

BOT in the Water Supply Sector in the People's Republic of China

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Key Features of Successful BOT: Structuring and Managing Risk

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INTRODUCTION

This paper defines the unique characteristics of build-operate-transfer (BOT) arrangements in the water supply sector and how conditions currently prevailing in the People's Republic of China (PRC) might affect the structuring of projects. These characteristics pose a wide range of controllable and uncontrollable risks that need to be addressed in properly structuring a water supply BOT. Key risks are enumerated in the paper, which also proposes a risk management framework, and describes tactics and tools that various role players in the BOT arrangement can use to mitigate these risks. Finally, conclusions are drawn pertaining to financial and institutional issues that, if not resolved, will likely limit the potential contribution that BOT can make to addressing the PRC's urban water supply problems.

MAJOR ISSUES IN STRUCTURING WATER SUPPLY BOT IN THE PRC

Rationale for Public/Private Partnerships

Economic and population growth in urban and peri-urban areas throughout the PRC is outpacing increases in the supply of treated water. One example of this problem is the Yangtze delta region comprising Shanghai, Jiangsu, Zhejiang, and Anhui provinces, where there are now 35 cities and towns with populations of over 1 million. Recent industrial growth exceeded 30 percent annually. To meet current rates of water usage, an

additional 170 medium-sized water treatment plants will need to be built by 2005, requiring investment (in 1994 terms) of at least \$8.5 billion. Adding to normal demand is the migration in recent years of 100 million rural dwellers into PRC's cities, and the rapid increase in living standards. Significant need exists not only for new water facilities but also for rehabilitation of existing infrastructure.

Decentralization of responsibility for financing and developing urban infrastructure to local governments and changes to national taxation policies have severely limited the fiscal capacity of most municipalities to effectively deliver adequate services. Expenditures on infrastructure development and operation have generally not kept up with economic growth in most cities since the early 1990s. Financing options available to local governments are also becoming more limited as national policy curtails access to credit, and domestic capital markets are relatively undeveloped. As a result, many local governments are beginning to consider various forms of private-public participation to deliver badly needed water supply infrastructure. Public-private partnership has emerged as a viable strategy for water supply infrastructure and delivery. Private companies bring managerial skills, new technologies, higher efficiency in the delivery of treated water, new investment capital, and a responsive attitude to shifting market demands. In the case of the PRC, it appears that the principal motivation of local governments for considering public-private partnerships is for access to new investment capital without further adding to their consolidated municipal debt.

There are several forms of private-public partnership that have been used successfully in various countries and that might have some relevance to the PRC: management contracts, leases, concessions, and BOT. Management contracts awarded to private firms for short-term operation and maintenance are not prevalent in the water sector in the PRC, nor are leases, which are generally for six to ten years, and do not involve any new capital investment by the private firm.

Concessions are similar to leases, but the private firm is responsible for investing in capital improvements to existing infrastructure. These contracts, which vary in duration from 15 to 30 years, are the predominant form used in the PRC and are generally structured through a cooperative joint venture (CJV), essentially a closed-end contract.

CJV differ from more typical equity joint venture (EJV) in two major respects. First, an EJV must be established as a limited liability company, whereas a CJV may choose not to have legal person status. Second, the

partners in an EJV contribute capital and share profits on the basis of their equity stakes in the venture, but a CJV may determine the distribution of profits and seats on the board of directors irrespective of partners equity contributions. Under a CJV, the foreign party may recover its investment before the end of the cooperation period if the contract stipulates that the PRC partners take ownership of all tangible assets upon termination. Examples of CJV in the water supply sector in the PRC are shown in Box 1.

Key Characteristics of BOT

The fourth option available for private financing is the BOT contract, which incorporates most of the features of concessions but is oriented toward construction of new water supply infrastructure. Similar mechanisms include build-own-operate-transfer (BOOT) and rehabilitate-

BOX 1

Water Supply Concessions in PRC

Harbin, Heilongjiang Province: SAUR International of France and the Harbin Water Company established a 50:50 CJV 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 (Yan, 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 the PRC. Capitalized at \$30 million, the first project of this company is a 20-year CJV 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 the 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).

(Continued on next page)

operate-transfer (ROT). In the PRC, BOT projects are generally treated as concession agreements in infrastructure and involve design, financing, construction, ownership, and operation of an infrastructure project by a private company. The fixed assets are transferred to the public sector at the end of the designated period. The State Planning Commission (SPC, now the State Development Planning Commission), which is preparing the BOT decree for adoption by the State Council, emphasizes that BOT projects should be based on concession agreements and be fully owned and financed by the private sector. This is the principal difference between CJV and BOT: the former often incorporates ownership and financial obligations of local partners, usually municipally owned water supply companies.

