reform

The organization of the infrastructure sectors (i.e., ministries, regulatory agencies, and utilities) has remained largely unchanged with the introduction of PSP. With financial transactions being the primary mechanism for transferring infrastructure services to the private sector, insufficient attention has been given to the broader issue of institutional reforms. It has been implicitly assumed that the introduction of private management into the ownership or operation of specific assets would obviate the need for such reforms. Instead, the weaknesses of existing institutional structures have limited the effectiveness of the private sector initiatives. In most countries, the piecemeal transfer of infrastructure components has proceeded slowly and the controlling bureaucracies that add overhead costs and often limit improvements in infrastructure performance, have remained relatively unaffected. The currency crisis has emphasized the importance of institutional reforms but government bureaucracies rarely reform themselves. Governments should carefully review the structure, size and responsibilities of state-owned utilities and other entities in the infrastructure sectors and establish special reform units reporting directly to top level ministers to spearhead the necessary reforms.

C. Strategic Planning

Governments' acceptance of private sector investment in infrastructure has been due, in part, to their failure to anticipate future bottlenecks and make timely strategic investments to prevent shortages in capacity. The increased role of the private sector in developing infrastructure has caused many governments to neglect their responsibility for sector planning. Instead, governments have offered assets and public services to the private sector in an *ad hoc* manner, often failing to ensure that individual investments were complementary. In certain circumstances, unsolicited proposals have been used as a surrogate for planning. For its part, the private sector has selected projects that had already been identified in government plans, giving preference to those which offered the highest rate of return, the lowest risk or the greatest short-term benefit. The private sector has had neither the interest nor the capacity to consider the network implications of its proposals. Governments have failed to subject these proposals to rigorous financial analysis to determine their sustainability in the absence of major increases in user charges or government guarantees. Governments have also often overlooked the complementary investment required from the public sector to make the private investments successful. The results have been unsolicited proposals that involved little commercial risk (government guarantees, wrap-around provisions, transfer of existing assets, granting select

rights of way) or politically generated proposals. Governments should maintain and strengthen their role in strategic planning of the infrastructure sectors and in the process identify where PSP should be encouraged and the level of complementary support that should be provided.

D. Legal and Regulatory Framework

The effectiveness of PSP has suffered from the lack of adequate regulatory structures to control both technical and economic performance. Regulation of tariffs and other economic factors is particularly undeveloped. The basic objectives of autonomy, accountability, transparency and predictability have been difficult to achieve. More importantly, the mechanism for consultation between the public and private sector and for dispute resolution between the providers and users of the network has not been fully developed. A further problem has been the failure to separate regulation from administration in order to avoid conflicts of interest. Most countries have been slow to establish autonomous regulatory agencies with independent funding and professional staff.

Unbundling the network into competitive and monopolistic components can significantly reduce the need for regulation. The competitive components can be transferred to the private sector in a way that promotes competition and allows deregulation. The monopolistic components can then be transferred to the private sector once an effective regulatory framework has been established. This regulation should create a situation where the businesses derive their profits from increased efficiency and the attraction of additional demand.

Effective economic regulation covers also deterrence of anti-competitive practices. Most of the developing countries lack laws or agencies for dealing with anti-competitive practices. Economic activity continues to be concentrated in large conglomerates. The currency crisis has provided new impetus for breaking up the monopolies and introducing anti-monopoly laws.

The lack of established legal and regulatory procedures applies to contract law as well. The means for enforcement of contracts and the resolution of disputes are not well established. Political interference in the award of contracts has also been a problem.

PSP without a well-developed legal and regulatory framework increases the level of risk to investors. It also encourages investors to rely on special situations and political relationships rather than their merits as a means for securing and implementing contracts. The transfer of infrastructure services to the private sector should not lead to privileged deals or profits secured by government guarantees. They should be businesses with regulated income streams which derive their profits from increased efficiency and the attraction of additional demand. These income streams should be capable of securing substantial private sector funding, both because their semi-regulated nature makes them much like a government bond, and because the essential and often monopoly nature of the service lowers demand risk. Such assets are also long-lived and thus attractive to pension and similar long-term funds.

E. Unbundling and Introducing Competition

Experience in a number of countries has shown that unbundled infrastructure sectors with individual components managed separately can perform better than centrally-controlled networks. The additional costs of unbundled networks due to increased communications and

transactions among components have been reduced by improvements in technology. At the same time, the unbundled management has been able to better focus on the capacity and productivity of the individual components and their interface with other components.

The unbundling of the infrastructure sectors is an important technique for reducing their natural monopoly and promoting competition. Many parts of the network can support competition. Where it is not possible to create direct competition between suppliers of network services, it is often possible to create competition among providers of complementary network services. For example, in the power sector, many countries are separating the networks into generation, transmission, distribution, and in some cases, a fourth segment responsible for retailing power to customers, with different companies responsible for each segment.

Where competition cannot be created, it is often possible to establish contestable environments e.g., a market for the business. One method is through effective competitive bidding for the sale or lease of assets and licensing or franchising of services. Another is to reduce the period of the contractual agreements or to provide for a periodic review of performance. A third is to introduce performance targets related to the quality of the service, the range of services, the prices charged for the services and overall market share. The ability of the private sector to achieve these targets is then linked to penalties, or provisions that may lead to early termination of the agreement. A fourth method is to require comparable performance vis-a-vis other networks. This may be in the form of requirements for increasing market share relative to other providers of similar services, or requiring a quality of service and price that is comparable to other networks serving similar markets.

Most infrastructure sectors are composed of profitable and unprofitable components. One practical, but not ideal, strategy for transferring the components to the private sector is to bundle profitable and unprofitable components to produce a combination that has an acceptable level of profitability. Another is to tender the profitable components through techniques ranging from operating agreements and franchising to sales of assets and to transfer the unprofitable components using management contracts; in effect, bidding out the government support for that component. A third strategy has been to transfer the profitable components to the private sector and to retain the unprofitable components in the public sector, but under control of local government units rather than the national government.

F. Sources of Financing

Private sector funding of infrastructure usually brings the risk of foreign currency mismatches in the financing package; income is in local currency, but the need to resort to foreign debt and equity markets means that debt service requires substantial foreign currency. The root problem is inadequate depth in capital markets in most DMCs which prevents a tailoring of local currency debt to long-lived assets. The need to resort to foreign debt (and equity) creates substantial risks, which have been exposed in the recent crisis. Few infrastructure consortia can withstand an exchange rate depreciation of 40 to 50 percent, let alone the 80 percent decline experienced in Indonesia when their product is sold for local currency. Hence the priority on programs to deepen the domestic capital market.

In principle, currency matching requires that the bulk of debt funding of infrastructure services such as transport, water supply, electricity and other urban services should be in local currency. In the absence of the necessary capital market reforms, it is hard to see how private

sector provision of infrastructure can proceed on the scale required to meet future demand. A priority, therefore, given the recent experiences, is that international development agencies such as ADB expand their role both in facilitating political risk insurance and in fostering the development of domestic capital markets in Asia, particularly bond markets.

Direct foreign investment will remain an important source of funds for the development of the infrastructure sectors. However, it will take time to restore investor confidence and, given the experience of Indonesia, Pakistan, Philippines, Republic of Korea and others, governments will naturally seek to limit their exposure to these funds in preference to local sources of capital, if possible. The development of domestic long-term capital markets will be critical for private sector investment in infrastructure, but these markets must have much better regulation as well.

G. Risk and Risk Mitigation

In order to reach financial closure, governments have often accepted commercial risks that should have been assigned to the private sector. This includes not only the foreign exchange risk but also demand/traffic (volume) risk. The most obvious example has been the take-or-pay provisions in power purchase agreements. These guarantees have had three negative impacts. First, they have isolated the private sponsors from the influences of the market. Second, they have created a large amount of contingent liabilities for governments that now add to their fiscal problems. Third, they have encouraged price rigidity leading to distortions in the market and reducing the potential of the private sector to improve efficiencies in investment and operations. Other examples are build-lease-transfer agreements and volume guarantees for toll roads, airports and seaports.

Because governments have had limited contract-related knowledge or experience, the private parties have been frequently able to convince them to assume some of the commercial risks. Also, because governments have often not been able to engage suitable legal, technical and financial experts to assist during negotiations, they have been at a disadvantage in arguing with foreign proponents concerning international practices such as take-or-pay contracts, or with international lenders concerning guarantees to protect their loans. Bureaucrats who have gone through a long, often contentious bidding process have been willing to accept some commercial risks during negotiations rather than to face rebidding. Alternatively, private parties frustrated with drawn out negotiations and the continuing renegotiating of clauses have accepted risks that should have been borne by the government.

Governments should build up capacity to negotiate and deal with the private sector. Commercial risks should be assigned to the private sector and other risks should be assigned to the party best able to mitigate them.

IV. SUMMARY OF SECTORAL BEST PRACTICES

The challenge for governments is to encourage an appropriate form of private sector investment in infrastructure. The study has identified significant differences among the infrastructure sectors concerning the appropriate balance between private and public participation in ownership of assets and provision of services. Only some of the sectors have well defined models for PSP. Other best practices are still evolving and the menu will continue to develop as experience grows. The decisions on which infrastructure components should be

transferred to the private sector are of a strategic nature. They depend not only on the characteristics of the sector and the market it serves but also on government objectives. There was consensus among the experts that the primary objective should be to benefit consumers. However there were a number of additional objectives which governments should consider: (i) reduction in national debt; (ii) stimulation of domestic capital markets; (iii) reduction in capital and operating subsidies; (iv) investment in new infrastructure or rehabilitation of existing infrastructure; (v) improvements in the quality of service; (vi) increased range of services; (vii) reduced prices for services; (viii) client-oriented operations; and (ix) more effective marketing.

Governments have at their disposal a number of means for effecting the transfer of infrastructure components to the private sector. The pace and sequence of such a transfer depends on the: (i) size and complexity of the infrastructure sector; (ii) rate of growth in demand and the competitiveness of the market; (iii) options for unbundling by function or geography; (iv) legal regime regarding ownership of land and other critical assets; and (v) capacity for economic regulation. The established mechanisms, which range from management contracts to unregulated competition, are not new and have proven effective. The key is to have a vision of where the sector is going, and to carry through the reforms as quickly as possible so as not to allow the interim change to become the final state of affairs. The findings of the sectoral experts for each sector are summarized below.

A. Power

In the electricity sector, IPPs provided a quick solution (in the Philippines, for example) by offering generation capacity needed for rapid economic growth. However, the costs were often high because the new capacity was not consistent with the least-cost expansion path and the private sector required high rates of return. However, these costs have been decreasing as the IPP market has matured. The focus on production rather than efficient distribution put the public sector in the position of retaining that activity in which it was least effective and restricting the private sector from performing the customer focused activities (distribution and supply) where it had real expertise. At the same time, it isolated the private sector from the market through a combination of regulated pricing and guarantees against commercial risks.

The power sector expert advocates restructuring to achieve a competitive market model with wholesale and retail competition. Such reform will encourage sustainable PSP and maximize the benefits to consumers. The expert suggests five major steps in implementing this approach, and their order of precedence. To some extent, these steps may proceed in parallel, but they should be considered sequential actions that will lead to the implementation of a competitive power market:

1. Getting the investment framework right.
2. Deciding on the goals of restructuring and the ideal industry structure.
3. Preparing the players to participate in a competitive market.
4. Privatizing existing and new assets.
5. Ensuring that the competitive market is implemented properly.

Best practices for power sector restructuring would include the following:

- Create an enabling legal and regulatory environment to support competitive markets in electricity.
- Unbundle the power sector into separate generation, transmission, distribution, and possibly retailing sectors to achieve the maximum benefits for customers.
- Privatization should include the sale of power distribution utilities as well as generation, and should include existing assets as well as new projects, using a transparent process.
- Open access to transmission and distribution wires, and the ability to trade power between buyers and sellers in an open market, are critical to achieve a competitive framework.
- Operate the generation and retailing markets competitively, with a large number of generators selling into a wholesale electricity market at prices which balance demand and supply throughout the day.
- Operate the transmission network as a concession on the basis of competitive bidding, or privatize it within a tight regulatory framework, controlling rates of return, prices or gross revenue.
- The independent regulator should mainly oversee prices and incentives for transmission and distribution operations.
- Restructuring should proceed at a pace consistent with the development of a competitive and unbundled system.

B. Water

The water sector has moved more slowly towards private sector investment, relative to electricity and telecommunications for example, not least because of the jurisdictional, environmental and sensitive social concerns about water supply, and its affordability. While major private sector involvement has now been achieved in distribution (Manila and Jakarta), the bulk of transactions were BOT models with take-or-pay clauses guaranteed by governments. Adding to these difficulties was the lack of knowledge about the location and condition of the (underground) networks and aquifers in many countries.

The volume on the water supply sector addresses the question of why, given the alternatives, the private sector should seek to invest in a sector with so many uncertainties, natural, governmental and financial. Water, unevenly supplied as rainfall, is often wrongly deemed a free public good, despite the costs of treatment and retail supply. Thus, there is often an ill-informed community constraint against private sector involvement in water supply, which in most countries has prevented the sorts of best practice referred to in this report.

The water expert makes the point that when it comes to best practice in the case of water supply, most of the messages are for government — to install sound and independent

regulatory regimes, catchment management policies and enforceable laws on tariff setting and collections. Once in place, best practices such as water supply concessions can be implemented. If not in place, then best feasible practice may simply relate to contracting out some services under government guarantee, or BOOT bulk supply to public sector water supply companies. It follows from this that since the particular features of the water supply situation and regulatory and privatization policies differ greatly across countries, so, too, will the feasible best practice.

One misunderstanding regarding the scope for bringing commercial practices to water supply is the issue of affordability. The report notes that the poor often pay more for water than the cost from efficient commercial piped supplies. Experience has shown that low-income families will pay for quality water supply — and are not averse to PSP — if it delivers.

The key points recommended were:

- The benefits of PSP in the water sector must be explained to win public acceptance.
- The starting point in any reform process for water supply is to form a high-level reform unit to drive and manage the process. It would be responsible for coordinating and facilitating the entire reform and PSP process. The reform unit may be a cross-sectoral unit.
- While not essential to commence reform, the introduction of tradable water rights leads to efficient use of water, particularly when it is scarce and has alternative uses.
- The water sector should be unbundled to the extent possible. The private sector concession model is most likely to achieve the greatest benefits to the community and the economy as a whole. The government continues to own the network while the private operators lease the long-term right to use the assets and collect revenue from service delivery. The benefits accrue due to strong financial incentives to reduce water losses and expand service.
- If politically difficult, then the next best strategy is to use BOT, BOOT, and rehabilitate-operate-transfer arrangements to bring expertise and finance to urgently required water supply projects. The bidding procedure should be carefully managed to ensure reasonable cost and the contractual arrangements should not constrain subsequent progression to more competitive models.
- Commercialization/corporatization of water supply utilities together with tariff reform is advantageous as an interim step if the introduction of PSP is to be phased.
- Tariff reform to achieve full cost recovery is essential for PSP. Cross-subsidies for the poor can still be considered in a transparent manner.
- Critical to the success of PSP in the water supply sector is for the government to create sound and independent regulatory regimes, catchment management policies, and enforceable laws on tariff setting and collection.

- Risks are likely to vary between countries and even between different water utilities in a country. They should be managed by the party best able to minimize and manage each risk most effectively. Where no party has a clear comparative advantage to manage the risk, it should be shared.

C. Roads

In Asia's roads sector, PSP has been equated with major BOT toll roads. These have been targeted where traffic is greatest — in and near the capital city and sometimes along major inter-city corridors. This private investment has produced some successes but also many failures. After more than a decade of concerted effort, implementation experience has not matched expectations. Indeed, surprisingly little has been implemented outside the PRC.

The road sector expert has advanced three reasons for modest progress in roads. First, governments have not defined their policy, often leaving the private sector to identify projects. Secondly, almost everyone involved has expected such toll roads to be profitable without government support, but this has only rarely proved to be the case (outside the dense PRC market, which is deemed a 'special case'). Thirdly, it has proved difficult to introduce promised tariffs and tariff increases in a sector where roads have become to be regarded as free.

What is clear is that private construction and maintenance of public roads produced better results where there was adequate competition and effective methods for enforcing contracts. Efforts to substitute private sector management for public sector officials in the management of the public network are in their early stages, even in the developed economies, but the preliminary results are encouraging.

Worldwide experience identifies a broad range of PSP modalities, in which BOT is close to being the most difficult to implement. Other modalities include maintenance management contracts, turnkey, operate and maintain or rehabilitate-operate-transfer concessions. Many of these modalities target improved maintenance, and rehabilitation of the network (rather than solely network capacity expansion). They have potentially much greater application than BOT projects. Looking ahead, the requirements are to both improve the BOT process, and to extend the modalities that are applied. The key points to emerge are:

- Governments must prepare the PSP environment. Institutions may need to be restructured with the objectives of controlling the PSP process in the public interest, and creating a regulatory body, separate from vested interests. A sound legal framework and a predictable regulatory regime are essential.
- Governments must identify priority PSP projects. This will almost always require an independent feasibility study, which focuses on traffic and tariff policy, project staging, network integration issues, risk allocation, finance and implementation issues.
- The best prospects for BOT projects are in middle-income countries (where the willingness-to-pay tolls exist) along existing congested corridors, or where there are missing links (e.g., estuarial/river crossings). A regulated income stream from a tolled public toll road is capable of securing project financing of an appropriate kind (i.e., suitable to pension funds and other long-term investor groups).

- Private sector modalities other than BOT exist, e.g., concessions, and should be applied more widely, as they can address many of the sector problems, and in the process create a new high growth industry for transport management companies.
- Traffic risk is the major risk and may be shared. The core risk being taken by the private sector, with government taking a share of the upside benefit and providing a downside guarantee in the event of low traffic.
- Transparency and competition are essential in the procurement process.
- Government support should be defined upfront as a maximum so that the private sector can prepare realistic bids.

D. Ports

In the port sector, the transfer of cargo-handling activities to the private sector has been, in most cases, extremely successful in replacing inefficient government bureaucracy with commercially-oriented management. Improvements in productivity and maintenance has increased the quality of service. However, where there was no competition, these arrangements were less likely to sustain these improvements. Private investment in port infrastructure has generally been limited to new and existing cargo terminals. Trans-shipment terminals were the most successful, since they were less dependent on local markets and land transport. Greenfield ports were slower to develop because they were further from their markets and the transport access was less developed. Basic infrastructure offered few opportunities for full cost recovery.

The ports sector expert, noted that the private sector has always been actively involved in port affairs. The land and water transport services that use the port are almost entirely private sector. Nearly all of the cargo shipped through ports is privately owned. The private sector provides an array of complementary trade facilitation and logistics services for this cargo. Within the confines of the public port, cargo owners, forwarders, and ship agents actively participate in decisions concerning the handling and storage of cargo. The public sector's role is to own, develop, and manage basic port infrastructure and common-user facilities.

The process of port privatization has rarely involved pure privatization, since land and infrastructure are rarely sold. Instead, the process involves PSP in operations and investment in equipment and facilities. The process is not a monolithic effort because of the diversity and complexity of ports and the services they provide. It can be divided into three components: (i) institutional reform, (ii) divestiture of existing services and assets, and (iii) investment in new facilities and services. These can be implemented individually or in combination. For each port component, there are many possible public-private partnerships. The main points regarding moves to best practice were:

- The bidding process should encourage unbundling not only of the network but also for the services within the ports. Where ports are not financially viable, they should not be bundled with profitable ports, but treated as stand-alone facilities that are turned over to local government or put under management contract using a competitive tender.

- The landlord model is the best structure for promoting PSP because it accommodates different forms of public-private partnership while recognizing that the only fixed responsibility of the public port is the ownership of the site.
- The most effective and efficient procedure for promoting PSP in the port sector is to lease existing facilities with relatively short-term agreements that allow for reorganization and improvement in productivity. Subsequently, concession agreements can be used to encourage private investment in additional capacity. Where this capacity is required immediately, or labor problems make it difficult to lease out existing facilities, then concessions might precede lease agreements.
- Continued public investment will be required, as it is difficult to recover the costs for basic infrastructure in a time period reasonable to the private sector. Public investment may also be required to reduce the barriers to entry. This is important where a new entrant would otherwise have to make a large investment before competing with existing service providers.
- The best form of tariff regulation is market regulation; the second best is through the terms of the contract that identify the non-competitive services requiring regulation, state the maximum rates, the formulae for escalating these rates over time, and the arbitration procedures for discriminatory behavior in excess of that justified by commercial pricing. The third best is the establishment of a regulatory agency outside of the port which would apply a pricing formula related to cost recovery. All of these are preferable to a vague procedure for negotiating future changes in tariffs.
- The private sector should assume all commercial risks. Other risks should be negotiated, based on which party has the capability to mitigate the risk.
- The critical element in any effort to promote PSP is competition, or at least the potential for competition. This can be provided through direct competition between private sector service providers, between public and private service providers or between bidders in the case of an activity that does not allow competition.

E. Airports

For the airport sector, PSP in terminal operations produced significant improvements in financial performance and the quality of service. Private sector investments have increased substantially over the last five years. During the previous twenty years, there was little capital investment in airports, despite a five-fold increase in traffic. The airports coped with the higher levels of traffic through a combination of larger aircraft, better air traffic control, improved runway design, and the addition of second runways and additional terminal space. This period has now ended and most countries need to invest in new airports. These are proving to be costly, complex and often controversial investments.

The key policy questions concern how best to structure airports and groups of airports to obtain maximum customer benefits. The discussion in the volume on airports and air traffic controls indicates that there is little evidence of significant scale benefits flowing from multiple airport operation; equally, however, there is little evidence of significant scale diseconomies. The case for significantly reducing the concentration of airport ownership at privatization

therefore depends on the trade-off between the up-front and visible costs of re-structuring, and the possibly less tangible benefits of increased competition resulting from break-up. The competition benefits in this industry are not clear-cut, primarily because major airports mainly serve distinct regional markets.