BOX 1 (continuation)

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.

Macao: 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 Macao; 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.

Others: Cathay International of Hong Kong has reportedly entered into water supply CJVs in the PRC, although details are not available. Other large infrastructure companies, recently listed on the Hong Kong Stock Exchange, are also reportedly assessing CJV opportunities in this sector although they are focusing on power and transport projects in the PRC. Neither the Asian Infrastructure Fund nor the AIG Asian Infrastructure Fund have so far invested in any water supply project in the PRC.

In order to facilitate development of infrastructure BOT, the SPC is taking a two-tracked approach: (i) develop the BOT decree to set out the legal framework, and support it by model contracts in the power, transport, and water supply sectors; and (ii) implement five pilot projects in these sectors in order to test the regulatory framework and provide models to other projects. The first of these projects, a power plant in Laibin, Guangxi, was bid competitively, and contract negotiations are under way. A water sector pilot project will also be bid competitively in Chengdu, capital city of Sichuan province.

While structured similarly to BOT, the foreign investment projects allotted as CJVs are governed by separate legislation administered by the Ministry of Foreign Trade and Economic Cooperation (MOFTEC). Even after the BOT decree is issued, there will likely continue to be an increasing number of projects structured as CJVs, particularly for small and medium-sized facilities. Foreign firms often believe that the direct participation of local governments as partners reduces policy and regulatory risk, and the CJV legal framework in the PRC has been tried and tested over many years. A recent example is shown in Box 2.

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 following are key characteristics of these BOT projects.

Form of Procurement

So far, CJVs in the water sector have been implemented through sole-source negotiations without the benefit of information and transparency inherent in competitive tenders. The proposed BOT decree, however, encourages competitive bidding. An important advantage to procurement through bidding is that financiers often prefer providing equity and debt financing to companies selected in fair competition.

Capital Financing

Almost all BOT projects are financed through a combination of equity and debt, supported entirely from the revenue flow of the project with-

BOX 2**Shanghai's Da-Chang Water Treatment Plant**

Da-Chang Water Treatment Plant is a foreign-owned venture jointly owned by Thames Water of the United Kingdom (UK) and Bovis, a subsidiary of P&O of the UK. The plant, located in Pudong, Shanghai, is being constructed with 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 2 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 nonrecourse project financing arrangements in the PRC and the first project financing without a foreign exchange guarantee, although the Shanghai government provided foreign exchange support through a special regulation passed at the municipal level.

(Sources: Van Daele 1996; Thames Water 1996.)

out recourse to credit of any project participant (Nevitt and Faboozi 1995). While project financing is defined as non- or limited-recourse financing, in reality most deals do require some recourse through partial guarantees. Nevertheless, in BOT financing, it is generally accepted that the enforceability of the contracts and the reliability of demand forecasts and revenue flows are more important to lenders than the creditworthiness of the BOT sponsors.

Project-financed investments carry greater risks for lenders than conventional corporate debt financing. The process of defining and allocating these risks is what makes BOT preparation complex and time consuming.

The perception of risk by project lenders is the most important factor, simply because if the sponsor cannot convince a debt financier to lend money for the project, the project cannot proceed. Local governments in the PRC must understand this dimension to BOT. Although for smaller CJVs sponsors are typically more risk tolerant, BOT projects rely on banks to take the risk of debt services from revenue; if risks are perceived as too high, banks will not be willing to get involved.

Most project-financed debt packages consist of loans syndicated by several commercial banks to reduce a single bank's risk exposure.¹ Equity-to-debt ratio sought by financiers in the PRC is no less than 25:75. Lenders will usually not consider an aggregate debt of less than \$100 million to \$150 million for projects with few risks and strong political support, such as the forthcoming Chengdu Water Treatment Plant. This limits the scope for BOT in the water supply sector, as most treatment plants cost well under \$50 million. Figure 1 shows the principal differences between the financing of water supply CJV and BOT in PRC.

Another approach to financing infrastructure is offshore listing of consolidated infrastructure companies on stock exchanges. Typically, sponsors combine their interests in individual joint ventures in the PRC (mostly in power and highway projects) into a single infrastructure company and then list this company to access often large pools of new equity capital, which can then be applied to the individual projects in lieu of corporate debt.² This is a time-consuming process and can cost anywhere from \$1 million to over \$5 million in listing and transaction expenses. Under current conditions it is unlikely that a critical mass of individual water supply investments will be reached soon to justify an offshore initial public offering in this sector.

¹Some large BOT projects in other countries rely on various forms of bond issues for debt financing in lieu of or in addition to commercial loans. Bond issues can potentially extend to the period of BOT (15-20 years), whereas foreign commercial lending has a maximum term of ten years in the PRC. However, obtaining credit ratings on bond issues is a time-consuming and expensive process.

²Recent examples include CEPA, Cheungkong Infrastructure, New World Infrastructure, Henderson Infrastructure, and Road King on the Hong Kong Stock Exchange, and Huaneng Power on the New York Stock Exchange.

	Small	Medium	large	Pool of Projects
POSSIBLE COMPONENTS	<ul style="list-style-type: none"> › water treatment plant › < 200,000 m³/d 	<ul style="list-style-type: none"> › water treatment plant › < 200,000 m³/d › possibly with intake 	<ul style="list-style-type: none"> › integrated water resources mgmt.; intake; water treatment plant; possible distribution › or large intake project 	<ul style="list-style-type: none"> › portfolio of small, medium and large intakes, water treatment plants, possible distribution
FORM OF VENTURE	CJV	CJV	BOT	BOT
TOTAL INVESTMENT	< \$50 million	\$50-\$100 million	\$100-200 million	>\$200 million
SOURCES OF EQUITY	<ul style="list-style-type: none"> › corporate sponsor, most likely water operator 	<ul style="list-style-type: none"> › corporate sponsor › additional private investors › possible offshore JV 	<ul style="list-style-type: none"> › corporate sponsor(s) › additional private investors › possibly investment fund › mezzanine financing 	<ul style="list-style-type: none"> › corporate sponsor(s) › additional private investors › possibly multilaterals › possibly investment fund › mezzanine financing
SOURCES OF DEBT	<ul style="list-style-type: none"> › loan from sponsor's bank 	<ul style="list-style-type: none"> › loan from sponsor's banks (likely to be syndicated) 	<ul style="list-style-type: none"> › project-financed › wide loan syndication › possibly multilaterals as lenders of record 	<ul style="list-style-type: none"> › project-financed › wide loan syndication › possibly multilaterals as lenders of record › eventual bond issue
DEBT SECURITY	<ul style="list-style-type: none"> › sponsor's balance sheet 	<ul style="list-style-type: none"> › sponsors' balance sheet 	<ul style="list-style-type: none"> › project revenues › partial, indirect sponsors' guarantees › possibly multilateral credit/risk guarantees 	<ul style="list-style-type: none"> › project revenues › partial, indirect sponsors' guarantees › possibly multilateral credit/risk guarantees › central government approval of bond issue

FIGURE 1. Financing of CJV and BOT Water Supply Projects

Form of Agreement

Most water sector BOT agreements are codified in a complex series of agreements that include (i) the concession agreement, (ii) government licenses, (iii) documents of title to land-use rights and user rights to any existing fixed assets (particularly relevant for rehabilitate-own-transfers), (iv) joint venture agreements between project sponsors, (v) shareholders' agreements, (vi) constitutive documents of the project company, (vii) project management agreements and technical consultancy contracts, (viii) construction contract and subcontracts, (ix) water supply contracts, (x) purchase agreements, and (xi) environmental consents (Clifford Chance, 1996).

SUPPLY

BOT projects can supply water directly to consumers, with control over the distribution system and direct involvement by the project company in tariff billing and collection; or through bulk supply contracts with existing water supply companies, which supply treated water to consumers and collect tariffs (Guislain and Kerf, 1995). Given the control of local governments over distribution networks and restrictions of foreign involvement in these networks, bulk supply contracts of treated water will likely remain the norm in the PRC.

Basis of Compensation

There are several bases for compensation in a BOT concession: (i) limits on the rate of return on investment (ROI); (ii) price regulation (a price cap tied to inflation commonly called "RPI minus X" where RPI is the retail price index and X is a factor set by the regulator, or local government); and (iii) prices set after comparing prices of water in comparable jurisdictions (UNCTAD, 1995). Water tariffs are subsidized by local governments and vary widely—there is reportedly a tenfold difference in unit prices across the country—so benchmarking prices may not be appropriate. Limiting ROIs has been the basis for most direct foreign investment so far, but the disadvantage of this approach is that there is little incentive to maximize efficiency once an ROI has been capped. Price caps are increasingly being applied in many countries for BOT compensation since they provide incentive to reduce costs and maximize market penetration.

Major Participants

BOT agreements have a wide range of participants, which may include Central Government agencies that have regulatory, fiscal, and monetary roles; local governments, which effectively franchise their water supply mandates (on a temporary basis) to the private sector; consumers, who are concerned with reliability and cost of service; project sponsors, who plan, finance, construct, and operate the project; project lenders, who provide debt financing to the project; financial advisers to the Government, sponsors, and financiers; contractors of the new facility; and insurers and guarantors, who bear some of the project risk.