In the United Kingdom, the authorities took the view that any potential competition gains from breaking up the British Airport Authority prior to privatization would have been offset by restructuring costs. In Australia, in contrast, the Government has preferred to restructure and reduce industry concentration radically, emphasizing the public policy benefits of inter-airport competition for long haul international traffic. The benefits of fragmented ownership also include those that flow from yardstick competition, enabling regulatory agencies to assess individual operator performance more effectively; and from introducing a limited element of competition by emulation between operators. The airport expert found the benefits from the Australian model to be greater. Key recommendations for the airport sub-sector are as follows:

- Airport privatization will be encouraged by the existence of legislation in the form of a BOT law or similar, signaling the government's recognition of the need for PSP in infrastructure provision. It is also important to ensure that the government is able to demonstrate that any projects offered to the private sector are economically viable.
- Regarding the optimum approach, full privatization based on asset transfer or acquisition through long-term leases is preferable to more restricted forms of PSP (but is also more demanding in terms of legal and regulatory frameworks).
- As to airport industry restructuring, there is no evidence of significant economies of scale in airport operation other than those associated with increased traffic density at a particular location. Hence, PSP can be based on individual airports (although facilities may need to be bundled to assist financing of major new developments or extensions to capacity).
- The existence of unprofitable airports does not justify the maintenance of a highly concentrated industry structure to facilitate cross-subsidies.
- Limited sharing of traffic and revenue risk (between the private sector partner and government) is justifiable in airport BOT or concession contracts.
- Denomination of some, or all, airport charges in US dollars is an effective way of hedging against currency risk and may significantly reduce the risk premium required by private investors;
- The benefits of PSP in airports are likely to be maximized by regulatory frameworks that incorporate good regulatory governance practice. The price-cap approach to constraining airport charges is likely to encourage better performance outcomes than one based on rate of return regulation.
- Competition for the market, whether through sale or leases, or BOT/concessioning, will be maximized by transparent bidding/sale processes.

V. THE ROLE OF THE ASIAN DEVELOPMENT BANK

The crisis has focused on the urgent need for institutional strengthening and governance reforms in both the financial and infrastructure sectors, areas where ADB can play a major role. There are a number of ways identified in the study in which ADB can assist in the reforms associated with increased PSP in infrastructure. The most obvious is to provide technical assistance to define policy objectives, develop network master plans, identify and evaluate projects, define the role of new regulatory institutions, and train regulators to handle their new responsibilities, prepare contracts and negotiate with the private sector. ADB's efforts to promote financial sector reform and develop long term capital markets will also be important. This would include efforts to improve the bankruptcy laws, and the regulation of domestic debt and equity markets.

In order for ADB to have a significant role in promoting PSP, it should link this promotion with on-going project lending. ADB can provide support for private sector investment directly through its private sector window and through its guarantee operations. More importantly, ADB should provide sovereign loans to complement but not compete with private sector investment in the form of public-private partnerships. Public sector project lending should also be used to finance basic infrastructure that cannot be packaged into financially viable investments for the private sector but provides significant economic benefits and improves sector efficiency. Program lending is another key modality to promote the necessary reforms where ADB provides financing for the adjustment costs in stages, upon the satisfactory achievement or fulfillment of government actions that will promote PSP and sector restructuring. This modality allows ADB to exercise some leverage on government decisions and actions to support reform. Country strategies should address which areas of development are to be financed by government using sovereign loans, general revenues and government bonds and which are to be financed by private investment and should ensure a coordinated approach to all forms of ADB assistance.

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.¹

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.

¹ 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

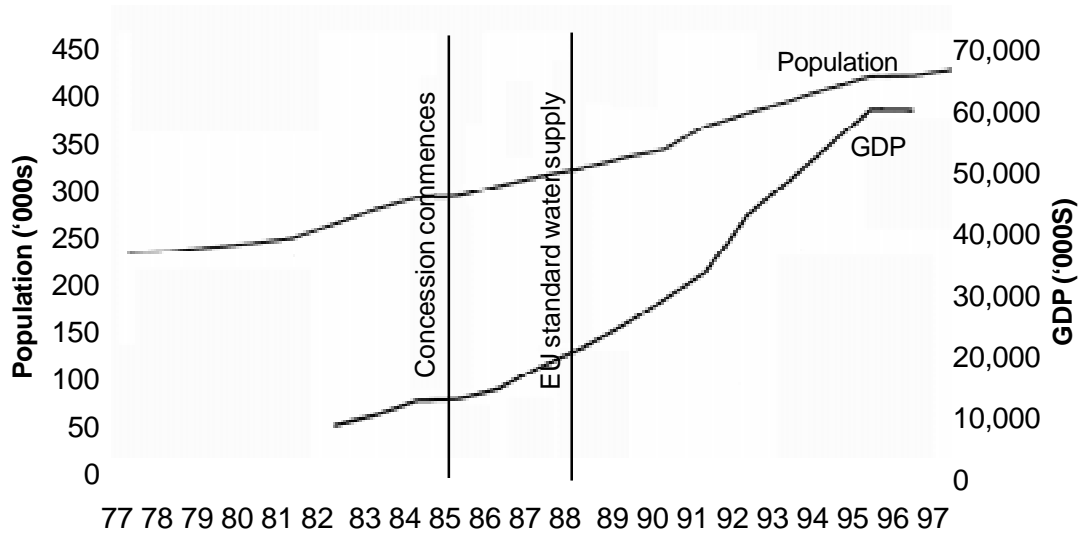
The manner in which we use and dispose of water impacts on virtually all aspects of our society and environment. For example, the availability of an adequate water supply impacts on the viability of agricultural and, particularly, industrial development. The internationalization of business and industry 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^a



^a 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

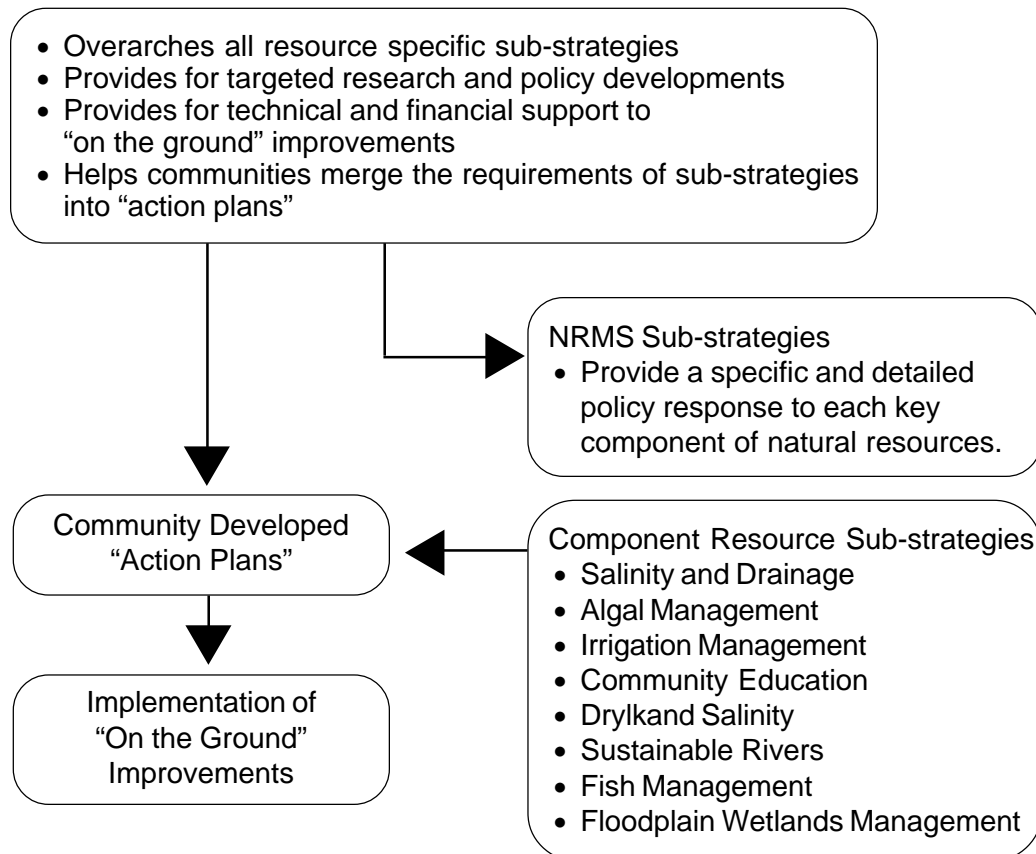
A natural resource management strategy (NRMS) provides a framework within which water resource issues can be addressed. The strategy operates in tandem with principles or policies developed by government. To facilitate community support the strategy should be developed in consultation with the community. 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 demand².

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.

² 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.³ 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 Thobani⁴ 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

³ 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).

⁴ 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.

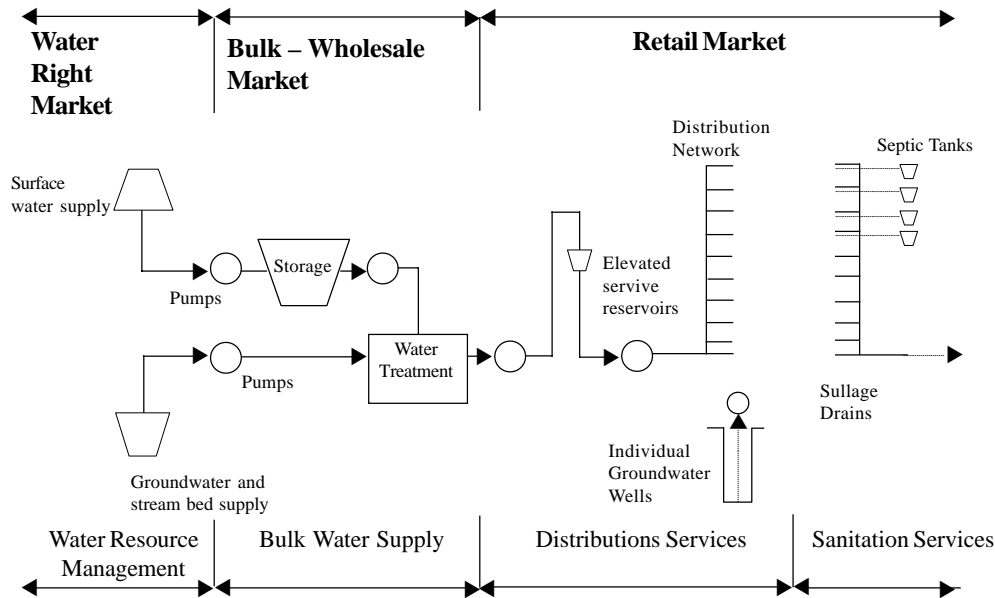
A private market approach to water, if it can be implemented properly, will ensure that water is not wasted and is directed to its most appropriate uses. This is because waste means lower profits. This incentive applies to all segments in the water supply chain. For example, as illustrated in Chile (Box 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.

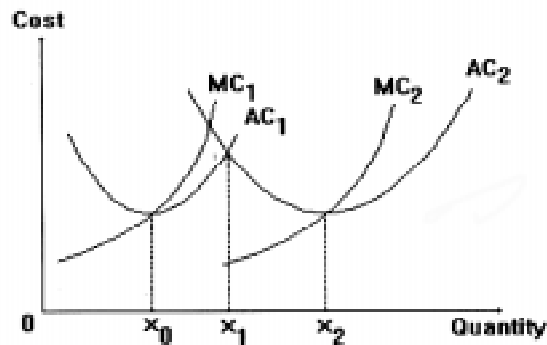
Figure 3: Representation of a Municipal Water Supply and Sanitation System



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 ³)	% 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

Element	Application Process
<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"> • An economic appraisal. • A review of business constituents. • Reallocation of non-core functions including regulation to other agencies as required. • 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. • Transfer assets and liabilities. • Establish capital structure/funding. • Determine tax/liability rules. • Prepare Articles and Memorandum of Association. • Prepare Statement of Corporate Intent (SCI). • Register corporatized utility under Companies Code. • Draft amending legislation as required.
<p>Any non-commercial obligations must be:</p> <ul style="list-style-type: none"> • Clearly identified in an SCI; and • Separately costed; and • Include transparent compensation 	<p>The utility in conjunction with the reform unit should:</p> <ul style="list-style-type: none"> • Identify non-commercial obligations for inclusion in an SCI (where appropriate) • Establish that non-commercial functions are not in the commercial interests of the company arrangements. • Cost non-commercial functions — costing should ideally be calculated by an independent expert • Negotiate a contract to deliver community service obligations (CSOs) — including arrangements for transparent funding of these non-commercial activities.
<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"> • Develop a corporate plan. • Review accounting procedures/implement effective procedures. • Define a financial model. • Develop business plan and budget plan. • Review office systems/requirements.
<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"> • Identify performance targets. • Identify measurement techniques; and • Undertake the necessary training to implement performance measurement. • Identify and account for any interaction between these targets and the compensation for non-commercial activities; and • Incorporate targets and compensation implications in the SCI.

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"> • Appoint a Chairman. • Appoint other board members. • Appoint Chief Executive Officer. • Determine structure of Board remuneration.
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"> • Staff can be legally transferred to the new company. • Redundancies can be offered. • Conditions of employment (including wages/salaries) must be established. • Staff are trained to operate in the new organization.

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"> • Corporate Plan. • Statement of Corporate Intent (SCI). • Half-yearly Reports. • Annual Reports. • Audited Financial Statements. • Employee and Industrial Relations plan. <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"> • Analyze regulatory options. • Choose the most appropriate regulatory framework. • Review existing tariffs. • 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.
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
Water					
–service charge per annum (\$)	80	80	80	80	80
– usage charge (c/kl)	70	76	80	85	90
Sewerage					
– 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
Domestic Water				
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
Domestic Sewerage				
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
Non-Domestic Water				
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
Non-Domestic Sewerage				
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 Thobani⁵ 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.

⁵ 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

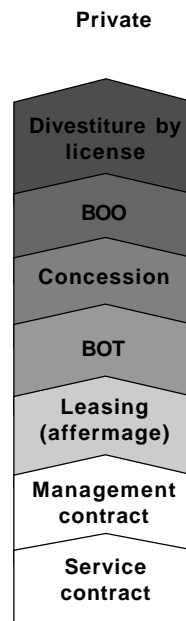
In many countries, PSP is a key requirement for meeting growing demands for water supply services. The private sector is an important source of new investment capital that is relatively scarce for many economies. It also brings management expertise and, in the case of foreign private investment, technologies 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

PSP Option	Service Contract	Management Contract	Lease Contract	Build Operate Transfer (BOT)	Concession Contract	Full Divestiture
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

Service Contracts	Management Contracts	Lease	Concession	BOT/BOOT/ROT	Divestiture
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	Full private sector incentives in bulk supply
Can increase utility's focus on core business	Limited commercial risks		Attractive to private financial institutions	Attractive to private financial institutions	
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		Attractive to private financial institutions	Mobilizes private finance for new investments	Mobilizes private finance for new investments
	Potential for utility to bring in competition			Addresses funding shortfall	Addresses any funding shortfall. Could be successful where there is good track record of
					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, www.adb.org, www.ifc.org, and 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
<i>Choice of Private Sector Investor</i>			
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	
<i>Design/Development Risk</i>			
	Fault in tender specifications	Use specialized consultants	Government
<i>Construction Risk</i>			
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
<i>Operating Risk</i>			
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
Revenue Risk			
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 Government/operator
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
Financial Risks			
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
Force Majeure			
	Floods, earthquake, riots	Investment insurance, government guarantee, ADB guarantee	Shared
Political (Sovereign) Risks			
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
Institutional/Legal Risks			
	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
Environmental Risks			
	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 Group⁶ 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.

⁶ 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*⁷ (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.

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.

APPENDIXES

DETAILED CASE STUDIES

Three in-depth country studies have formed an integral part of this towards best practice study. This Appendix presents detail of and lessons learned from the experiences of private sector investment in water supply in Macau, China; Johor Bahru in Malaysia; and Manila in the Philippines. These case studies help to identify best practices that can be replicated in Asian Development Bank's other developing member countries (DMCs).

A. Macau, China Concession

This part of Appendix 1 presents detailed information on the Macau Water Supply Concession (MWSC). This concession, which has been in operation for around thirteen years, is one of the most successful examples of private sector participation (PSP) in water supply in the Asian region. The following presents background on Macau, China and the underlying factors that led to the concession; details of the concession; important outcomes; and lessons from the experience for other countries.

1. Background

Macau, China has a total area of just under 21 square kilometers, which includes the Macau peninsular and the islands of Taipa and Coloane. It is situated on the western edge of the delta formed by the Pearl River Delta (Zhu Jiang) and the West River (Xi Jiang). Macau, China borders province of Guangdong Province. In 1995, Macau, China's resident population was 425,000. Until 1995, Macau, China's population was growing at around 3.8 percent per annum, population growth was stagnant in 1996, but increased somewhat in 1997. Some areas of Macau, China are considered to have the highest population density in the world. Macau, China has one of the highest per capita incomes in Asia, it reached US\$16,184 (around 129,000 Patacas) in 1994.

Macau, China's political and legal system is based on the western system with the separation of executive, legislative, and judicial powers. On 20 December 1999, it became a special Administrative Region of the People's Republic of China (PRO). Under this arrangement, it retains its own political and legal system.

2. The Need for Private Sector Participation

Unlike many other countries, water supply in Macau, China has had some form of PSP since 1905. From 1936 until 1982, Macau, China's water supply was owned and managed by Mr. Ho In. Water supply was only a minor part of Mr. Ho In's commercial and industrial activities in Macau, China. He is reported to have managed the water utility in a governmental manner. By the early 1980's, Macau, China's water supply had deteriorated to the extent that:

- Water quality was extremely poor with high salinity and turbidity. This was due to the poor quality of the raw water drawn from the eastern tributary of the Pearl River, a treatment plant working at overload capacity and a lack of scientific management and technology.
- Some areas of Macau, China only received water at night — this was due to a lack of water supply capacity and pressure.

In addition, unaccounted-for-water was at high levels and the water utility was operating at a loss. As might be expected, Macau, China's water supply customers and the government were extremely dissatisfied with the level of service. The situation of Macau water supply was then rather similar to the situation in many, if not most, DMC urban areas in Asia today. For this reason, and others, the Macau transformation to universal access to potable water supply is of great signal value.

3. The Macau, China Concession

New World, a Hong Kong, China based development company, took over the operations of the Macau Water Supply Company, commonly known as Sociedad de Abastecimento de Aguas de Macau (SAAM), in 1982. The Government accepted this take over on the condition that tariffs could not be increased. New World set to work replacing meters to increase income. New World also put in place improvements in the utility's management and financial systems.

The replacement of water meters reduced the unaccounted-for-water from 40.3 percent in 1982 to 24.5 percent in 1984. However, leakages and poor quality water persisted. The company, which had little previous experience in the water supply business, realized it lacked the expertise to improve water quality. In 1984, the Government and New World invited Lyonnaise des Eaux to help them improve water quality.

The Government commenced negotiations for a water concession contract in 1984. The concession contract, which was not put out to commercial tender, was signed in 1985 and runs for 25 years to 2010. This water supply concession was the first concession of its type in Asia.

As a consequence of the concession, SAAM was restructured. 85 percent of the company is now jointly owned by the joint venture (JV) company Sino-French Holdings Ltd. — comprising Lyonnaise des Eaux and New World — the remaining 15 percent is held by shareholders in the old water company. The operation of SAAM is the responsibility of the Sino-French JV.

After the concession was introduced in 1985, equity in SAAM was P51m (million Patacas, P1=approximately \$HK1.0) — P3m from the old company and P48m from the concessionaire (Lyonnaise 50 percent and New World 50 percent). Since then, a further P400m of capital funding has taken place primarily through bank loans.

The 25-year concession contract created a formal legal relationship between the Government and SAAM. The contract includes the following features:

- Annual payments to government of a rental fee and a sales tax based on the gross sales value of water supplied.
- Water supply quality to be improved to meet European Union Standards.
- Water supply quantity must meet specified levels - water supply availability is to be universal
- Uniform water tariffs based on volumes consumed — government receives a small discount and water used for fire fighting is supplied free of charge.
- A tariff revision formula - based on operating costs.

- Detailed regulations governing the utility's relations with customers — provision is made for water supply to be disconnected for non-payment of water bills 45 days in arrears, in this instance a reconnection fee applies.
- Government delegate to act as a regulator of SAAM (see Box A1 .1).
- Submission to government delegate of annual and five year forward investment plans for approval.
- Dispute resolution procedures (see Box A1 .1)
- Specified ratio of shareholders funds to net fixed assets.
- Partial compensation for rehabilitation of existing SAAM assets — implemented in early years through the tariff revision formula.
- Macau, China's general company taxation laws apply to the utility's profits.
- SAAM is prohibited from investing in other countries including PRO.
- A Government right of early redemption of the concession contract subject to two years notice after the expiration of the first half of the concession's term.
- Provision for extension of the concession contract by mutual agreement.
- Transitional arrangements for asset transfer at the end of the concession.

Box A1.1: The Role of the Regulator in the Macau Water Supply Concession

The Government delegate is the supervisor/regulator of the concession. The supervisor reports to the undersecretary of the economic and financial affairs department who is under the governor. The delegate:

- Must balance the interests of the utility and the public.
- Negotiates tariffs every November for introduction the following January.
- Monitors the utility's investment plans to ensure water demand is satisfied.
- Reviews the revised tariff and capital cost recovery applications.
- Reviews technical data on quality and quantity monthly.
- Reviews financial data six monthly.
- Has meetings with the MWSC approximately every two months.
- Attends MWSC board meetings as an observer.
- Consults with the public works department and the government chemist on technical matters.
- Imposes penalties on the utility if it fails to comply with the duties set out in the contract.