Ownership of Assets

The Water Law, which was approved in 1988 by the National People's Congress, and the Constitution both state that water resources are owned by the "whole people." What is conveyed to an operator in a BOT project or CJV is the right, for a fixed period, to extract, treat, and sell the treated water—but ownership rights for the water itself are not conveyed. Similarly, land is owned "by the people," and State regulations allow for only the conveyance of land-use rights, for periods ranging from 20 to 70 years.

On the other hand, ownership of fixed assets can rest with the local government or with the project company during the concession period. The advantage of the latter arrangement is that assets can be assigned as collateral for project financing. Lenders often require that all operating assets be assigned to them for a project loan so that they can replace a project sponsor/operator in the event of default and maintain the revenue stream for which loans are to be paid.

Policy Making, Regulation, and Enforcement

There is often confusion in local government over possible loss of policy and regulatory control that might come about in the implementation of BOT. However, there is nothing inherent in the BOT approach that limits the rights and obligations of local governments over water policy, pricing, health regulation, environment, and safety standards. BOT simply temporarily transfers development, ownership, and operating rights to a private company. The rights to set performance standards, establish wa-

ter supply and demand management policy, enact policy through regulations, and enforce these regulations through regular and continual monitoring can and should be fully retained by government.

Tariff Setting, Invoicing, and Collection

Since most water supply BOT projects in the PRC will be for bulk water supply contracts, the setting of tariffs, invoicing, and collection will remain the responsibility of local government price bureaus and the water supply companies. The BOT project company is not expected to become involved.

The Scope of BOT in the PRC Water Supply Sector

The pending BOT decree is expected to clarify the framework governing direct foreign investment. Presently, two regulations provide partial definition of the scope for investment in water supply. The Interim Provisions on Guiding Foreign Investment Direction and the accompanying Catalogue for the Guidance of Foreign Investment Industries were promulgated by a decree of the SPC, the State Economic and Trade Commission (SETC), and MOFTEC in June 1995. Sectors and industries acceptable for foreign investment are defined in the Catalogue, and more than 300 types of investment projects are classified for which foreign investment is either encouraged, permitted, restricted, or forbidden. Projects not specifically listed are deemed to be “permitted.”

The Catalogue clearly states that “construction or management of urban networks of water supply, water drainage, gas and heat power” are specifically “prohibited foreign investment industries.” However, in August 1995, a joint Circular on Relevant Issues Concerning the Examination, Approval and Management of Experimental Foreign-Invested Franchise Projects was issued that provides for BOT projects for “an experimental period” in the area of power, transport, and “city water supply plants” (Wu, 1996). This Circular gives interim guidance until the BOT decree is passed.

Although the Catalogue and the Circular appear to be in conflict, the intent is quite clear. The PRC categorically rejects foreign involvement in the physical distribution of power, water, or gas anywhere in its territory. The Catalogue’s prohibition of water supply “networks” means that for-

foreign (or domestic private) involvement in the construction or operation of water supply lines is not allowed for BOT. However, since water treatment is not specifically mentioned, it is deemed to be “permitted” and in fact this interpretation was subsequently confirmed in a separate circular. Since water intake facilities are not mentioned in the Catalogue, they are “permitted.” Conveyance pipelines between a water intake facility and a water treatment plant are not considered part of a “water supply network” according to the Ministry of Construction (MOC). BOT can therefore cover the full process of water diversion to water intake, conveyance, and treatment, up to existing distribution networks (Figure 2).

Recently there has been much foreign investment in large industrial parks and townships, which generally require completely new water supply systems, including distribution networks. Given that these are largely foreign-involved manufacturing enterprises with a potential for generating revenues in foreign exchange, these estates could be quite attractive for BOT investments, but clarification of the regulations for these situations is required.

Financial and Institutional Issues for BOT in the Water Sector

Three major financial issues will affect the degree to which BOT projects become a significant contributor to the development of water infrastructure in the PRC: affordability and viability of market-based tariffs; sustainability of effective market demand; and structuring of project financing.