Disputes are referred to a conciliation commission made up of three people – one person is appointed by each party with the third being a mutually acceptable person. If the dispute is not settled within 60 day, then the parties can resort to legal means of resolution. To date this has never happened.

4. Investments and Cooperative Ventures

The concessionaire has undertaken a substantial investment in addition to the initial injection of equity. In accordance with the investment plan, which is required under the concession contract and approved by the government delegate, SAAM invests approximately 40 to 50 million Patacas per annum in expanding and improving Macau, China's water supply. These investments have been primarily funded by loans from local lending institutions.

Because of the poor quality of Macau, China's raw water supply, the concessionaire as part of the contract requirements needed to develop quickly a new raw water source. The most appropriate source of water supply was the Modaomen estuary of the West River situated in PRC (see Box A1 .2 regarding long-term raw water security).

As the concession contract geographically restricted SAAM's investments to Macau, China, the company needed to develop a relationship with a third party to supply it with this new source of raw water. The Water Supply to Macau Company (WSMC) was formed to undertake this role. The WSMC, which is 100 percent owned by PRO, supplies water under contract to Macau, China and to nearby Zhuhai in PRC. SAAM has a close association with the WSMC providing loans and ongoing technical and management expertise. The contractual arrangements between WSMC and SAAM specify that raw water tariffs can only increase in line with retail water tariffs.

Box A1.2: The Long-Term Security of the Modaomen Raw Water Resource

The Modaomen estuary currently has an abundance of fresh water with low levels of pollution. This water source has a high capability for self-purification and only a limited intrusion of salinity. The level of salinity increases in the winter-spring dry season. However, a system of storage reservoirs constructed in PRC is used as a stand-by if salinity increases to unacceptable levels.

Unfortunately, as in many other countries, there is currently no mechanism in place to ensure the long-term quality or quantity of this important source of raw water. There is currently no single authority responsible for the management of the Pearl River or the West River catchment areas. In addition, water rights in PRC are not tradable. Hence, there is no mechanism for balancing competing uses for monitoring or controlling pollution, should industry develop in the catchment area. Thus, the long-term security of this and other important sources of raw water is not assured.

The threat of upstream pollution to Macau, China and the nearby Chinese city of Zhuhai has been recently highlighted. A number of cylinders containing cyanide fell from a truck and remained submerged in the West River 125 miles upstream from the two cities raw water intake. It is not clear whether this accident led to any leakage of cyanide into the Modaomen estuary. Indeed, extensive laboratory tests identified no trace of cyanide in Macau, China's raw water. Nonetheless, the incident demonstrates the importance of upstream water quality in any water supply system.

As development and economic activity increase in and around the catchment areas, the issue of raw water quality and quantity is likely to become more critical for the communities supplied by the West River. The introduction of a Pearl River Water Commission, which has responsibility for the overall catchment, would help ensure the long-term security of the raw water source. The introduction of tradable water rights would also help ensure that the raw water is directed to its most valuable uses as economic activity in the area increases and competitive demands for the resource increase.

In addition to securing a new source of raw water, the concessionaire has undertaken an on-going program of investments. These include:

- Upgrading and extending water treatment plants.
- Replacement of major pipelines.
- Reservoir construction and post-chlorination stations.
- Leakage detection activities and related investments.
- Introduction of a computerized Supervisory Control and Data Acquisition (SCADA) system.
- Introduction of an automated water production control system.
- On-going upgrading or replacement of meters.
- Construction of a new head office.
- A fully-fledged purpose-built laboratory.

5. Tariffs and Tariff Revision

Prior to the concession contract, the water tariff had remained unchanged for a long period and did not fully reflect the cost of supply. Consequently, the Government agreed to a tariff revision at the commencement of the concession contract. Over the period from 1980 to 1985, tariffs increased twice from P1 .80/m³ to P2.30/m³ in 1983 and then to P2.50/m³ in 1985. The concession contract stipulates that water tariffs should be set at a uniform rate for all customers.

As discussed in the main text, a number of approaches can be utilized to regulate monopoly price and profits; these include rate of return regulation, cost-plus regulation, and Price Index minus X regulation. The Macau, China water concession contract does not stipulate a minimum rate of return but uses a form of cost-plus tariff regulation.

Under the concession contract, there is an annual revision of the tariff. The tariff formula specified in the contract allows for tariff increases based on changes in the costs of

- raw water.
- energy.
- labor.
- specified repairs and maintenance costs.

The annual revision of water tariffs has not led to a full pass through of the cost increases associated with the tariff formula. In large part, this was due to the economies of scale in water supply and the positive impact these had on costs, as demand for water in Macau, China increased in line with substantial increases in the population and economic activity. Thus, SAAM has implemented a lower tariff increase than they were entitled to under the concession contract.

Representatives from SAAM have said that the lower tariff increases were accepted by the utility because they were making a reasonable profit. In addition, the good relations SAAM had with the Government would have been jeopardized if the utility earned excessive profits.

6. Outcomes

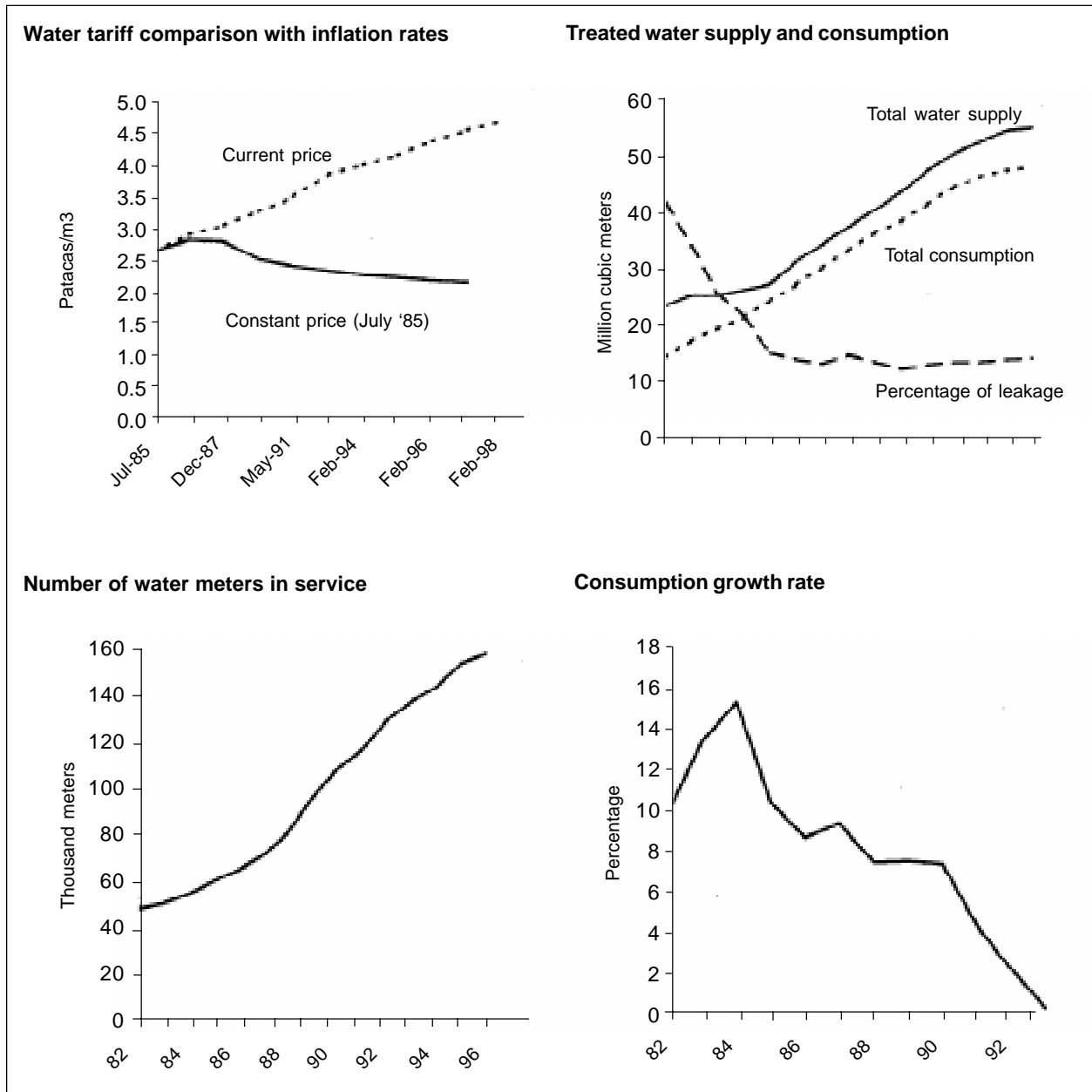
The Macau, China water supply concession has been an outstanding success for the citizens, the Government, and the concessionaire.

Within three years of signing the concession contract, Macau, China's water quality was brought up to the European Union standard. In sharp contrast with the situation in 1985, all of Macau, China citizens now receive consistently good quality potable water at a pressure and output that meets all customers needs 24 hours a day. Customers can drink tap water — a situation unusual in Asia and dangerous in nearby Hong Kong, China! This situation has been achieved with a real reduction in the water tariff (see Figure A1.1).

Despite total consumption more than trebling between 1982 and 1998, designed water treatment capacity now exceeds maximum daily demand by over 20 percent. By way of contrast, maximum daily demand exceeded treatment capacity by 36 percent in 1982 (Figure A1.1)

Unaccounted-for-water from leakages has also declined. The program of meter installation and repair instigated by New World prior to the concession led to a dramatic reduction in unaccounted-for-water from 40.3 percent in 1982 to 20.2 percent when the concession commenced in 1985. At that stage, leakage was a major contributor to the remainder of this unaccounted-for-water. The replacement of pipes (70 percent of distribution pipes have been replaced) and a range of leakage detection activities by the concessionaire have seen the level of leakage decline. Since 1986 leakage has ranged between 13.8 percent and 11 percent. The concessionaire believes that the major share of remaining leaks are inside customer boundaries.

Figure A1.1: Some Outcomes from the Macau, China Concession



In May 1998, SAAM had 250 staff — two of these were expatriates. The level of staffing has remained fairly constant since the concession commenced in 1985. Although no data on productivity is available, SAAM management reports that productivity has increased significantly since 1985. This increase is demonstrated by the large increase in customers and the quantity of water supplied. A number of current staff are also engaged in a range of activities not previously undertaken by the old water utility — the work undertaken in SAAM's state of the art laboratory and research center highlights these new activities (see Box A1 .3).

Box A1.3: Macau, China's World Class Water Laboratory and Research Center

A purpose built laboratory and research center is an important part of SAAM's water supply operations. The center provides the utility with a comprehensive analytical service which links with the Government's laboratory and the European laboratory facilities of Lyonnaise des Eaux. The center has two divisions: the Water Analysis Division and the Research Division.

The Water Analysis Division undertakes daily analysis of Macau, China's water supply at various stages of its collection and treatment. The division also undertakes a wider monthly analysis across 60 parameters. As part of the concession's regulatory arrangement, all daily and monthly results are submitted to the Government laboratory for comparison and record. Since 1996, the water analysis has been extended to cover:

- radioactivity in raw water (due to the construction of a number of nuclear power stations in neighboring regions); and
- detection of Giardia and Cryptosporidium (to determine background level and potential risk).

The Research Division undertakes a research program in collaboration with Lyonnaise des Eaux Group's Central Laboratory. Research undertaken in Macau, China includes research into membrane ultrafiltration and microfiltration techniques (the most advanced water treatment technique in the world) with the assistance of pilot scale plants installed at Macau, China's Coloane Water Treatment Plant.

Commensurate with Macau, China's growth in economic activity and population, SAAM's annual turnover increased in real terms by 68 percent from 1986 to 1996.¹ The utility's net profit after tax also increased in real terms over this period. However, in 1986, net profit as a proportion of turnover was 21 percent in 1986 compared with 14 percent in 1996. Reducing operating costs has now become a major issue for the utility as growth in Macau, China's economic activity has slowed considerably.

The water supply concession is now a showpiece for Macau, China, the Sino-French Holdings consortium and for the Lyonnaise des Eaux Group. Representatives from a number of countries and organizations, and many from PRC, have visited Macau, China to learn from the experiences of government and the concessionaire. The laboratory and research unit's staff are playing an important role in technical conferences and seminars in PRC; Hong Kong, China; and France. In addition, the experience gained by the Sino-French Holdings consortium is now being transferred to a number of JV water supply opportunities in PRC.

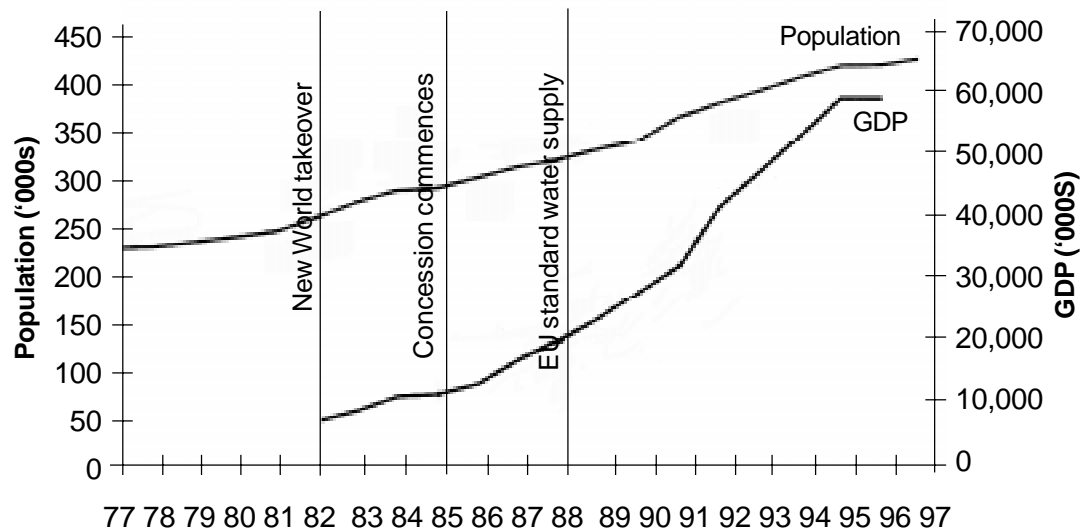
7. Lessons Learned

A number of lessons can be learned from the MWSC. These include:

- Private sector investment does not in itself ensure success. Macau, China's water supply has been in and out of private hands since early this century and yet the network fell into disrepair, the company was unprofitable and water quality, both raw and treated, deteriorated to unacceptable levels. The 1982 takeover of the utility by New World led to some improvements in metering and profitability. However, because of a lack of technology and experience in water supply, water quality, water pressure, and leakages remained problems. The JV between New World and Lyonnaise des Eaux brought together a successful combination of capital, local knowledge, world best practice technology and expertise in water management and treatment.

¹ 1 SAAM's 1997 Annual Report had not been publicly released when the consultant visited Macau, China.

- Asian countries can achieve high quality water supply. The Macau, China Government's clear statement of its objectives — European Union Standard water quality and universal availability of water supply - in the concession contract and the involvement of a competent qualified concessionaire were important in achieving this goal.
- Macau, China's long history of PSP in water supply and the Government's and citizens' acceptance of the continuing need for private sector investment in water supply facilitated the transition to a concession arrangement.
- It is difficult, even impossible, to account for all variables in a contract. SAAM's senior management believes it would have been impossible to envisage the massive increase in Macau, China's water demand when the concession contract's tariff revision arrangements were being negotiated. Thus, flexibility in the application of the concession contract's terms has been critical to the Macau, China concession's success.
- A cost-based tariff regulation formula may not take into account the potential for cost savings emanating from economies of scale in water supply. Similarly, in a larger utility, the concession contract requirement for uniform tariffs across all customer groups may not be a viable or efficient option for resource allocation.
- There is a positive two-way interaction or relationship between water supply improvements and economic growth. A good quality water supply encourages, or at least facilitates, growth in economic activity. 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 (see Figure AI .2). Conversely, the growth in population and economic activity has improved the viability of the concession and reduced the level of tariff increases associated with the higher levels of investment in water supply.
- The existence of a new high quality and abundant source of raw water helped contribute to Macau, China's water supply achievements.
- Increased economic activity upstream from a high quality raw water source can put the resource in jeopardy and this risk needs to be managed. In Macau, China's case the quality and quantity of its water supply could be under threat in the longer term from increases in economic activity in PRC. Discharges into the Pearl River are one potential source of degradation in the raw water supply. To manage this threat responsibility for the water catchment should be in the hands of one authority. As competing demands for the water supply increase, tradable water rights should ideally be introduced, creating desirable incentives to optimize the use of bulk water.

Figure A1.2: The Relationship Between Good Quality Water and GDP Growth

B. Johor Bahru, Malaysia

This section presents detailed information on a private sector venture to restore, build, operate, and transfer water supply facilities in the Malaysian State of Johor. The project falls into the category of a build-operate-transfer/rehabilitate-operate-transfer (BOT/ROT), it involves bulk water supply and raw water treatment for the city of Johor Bahru. The following presents background on the enabling environment in Malaysia; details of the water supply utility operating in Johor and the underlying factors that led to the Johor Bahru contract; details of the BOT arrangements and outcomes flowing from these arrangements; and outlines some lessons we can learn from the Johor Bahru bulk water supply arrangements.

1. Background

Malaysia is a federation of states. Responsibility for water supply is within the jurisdiction of state governments. However, constitutional responsibility for sewerage rests with the federal government. Malaysia's legal system is based largely on the British common law system.

Foreign investment in property in Malaysia is subject to approval from the Foreign Investment Committee (FIC), in addition to approval from the relevant state authority. Conditional FIC approval for initial foreign residential purchases is usually forthcoming. However, subsequent residential and any commercial/industrial property purchases are normally contingent on the purchase being made through a Malaysian company. This company should comprise not less than 70 percent Malaysian citizenry, 30 percent of which is to be Malaysian indigenous, or *Bumiputra*. Additionally, approval from the relevant state authority is required for acquisition of real property by non-citizens or foreign companies (excepting industrial properties), otherwise such acquisitions are rendered void under provisions of the National Land Code 1965. The FIC and the state authority operate as separate entities within such a transaction.

PSP in water supply is negotiated and organized at the state government level. However, the specifics of the arrangements and the final approval for the arrangements are given by the Federal Economic Planning Unit of the Prime Minister's Department.

Malaysia has a national policy to privatize all of the country's water supply services. Sewerage services were privatized in 1993. The move towards privatization of water supply is at different stages in different states. Currently, eight states have PSP in bulk water supply, through various forms of BOT arrangements. However, government policy has shifted away from BOT bulk water supply arrangements as they are considered to transfer little risk to the private sector. The government is now tending to focus on PSP in the entire water supply network including distribution, management, and revenue generation. In 1996, the organizations supplying Malaysia's retail water ranged from water utilities within a state public works department to a private company operating under a management/concession contract (see table below).

Table A1.1: Characteristics of Malaysian Water Supply Utilities by State, 1996

Organization	State
State Public Works Department	Kedah, Perlis, Phang, Sarawak
State Water Supply Department	Selangor, Negeri Sembilan, Trengganu, and Sabah
State Water Board	Penang, Melaka and Perak
Corporatized Body	Johor
Privatized Company	Kelantan

2. Johor Bahru

Johor Bahru is a southern city in the state of Johor. The water requirements of the city, like the remainder of the state, is supplied by the Johor Water Company (JWC). The Johor water utility became a corporatized company under the Companies Act in February 1994. The State government holds 100 percent of the company's equity. The board of the JWC is made up of state government officers.

The JWC has full autonomy in all but three areas. These are the water supply contract with Singapore, the Malacca water supply contract and the two bulk water supply contracts which supply the JWC with its treated water. These contracts are implemented by the JWC but they are not permitted to deviate from agreement conditions without reference to the federal government.

The JWC as a corporatized company can borrow from non-government sources. Under the corporatization arrangements, the company is not permitted to retrench staff for the first five years (Staffing levels are expected to be trimmed when this period expires in 1999).

Under the utility's corporatization, legislation a regulator reviews proposed tariff increases, etc. The water tariffs currently charged by the JWC were introduced in 1991 (see Table A1.2). These tariffs apply to the whole of the state of Johor although costs, supply constraints and demand differ between regions.

**Table A1.2: Current Retail Water Supply Charges in Johor,
Effective Since 1 April 1991**

Residential	Government	Commercial/Industrial	Shipping – special rate
0-15m ³ @ 0.3 RM per m ³	1.15 RM per m ³	0-20 m ³ @ 1.20 RM per m ³	3.70 RM per m ³
16-30m ³ @0.70 RM per m ³	Minimum charge 5 RM per month	20 m ³ @ 1.60 AM per m ³ .	
31-45m ³ @ 0.95 RM per m ³		minimum charge 10 RM per month	
45 m ³ @1.15 RM per m ³			
Minimum charge 3 RM per month			

Source: The Malaysian Water Association

Johor Bahru's average monthly consumption by residential customers is 32.3 cubic meters. In 1995, the average family's monthly water bill was RM18.65 or US\$7.39, by way of comparison the average electricity bill was RM39.30 or US\$15.57 (ADB 1997). In 1995, per capita Gross Domestic Product (GDP) for Malaysia as a whole was RM 10,570. Thus, a Johor Bahru family's average annual water bill of RM 224 is around two percent of Malaysia's per capita GDP.