Tariffs

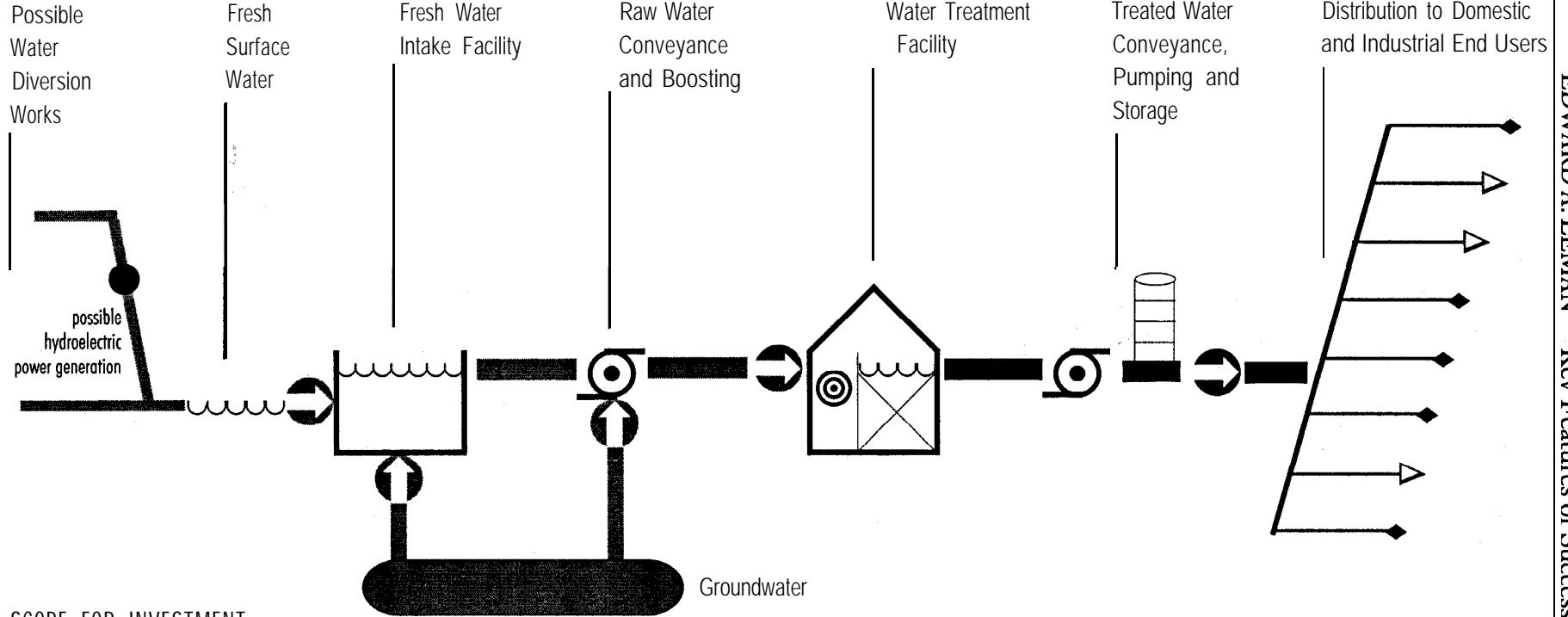
Although project companies will rely on bulk water offtake agreements with water supply companies that agree to “take or pay” a specified volume of treated water, increasingly sponsors, lenders, and guarantors recognize that no matter how strong the local commitment, the project must be economically and financially viable in its own right. The economic benefits of the project must outweigh the economic costs; otherwise, the deal is inherently flawed. While it is preferable that water tariffs be market based to cover operating and maintenance costs, debt servicing and repayment, and profits to sponsors, this is often difficult. In the PRC, as it is in most municipalities of North America, both water supply and wastewater

GOVERNMENT AGENCIES

Ministry of Power,¹ Ministry of Water Resources, local water resource bureau

Ministry of Construction, Municipal Governments, Local Construction Commissions, Districts

ACTIVITIES



SCOPE FOR INVESTMENT

foreign investment encouraged > 300,000 m ³ /day	UNCERTAIN	no specific mention; negotiable	PROHIBITED
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FIGURE 2. Allowable Scope for Direct Foreign Investment in PRC Water Sector

¹ Possible involvement in hydroelectric generation.

ment are subsidized. The tariff issue therefore becomes one of degree of subsidies and the capacity of municipal budgets to support them. Foreign lenders will look for local governments to maximize tariffs in order to reduce subsidy burdens on municipal finance; they will also look for sound municipal financial capacity to support the remaining subsidies over the full term of the project.

Assessing the creditworthiness of local governments and their water supply companies is a difficult task for a number of reasons. The impact of the 1994 tax reforms on municipal finance is still unclear, and decentralization and tax reform mean that local governments are increasingly called upon to finance expenditures without provisions for new sources of revenue. It is difficult for foreign companies to obtain an overall view of local finances by examining the budgets. Many items are “off” budget, and it is virtually impossible to obtain information on them. Since most municipal water companies are “corporatized” but not “commercialized,” the extent to which they can tap municipal credit is also unclear. Means must be found for lenders to learn the real creditworthiness of offtake parties and local governments.