Submissions have been made by the JWC to increase its tariff rates, but by May 1998 new tariffs had not been announced. However, newspaper reports indicate that the Government of Johor has announced that water tariffs will need to rise in the future. In 1997, it has been reported that the Johor government awarded a six months exclusive contract to a private water company to examine various options for the privatization of the utility. By May 1998, the details of this study's findings or any government decision arising from the study's recommendations had not been released.

3. The Need for Private Sector Participation

The state of Johor, and particularly the city of Johor Bahru, has experienced substantial population and economic growth, which has led to increased demand for water. A study undertaken by the JWC in 1991 indicated that water shortages would be imminent unless bulk water supplies were expanded. Failure to expand water supply capacity was becoming a threat to future economic growth. At that stage, the JWC had not been corporatized and all funding came from federal and state government sources. In response to the urgent need for capacity expansion, the utility requested funding from the federal government. However, this request was not successful. As demand for water supply was quickly going to exceed available supply the utility, in agreement with the state and federal governments, decided to seek PSP in the supply of bulk treated water for the city of Johor Bahru. In addition, a second tender was advertised for the private sector provision of bulk supply in another part of the state.

4. The Johor Bahru Bulk Supply Contract

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. By the end of June 1992 a 20-year concession contract had been negotiated and signed between the State of Johor (supported by independent specialist advisers) and Equiventures.

Equiventures is a JV company comprising Kembangan Dinamik – a diversified Bumiputra company supplying 49 percent of the equity, Pilecon Engineering Berhad – a Malaysian publicly listed engineering and construction company, and Lyonnaise des Eaux. Pilecon and Lyonnaise supplied the remaining 51 percent of the equity. The JV consortium has delegated responsibility for operation, rehabilitation, and management to Strategi Tegas, a company jointly owned by the joint venturers. Strategi Tegas employs 85 people of which one, the general manager, is an expatriate.

The main objective of the contract is to guarantee sufficient supply of drinking water to Johor Bahru. The contract requires the:

- Operation and maintenance of existing works (encompassing a catchment area, intake tower, treatment plant, pumping station, pipelines and reservoirs).
- Rehabilitation and modernization of existing works.
- Financing, design, construction and operation of new works.
- Transfer of all assets to the state of Johor at contract expiry.

The contract thus falls into the category of a BOT/ROT, both of which were discussed in the main text. It requires a three stage program of investments, stages one and two have been successfully completed. Commencement of the third stage will be triggered when consumption reaches a prescribed level. Negotiating the timing and phasing of the project's capacity expansion is reported as being the most difficult negotiating point in the contract. This was because:

“The government was concerned about insufficient water capacity, while the concessionaire was concerned about investing in capacity that might not generate revenue in the near term. ... To deal with the uncertainty, it was agreed that the project development would be in three phases. In determining the level of demand to target, the government and the concessionaire split the difference between their demand projections.” (Haarmeyer and Mody 1997, p. 90)

The contract also includes the following features:

- Water supply quality to meet World Health Organization (WHO) standards.
- Water supply quantity must meet specified levels - the contractor must supply bulk treated water to the JWC within plus and minus ten percent of a water demand curve derived by a JWC consultant.
- Weekly monitoring by Johor state government for compliance with certain water quality parameters.
- Penalties are prescribed if water quality fails to meet specifications.
- Payments are made by the JWC for bulk water. These payments are in two parts: (i) a fixed monthly payment based on fixed cost of the concessionaire; and (ii) a bulk water supply variable rate which is based on a decreasing sliding scale.
- A tariff revision formula - the variable component of the bulk water tariff is adjusted annually with adjustments based on inflation, costs of energy, chemicals and labor.

- The fixed monthly payment is adjusted annually in line with inflation with minimum increase being four percent. The maximum tariff increase is to be less than
 - five percent for the first five years;
 - six percent until 2001; and
 - seven percent for the last ten years.
- An arbitration clause.
- Penalties for late payment.
- Re-negotiation of contract provisions is permitted after ten years.

5. Financing and Investments Under the Bulk Water Supply Contract

Malaysia has relatively strong capital markets. Reflecting this, the financing for Johor Bahru's bulk water project was entirely in Malaysian Ringgit. The ten-year loan to cover the first two stages of investments was arranged with the Public Bank Bhd within only three months of signing the contract. The Permata Merchant Bank Bhd became the underwriting bank and provided a bank guarantee facility. Box A1.4 presents details of the financing arrangements. No government guarantee or comfort letter was required. Haarmeyer and Mody (1997, p.92) report that:

“The banks were satisfied that the concession and financing agreements properly allocated project risk and gave sponsors appropriate incentives to perform. Lenders also drew comfort from the ability of the project to immediately generate cash flow from on-going operations and the reputation of the sponsors and their significant shareholder undertakings.”

Box A1.4: Financing Details for Stage One and Two of the Johor Bahru BOT/ROT (as at 1992, US\$ equivalents)

Equity	\$US40m	23%
Cash generated from operations	\$US49m	28%
Ten year loan	\$US88m	49%
Total financing	\$US 1 77m	100%
Loan Draw down period	December 1992 to December 1995	
Repayments schedule	June 1992 to December 2002	
Bank Guarantee facility	\$US18m	

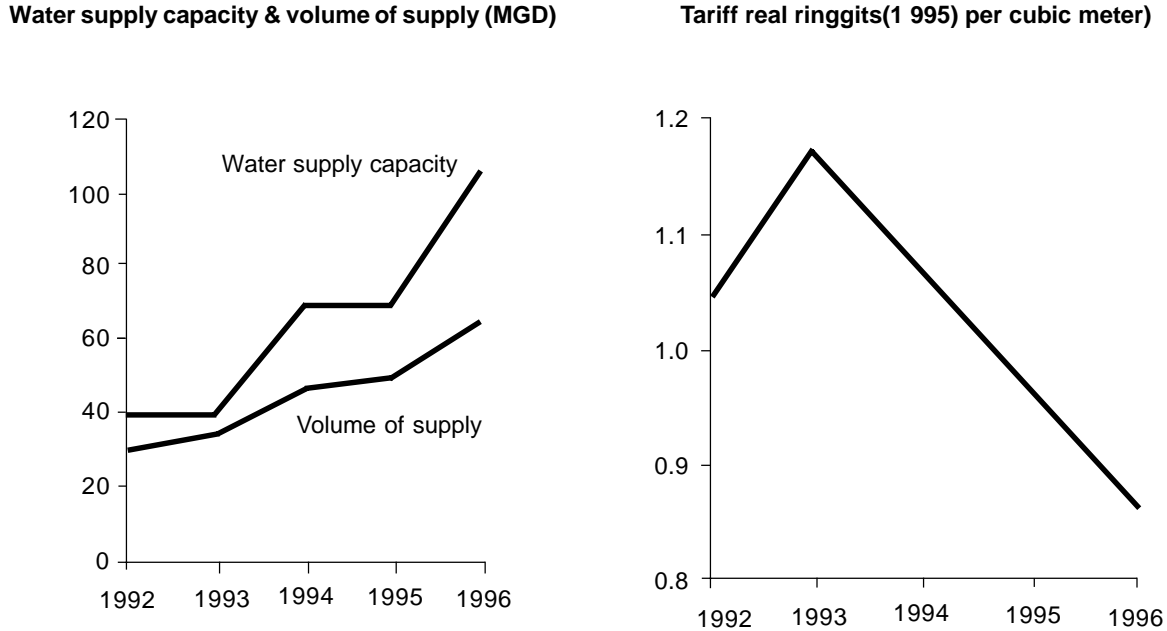
The build-own-operate-transfer (BOOT)/ROT contract for Johor Bahru's bulk water supply involves investments of RM 750 million (\$US284 million) spread out in three stages (see Box A1.4).

- Stage one works were undertaken from mid-1992 to 1993 and included
 - an expansion of the existing 182,000 cubic meter per day Sungai Layang Plant with an additional 136,000 cubic meter per day treatment capacity;
 - construction of a new intake/pumping station to transfer up to 170,000 cubic meter per day raw water from Sungai Johor to the Upper Layang reservoir;

- construction of a 25 km raw water pipelines between Sungai Johor and Upper Layang Reservoir;
- expansion of the storage capacity of the existing Upper Layang Reservoir by using Hydroplus equipment on the spillway and
- modernization of the operational control system of the Sungai Layang production facilities.
- Stage two works were undertaken in 1994 to 1995 and included
 - construction of phase one of a new treatment plant at Sungai Johor;
 - construction of raw water and treated water pipelines for the Sungai Johor plant; and
 - construction of two service reservoirs.
- The commencement of stage three of the project is triggered when Johor Bahru's water consumption reaches a level specified in the contract. Stage three works will include
 - construction of phase two of the Sungai Johor treatment plant;
 - construction of associated pipelines; and
 - construction of the Jengelli Dam — construction may be rescheduled depending on certain circumstances.

6. Outcomes

The Johor Bahru bulk water supply contract has been in operation for six years. As noted above, stage one and two of the rehabilitation and construction program have been completed within the initial budget and the contract timetable. The successful completion of these projects has permitted a substantial increase in the quality and quantity of bulk water supplied to the city of Johor Bahru.

Figure A1.3: Johor Bahru Water Supply Capacity, Volume and Real Bulk Tariffs^a

^a The contract was signed on 28 June 1992 and construction and restoration began in December 1992.
Source: Lyonnaise (South East Asia) Sdn Bhd reported in Haarmeyer and Mody 1997.

As Figure A1.3 illustrates, 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. Demand growth is expected to be zero in 1998.

The increase in bulk water supply reflects the substantial increase in economic activity and population growth that would not have been sustained in the absence of the bulk water supply investments.

While demand has been strong, it has now stabilized due to the deterioration in economic conditions. The State of Johor, like the rest of Malaysia, has experienced a severe drought over the last few years and water capacity in the Layang Reservoirs, which supply Johor Bahru, is low. In the six-year life of the Johor Bahru contract, the Upper Layang Reservoir, which had its capacity expanded by 15 percent as part of the Equiventures contract, has only reached full capacity once. In May 1998, the reservoir held only 30 percent of its possible capacity. However, despite the severe drought demand has always been met. This is in marked contrast with other parts of Malaysia where rationing has been necessary.

Johor Bahru's retail water tariffs have not changed to reflect this water shortage. As noted earlier, the JWC has not increased its water tariffs since 1991. As the following discussion highlights, this rigid tariff has had a number of implications for the JWC.

Although the JWC's water tariffs have not changed since 1991, the bulk water costs associated with supplying retail water have increased in nominal terms. This is because under the contract with Equiventures the price of the bulk water purchased increases annually. (The contract stipulates the minimum increase - four percent per annum — and the maximum increase - eight percent per annum.) This situation means that the disparity between the average retail tariff revenue per cubic meter earned by JWC and bulk water charges paid by JWC are increasing over time. 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 (Haarmeyer & Mody 1997). 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.

The bulk water charge relates to all water supplied by Equiventures to the JWC, including unaccounted-for-water, which generates no revenue for the utility. This has created an incentive to reduce the level of unaccounted-for-water. As a consequence, the JWC awarded a performance contract to a third party to reduce Johor Bahru's leakages. Payment under this performance contract is made only when non-revenue water is reduced to less than 20 percent. 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).

There has been no demand management associated with the water shortages arising from the recent drought in Johor Bahru as bulk capacity was sufficient to meet current demand. However, as demand trends upwards towards capacity, the need for demand management will become more urgent. The absence of a link between the bulk water supply charge and the retail tariff will make the implementation and co-ordination of demand management a difficult task. The breaking of the nexus between bulk and retail supply means that the potential for the bulk supplier to be involved in demand management at the retail consumer level is low.

The need for management of Johor's water resources extends further than retail supply. Catchment management and even inter-catchment management are important issues for the supply of bulk water. Water quality and water quantity are both areas of concern. In Johor Bahru, the major competing claims for water are the Johor state and Singapore — which has a contract with the Malaysian government to extract and treat water for Singapore to the year 2060. However, in other parts of Malaysia there are also competing demands from the agriculture sector for irrigation, from the energy sector for hydro-electricity as well as demands for water to be transferred to drier interstate areas.

Currently, no formal body in Malaysia is responsible for these water catchment issues. It has been reported that the federal cabinet voted for a national water council. The council, once established, would aim to resolve these problems through political means. However, the ability of the council to operate depends on amendments to the Malaysian Constitution.

7. Lessons Learned

The experience with private sector investment in bulk water supply in Johor Bahru provides a number of lessons for governments considering PSP in water supply:

- Access to a reliable bulk water supply facilitates growth in population and economic activity.

- When faced with escalating retail demand and limited public sector funds for investment, a BOT/ROT contract can be a successful approach to increasing supply of bulk water.
- Contracts with the private sector to undertake bulk water investments can often be negotiated more quickly than contracts for retail concessions. This is because risks are more clearly defined and can be managed by the private sector more readily. Thus, the private sector risks associated with contracts for bulk water are relatively lower than in concession contracts.
- Contracts for private sector investment in bulk water supply will generally lead to an increase in the retail utility's costs. This cost increase needs to be recognized by the utility and the government. Failure to do so can lead to the retail utility's insolvency. Ideally, in these situations there should be a link between increases in bulk water charges and changes in the level of the retail tariff. If this is politically unacceptable then some form of subsidy could be needed — however, this second best solution may not be viable in the long-term and can lead to other inefficiencies.
- Bulk water is an intermediate good. Hence, the private sector investor in bulk water supply has no relationship with the retail customer. The bulk supplier's customer is the distribution utility or the government. If there is no link or relationship between the bulk water charge and retail water charge and retail tariffs are subsidized there is little incentive to conserve water.
- Bulk water contracts have some limited potential for facilitating improvements in the efficiency of retail distribution systems. This is because bulk water contracts are paid on the level of bulk production, even if this water is subsequently lost in the distribution system through leaks. Thus, the commercial retail distributor has an incentive to reduce leaks and generate additional revenue. However, if a retail utility is subsidized or is not accountable for its losses, the incentive to reduce these leaks is reduced or even eliminated.
- Bulk water supply contracts produce no incentives for the retail distribution utility to reduce or minimize sources of inefficiency associated with the general operation and management of the utility. Corporatization, if appropriately implemented, can create an incentive structure to improve the utility's performance.
- Demand management is an important element of the water market, which can be easily dismissed in favor of increasing supply. Failure to implement demand management can lead to waste of a scarce resource and hasten investments, which could otherwise be delayed.
- The use of BOT-type contracts for bulk water supply makes the demand management of drought more complicated.

C. Manila, Philippines Concessions

The Manila concessions have been in operation since August, 1997. The following presents background on the Manila water sector, the Metropolitan Waterworks and Sewerage System (MWSS) and the underlying factors which led to the concessions; details of the concession; outcomes and some lessons we can learn, at this early stage.

1. Background

In the early 1990s, under President Ramos, the Philippines began an increasing process of reform in infrastructure — for example, removal of subsidies, introduction of the BOT law, increasing the level of cost recovery, privatization, and regulatory reform. By 1995, the Philippines was successfully emerging from the power crises. Importantly, this accomplishment was largely ascribed to private investment in the sector - in the form of Independent Power Producers (IPPs), but backed by power purchasing agreements, usually guaranteed by the Philippine Government.

Tasman Asia Pacific (then named Tasman Economic Research) undertook a project for the World Bank and the Ministry of Finance in 1994 — the National Water Sector Reform Study, Philippines. This project reviewed the situation facing the water sector in Manila at that time, and developed potential responses capable of improving outcomes. While these reforms focused on the water districts of the entire Philippines, they also covered Metro Manila.

The MWSS was then the monopoly state water supply and sewerage utility in Metro Manila, and was characterized by:

- Low coverage — within defined service areas.
- High unaccounted-for-water levels (e.g., 56 percent, at May 1996).
- Poor management of ground water resources.
- Lack of investment to finance bulk water developments.
- Inadequate water tariff and allocation policies.

2. The Need for Private Sector Participation

The water utilities were failing to attract the required private sector investment, in part, because tariffs rarely covered costs. Following these and related earlier developments, and in order to increase private sector investment, the Government reformed the legal structures and incentive systems. Two key enactments were:

- The BOT Law (1993), which enabled PSP in what were historically public works activities.
- The Water Crises Act (1995), in response to the recurring crises in water supply.

The latter legislation provided, in particular, for the privatization of the MWSS and the Local Water Utilities Administration (LWUA).

It is significant that it took this water crisis to precipitate a total re-assessment of strategies for the water utilities in the Philippines, and in particular, the MWSS, just as it took a power crisis to lead to changes encouraging IPPs - eventually leading to a new strategy for competitive private power in the Philippines.

The study, undertaken by Tasman Asia Pacific for the World Bank and the Ministry of Finance, introduced PSP as a preferred method of addressing the inefficiencies plaguing the water supply sector.

Following the above study and report, the National Economic and Development Authority adopted Board Resolution 4 in 1995, encouraging:

- The introduction of commercial incentives and management in local water districts.
- Incentives for the Local Government Units to improve water supply arrangements.
- The application of economic pricing of water.
- Economic allocation principles for water resources.
- Innovative water supply projects at the local level.
- Increased PSP.

3. Background on the MWSS

a. Introduction

The MWSS was formed in 1878, making it one of the oldest (and largest) water utilities in South East Asia. The MWSS's stated objective is to provide adequate, potable water supply and adequate and dependable sanitary wastewater disposal services at affordable rates.

The MWSS serves an area nearly three times the size of Metro Manila, which includes six cities and 31 municipalities of Metro Manila plus Rizal and parts of Cavite province. In 1995, this service area was 1,800 sq. kms, with a population of 11 .0 million (see Table A1.3).²

Two thirds of this population is served through roughly 825,000 connections. Only half of the covered population receive 24 hour per day service; the remainder receive less than 12 hours per day service and often much less. Of those not covered, a large percentage have individual wells or obtain their water through vendors —priced at a multiple of (up to 10 times or more) MWSS water tariffs and with doubtful quality.

In summary, under the MWSS, only two thirds of the population had access to a piped water supply and 11 percent were connected to sewerage. In addition, more than half of the water produced was not billed — 56 percent in 1996.

b. Non Revenue Water

The MWSS, non revenue water (NRW) levels (see Table A1.4) were among the highest in the South East Asia region. These losses can be attributed to leaks, illegal connections, inaccurate measurement, non-paying connections, and other factors. In a private firm, such losses are the difference between commercial prosperity and bankruptcy; but in a state utility such as MWSS this loss-making situation just caused gradual degradation of the system and increased use of private wells. This was not sustainable.

² W C Barreiro and F Arellano, Privatizing Water Services in Metro Manila, A case Study of Privatization in Emerging Megacities, November, 1997.

Table A1.3: Summary Table of Statistics — MWSS 1995

Average Water Tariff	Pesos 8.78/m ³
Billing	42.87%
Service Population — water supply	7.32 million (66.5%)
Service Area	1,800 sq kms
No. of Connections	825,000
Water Production	3,000 mld
Non-Revenue Water (May 1996)	56%
Water Availability	16 hours
No. of Treatment Plants	3
Total Pipeline	12,000 kms
Water Coverage	68%
Average Consumption	133 liters per person per day

Source: W. C. Barreiro and F Arellano, Privatizing Water Services in Metro Manila, A Case Study of Privatization in Emerging Megacities, November, 1997

Table A1.4: MWSS Non-Revenue Water

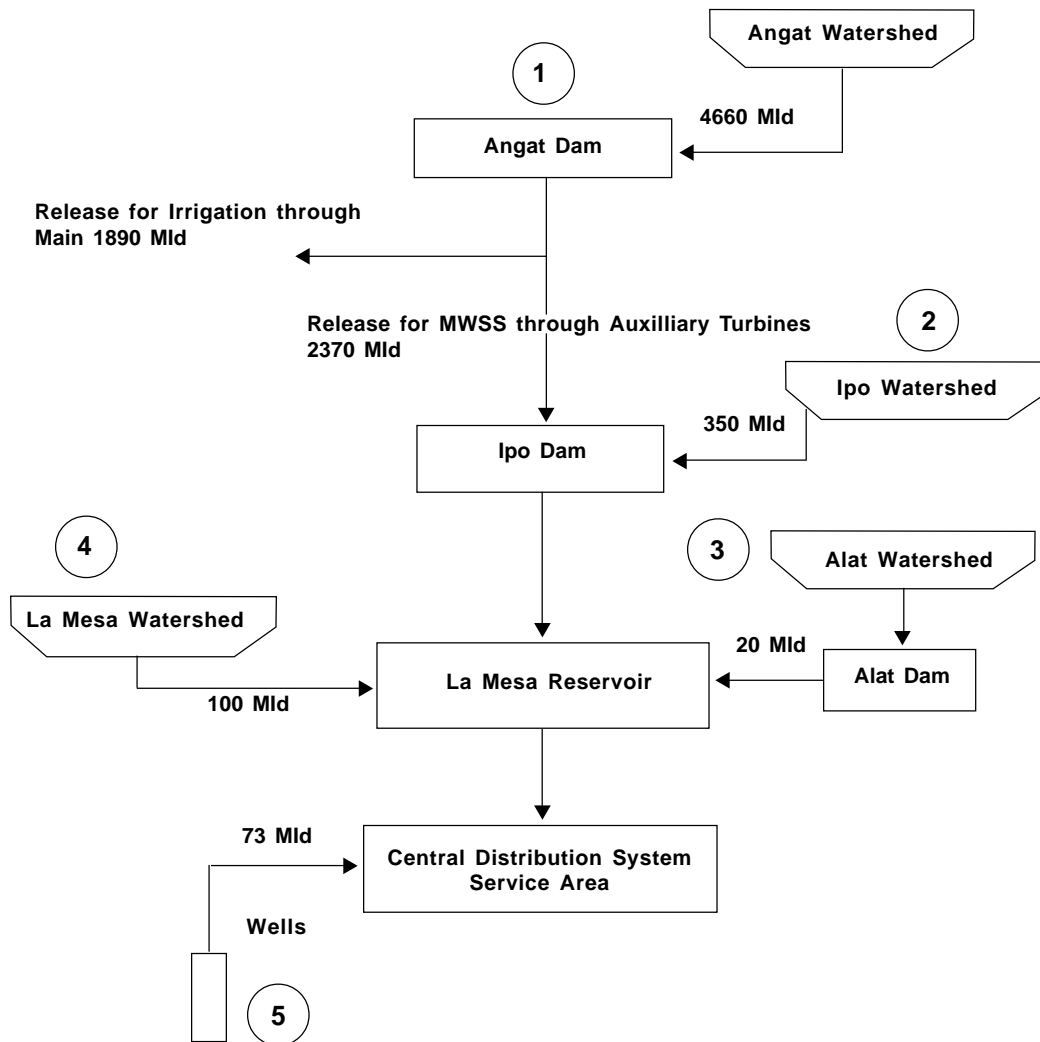
	1990	1991	1992	1993	1994	1995
Water sent to distribution system (mld)	2,490	2,465	2,335	2,555	2,765	2,635
Water billed (mid)	1,055	1,060	1,050	1,090	1,145	1,155
Non-Revenue Water	56%	54%	55%	57%	59%	56%

Source: Lyonnaise des Eaux, Manila, Philippines, Privatization of MWSS Outline Description, October 1996.

c. Raw Water Sources

The supply of raw water to the existing MWSS system is dependent on watersheds and aquifers, as illustrated in Figure A1.4. The rapid growth in population and urban development over recent decades has strained available water resources. Later in this paper we will discuss the 1998 water shortages (attributed to the El Nino effect) and their impact on this supply. Table A1.5 details the raw water sources and conveyance facilities.

Figure A1.4: Raw Water Sources



Source: Lyonnaise des Eaux, Manila.

Table A1.5: Raw Water Sources

Raw Water Source	Average Yield 1990-94 (Mld)	Percentage
Angat Reservoir	2370	81.4
Ipo Watershed	350	12.0
Alat Watershed	20	0.7
La Mesa Watershed	100	3.4
Wells	73	2.5
TOTAL	2913	100.0

Table A1.6: Financial Highlights

	Million Pesos	Million US\$
Operational Revenues		
Water Supply	3152	126
Sewerage Services	302	12
Environmental Charges	315	13
Installation Charges/Other	98	4
Total Revenue Operations	3867	155
Costs		
Wages	(998)	(40)
Other Cash Expenses	(681)	(27)
Depreciation	(902)	(36)
Bad Debts	(76)	(3)
Total Operating Costs	(2,657)	(106)
Net Operating Income	1210	49
Non-Operational Income/Expenses	(719)	(29)
Net Income	491	20

Source: IFC documents/MWSS, December 1995.

4. The Manila Concessions

The strategy for the MWSS service area involved pursuing the goals of expanded service coverage, operational efficiencies, and an easing of the financial burden on government.

In November 1995, the Government decided to conduct a feasibility study into the form, extent, process, and guidelines for privatization. The first phase was devoted to forming a clear privatization plan. The second phase in this process was implementation of the privatization process.

5. Preparation for Privatization

Phase 1 took eight months from November 1995 — and included formulating the basis of offer and information for prospective bidders. The basis for the tender was to be water tariffs, and bids would entail many contractual obligations regarding coverage, water quality, and investments.

The French Government provided US\$1 million for a technical assistance grant for the study leading to the privatization process. The International Finance Corporation (IFC) was lead adviser for this study. The mandate was:

“To evaluate and recommend the transaction structures for privatization in the light of government objectives, sector requirements, water resources, and projected demand, labor considerations and operational, legal and financial constraints.”

Focus was to be placed on the two main options - concession and sale of assets. The IFC was also required to select and hire other consultants. This was completed without bidding, as permitted under the Water Crises Act. It seems generally agreed that the process was

efficiently expedited, but at a cost in terms of some aspects of the process being less than ideal.

The eventual transaction cost of the privatization program was US\$5.8 million — \$3.8 million for adviser/consultant fees plus a \$2.0 million success fee (which MWSS advanced and was reimbursed by the winning bidders). This contingent or success fee was to be paid by the winners to the IFC on successful completion of the privatization. The financial arrangement meant that the MWSS did not have to provide any funds from its own budget. The presence of the (private sector style) success fee in this case, and the absence of such incentives in most World Bank and ADB reform technical assistance is a possible reason for the relatively rapid and successful result in Manila. Outcome driven payments, rather than payment by inputs or reports, have the effect of focusing all parties on the defined goals.

6. Privatization Strategy

Following assessment of the advantages and disadvantages of full versus partial privatization of MWSS, the study recommended full privatization of water supply services on the concession model. The total service area was divided into two zones (East and West), to be served by two different concessionaires. The MWSS would retain ownership of the fixed assets and would transfer operation and management of facilities to the concessionaires. Importantly, the concessionaires would be responsible for future investments for water source development, treatment, distribution, and provision of sewerage facilities. The study drafted a 25-year concession agreement — defining rights, responsibilities, relationships with MWSS, the government, and the concessionaires. The concession agreement specifies standards and targets to be met. A JV was to be set up to operate and maintain common facilities. Both concessionaires would have rights to Angat water.

The targets set out in the study are briefly summarized below:

- Universal water services for the population of the MWSS service area within 10 years.
- Non revenue water to decrease from 56 percent to 32 percent in the first 10 years.
- Universal water service to be achieved without an increase in real water tariffs over the first 10 years (see subsection on tariffs in this paper regarding petitions of concessionaires to increase tariffs).
- System to address the one third of service area population who are poorest and unable to afford piped water.
- Uninterrupted 24-hour water service, which meets WHO standards, to be provided within three years to all connected customers.
- Wastewater program to attain over 80 percent coverage within the 25-year concession period.
- Approximately US\$7.5 billion to be invested to improve and expand water and wastewater system during the 25-year concession.

The study noted that the MWSS would retain the ultimate legal responsibility for providing water to the franchise area, i.e., this responsibility has not gone to the private sector. The MWSS was not selling or transferring ownership of its assets, but engaging two concessionaires to operate the existing facilities.

As noted, the IFC advised and assisted MWSS and the Government on the bidding procedures. Each bidding consortium was required to be composed of the following:

- Filipino shareholding — 60 percent minimum.
- Only one local sponsor owning at least 20 percent of the shares; no other Filipino entity should hold more than half the shareholding held by this local sponsor.
- Possibly up to 10 percent of shares to be held by employees transferred from MWSS to the concession companies.
- Foreign shareholding — 40 percent maximum.
- Only one international operator owning 20 percent of the shares of the consortium.³

The concessionaries had to be Filipino companies and the water utilities were to be managed and operated by Filipinos. Since Philippine law requires the concessionaire have a minimum Filipino ownership of 60 percent, in the study it was proposed that of the 60 percent, 10 percent be for employees, 20 percent-30 percent for the main sponsor and 20 percent for the other local investors. The study also recommended the foreign operator should take a minimum 20 percent share in the company.

Physical targets and tariffs would be set and monitored by a regulatory body to be established within MWSS, with a mandate to ensure compliance. Finally, it was stipulated that the concessionaires were to be selected through a transparent bidding process against tariff.

The study recommended guidelines on protection of MWSS employees from loss of tenure.

The consortia would have to bid for both of the two concessions, but could only win one. The two zones' boundaries were communicated by an IFC information note in July 1996, as follows:

Table A1.7: Zone Boundaries

	Population 1995	Water Supply 1995	Facilities
EAST	4.5 million	71% coverage	Balara I and II treatment plants Makati City and Quezon City sewerage systems
WEST	6.3 million	63% coverage	La Mesa I and II treatment plants Central and Dagat Dagatan sewerage systems

Source: Lyonnaise Des Eaux — Manila, Philippines, October 1996.

³ IFC Outline Description — Privatization of MWSS, October, 1996

7. Target Coverage

The study outlined targets for the concessionaires as follows:

Table A1.8: Concessionaire Targets

	1997	2002	2007	2012	2017	2022
Water Supply	67%	92%	97%	98%	98%	98%
Gravity	7%	7%	10%	17%	23%	33%
Sewerage		26%	23%	21%	24%	22%
Septic						
Total Sanitation	7%	33%	33%	38%	47%	55%

8. Regulatory Body

It was noted that MWSS would act as the regulatory body after the privatization. The study had recommended MWSS serve as regulator, but subject to:

- The principle function of the regulator being to monitor and enforce the concession agreement.
- The establishment of a regulatory office within MWSS – but separate from other MWSS activities.
- The regulatory office being managed by five members, including a chief regulator – all reporting to the MWSS Board.
- The establishment of an arbitration panel of three outside MWSS, to address and resolve issues between the regulator and the concessionaires.

9. The Concession Agreement

The concession agreement document was circulated pre-bid. The document was very detailed and included provisions on:

- Assets and liabilities – long-term debts were to be retained by MWSS, but serviced by the concession fees paid to MWSS.
- Clarification of transitional arrangements for existing projects.
- Tariff adjustments – the concessionaires were not to adjust rates, except for inflation, during the first 10 years. Such adjustments were to be subject to review and approval of the Government (see note on petitions before regulatory office discussed later in this section). Upstream water treatment plants were to be managed and financed by the concessionaires.
- There would be scope for “Extra-ordinary Price Adjustments” (EPAs) in defined or force majeure situations (as happened in 1998 — the Peso depreciation and a 30 percent drop in bulk water supply attributed to the El Nino effect).

- Allocation of capital costs — 90 percent were assigned to the West concession — in an apparent attempt to equalize what were expected to be lower tariffs in the western area (this increased the foreign exchange (FOREX) risk element in the West concession).

10. Implementation of the Privatization

The main phase of the privatization included:

- Pre marketing.
- Registration.
- Due diligence.
- Strategy report.
- Information memorandum.
- Documentation.
- Pre-qualification.
- Tendering.
- Pre-negotiation.
- Bidding.
- Evaluation.
- Award of contracts.

The Schedule, planned and actual, is outlined below.

Table A1.9: Privatization Schedule

	Initially Planned	Actual
Investor registration	April/May 1996	April 1996
Data room open	15 May-i November 1996	June — 1 November 1996
Additional preliminary info. Issues	May 1996	July, September 1996
Information memorandum issued	June 1996	Mid-October 1996
Pre-qualification (local sponsor/international operator)	June/July 1996	Notification 20 September 1996
Tender documents issued	August 1996	Draft Concession Contract — 31 October
Pre-qualification (consortia)	September 1996	Comments on Draft Concession Contract up to 15 November
Pre-negotiations with bidders	October/November 1996	December 31, 1996
Bidding	December 31, 1996	January 1997
Evaluation	January 1997	February 1997
Closing	February 1997	April 1997
Beginning of operations		

Source: IFC/MWSS documents

MWSS created a technical committee (mostly from the IFC) to review the bidding consortia's qualifications and structure. The final list was approved by MWSS. The four consortia which pre-qualified were:

- Aboitiz Equity Ventures (Philippines), Compagnie Generale des Eaux (France).
- Ayala Corporation (Philippines), Bechtel Enterprises (United States) and North West Water (United Kingdom).
- Benpres Holdings Corporation (Philippines), Lyonnaise des Eaux (France).
- Metro Pacific (Philippines), Anglian Water International (United Kingdom).

The participating firms took approximately nine months for their studies and proposal preparation. It has been estimated that the bidders incurred a cost of around Pesos 100 million each in bidding.

The bids were presented on January 6, 1997. Each bidder had to submit two envelopes:

- One technical proposal – opened immediately.
- One financial proposal – opened January 23, 1997.

The MWSS issued bid documents and guidelines, including the draft concession agreement to the pre-qualified bidders. These included:

- Bids were to be based on an average tariff the bidder would charge. The winning concessionaire would not be allowed to increase tariff bids except for normal inflation. The tariff bid was to exclude additional capital costs needed after the first ten years.
- Bidders were required to bid for both concession areas.
- The bids were to be accompanied by a performance bond of US\$120 million for the West Zone and US\$80 million for the East Zone.
- A winning bidder could be awarded only one concession (a formula and procedure was outlined to determine the best combination in case one bidder offered the lowest bid for both concessions).
- Bidding for the two concessions was to take place simultaneously.

11. The Bids

The four pre-qualified bidders submitted bids for both zones. All proposals complied with technical requirements. The tariff rates submitted are detailed below (the average water tariff of MWSS at the time of bidding was Pesos 8.78 per M³).

Table A1.10: Bidders' Tariff Rates

BIDDER	EAST ZONE	WEST ZONE
Aboitiz Equity	P5.52 (62.88%)	P4.99 (56.88%)
Ayala Corporation	P2.32 (26.38%)	P2.51 (28.63%)
Benpres Holdings	P6.13 (69.78%)	P4.97 (56.59%)
Metro Pacific	P5.66 (64.50%)	P5.87 (66.89%)

As can be seen from above, Ayala submitted the lowest tariff for both East and West. The bidding rules included a formula to determine the best combination for consumers. When this formula was applied, the result was the Ayala led consortium for the East Zone and the Benpres led consortium for the West Zone.

12. Private Concessionaires

The two consortia took over facilities on August 1, 1997. The Benpres Holdings/Lyonnaise des Eaux consortium was named Maynilad Water Services, Inc. (MWSI) (Maynilad is the old Filipino name for Manila). The Ayala/Bechtel consortium was named the Manila Water Company (MWC). Decisions had to be made on disaggregation of facilities, accounts and books, physical equipment and distribution of employees. Two important documents were:

- The JV agreement for common facilities.
- The interconnection agreement — to cover metering points for the pipelines crossing each concession. An audit of MWSS assets was expected to be completed by 10 June 1998.

13. Unresolved Issues

Issues which were still to be clarified at the time of writing included:

- The definition of boundaries and completion of the interconnection agreement.
- The former has been difficult. There are cases where households in the same street would have been served by different concessionaires, and in particular, at different tariffs. Another paramount issue is the disaggregation of the two zones — requiring a number of side agreements between the concessionaires. There will be cross boundary water transfers and this poses potential problems in setting the transfer fees between the two concessionaires.
- Tariff Adjustments
- On May 22, 1998, public consultations were held by the MWSS regulatory office to discuss separate petitions placed by the two private water concessionaires for higher water rates. Another session took place on May 25, 1998. The MWSS regulatory office scrutinized the arguments of Maynilad and Manila Water Company for EPA, citing losses brought about by the El Nino phenomenon and the devaluation of the peso.

The two concessionaires petitioned for the following tariff increases:

- MWSI — sought an increase of 15.06 percent (EPA equivalent to an increase from a basic rate of P4.96 per cubic meter to P5.71).
- MWC — sought an increase of 97 percent (from P3.65 per cubic meter to P7.21 per cubic meter).

Both sought to take effect on January 1, 1999.

The press in Manila noted the contracts for the two firms stipulated a five-year freeze on water rate increases. According to the concessionaire agreement, in order to qualify for an EPA:

“notification from the regulatory board or the concessionaires is needed and the price adjustments (after the MWSS privatization) should be made after March 31 of the charging year” — i.e., the year 2000.”

During the public consultations on the water rates adjustments, four bodies made objections to the proposal. Opposition groups (FDC) protested along the following lines:

“the two private water companies offered lower rates when the two took over the MWSS in August last year. Less than a year after they are using loopholes in the contracts to adjust their prices to approximate the old rates. If the concessionaires are presently suffering from financial constraints, they should take the blame.”³

14. Devaluation and Bulk Water Shortage

The devaluation of the peso, the 35 percent reduction in water supply brought about by El Nino, the material deterioration of the distribution network, significant increases in employees' salaries and the projected increase of the concession fee, because of anticipated cost overruns of existing projects, were all cited by the concessionaires.

MWSI and MWC, at the beginning of June 1998, asked the NWRB for an increase in the volume of water flowing from Angat. According to newspaper sources: the two concessionaires wanted to return to the pre-water-rationing rate of release of 31.5 cubic meters per second from the current 25 cms.⁴ Water rationing was enforced in Manila in December 1997 – decreasing the rate of water release from 32 cms to 28 cms – when the water level in Angat Dam fell to 180 meters, or 22 meters below the ideal level of 202 meters. Then, in February 1998, the MWSS decreased the rate of release to 25 cms to conserve water in the face of the continued El Nino effects. Both MWC and MWSI source an average of 1,050 million liters a day from Angat Dam. As at 6 June, 1998, Angat's water level was 167.06 meters — two meters down on the level a fortnight ago, despite the rains. This is because the rains did not fall over the Angat watershed.

³ *Philippine Daily Inquirer*, 24 May 1998.

⁴ *Philippine Daily Inquirer*, 6 June 1998.

Box A1.5: Tariff Adjustment — Manila Contract

The value to the community of the competitive tendering process is highlighted by the tariff bids being substantially below the MWSS tariffs. The problem regarding the interpretation of the low tariff outcomes in Manila is that since the contract was signed, there have been two developments that have activated review of tariffs in terms of the *force majeure* elements of the contract.

In the first place, the capacity of MWSS to deliver the volumes set out in the financial assumptions of the bids have been undermined by the drought – associated with the El Nino effect. Water volume delivered to the concessionaires is down in excess of 30 percent, thereby reducing the capacity to sell and invoice customers.

In the second place, the devaluation of the peso is far in excess of the trigger that activates the case for tariff review. In the case of the West concession - assigned 90 percent of the capital costs of the MWSS system – there is a substantial FOREX financing cost following the depreciation of the peso.

The biasing of capital costs towards the West concession was, we are advised, an attempt to balance costs across the concessions – the IFC expected a need to add costs to the West concession in order to bring in tariffs which would be similar to those across the boundary. Ironically, the competitive bids yielded tariffs in the East below those in the West. Whatever the reason for the tariff outcome – East / West – the capital cost outcomes meant that the West concession had substantially higher financing costs, notably in terms of foreign currency.

The outcome of both El Nino and peso depreciation shocks, in terms of the *force majeure* elements of the contracts, is that the East concession is seeking a sharp increase in tariffs – although not to levels that would have applied without the privatization process. We were advised that the formulas for adjusting tariffs under the former MWSS currency exchange rate adjustment system would have led to tariffs around 12-13 peso, absent the competitive privatization, of the 5.7 and 7.2 peso requests. The contract envisages adjustments of tariffs to be spread over the length of the concession – whereas the East concession has requested a sharp increase in the first review, as a means of compensating for unforeseen increases in capital costs, and their dramatic effect on cash flows.

Bid the tariff – or the Concession fee?

The low tariff outcome in Manila has been criticized by some on the grounds that it has reduced tariffs at a time when conservation of water should be encouraged. While privatization has delivered lower water tariffs and a contractual obligation to move towards quality service, could this shift to an efficient structure have been achieved without tariff cuts – so as to achieve conservation objectives?

The alternative model, which the concessionaires could well have preferred, is one in which the tender was bid in terms of concession fees, with water tariffs set in advance, along with the indexation formula. This would have enabled harmonization of tariffs at the outset and subsequently, through the indexation formula. Bidding the concession fee at defined starting tariffs could have generated a cash flow which, in principle, could have been the same for the Government of the Philippines.

One reason for favoring a tariff rather than a concession fee bid is that pre-set tariffs can smack of the old model in which tariffs are a matter for Government. The private sector, the argument goes, should be innovative in product design and quality, and in devising competitive tariffs – with new incentives which optimize the resource and maximize benefits. A weakness with this argument is that the tariff is for an essential service – and thus is dominated by the regulatory process, once the tender has been awarded.

The National Irrigation Administration (NIA) has blocked the concessionaires' petition, saying that if the 25 cms is not maintained until end June, there will not be enough water by August to irrigate NIA expects Angat's water level to rise to 182 meters by August if the rate of water release is kept at 25 cms up to the end of the month, and if the strong rains come in the second week of June. But, at a faster rate of release, Angat Dam may not reach 180 meters by August.

The MWSS project management officer dismissed NIA's warnings, citing MWSS' own calculation that reportedly showed it could increase the rate of water release to 31.5 cms and still meet the 180-meter elevation by August.⁵

In meetings with MWSI it was noted that the devaluation of the Peso had a great effect because of the way the formula was determined. The cost is spread over the life of the concession – i.e., the 50 percent devaluation has to be spread over 25 years. The way the formula is structured, the West concessionaire has to absorb 90 percent of the concession fee of the old MWSS –60 percent to 70 percent is paid over the first 7-8 years – approximately US\$60-70 million a year.

The formula may have been structured to balance the bids – the West side is more dense than the East and there would have been less revenue per capital invested on the East side – perhaps this is the reason for the imbalance. The formula was presumably built on the assumption of a gradual exchange rate adjustment, and not the massive devaluation in the first year. As a result, the West concession - MWSI – has to absorb the increased FOREX cost. Under the old MWSS system, the currency exchange rate adjustment allowed for the impact of the last year. Under the post privatization scheme all the impact is expected to be spread over the contract – implying cash flow challenges for the concessionaires in 1998.

It should be noted that devaluation only has to exceed two percent to claim *force majeure* adjustments. The fact that the bulk water being supplied was down over 30 percent also automatically triggers *force majeure*, but the concessionaires argued this would probably not need to be used because the contract states a clear volume of bulk water to be supplied.

Overall, opinion on the speed of the implementation of this privatization has been positive, but there has been criticism that the regulatory body was not fully in place. The process of setting up an independent regulator takes time. Furthermore, the closing audit and inventory of MWSS assets had not been completed. The MWSS failed to implement the transfer of employees in time. The consultant was advised that approximately 100 (2 percent of a total of 5,000) MWSS employees refused to sign the offer sheets of the concessionaires, 200 took up voluntary retirement, 50 joined the residual MWSS organization and the rest moved to the West/East concessionaires.