Market Demand

Related to tariffs is the issue of sustainable market demand. One of the reasons that many lenders feel the PRC is a high investment risk is the comparative newness of economic reforms and the high rates of growth generated by these reforms. This becomes particularly important in considering the purchasing power of consumers to pay market-based water tariffs over the duration of a BOT contract, particularly if optimistic assumptions have been made about increases in consumers’ income.

The suitability of BOT arrangements for water supply infrastructure may not be uniformly spread across the country. Lenders will most likely focus, at least initially, on a limited number of high-performing coastal cities with strong underlying economic fundamentals including evidence of foreign industrial investment, comparative lack of pressure on municipal budgets, and evidence of successful debt repayment to previous foreign lenders. The poorer inland provinces are therefore unlikely to benefit soon from BOT projects and must rely instead on CJVs, concessional financing from export credit agencies and multilateral and bilateral agencies, and government budget resources.

Project Financing

A unique aspect of BOT projects concerns their structuring to make them conducive to non- or limited-recourse project financing. Financiers currently have little interest in debt packages under \$150 million; they prefer a \$200 million-\$250 million debt package. As only a few projects can reach the \$100 million mark, the remaining option is to pool individual infrastructure projects into an integrated portfolio with aggregate debt over \$150 million.

Although the pooling concept may be sound, implementing such arrangements raises a number of logistic issues. Assembling a portfolio of water supply projects may require considerable negotiation before competing interests are resolved in a consensus agreement. Obtaining approvals is difficult enough for a single project; to replicate approvals over several projects will likely take considerable time. Finally, the technical preparation of several projects in different municipalities will be both complex and time consuming. Central Government assistance, perhaps supported by multilateral development banks, may be essential in attracting foreign sponsors to consider pooled water supply projects, at least initially.

This in turn raises several questions surrounding the institutional aspects of BOT in water supply projects in the PRC. At present, institutions involved in BOT projects include the SPC, which is drafting the regulatory framework for BOT and reviewing and approving foreign investments over \$30 million; MOFTEC, which reviews and approves foreign investment (and administers CJV law regulations); the State Administration of Exchange Control (now the State Administration of Foreign Exchange), which regulates foreign exchange convertibility; the MOC, which produces guidelines for water supply companies, and the Ministry of Water Resources, which develops policies relating to water resources and water supply in towns and villages; and the SETC, which regulates current State-owned assets. This range of central agency involvement in BOT is bewildering to foreign sponsors. Clearly establishing the mandates, responsibilities, and interrelationships of these agencies will be helpful.

The relationship of local governments with the Central Government is another element area that confuses foreign investors. Local governments are the principal counterparts with whom foreign sponsors must work in structuring and implementing a BOT project, but they appear to need guidance from the Central Government on their scope to negotiate and approve BOT deals. While it is reasonable to expect that cross-provincial

and strategic BOT projects will continue to require central approval, small water supply BOT projects could be handled more efficiently at the local level, within a regulatory framework acceptable to the Central Government.

Finally, in the context of decentralization, it is a major challenge for investors to know which of the PRC's 662 cities are amenable to BOT and have the creditworthiness to support these arrangements. Guidance from the Government would be extremely useful. The financial and institutional issues outlined here are encountered in many countries besides the PRC and pose intrinsic risks to foreign sponsors and lenders. Some countries have managed to reduce these risks so that the sponsors and local agencies can concentrate on dealing with the many other complex risks associated with BOT in the water supply sector.

THE NEED FOR RISK MANAGEMENT IN WATER SUPPLY BOT PROJECTS

What Risk?

Every BOT project will carry some risk. The challenge is to reduce uncertainty to an acceptable level and allocate responsibility to the party best able to handle it. This is called risk management. The difference between "perceived risk" and "real risk" is the amount of information available with which to define the uncertainty. Success in BOT often rests on the ability of key participants to share accurate and timely information so that perceived risks can be minimized and resources can be spent efficiently in managing real risks.

A major challenge in risk management is to discern whether a risk is controllable or not. A real risk, over which BOT participants have control, can be clearly defined and allocated. An uncontrollable risk, on the other hand, is difficult to allocate. As a deal progresses and more information becomes available, some uncontrollable risks may gradually become controllable, while new unforeseen risks may arise. Given the complex nature of BOT, a rigorous process of continual risk assessment and management must be incorporated throughout the life of the project (Letondot, 1996).

Whose Risk?

In a BOT project, all parties must understand what each party considers to be a risk and what their desired outcomes are. Without this mu-

tual understanding, failure is virtually assured, either during negotiations or later during construction or operations. From the point of view of Government, there are at least four desired outcomes from water supply BOT projects: (i) development of infrastructure to support economic growth, (ii) continued inflation control with water tariffs remaining within set margins, (iii) complete financial independence of the project without any debt incurred by Government, and (iv) manageable conversion of local currency into foreign exchange.