15. Outcomes

The MWSS privatization provides interesting insights. Most agree that the privatization strategy, the bidding process, the selection process and the transition have been highly successful. It can be argued that the speed of the process helped to lead to successful takeover. However, many issues had to be covered in a very short span of time.

⁵ *Philippine Daily Inquirer*, 6 June 1998.

16. Loose Ends

According to the concessionaires the following problems had appeared at the time of writing:

- The formula used means the extra cost arising from the 50 percent devaluation has had a large effect. Considering that the cost is intended to be spread over the life of the concession, perhaps the regulator should be looking at re-basing issues⁶ – this could be a lesson for future concession agreements. There would appear to be a case for allowing the extra FOREX cost of borrowings to be passed through in tariffs over a period shorter than the full 25 year concession period.
- Interconnection Agreement - there are unresolved issues between the concessionaires regarding the physical boundary definitions of the concessions and the completion of the interconnection agreement, which is subject to arbitration.
- The audit of MWSS assets remains to be completed.

17. Lessons Learned

a. Appropriate Bidding Criteria

There is some support for the notion that in light of the wasteful use of water by many consumers in Manila, it would have been preferable to have had a higher tariff structure. This could have been achieved by pre-determining the tariff structure and bidding the concession fees – i.e., the highest fee for each concession would win, and the concessionaires would be subject to the same conditions as in the current contract – including extra-ordinary tariff adjustments.

b. Bulk Water Rights and Trading

A system of tradable bulk water entitlements is not present in Manila – there is simply reference to bulk volumes, which are the responsibility of MWSS. While it seems correct that it was better to proceed apace than wait on the resolution of long-term and complex bulk rights and entitlements, the allocation of water across bulk uses should now be a priority item.

⁶ In Article 9 Provisions in the contract:

There is an **allowance for automatic rate adjustments** each year for inflation. If this was not the case, the bidders would have had to forecast inflation and allow for this in the bids.

There are the EPA provisions – i.e., through the EPA, if there are different definitions of achievement (e.g., say environmental goals) which were not known at the time of privatization, or if the concessionaires' performance lags behind required standards and the regulatory office feels a price reduction is more appropriate than a penalty, or if the concessionaire benefits from grants or subsidies or the CPI definition changes, or the actual payments of the concessionaire to finance MWSS loans are different from those assumed at privatization – then the rate level will be adjusted to reflect the financial effects of any of the above.

There is **rate re-basing** – this allows the regulator to reset the rate level on fixed dates every five years. It was argued that without this mechanism it was likely the concessionaires would incur cumulative losses and go bankrupt or earn cumulatively large profits. Further, it was argued that bidders can prefer the conditions determining long-term rate changes to be left vague, because this allows them to seek to re-open the original contract terms when they are running the concessions and thus have the bargaining power. It was argued, on this basis, that there needed to be a clearly specified re-basing mechanism running at pre-determined intervals, so that it would be more difficult for the concessionaires to manipulate the contract. The regulator, should under this system, be able to argue that complaints will be dealt with under existing contract terms and so not have to renegotiate the contract.

c. Regulatory Body Must Be in Place

In Manila, the independent regulatory body was not properly in place, and the compromise agreement involved placing the regulatory agency within MWSS. Ideally, the agency would have greater independence and build on skills from other regulatory exposures of the Government of the Philippines. On the positive side, the structure and apparent efficiency of both the concessionaires and the trimmed MWSS is noticeable to the observer – there has been a huge cultural shift in the Metro Manila side of water supply in the Philippines.

d. Secure High Level Advice and Good Public Relations

The IFC advised during the Manila negotiations. It is critical that in devising a contract, the government has capable advisers to obtain a fair contract with private operators. A strong public relations campaign is also mandatory. In the case of the MWSS, communications were very open through all media outlets.

Because of the obvious high standards of professionalism, with the incentive of success fees, there was a sense that it would happen and be a fair and efficient outcome. As it turns out, the bidding process in Manila was transparent and fair – which meant well qualified and established companies submitted bids. While there were disagreements about the interpretation of the formula for choosing whether the Ayala bid should win the East or West concession, and surprise at the low bids, it is to be expected that there would be frustrated losers; market competitions are like that.

The tax incentives offered appear to have been a significant incentive – whether they were necessary is uncertain. Without them tariffs would have been higher, which would not have been a bad thing. Indeed, some argue that an environmental levy, to fund water supply development, should have been attached to tariffs – to counter the waste of water at the new low rates.

The due diligence process was acknowledged as thorough by all concerned.

Employee participation in the process was encouraged. The privatization process was swift and did not really give the unions time to consolidate a united response. At present it appears both employers and employees are fairing well.

18. Conclusion - Manila

At this stage of the Manila privatization, it would be presumptuous to conclude that it is best practice. However, on the basis of a limited review, we feel confident the privatization will improve water supply services, well beyond expectations a few years ago. There are already some signs of customer appreciation of improved service – although they have been crowded out by the 30 percent drop in water supply attributed to El Nino. The administrator of MWSS views the exercise as working well, and the allocations of scarce water by the concessionaires have been deemed to have been fairly and efficiently handled in a very difficult situation. While expectations have been running high, especially regarding the percentage of potable water, the private concessionaires will deliver within a fairly short time frame, the challenge is not small. The concessionaires are pledging very large investments. Manila awaits the private sector involvement bringing huge economic, technical, institutional, and management benefits in the provision of water services but because the privatization is so recent we must postpone any conclusive evaluation.

What is clear is that there are committed commercial entities with obligations, in terms of connections and water supply quality and coverage, that offer Manila a future of potable water supply that seemed impossible — or out of the bounds of reasonable expectations a few years ago. At the present time, what we can conclude is that the study process, the bidding process, and the transition have been successful.

OTHER COUNTRIES' EXPERIENCES

In addition to undertaking detailed analysis of the three water supply privatizations discussed in Appendix 1, we have used available literature to briefly examine private sector activity in water supply and the enabling environment for the following twelve countries:

- Australia.
- France.
- Hong Kong, China.
- India – State of Andhra Pradesh.
- Indonesia.
- New Zealand.
- Pakistan – Karachi.
- Thailand.
- People's Republic of China (PRC).
- United Kingdom (UK).
- United States (US).
- Viet Nam.

A. Australia

1. Private Sector Activity in Water Supply

The majority of Australia's water supply is currently owned and operated by regional government-owned monopolies. However, to varying degrees, governments of Australia's states and territories are prepared to consider private sector investment and participation in economic infrastructure, including water supply (see below). Reflecting this, the private sector has become more prominent in water supply investments in recent years. For example:

- In January 1996, the South Australian Government entered into a 15-year outsourcing contract with a consortium to maintain and operate Adelaide's metropolitan water and wastewater system. The system serves a population of over one million. This was the first major water supply outsourcing contract of its kind in Australia. All capital works associated with the system are managed by the consortium, however, ownership of the assets remains with the South Australian government;
- In November 1996, a build-own-operate (BOO) water treatment plant was opened to supply approximately 80 percent of the inhabitants of Sydney and its regions. The Prospect Filtration Plant, which involved an investment of A\$600 million, is the largest water-filtration plant ever developed in a single stage in the world. The procurement, design, and construction of the plant was completed in less than three years. BOOs have also been contracted for smaller treatment plants supplying Sydney including the MacArthur water filtration plant which involved an investment of A\$1 35 million. Private sector investment has also been encouraged for filtration plants for Sydney's southern suburbs and the Wollongong region and for the sewerage scheme in the Blue Mountains — west of Sydney.
- The Victorian Government has contracted for private investment and provision at the Yan Yean Water Treatment Plant (involving an investment of A\$35m).

- A number of water projects will be undertaken in regional Victoria over the next two to three years. The Victorian Government expects that some of these projects will be delivered on a build-own-operate-transfer (BOOT) basis.
- The Queensland Government is undertaking feasibility studies into the viability of privatizing central Queensland water pipelines.

2. The Enabling Environment

Australia is a federation of six states and two territories. The states and territories have primary constitutional responsibility for supplying water within their jurisdiction. Water supply has been provided typically by vertically integrated government enterprises that operate within regionally defined monopolies.

a. National Water Resource Policy

The Commonwealth Government and all state and territory governments are signatories to the Competition Principles Agreement. Through this agreement, a national water resource policy has been put in place.

The Competition Policy Agreement on water resource policy provides for reforms to institutional and pricing structures, corporatization and, if desired, privatization. All Australian State and Territory governments have agreed to implement the following reforms:

- Pricing reforms, including the adoption of consumption-based pricing and full-cost recovery and removal of uncommercial cross-subsidies. If cross-subsidies remain, they must be made transparent. In particular, where the price of a water service to a consumer is less than full cost, this fact should be fully disclosed. Ideally, in these situations, the government should pay the shortfall to the service provider directly as a Community Service Obligation payment.
- Institutional reforms, which as far as possible are to be in place by 1998, include structural separation of water service provision, standard setting, regulatory enforcement, and resource management functions.
- The agreement also requires that service providers, particularly in metropolitan areas, have a commercial focus through corporatization, privatization or contracting out. Box A2.1 highlights some of the institutional and privatization reforms taking place in the publicly owned Melbourne water utility.
- Urban area reforms should include the adoption of two-part tariffs comprising a connection charge and a usage charge – where this is cost effective. Publicly-owned service providers must earn a real rate of return on the written down replacement value of their assets. This return should be commensurate with the risk they face under public ownership. Metropolitan bulk suppliers must charge on a volumetric basis to recover all costs and earn a positive real rate of return on the written down replacement value of their assets.
- In rural areas water supply reforms include the introduction of full cost recovery and transparent arrangements for subsidies by no later than 2001. Rural water providers must also achieve a positive real rate of return on the written down replacement costs of assets by 2001, where practicable. Future investment in the industry, whether to extend existing schemes or establish new schemes, is to be undertaken

- only after appraisals indicate the investment is economically and ecologically sustainable. Where there is inter-state trade in water, pricing and asset valuation practices are to be made consistent. Funds should be set aside for future asset refurbishment and/or upgrading of government-owned water infrastructure. For the Murray Darling Basin, provision is to be made for funding of future maintenance, refurbishment and/or upgrade of headworks and other structures.
- Other sections of the agreement relate to institutional reform of resource management, groundwater, water allocations or entitlements, trading in water entitlements, consultation and public education, environment, water and related research, and taxation reforms.

Box A2.1: Melbourne Water's Unbundling, Corporatization and Tariff Restructure

Contracting out is a model whereby many of the services of water companies, such as tariff collection, tunneling, design, information technology and construction activities, are separately contracted out by the Government owned water utility. Melbourne Water commenced contracting out in the early 1980's. The utility's steady expansion of contracting out has been a precursor to more substantial private sector involvement.

Melbourne Water started by contracting out legal services in the late 1980s. This was followed by the sale of the information technology division to former staff members. Subsequently, it has contracted out printing, parks and gardens maintenance, engineering design and surveying, tunneling and many other services. In addition, all maintenance of the water and sewage infrastructure has been contracted out to three separate private engineering firms. A major result of these initiatives has seen employee downsizing from approximately 7,500 in 1989 to approximately 1,800 in late 1994.

In early 1995, the Government went further by adopting a corporatization model. The Melbourne Water Corporation was split into four entities — a wholesaler and three retail water distribution companies for metropolitan Melbourne. The distribution companies were responsible for the local distribution of water and collection of sewage and drainage. They are required to purchase their water from the wholesaler and pay that entity for the treatment of sewage and drainage. The retailers bill their customers for their service. There is now scope for the new corporatized entities to seek tenders for the private provision of water services on a concession basis.

The breaking up of Melbourne Water Corporation has produced further contracting out of activities, increased competitive pressures, automation of many activities and increased efficiencies in network management. One key area of the businesses that has experienced significant demands on performance is infrastructure and asset management.

The Melbourne Water example shows that there are some benefits to be gained from a gradualist approach. Private sector disciplines are introduced to a range of services over a period of time. Subsequently, full corporatization, privatization, or the letting of a concession can be considered.

In general, substantial efficiencies have been gained through the contracting out process, despite the claim by staff associations and others who have argued that the departure from the former public service oriented water company has meant substantial losses of corporate expertise. In fact, it is now clear that the private water service providers, including the privately built treatment plant (Yan Yean), are attracting a new level of skill to the organizations. For example, we are seeing on boards and in new management, people who had previously not worked in the water sector, but who bring substantial experience from normal corporate competitive behavior. As a result, the contracting out approach has led to an injection of new managerial talent and expertise.

b. Tradable Water Rights

Transferable water entitlements for surface water have been introduced in most Australian states. Permanent transfers of water are allowed in South Australia and on certain rivers in New South Wales. Generally, transfers are permitted only in the same supply system.

In most other cases, water entitlements are transferred on a temporary basis. Historically, initial water rights have been allocated free of charge. However, some new allocations have been auctioned, for example, in Victoria and Queensland.

c. State Government Policy on Private Infrastructure Investment

The NSW Government aims to maximize private investment in infrastructure to the extent that such investment would result in net benefits to the community beyond those from public provision. It has released guidelines for private sector participation (PSP) in the provision of public sector investment.

The Queensland Government, in September 1997, released a *Policy Framework for Private Sector Involvement in Public Infrastructure and Service Delivery*. This framework has been developed to encourage and formalize processes for PSP in the delivery of public infrastructure services. The central tenet of the framework is value for money on a whole-of-life basis for the delivery of the infrastructure asset and service.

The Victorian Government has a policy to actively encourage private sector investment in the state's infrastructure wherever benefits, in terms of efficiency and cost effectiveness, can be demonstrated. The *Infrastructure Investment Policy for Victoria*, released in August 1994, is designed to assist both Victorian Government agencies and private sector proponents when considering private investment in state infrastructure, facilities, and services. It sets out guidelines for promoting greater certainty for business in making infrastructure investment decisions.

The Tasmanian Government is currently developing guidelines on private sector provision and investment in economic and social infrastructure.

The South Australian Government has indicated that it is keen to encourage private sector investment in public infrastructure. South Australia has released guidelines for investment in infrastructure by the Private Sector.

In 1992, the Western Australian Government released guidelines on its approach to the private provision of public infrastructure. The Western Australian Government is in the process of redeveloping these guidelines for release in the near future.

The Australian Capital Territory Government is also receptive to considering proposals from the private sector regarding investment in the territory's infrastructure. The Government has not, at this stage, published guidelines on PSP in public infrastructure.

The Northern Territory Government has not yet published guidelines on PSP in public infrastructure. However, the Territory is prepared to consider further opportunities for private sector provision of such infrastructure.

d. Foreign Investment Policy

Recognizing the substantial contribution foreign investment makes, the federal government's policy on foreign investment in Australia is framed and administered with a view to encouraging investment, so long as the investment is consistent with Australia's needs. There is no specific restriction on foreign investments in Australia's water supply infrastructure.

However, notification and prior approval is required for all significant foreign investments. For example, acquisitions of substantial interests in Australian businesses with total assets of A\$5 million or more (A\$3 million or more for rural properties), or plans to establish new businesses involving a total foreign investment of A\$10 million or more would require prior approval.

B. France

1. Private Sector Activity in Water Supply

France has a 150 year history of private sector involvement in the water industry. Today, private water operators serve around 75 percent of the population and private sewerage operators serve around 40 percent of the population. Four major private suppliers serve the bulk of the market. The largest private supplier is the Compagnie Générale des Eaux which serves 40 percent of the market. The second largest water company is Lyonnaise des Eaux-Dumez which serves 23 percent of the market. The next two largest companies serve seven percent of the market between them. Several small companies have been bought out by one of the big four, who are also involved in waste disposal, television broadcasting, mortuary services, construction and electrical contracting businesses.¹

Although the 36,000 local municipalities have the option of providing water services themselves, private sector involvement has about doubled since 1950. Where municipalities are involved, they often combine to form water syndicates.

2. The Enabling Environment

The majority of private sector involvement is through franchising contracts. Franchising allows competitive disciplines to be introduced even where there is substantial market power. It can be an alternative to regulation to limit monopoly power. Rival companies bid to take over the management and operations of water facilities for a fixed period. Firms compete on price, subject to a range of non-price considerations including past experience, stability and quality assurance. Franchising contracts often specify service quality requirements, maintenance obligations, the scope for price increases, and the property rights that apply to parties once the contract expires. Competition occurs at the initial contracting stage through bidding. It also occurs, though to a much lesser extent, at contract renewal - since there is some (albeit small) prospect that the contract may be re-let to another contractor (in practice, re-letting a contract to another contractor rarely occurs). The franchising model usually takes one of three basic forms:

- **Management Contracts** – These contracts provide for the most limited form of private sector involvement. Government owned utilities contract out specific functions to private companies. The public company retains ownership of assets, accepts general responsibility for the system and responsibility for billing customers. The private company accepts responsibility for a series of specified tasks for the duration of the contract.

¹ New Zealand Business Roundtable 1995, *Reform of the Water Industry*, a report prepared by CS First Boston NZ Limited, August.

- **Affermage Contracts** – These contracts are also known as leasing contracts. They give a private company responsibility for asset operation and maintenance, billing and collection of fees from customers. The contracted private company has discretion in the day to day management of assets and staff and accepts responsibility for financing investments with life spans that fit within the contracted period, which is typically around 10 years. The government utility accepts responsibility for financing construction and operations with a life span greater than the contract period. Contracts usually specify the private contractor’s responsibilities for maintaining quality. This type of contract is the one most commonly used in France.
- **Concession Contracts** – These contracts devolve further responsibilities to the private contractor. The contractor can assume responsibility for financing, maintaining or refurbishing assets with long life spans. Consequently, contract periods usually are longer (typically, 15 to 30 years) to allow the contractor to earn an appropriate return on investment. At the end of the contract period, the ownership of assets is notionally transferred to the government utility. In practice, the franchise is usually renewed and the relationship is ongoing. Water fees are established through negotiated or competitive bidding. Water charges usually are usage related. Concession contracts typically specify initial prices and the scope for price increases based on inflation and increases in input costs. Contracts often contain five-year “break points” where either party can request to renegotiate prices. The Ministry of Economy and Finance monitors fee levels. There is no explicit rate of return regulation. However, price negotiations between contractors and the government utility are often based on each party’s perceptions of an appropriate rate of return.

C. Hong Kong, China

1. Private Sector Activity in Water Supply

Private sector activity in Hong Kong, China’s water supply is primarily restricted to construction under tender of segments of the water supply system. The Water Supplies Department, one of the departments under the Works Bureau of the Government of the Hong Kong Special Administrative Region of PRC, has responsibility for the region’s water supply. The department’s principal functions are to plan water resources and design, construct, maintain, and operate Hong Kong, China’s water supply systems. Hong Kong, China’s water supply is reported as costing four times more than the user fees charged.

2. The Enabling Environment

a. The Legal Environment — Dispute Resolution

The Hong Kong, China judicial system is based on the English model, however, investors are often advised to resolve disputes through less formal means. Indeed, Hong Kong, China, like Singapore, has sought to make it an attractive venue for arbitration. Both countries have adopted United Nations Commission on International Trade Law rules, which has played a significant part in increasing certainty for international investors by introducing uniformity in the

law of international commercial arbitration. The number of arbitration cases in Hong Kong, China, for example, increased from 54 to 185 two years after it adopted the Model Law.²

The basis of the Model Law is to give the parties the freedom to submit disputes to arbitration and to determine their own procedure including the number of arbitrators and the place and language of arbitration. There are, however, certain overriding principles to ensure fairness and due process. Court intervention is restricted to limited circumstances such as challenging the jurisdiction and appointment of the arbitral tribunal.

b. Environmental Standards

Hong Kong, China's system of environmental regulations and laws are similar to those in Organization for Economic Co-operation and Development countries.

D. India — State of Andhra Pradesh

1. Private Sector Activity in Water Supply

To date, most of the focus of private/government partnerships in infrastructure service provision in India has been in the power and transport sector. Water supply is a high priority for most state governments as surface and groundwater is scarce. However, few new water supply projects of a private investment nature have been implemented.

2. The Enabling Environment

a. The System of Government

India is a Union of States. Under the constitution, the legislative of the union, called the parliament has power to make laws for the whole or any part of the territory of India. State legislatures have power to make laws for their state, which are not covered by the Union List. The Union List gives exclusive power to the parliament to make laws in a number of areas including: defense, foreign affairs, currency, income, tax excise duty, railways, shipping, posts, and telegraphs. Both parliament and state legislatures have the power to legislate in areas covered by the Concurrent List which includes electricity; newspapers; criminal law; marriage and divorce; stamp duties; trade unions; and price controls. India's states have significant authority over water supply and sanitation and these powers can be passed down to the municipality level.

In the state of Andhra Pradesh, the planning and construction of water supply and sanitation facilities is carried out primarily by the Public Health and Engineering Department (PH ED). This state government body is responsible to the ministry for municipal administration. Under government grants or joint funding arrangements with municipalities, the PHED makes plans, designs schemes, and manages the construction process for major municipal water supply and sanitation projects through competitive tendering.

² See Asia Law January/February 1995 p. 28

Each district has a PHED office and a district superintending engineer. Once constructed, water supply and sanitation facilities are handed over to the municipality for operation and maintenance.

Existing institutional arrangements within India tend to preclude a commercial customer-oriented focus in the government agencies responsible for water supply and sanitation services. All of India's political parties support continued subsidies for water.

b. The Legal Environment and Dispute Resolution

India's legal system follows the British model. Disputes can be settled by the courts or alternatively through Lok Adalats, which are voluntary agencies for resolution of disputes through conciliatory methods.

c. Industries Reserved for the Public Sector

Six Indian industries are reserved for the public sector because of their strategic importance to the nation, another 16 industries of strategic, social or environment concern require industrial licenses. Water supply does not fall into either of these listings.

d. Foreign Exchange Controls

The Foreign Exchange Regulation Act 1973 governs India's foreign exchange (FOREX) control. In August 1994, India moved to Article VII status in the International Monetary Fund. The Indian FOREX market is developing and over the last few years a variety of instruments have been introduced.

e. Environmental Standards

Water allocation, groundwater monitoring and pollution control are divided between a number of government organizations, making integrated management of the water resource on a catchment or river basin basis difficult. For example, responsibilities for water resource management in Andhra Pradesh are split between three government agencies: the Irrigation Department, the Groundwater Department and the Pollution Control Board.

In Andhra Pradesh the institutions for water resource control have evolved over a long period of time. A rather complex set of rules and procedures are followed in most of the delta regions to allocate water and recover costs from an interconnected system of canals, barrages, intakes and storage tanks. Efficiencies could be gained through developing greater flexibility in water allocation and an ability to trade water between irrigators and urban water users. The technical capacity to achieve this exists now. However, the institutional arrangements needed for greater inter-sectoral water trading would take some time to develop.

E. Indonesia

1. Private Sector Activity in Water Supply

Indonesia's water supply has historically been subject to high volumes of unaccounted-for-water, minimal metering and insufficient pricing. The majority of Indonesia's urban poor do not have household connections to piped water. In a bid to redress these problems, the

Indonesian Government has recently awarded a number of private sector contracts. For example, in 1997 two private companies were engaged to supply water to Jakarta, under long-term (25-year) concession arrangements. In the same year a private consortium signed a long-term agreement for the construction and operation of a drinking water plant in Medan – the fourth largest city in Indonesia. A build-operate-transfer (BOT) contract has also been under negotiation for water treatment in Surabaya. However, to date, neither of these contracts has been closed, reflecting the current political situation and changing circumstances.

2. The Enabling Environment

a. The Legal System

Indonesia is a civil law jurisdiction (with some similarities to the Dutch system). However, the framework for the country's civil and administrative law is not strong. Law enforcement depends primarily on the criminal courts. However, disputes can be settled through local arbitrators – the most prominent non-court dispute resolution body in Indonesia is BANI, the Indonesian National Board of Arbitration.

Indonesia has ratified the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral awards but the country has not introduced the required implementing regulations.

b. Environmental Standards

The Ministry of Public Works, through the Directorate of Water Resources, is responsible by law for the quality and quantity of surface water in Indonesia.

Indonesia has enacted a significant body of environmental laws; the degree of enforcement and compliance with these laws is variable.

F. New Zealand

1. Private Sector Activity in Water Supply

Historically, councils and unitary authorities have provided water supply and wastewater treatment services to New Zealand's urban and rural areas. However, there has always been some private investment in the industry. Many small towns and isolated communities have private water supplies. For example, Oamaru city's water is supplied by a farmer-controlled irrigation company. Irrigation schemes, including all those previously owned by the government, are now owned and operated by private interests.

New Zealand has been relatively slow to introduce private sector investment into its metropolitan water supply sector. A BOOT contract has recently been awarded in Wellington's Lower Hut Valley and another BOOT contract has been put out to tender by Auckland's water authority. A joint consortium has also been contracted under BOOT arrangements to design and construct treatment facilities for a population of one million in Manukau.

2. The Enabling Environment

In New Zealand's unitary system of government water supply is the responsibility of local or regional councils and unitary authorities. These bodies control the taking, use, damming and diversion of water as well as the control of discharges into water.

Amendments to the Local Government Act in 1989 increased regional councils' and unitary authorities' accountability in their resource allocation roles. Most councils have, to varying degrees, separated the water supply and wastewater utilities from other council activities. The majority of councils now supply water and sewerage services through stand alone business units rather than council departments and some councils have opted for corporatization.

Resource allocation remains a problem in New Zealand. Permits to use water are generally allocated on a first come first served basis. In many rural districts, water scarcity is a growing problem. In addition, many water utilities do not meter supply to domestic or small commercial customers, hence water charges are not based on usage. In some cases, meters have been installed but are not used. Greater use of economic instruments in allocating water is hindered by the Resource Management Act. For example, charging for sewerage services on the basis of water usage is currently not possible.

G. Pakistan — Karachi

1. Private Sector Activity in Water Supply

Karachi's water and sewerage facilities are in the process of being privatized by competitive tender. In the face of significant operational and financial difficulties over the past few years, the Government concluded that the magnitude and urgency of the required changes were such that the only viable option – even with continued multilateral and bilateral assistance – would be to transfer operating and investment risks to the private sector as soon as possible. The successful tenderer will have to invest between US\$350 million and US\$500 million to improve existing facilities if performance goals are to be met.

The Karachi project is one of the largest instances of private participation in Pakistan's water sector. The successful implementation of this project should help pave the way for private participation in other cities in Pakistan that the private sector now perceives as risky.

2. The Enabling Environment

Pakistan has a federal system of government with four provinces and two territories. In 1988 Pakistan began to re-orient its policies to improve its extremely poor social indicators. Encouraging private sector investment was seen as one mechanism for achieving this goal.

Pakistan initiated an International Monetary Fund and World Bank supported reform program in 1993. The World Bank reports that the progress with structural reforms has been mixed, but significant advances have been made with privatization and attracting private investment, particularly in the energy sector.

Almost all surface water in Pakistan is contaminated by pollution. The World Bank reports that environmental degradation and pollution are seriously affecting public health. In

1992, the federal government took steps to arrest Pakistan's environmental problems through a national conservation strategy. This was followed by an action plan for 1993—1998. The Government also encouraged the preparation of provincial strategies.

The Federal Government has created a privatization commission, which is responsible for privatizing a wide range of government owed institutions.

The Water and Power Development Authority is a semi-autonomous body responsible for the planning, formulation, and execution of schemes for the exploitation of surface and underground water resources for irrigation, water supply, drainage, and hydro-electricity in Pakistan.

H. Thailand

1. Private Sector Activity in Water Supply

The sourcing and distribution of water in Thailand is the responsibility of the Metropolitan Water Works Authority and the Provincial Waterworks Authority (PWA).

The PWA awarded Thailand's first private sector water contract in 1995. The BOOT contract, which will operate for 25 years, was awarded for water supply in the Patum Thani/Rangsit region. Construction of the Patum Thani production and transmission facilities was to be completed by October 1998. The PWA is awarding a management contract for the distribution system, which will also cover leakage control.

The PWA has a privatization policy for regional water supply in place. The recent regional economic crisis has increased the urgency of its implementation as the PWA can no longer rely on government grants and other support for capital expenditures.

The PWA has re-assessed the benefits of the BOOT approach to privatization. The authority is currently negotiating with potential investors for three to four BOO schemes. In future, the PWA plans to include both the production and the distribution in the same package.

The Royal Thai Government is currently seeking reviews of the regulatory frameworks, tariff structure and privatization option(s) for the PWA (all of Thailand), the MWA (Bangkok) and the Wastewater Management Authority.

2. The Enabling Environment

Thailand's current laws with respect to water are outdated, a new Water Law has been drafted but has not been enacted. The Head of PWA, Dr. Wanchai Ghooprasert has called for the enactment of the Draft Water Law. He has recently been reported as saying that Thailand has:

“. . . many water-related agencies, but a general lack of coordination among them, resulting in gaps and overlaps in activities and services. A central body with adequate capability, capacity and authority should be established. . . . There is a lack of unity in the plans of concerned agencies, and there is no master plan that covers all sectors. Furthermore, the existing plans lack a participatory approach.

An Integrated Water Resources Management approach should be adopted. The economic value of water should be seriously considered.” (Ghooprasert 1998)

3. Foreign Ownership

Thailand's Board of Investment imposes ceilings on foreign ownership of most activities, the exception largely being manufacturing industries. Both foreign and local investors may apply for incentives under the Investment Promotion Law. The Board of Investment maintains a list of businesses eligible for promotion and can also consider individual projects on a case-by-case basis. It is by this means that the Government can provide incentives to promote priority areas, including investment in infrastructure. Promoted projects are subject to a myriad of conditions such as minimum capital investment requirements, minimum requirements for Thai share participation and certain requirements to use local raw materials. The promoted projects are then able to gain significant advantages. These include the removal or minimization of price controls, the right to bring in foreign specialized labor, the right to own land to carry on the relevant project, exemptions or reductions in import duties on imported machinery and raw materials and, in some circumstances, company tax holidays.

4. Environmental Standards

Thailand has enacted a significant body of environmental laws; the degree of enforcement and compliance with these laws is variable.

I. People's Republic of China

1. Private Sector Activity in Water Supply

In recent years, there has been some major private sector investment in PRO's water supply, and some examples are summarized in the following boxes.³

2. The Enabling Environment

PRC, through the State Planning Committee has both developed a BOT decree and an associated decision framework and has supported model contracts in the power, transport, and water supply sectors. The initial role model was a power plant in Laibin, Guangxi province, and a follow-on has been a water sector BOT in Chengdu, of Sichuan province. Both have been bid competitively, and contract negotiations were deemed highly successful.

³ For a detailed review of water BOT issues and experience in PRC see "BOT in the Water Supply Sector in the People's Republic of China", proceedings of a Seminar, October 1996, Asian Development Bank, Manila. The box in the text is from the conference volume, pp53-57.

Box A2.2: Water Supply Concessions in PRC

Ha-bin, Heilongjiang Province: SAUR International of France and the Harbin Water Company established a 50:50 cooperative joint venture in 1993 to finance, construct, and operate a 225,000 cubic meters (m³/day) water treatment plant for a period of 28 years. Investment contributions are both in kind and in cash, and total Y165 million (Van, 1996).

Shenyang, Liaoning Province: Hong Long Land Holdings Ltd., AIDC Ltd. of Australia, and Temasek Holdings Ltd. of Singapore have established China Water Company Ltd. to finance, develop, and operate water treatment projects in PRC. Capitalized at \$30 million, the first project of this company is a 20-year cooperative joint venture with the Shenyang Water Supply General Co. to develop a 150,000 m³/day water treatment plant. Additional projects are in the pipeline (AWSJ, 1996).

Tanzhou, Guangdong Province: Suez Lyonnaise des Eaux of France and New World Group of Hong Kong have established a joint venture company to pursue a number of water supply projects in PRC. In Tanzhou the company has entered into a 30-year concession contract for the development of a 240,000 m³/day treatment plant in four phases of 60,000 m³/day each; the first phase was completed at the end of 1994 (Suez Lyonnaise des Eaux, 1995).

Nanchang, Jiangxi Province: Suez Lyonnaise des Eaux entered into a concession agreement in 1994 for the construction and operation of a 200,000 m³/day treatment plant, followed by another contract in 1995 for the buy back, upgrading, and operation of an existing 50,000 m³/day treatment plant.

Shenyang, Liaoning Province: Suez Lyonnaise des Eaux entered into a concession agreement in early 1995 for the buy back and operation of a 450,000 m³/day treatment plant built by subsidiary Degremont in 1992. Two additional concession contracts have reportedly been signed by Suez Lyonnaise des Eaux.

Macau, China : In 1985 a joint venture of Suez Lyonnaise des Eaux and New World Group was awarded a 25-year concession to supply water to 600,000 residents of Macau, China; this contract includes the establishment and operation of two water treatment plants and over 275 kilometers of distribution networks. Elsewhere in Asia, Suez Lyonnaise des Eaux has also entered into three concession contracts in Malaysia (Taiping, Johor Bahru, and Kota Kinabalu) comprising treatment, storage, and distribution networks.

Box A2.3: Shanghai's Da-Chang Water Treatment Plant

Da-Chang Water Treatment Plant is a foreign-owned venture jointly owned by Thames Water of the UK and Bovis, a subsidiary of P&O of the UK. The plant, located in Pudong, Shanghai, has a concession period of 20 years.

The plant involves the construction of a 400,000 m³/day potable water treatment, storage facilities, and pumping station. Peak capacity is 520,000 m³/day. The local side is responsible for the provision of raw water, operation of the intake, and distribution mains. Thames Water is responsible for the operation of the works on completion of Phase 1 (200,000 m³/day). There is also a training element to this project. Thames Water was responsible for the process, mechanical, and electrical works design in conjunction with a local design firm. Once completed, Da-Chang will serve around two million of the 13 million residents of Shanghai.

Total project costs are \$73 million. A \$54- million project financing for the plant was syndicated to foreign banks with a ten-year maturity, including a two-and-a-half-year construction period; financing took 12 months to arrange. Participating banks included BZW Asia Limited, Credit Lyonnais, Standard Chartered, and Sumitomo Bank Limited. Lenders maintain that this is one of the first non-recourse project financing arrangements in PRC and the first project financing without a FOREX guarantee, although the Shanghai government provided FOREX support through a special regulation passed at the municipal level.

While structured similarly to BOT, the foreign investment projects allotted as cooperative joint ventures (JVs). These JVs operate under separate legislation under the Ministry of Foreign Trade and Economic Cooperation. To quote Edward Lehman at an Asian Development Bank (ADB) 1996 conference:

“No matter which legal form they take, BOT, BOOT, and ROT projects are typically very complex, involve a wide range of role players, and carry a large number of risks that must be managed by them. It is essential that local governments appreciate the great complexity and range of potential risks before committing time and resources to what are invariably very long negotiations with private firms.”

The tendering and procurement process under the new laws and procedures is designed to be highly competitive. One benefit of such competition is that different bidding parties (consortia — usually foreign and local operators, investors and financiers) will typically come up with differing debt and equity structures, and differing ways of sharing risk, with the Government than being able to choose the best combination that meets their specified requirements.

PRO's early experience with BOT contracts had seen provincial governments ignoring central directives and the ministry of finance was often required to step in. The new laws are, in part, an attempt to learn from those experiences. For example, in 1993 the PRO Government imposed a freeze on rates of return for BOT contracts. This effectively halted foreign projects for over two years and led the PRO Government to a decision to consider this form of PSP in infrastructure on a case-by-case basis, with underwriting at the provincial level.

J. United Kingdom

1. Private Sector Activity in Water Supply

From 1973 until 1989, there were ten vertically integrated water authorities in the UK, each responsible for providing water, sewerage and drainage services in England and Wales. These water authorities provided services within their respective monopoly areas, except where supply was arranged through one of the 29 pre-existing privately-owned statutory water-only companies. Local government authorities operated many parts of the sewerage system on behalf of particular water authorities.

The water industry was sold to the private sector in 1989 as part of the conservative government's wide ranging privatization program. In September 1989, the assets and liabilities of the then water authorities were transferred to ten subsidiary companies within holding companies (known as Water Groups). Shares in the holding companies were sold in November 1989. Each subsidiary company was granted a 25-year operating license, making them responsible for all water and wastewater services, including extracting raw water, delivering processed water, and receiving, treating and discharging wastewater. The Secretary of State for the Environment or for Wales (depending on where the appointee operates) can terminate these operating licenses at anytime, provided it gives 10 years notice.

There has been some structural reorganization of the UK water system since the water companies were sold in 1989. There has also been changes in the regulatory arrangements and some community unrest about the privatization process. For example, the Government

introduced price cap regulation in 1990 in response to concern that the utilities would abuse their monopoly power. There was considerable customer unrest as the first periodic review of the price formula approached as prices had risen considerably since privatization. Consumer dissatisfaction continued after the 1995 periodic review. Customers and the (then) opposition party were dissatisfied that 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.

The British approach to privatizing water supply demonstrates that privatization can be very unpopular if the community is not consulted and not given the necessary information to understand the need for and nature of the cost of new investments that privatization has facilitated.

2. The Enabling Environment

Following privatization, the Government introduced price cap regulation to limit abuse of monopoly power. Price caps restrict the ability of service providers to increase prices. To prevent service providers from exercising monopoly power by lowering quality instead of prices, the price capping formula contains a quality factor. The Government also held monopoly power in check during the first years of privatization by holding special (or “golden”) shares in the ten water and sewerage holding companies. These special shares were redeemed on 31 December 1994 to expose water and sewerage companies to competitive disciplines through threat of merger and takeover.

At the time of privatization, opportunities for direct competition in the supply of water and sewerage services were expected to be limited. The level of network competition in electricity and gas was considered unachievable in water, due to higher costs of transportation. The Director General of Water Services therefore did not actively promote competition. Some competition was facilitated under the Water Act 1989 (later consolidated into the 1991 Water Industry Act) through provision for companies to apply for inset appointments.

Initially, inset appointments could be granted to a company seeking to provide water and/or sewerage services on a greenfield site (i.e., one not attached or near to a public supply) within the incumbent service provider’s area. Some competition already existed on the borders between regional water companies. Inset appointments allowed new suppliers to serve previously unconnected consumers within a regional water companies geographic area. Inset appointments can be facilitated by:

- A direct connection to a neighboring water and/or sewerage company’s system.
- A bulk water supply/sewerage connection agreement with a neighboring undertaker.
- A new or existing source, sewage treatment plant or discharge consent.

Inset appointments can only be granted to a limited company. They may be granted to an existing water and sewerage undertaker. New entrants seeking an inset appointment must satisfy competence and financial viability conditions set down by the Director General of Water Services. A large customer can become its own supplier by setting up an affiliated company to act as appointee.

In practice, the existing appointee would normally continue to supply water and/or sewerage services to the boundary of the inset area and would be paid for doing so by the inset appointee. The customer would receive his/her bill from the inset appointee. In the case of a bulk water supply or sewerage connection agreement, parties are expected to reach agreement on the terms and conditions for access. However, if they fail to agree, the Director General of Water Services has powers to make a determination on terms and conditions.

The Competition and Service (Utilities) Act 1992 extended the provision for competition to allow inset appointments to be granted not only for greenfield sites but also for sites supplied with 250 megaliters or more of water a year. The process for considering inset appointments was simplified in July 1995. This led to an increase in the number of inquiries and formal applications for inset received by the Office of Water Services (OFWAT).

When provision was made in the statutes for new entrants via inset appointments, two types of insets were envisaged. One was where new resources would be developed or new sewerage services provided and the other was where a brokerage arrangement would be sought. That is, the applicant would obtain a bulk supply from a neighboring company or, in the case of sewerage services; the inset appointee would connect to the neighboring company's sewer. As at March 1997, only one of the inset applications received by OFWAT has involved the development of a new sewerage service and infrastructure. There were no inset applications received by OFWAT involving the development of new water resources.

When the inset applicant and the existing undertaker are unable to agree on the terms of bulk supply or mains sewerage connection, the Director may be asked for a determination. As at March 1997, OFWAT had considered 18 inset applications. In all cases the Director of OFWAT has been asked to determine the price at which the incumbent must provide the supply or connection (i.e., access price). The Director has made such determinations by taking into account the long-run marginal cost of supply. If this differs across a region then consideration is given to local long-run marginal costs.

While provision for inset appointment was made in 1989, the first inset appointment was not announced until March 1997. Anglian's water license was varied in May 1997 to make way for this inset appointment. Anglian is to supply a chicken factory (Buxted Chickens) which presently receives a supply from Essex and Suffolk. The variation was to take effect on 1 October 1997.

Although only one inset appointment has been announced to date, the threat of inset appointment has prompted some competition in water and sewerage prices. The threat of inset, usually by an agent acting on behalf of a potential applicant, has led companies to disentangle the costs associated with wholesale supply (bulk supply) business from the retail cost of supplying water. Many of the 29 water companies have introduced large user tariffs for water and some have introduced similar tariffs for dirty water.

3. Recent Attempts to Increase the Scope for Competition

OFWAT considers that further competition in the water industry is more likely to evolve if suppliers or potential suppliers have reasonable access to water. Access or common carriage arrangements will foster competition from newly developed water sources and reused treated wastewater.

In April 1996 the Department of the Environment issued a consultation paper proposing common carriage — third party access to water networks — and competition in water supply to large industrial customers. The Department of the Environment consultation paper published on 1 April, 1996 had a three month consultation period. It proposed legislative changes for inset appointments, cross-boundary supplies, common carriage and liberalizing the making of connections. These proposals (described below) were broadly supported by the industry regulator and most were implemented on 28 January 1997. They are expected to generate a limited form of competition in the water industry, relative to electricity and gas, albeit slowly.

4. Inset Appointments

Until recently, once an inset appointment was granted, the appointee remained in place unless another replaced it. The consultation paper proposed that inset appointments could be made for limited periods and the Director General be given powers to nominate an undertaker to replace the appointee at the end of the period. To increase the number of customers who can benefit from inset arrangements, the 250 megaliter test was amended to include premises that consume 250 megaliters that are commonly owned but separated by highways, railways, and or watercourses. The government also announced in January its intention to consider whether the level of water supply at which inset appointments would be available to large customers should be reduced below 250 megaliters per annum.

In August 1997, OFWAT announced plans to allow Anglian Water to act as sewerage undertaker for a former Royal Air Force site in Severn Trent Water's sewerage area. Water services to the site are currently provided by Yorkshire Water. The ministry of defense has sold the site including land and improvements (including sewerage pipelines and a sewerage treatment works) for a private housing development. The system operates on a standalone basis and does not require connection with Severn Trent's or Anglian's own sewerage system. OFWAT has required that a locally based customer service committee⁴ serve customers from the new development. This committee already represents the site's water customers and is different to the one that usually serves Anglian's customers.

5. Cross-Boundary Supplies

Until January 1997, any customer wanting to take a supply of water for domestic purposes could approach any undertaker for a cross boundary supply. The undertaker had a duty to supply that customer, although the customer was required to meet the costs of any required pipelaying. Customers could not require a cross-border supply of water if the water was intended for non-domestic purposes. The consultation paper proposed legislative changes to extend cross-boundary supplies to cover non-domestic use (OFWAT April 1996).

6. Common Carriage

Common carriage was proposed by the department of environment in April 1996 to further increase competition. It was envisaged that common carriage would occur where an appointee's pipes are used to transport water owned by a different supplier.