For local governments, the desired outcomes are many and include (i) additional water supply at little or no cost to municipal budgets, (ii) increased efficiency of supply, and (iii) increased consumer satisfaction with the service. Possible risks include (i) political concerns over public perception on the involvement of the private sector in the provision of water, (ii) high cost and complexity of negotiating a BOT, (iii) financial obligations associated with the offtake, and (iv) water tariff increases that may not be acceptable to consumers. Consumers' desired outcome is simply acceptable quality and quantity of water at the lowest possible price. Their perception of risk relates to unmanageable price increases or unreliable supply.

The sponsor's desired outcome is essentially an adequate return on equity investment. For international operators, effective entry into the PRC and an enhanced reputation may also be the desired outcome. Risks for sponsors include (i) failure to close the deal after absorbing considerable development costs, (ii) failure to secure financing at an acceptable rate, (iii) technical or financial failure of contractors, (iv) failure during operations, (v) policy changes during the project that increase costs or reduce revenues, (vi) market failure or unexpected competition, and (vii) changes in the monetary environment that may negatively affect foreign exchange convertibility and remittance procedures.

The desired outcome for project lenders is to fully recover debt and interest on the basis of an agreed-upon servicing schedule; risk covers the full gamut of uncertainties listed above. If the project falters for whatever reason, particularly early on in the project cycle, debt servicing stands to be delayed or abandoned. Major risks are unexpected technical delays during construction and financial instability of project sponsors. Finally, insurers and third-party guarantors seek full payment of premiums without call on their commitments.

How Much and When?

Participants in a water supply BOT will experience varying degrees of risk at different times during the project cycle. This has significant implications for developing an overall risk management strategy. Figure 3 shows a profile of perceived risk for major players during the eight principal stages of a water supply BOT project (described in Box 3).

The peak risk occurs in the construction and initial operating stages where technical failure is the principal concern. The longest risk is for the project sponsors, who incur expenses at the initial identification stage and commit an increasing amount of capital throughout the planning, contracting, and construction stages, right to the end, as equity payback and profits are the last to be paid from the revenue stream. Debt holders follow a similar but shorter risk pattern. Debt financing does not become effective until the start of construction and, since commercial debt is generally limited to ten years, debt holders receive their returns well before the end of the BOT period. Contractors endure the shortest risk, ending within a stipulated performance period after construction completion and commissioning of the facility.

Local governments and consumers may perceive an entirely different risk profile. From the planning and approval stage, municipalities risk disapproval from Central Government or misinterpretation by consumers. This risk peaks after start-up and declines as the completed facility demonstrates its technical and social benefits. As the BOT period draws to a close, local governments may well perceive increased risks of becoming saddled with a nonperforming fixed asset and the need to develop alternate facilities. Consumers' perceived risks, on the other hand, begin only at operation when user costs are likely to increase, and will gradually diminish as the facility proves its worth. However, concern over reliability, quality, and cost of continued water supply after the expiration of the BOT contract may increase in later stages of the project.

RISK MANAGEMENT FRAMEWORK FOR WATER SUPPLY BOT PROJECTS

Overall Framework

In order to minimize the concerns and perceived risks of all players, a comprehensive program should be structured jointly so everyone fully un-

BOX 3**Eight Stages in a Typical Water Supply BOT Project**

1. Identification: Host government or foreign sponsors identify a specific project opportunity.

2. Feasibility Assessment: The market, technical, economic, and financial feasibility of the project is assessed in detail. This stage requires diligent assessment of all key aspects.

3. Planning, Approvals, and Project Company Selection: Assuming the project is feasible, approvals from local and central government agencies will be secured. Project company selection can occur through competitive bidding or through negotiation with a single sponsor.

4. Financial Structuring: Once the project company is awarded the contract, financial structuring is carried out by the sponsors to establish equity and debt requirements and secure financing. With financial closure, funds begin to flow into the project company.

5. Contracting: The project company enters into a stipulated fixed contract with a construction company through a design-build turnkey arrangement.

6. Construction and Commissioning: Contractors and subcontractors construct the water supply facility and commission the project according to agreed performance criteria.

7. Operation: Either the project company operates the facility for the duration of the BOT period or contracts out this role to an independent company.