⁴ There are 10 customer-service committees appointed by the Director of OFWAT to represent the interests of consumers of water and sewerage companies.

Consultation revealed two key obstacles to the opening up of existing water networks to common carriage. One concerned water quality and the question of whether water quality standards could be safeguarded.⁵ A report commissioned by the department of environment and OFWAT by the Water Research Centre concluded that the difficulties in this area, while presenting a challenge, are not insurmountable (OFWAT 1996). The second obstacle concerned customers' perception of changes in taste and hardness that will lead them to regard the product as inferior. The Director General of OFWAT considered that attempts to ensure taste and hardness do not change as a result of common carriage and are likely to ensure that competition could not occur. Changes in taste and hardness would therefore have to be accepted, as they are already when the source of supply is varied within an existing network (Byatt, ICR 1997a).

The paper proposed legislative changes to allow any existing water undertaker (including new appointees) or new suppliers holding a direct supply license from the Director General, to supply customers by means of common carriage across any water undertaker's system. It was intended that from January 1997, large users in England and Wales (i.e., those with demands of 250 megaliters or more of water per annum or those that dispose of a similar amount of wastewater) be able to take advantage of common carriage provisions. The Director General will have the power to determine, in the absence of agreement between a prospective incoming supplier and the incumbent undertaker, the terms on which water should be supplied.

By September 1997, OFWAT had received two applications for common carriage of water. However, the Government is yet to endorse a legal framework within which access can occur.

7. Connection Charges

Prior to January 1997, customers did not have a choice over who connected their premises to the water mains. Water companies effectively had a monopoly on this and were allowed to charge reasonable costs. Companies insisted on making the physical connection, though in practice many allowed the customer or their contractor to carry out the trenchwork and lay pipes. In the consultation paper, the Director General pressed for changes to the legislation to allow other parties, such as developers and builders, to make the physical connection to the mains (OFWAT, April 1996). These changes were implemented early in 1997.

K. United States of America

1. Private Sector Activity in Water Supply

In the US, water and wastewater operations are highly fragmented. There are around 52,500 water systems. Of these, around 46 percent are publicly owned, 28 percent are privately owned, and 26 percent are ancillary systems associated with schools, hospitals, caravan parks, etc.

⁵ Water quality was already an issue in UK before common carriage proposals were aired. Between privatization in 1989 and March 1996, 9 billion pounds (1995–96 prices) was spent on asset maintenance, refurbishment, and construction. Nearly 40 percent of this expenditure (3.4 billion pounds) went to improving drinking water quality. Capital expenditure of around 4 billion pounds is planned for the 10 years 1995 to 2005 to further improve drinking water quality.

Privately-owned companies serve around 15 percent of the US population. Most private water companies are investor-owned, though there are some mutuals owned by shareholders. Private companies operate the majority of smaller systems in the US. There are very few privately owned systems serving a population of more than one million people (Beecher and Mann 1990). In some cases, privately-owned companies own combined water and electricity businesses.

Publicly-owned companies, usually municipalities, serve around 85 percent of the US population. Municipalities dominate the provision of services to larger urban areas. Publicly-owned companies also traditionally have dominated the provision of wastewater services. These services have been substantially subsidized by governments. Competition between publicly-owned companies is deterred by regulation. For example, if municipalities choose to serve customers outside their jurisdiction, they become subject to state regulation. Many municipal water supply systems face serious problems associated with capital deterioration, deferred maintenance, unreliable water supply, and under-pricing of services.

Most of the government owned systems price on the basis of estimated usage or on the basis of political considerations. In many systems, including New York City, water meters are only just being installed for usage based charging. This has provided an incentive for overuse of water by consumers. Water suppliers are not able to identify where system losses and excess demand are occurring and therefore find it difficult to improve efficiency.

Mounting regulatory pressures (costs of complying with regulation), and budgetary problems prompted greater consideration of private sector contract operations and maintenance of water and wastewater facilities. In 1992, there were around 300 operations and maintenance competitive franchising contracts between private operators and municipalities. The contracts generally run for five years. It is estimated that these contracts have achieved cost savings of between 20 and 50 percent (Haarmeyer 1992).

Performance comparisons of private investor-owned water utilities versus public water utilities have found that the two types of companies generally provide comparable services, though investor-owned companies pay taxes and do not receive non-operating income like public utilities. The government-owned water utilities receive generous tax subsidies that investor owned utilities do not. A study by Neal, Maloney, Marson, and Francis (1996) found that investor owned utilities generally had a lower net cost of capital, lower real water bill and greater efficiency in their operations than government owned utilities.

Public and private water utilities in the US face pressures associated with increasing urbanization, deteriorating infrastructure, and increasingly stringent drinking water quality regulations. The ability of utilities to respond to these problems is partly constrained by regulations in the industry (Mann 1993).

2. The Enabling Environment

a. Government Involvement and Regulation

Water services are highly regulated in the US for both investor-owned and government-owned companies.

There are many federal laws affecting water supply in the US. Historically, the Federal Government was responsible for project development and financing, for example, of storage and flood control systems. During the 1980s the federal role moved toward issues of water resource management and drinking water quality. The Federal Government also provides funding programs for wastewater treatment. These programs discourage the take-up of new approaches to meet the community's treatment needs. Federal Government grants also create disincentives for companies to comply with water treatment standards, as failure of the government to provide funds was an acceptable excuse for non-compliance (Stiefel 1994).

Federal laws are enforced by a plethora of agencies. Federal agencies include the American Water Works Association, National Institutes for Water Resources (NIWR), National Association of Regulatory Utility Commissioners, American Water Resources Association, and the Water Quality Association. These federal agencies usually have state-based counterparts.

While the Federal Government plays a large role in water matters, the states have primacy over the federal government in planning, management and regulation matters.

States have authority to create, allocate and regulate water rights. Different rules have evolved concerning the ownership of surface water versus groundwater (Berg 1997). Surface water accounts for 60 percent of public supply, while groundwater accounts for around 40 percent of public supply. Groundwater has been the subject of a common property resource dilemma. Each state has authority to create and regulate water rights within its boundaries. However, groundwater does not conform to state boundaries and common property issues arise because one form of usage of groundwater generally precludes another. This has been a source of conflict between states (Berg).

State governments generally have primacy in the control of utility operations, including prices. The states regulate public water utilities through state public utility commissions (PUCs). There are 46 PUCs in the US, regulating around 20 percent of water systems. PUCs determine revenue requirements and rate structure design. Companies must apply to PUCs for rate of return and price increases. Such applications often are evaluated using formal judicial processes with hearings and rules of evidence and procedure. At these hearings, utilities must prove that price increases are justified by an increase in costs. Investor-owned utilities are regulated through 40 state-based commissions. These commissions regulate the finances of investor-owned utilities to some degree through approval of debt-equity ratios; issue of stocks, bonds and dividends; and financial arrangements for water projects. Investor owned utilities usually require prior approval for a major change in a utility's corporate structure or ownership. They also require utilities to file annual or period reports with financial, operating and planning data.

Monopoly power is controlled primarily through rate of return regulation. Rate of return regulation seeks to control a monopoly's behavior by defining maximum allowable profits, having regard to the utility's costs. This regulation has generated several forms of inefficiency. First, poorly designed rates misallocate water among users. They also have created situations where revenues do not cover costs. There is not widespread use of marginal or incremental costing in the rate design process. Pricing mechanisms often do not allow for cost variations due to seasonal, geographical, and availability factors. Second, there is no incentive to minimize the costs of providing water services. In fact, rate of return regulation can have the opposite effect by encouraging utilities to maximize the value of their asset base to allow higher profits. Third, the costs of regulation often exceed the benefits, which leads to a misallocation of

utility and regulatory resources. The potential for distortion through rate of return regulation is affected by how utilities' costs are measured. Most PUCs base their decision on an historic cost accounting standard. Some use replacement cost.

b. Cross Boundary Trade in Water

There is interest in establishing a quasi-national market within the US by piping, or delivering water from Alaska by tanker to the US West Coast. The Alaska legislature has passed a law that sets up a mechanism for cross-border water sales. It is envisaged that purchasers of water from Alaska will be able to trade Alaskan water with other water companies. For instance, Nevada could buy water from Alaska and trade it to California in exchange for a portion of California's Colorado River water (Bradner 1993).

There is also interest in importing water from Canada in the future once internal debate within Canada is resolved (Berg). Canada, for the most part, is water rich. There is an interest in selling this water to the US and even water poor countries overseas. One proposal involved the export of water to Saudi Arabia by a company called Alaska Glacier Beverages (Bauman 1994).

L. Viet Nam

1. Private Sector Activity in Water Supply

To date Viet Nam has had limited private sector investment in water supply. In 1996, the first water supply BOT arrangements in Viet Nam were awarded for 20 water treatment plants in Ho Chi Minh City.

2. The Enabling Environment

a. The Legal Environment — Dispute Resolution

Viet Nam's BOT laws include procedures for dealing with disputes. The legislative regime provides that the parties must first seek to resolve the dispute by means of conciliation. Failing this, disputes between the BOT contractor and ancillary contractors are referred to a Viet Nam arbitration body, an *ad-hoc* arbitrator, a different country's arbitrator or an international arbitrator depending upon the method agreed in advance by the parties. Disputes between the BOT Contractor and a government agency are resolved through an *ad-hoc* contractor, unless discussion with the government agency results in an international arbitrator being appointed.

b. Laws to Promote Foreign Investment in Infrastructure

Viet Nam adopted specific legislative provisions dealing with BOT projects by amending the foreign investment law in 1992. Regulations for implementing the law have been circulated in a number of Government decrees and circulars. The key components of the regulatory structure for infrastructure projects are provided by Decree No 18 — Regulations Governing in Detail the Implementation of the Law on Foreign Investment in Vietnam, 16 April 1993; Decree No 87-CP — Regulations on Build-Own-Operate-Transfer Contracts, 23 November 1 993 and the Circular on Guiding Implementation of the Regulations on Investment in the Form of Build-Own-Operate-Transfer Contracts, 28 February 1994.

Under the BOT laws, a project may be undertaken with 100 percent foreign-owned capital or as a JV with foreign-owned and Vietnamese capital. However, there have been strong implicit and explicit taxation and other incentives to develop JV partnerships for BOT schemes with state owned enterprises (SOEs). In JV arrangements, the SOE's equity contribution is typically in the form of land.

As a general rule, projects dealt with under the Viet Nam BOT laws require the setting up of a Vietnamese company which contracts with the Vietnamese Government. Sponsors are permitted to construct and manage a project for a period of time, following which the sponsors are obliged to transfer the project to the Vietnamese government.

The BOT law allows for selection of the preferred contractor by either competitive tendering or through direct negotiation with foreign investors. However, many of the BOT contracts presently under consideration are being directly negotiated with a preferred tenderer selected by the Vietnamese Government. Competition for the market or the right to provide a service or build a facility is theoretically possible within the present legal framework. However, the processes are relatively unfamiliar to the Government authorities vested with the responsibilities for implementing contracts.

The Government has been addressing investor concerns about the law on a case-by-case basis. However, while foreign investment in Viet Nam has been growing rapidly, investment in BOT schemes has been slow.

c. Environmental Standards

Viet Nam at this stage has not developed a detailed body of environmental laws. However, the BOT laws (discussed above) incorporate significant regulatory detail in certain areas such as environmental regulation.

BEST PRACTICE WORKSHOP - PRIVATE SECTOR PARTICIPATION IN WATER INFRASTRUCTURE INVESTMENTS

The major theme advanced in this paper is that government needs to increase its role in regulatory, structuring and governance processes so that the private sector can be enabled to invest, manage and bear most of the demand risk. Competitive outcomes of low cost and improved quality were achieved in Macau, China and are in prospect in Manila. This appeared to confirm to participants in the workshop that the key to water supply investment is to sort out, and develop, the appropriate roles for government and private participants in the sector.

There appeared to be general support for the notion that the private sector should be invited to tender for least cost provision of water supply services on public sector assets. Ideally, or eventually, this could be through a concession model, with government structuring and regulating the process, with clearly-defined scopes of works. Furthermore, it was agreed that the capacity of developing member countries (DMCs) to move forward in involving the private sector in provision of services would vary on a case by case basis. In some countries, there are very poorly defined water rights, major problems of conflict between regional, municipal and national governments, and little by way of any history of enforcing commercial charges reflective of the costs of providing quality water. These and other factors make it difficult to move rapidly to a preferred concession model, which demands clear boundaries between commercial and government activities. In the absence of clear systems of governance and regulatory structures, private sector participation (PSP) in water supply was seen as a very risky business - hence the dominance of the public sector model. However, cost savings from PSP are now increasingly recognized.

The two water supply concessions advanced as examples of good practice, and covered in the circulated report, were discussed briefly at the Workshop. The leading executives from the Macau, China and Manila water utilities (the private sector investors managing these best practice water reforms) were present and able to deal directly with many of the issues raised. The question was not so much whether there were flaws in the details of the arrangements in Manila and Macau, China (indeed, there were areas where things could have been done better), rather, the question was: how would it be possible to move as fast in other countries, where the tender process was less advanced? build-operate-transfers (BOTs) were less satisfactory, but also easier to implement. In these DMCs, BOTs could be seen as a useful first step.

There was a general preference for an eventual shift towards full water concessions that is, arrangements whereby the private sector manages the business from reservoirs through to the household taps, directly billing the households and businesses taking water. While this was viewed as some distance off in most countries, this nevertheless did not mean that BOT models were necessarily the preferred way to go. The participants in the Workshop agreed that the history of many BOTs, and other take-or-pay bulk contracts for electricity, water, roads and other infrastructure services, is not a happy one. This is highlighted most dramatically in the case of electricity power purchasing agreements (PPAs).

The reason for the new, and somewhat negative, view on BOTs and PPAs is as follows: many of the Asian utilities, often with government guarantees, now have obligations to meet US\$ commitments against investments, but the income received through the sale of the product (electricity or water) is in domestic currency, which has sharply depreciated against the US\$.

The BOT/PPA contracts, now vastly more expensive, had often been designed in isolation from the customer and market forces. The commentators at the workshop saw the contracts as an interesting learning experience, but not as the path towards best practice. Nevertheless, there will be many examples where it will be possible to move forward in providing bulk water through first initiating private sector BOT arrangements. However, these BOTs should not be confused with any ideal solution. As an example, in many cases the real physical problem in Asian water utilities is water leakages, poor management, corruption, and inadequate governance. Simply facilitating a higher water supply, through BOTs and take-or-pay deals, would not always improve matters.

It was also agreed generally that the key steps required on the path towards best practice in water involve government getting its act together. Government should create sound regulatory institutions, viable tariff structures, define discharge obligations on those who might otherwise pollute rivers, and generally advance water resource plans and management strategies for the bulk product. The participants agreed that water shortages, droughts and so forth are serious recurring issues. However, the overwhelming agreement within the workshop, and as set out in the paper, was that the key shortage, in the case of the water sector, was of management and financial expertise, rather than water or financial capital. The suggestion that finance is not the binding problem led to an interesting discussion. The bankers agreed that if the regulatory institutions are in place, if contracts are enforceable and water tariffs are economic and commercial, then private sector investment in water businesses is viable. Most recently, this has been proven in Buenos Aires, Jakarta, Macau, China and Manila.

If government creates massive uncertainty, by not having clear regulatory regimes, by failing to allow tariffs to be set on a predictable basis, and by failing to supply clear water and access rights and other infrastructure rules, then the private sector would only invest at prices which customers may not accept, and which often demand government guarantees. This whole move away from government guarantees towards a market based pricing regime was seen as fundamental by all involved in the workshop discussion.

A. Corporatization as Transition

It was agreed that in the initial stages it may be desirable to convert the water supply sections of ministries in charge of water supply into business units, or component parts, for example by creating retail and wholesale water corporations under a new corporatization law as in NSW and New Zealand. "Corporatization" was defined as a process whereby all features of private corporate law apply to the directors and managers of the water business; however, the shareholders continue to act on behalf of the state, usually they are ministers. Corporatization involves the passage of corporatization law whereby explicit agreements Statements of Corporate Intent - are negotiated between the private sector/manager and the government, defining and limiting the rights of government and the private sector investor.

It was agreed that corporatization could be a useful transition vehicle where:

- There are complex jurisdictional and boundary matters between governments.
- Catchments can be contaminated.
- There are complications regarding trade-offs between irrigators, residential and industrial uses and the utilities, in some cases hydro-electric utilities.

Thus, corporatization can be implemented as a “half way house” which would then subsequently facilitate a coherent unbundling and competitive tender process for the respective sub-businesses.

There was considerable discussion of the virtues and limitations of benchmark competition. Benchmark competition involves the comparison of separate corporatized or privatized retail businesses, as in East and West Manila and East and West Jakarta, in a cost and data sense by government and private sector customers. However, the customer cannot, in fact, choose to switch water supply, in the way they can switch the provider of other commodities and services.

B. Social Issues

The consultant had indicated that there was a major social problem in the water sector. This arose because water - as H₂O - was provided free by nature, yet water supply was a profoundly different product, and quite expensive. Water supply can vary all the way from pure water to sewage and poisonous or contaminated substances. This confusion in the community of free rainfall with piped water provided almost freely (in many countries) by public utilities, accounts for many misunderstandings. Water in many countries costs more than gasoline, once one adjusts for having to buy in water bottles from vendors, and once one allows for the health effects of not having safe water.

It was argued by the consultant, and confirmed from the floor, that even in the poorest countries, such as India, there is a well-researched willingness and ability of the poor to pay for quality services. Indeed, the research undertaken by Asian Development Bank (ADB) and others has confirmed that the costs of piped water are rather higher to the poor than to the middle class. Water costs from vendors and bottle water suppliers, adjusted for the time costs of collection and treatment of water, far exceed efficient commercial supply as provided in Macau, China, for example.

C. Water - The Issue is Governance

The central theme of the presenter was that jurisdictions and water rights issues can only be resolved by the government agencies. Thus, issues of government policy are fundamental to resolving most water problems as a precursor to facilitating PSP in water supply. This central proposition was generally accepted, as was the notion that the private sector could often, but not always, do better in provision of services on public assets. It was agreed that there was far too much attention in the various DMC ministries to the physical side of water supply, that is, with constructing new pipelines and dams, with all the associated problems, including corruption. There was rather too little attention given to the fundamental issues of governance - regulation, structure and enforcement of laws. Maintenance of pipes and distribution systems was seen by the participants as a major and almost universal problem with public sector provision of water supply in Asia. However, when water rights are vested in concessionaires a loss of water supply means a loss of money - the resulting incentives are there for sound management of water supply distribution and for asset maintenance, if there is a long-term lease.

It was noted that because water is a capital intensive commodity, involving dams, pipes, access rights and huge tracks of land, there is inevitably a lot of interest in the business

community about potential investments in water. But in low income countries, where corruption is a problem, these investments are open to many complications, unless the governance arrangements are strong. Furthermore, the wisdom of asset sales (dams and pipes) was questioned, with the general preference being for leasing or concession contracts on assets, which remain in public ownership - the French concession model.

D. Financing

It was generally agreed by bankers, operators and financiers in the audience, that as long as the commercial environment was right, then there would rarely be a fundamental shortage of capital to meet the needs of water investments. Indeed, the essential nature of water as a product means that the income from water sales should be a secure source of income which could be securitized and thereby facilitate major private sector investments. While the government would have to provide some guarantees, these guarantees should ideally cover little more than a willingness to enforce the law and to manage certain *force majeure* situations in regard to earthquakes, contamination, riots, and so forth. Demand risk was something the private sector could take, given the essential nature of water as a product. Thus, the pressure was seen as very much on government to address the regulatory and governance requirements so that the private sector could provide the capital from pension funds and other sources with a taste for long-term regulated income streams.

E. Agenda for Change

It was agreed that governments need to put sound regulatory institutions in place, and that prior steps might involve the formation of reform units to drive the restructure and privatization process. In Jakarta, the privatizations (east and west concessions) preceded the formation of regulatory processes, which had been recommended. This was seen as one of the problems now faced in achieving value for customers and security for investors.

One area of debate, particularly in the form of written comments, related to some of the details of water privatization in Manila. The competitive tender was on the water tariff in Manila, with East Manila coming in with a very low water tariff and with both East and West Manila having successful water tenders substantially below the tariff charged by the earlier Metropolitan Waterworks and Sewerage System (MWSS) — the utility being replaced by the private concessions. There was discussion as to whether the government should have predetermined the tariffs to be set for water in Manila, reflecting the need to conserve the scarce water resources of the region. Higher tariffs would signal the need for households and businesses to conserve scarce water. The tender could then have been on the concession fees, the proceeds of which could have been used to meet environmental investments needs in the water sector or elsewhere.

Those arguing for competitive tender on water tariffs per cubic meter felt that the competitive tendering, in terms of the cheapest price per unit of water, was the best way of indicating to the community the value that could come from the competitive private sector process, that is, passing on lower water tariffs. There was nothing stopping government having an environmental levy on water use. Thus, the fact that water tariffs came in much lower than many expected should not be used to preclude the tendering process in terms of the water tariffs. Nevertheless, some felt that tendering the concession fee could well be a more efficient mechanism than tendering the tariff.

F. Summary

In summary, most participants in the workshop saw the scarce items in the sector to be to management skills, training, and expertise. Participants were generally of the view that ADB, in particular, should be financing more institutional strengthening and training programs, both in relation to the management of water institutions and the structuring of tendering and regulatory processes. Rather than lending billions of dollars for actual provision of piped and other physical water systems, ADB could achieve a far higher level of investment in most DMCs by helping the DMCs to get the regulatory governance structures right. By facilitating new regulatory and other arrangements, this would enable tariffs and investments to take place on a commercially viable basis, suitable to private sector finance.

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