8. Handover and Exit: Upon expiration of the BOT period, the Government inspects the facility to ensure compliance with agreed-upon performance standards. The entire facility is transferred to the Government, which can operate it or choose to negotiate an extended concession contract with the project company or other companies.

derstands each other's desired outcomes, the risks that each must assume, and the timing and costs of these risks. Since each project has a unique set of risks, a standard program cannot be applied, but a framework may assist in structuring a specific program. In general, the process of risk management consists of (i) identifying and defining perceived risks, (ii) reaching consensus on which are real risks, (iii) deciding which of these are control-

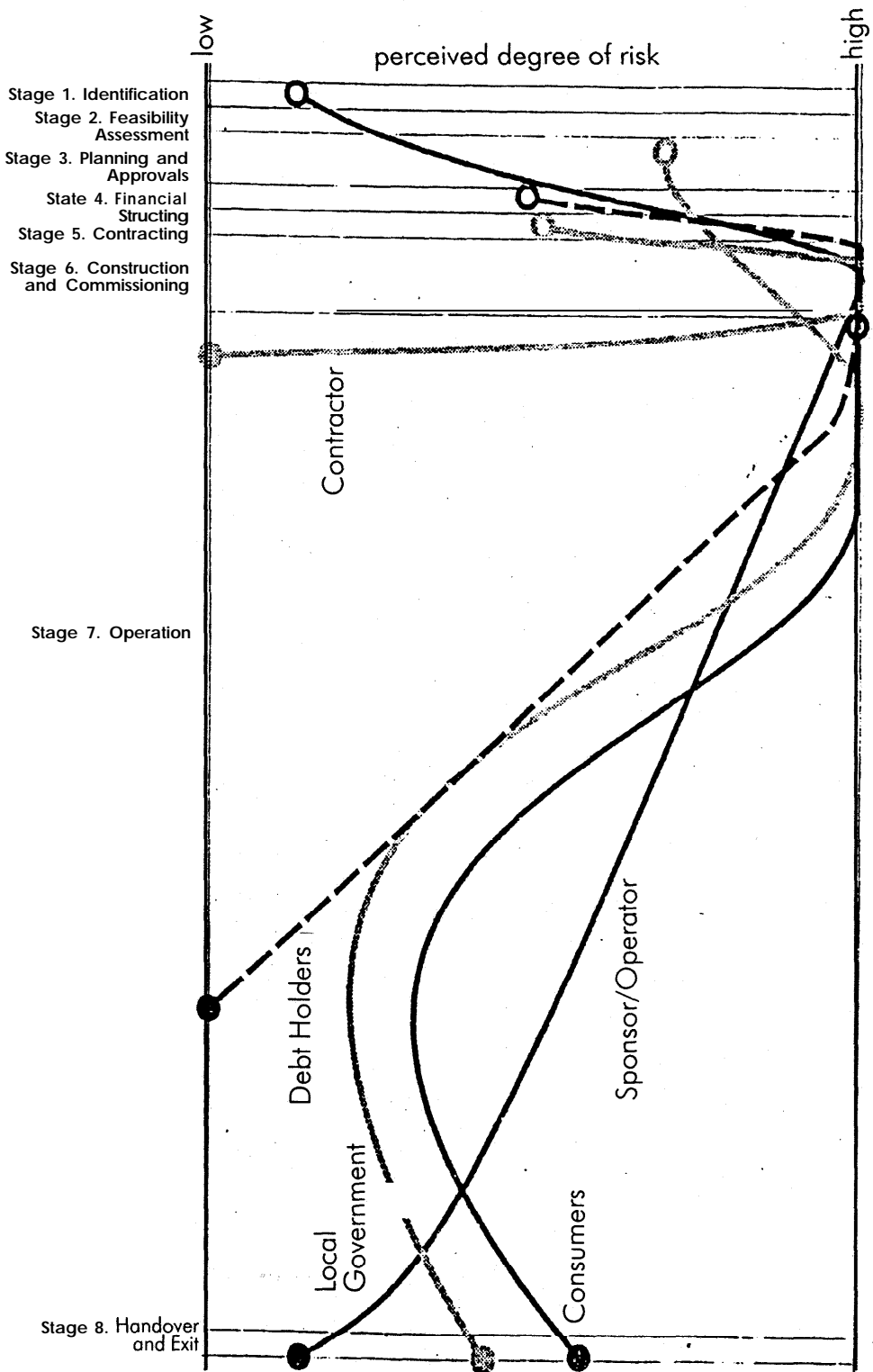


FIGURE 3. Perceived Risks Among Stakeholders in a Water Supply BOT Project

lable and which are not, and (iv) agreeing on which strategy to use to manage both controllable and uncontrollable risks.

There are four basic tactics for managing risk: (i) avoidance or ensuring conditions that eliminate certain risks; (ii) minimization by reducing the likelihood or severity of certain risks; (iii) transfer of unavoidable risks to a third party, often by monetizing the risk and paying a premium for the third party to carry the risk; and (iv) acceptance and allocation of the remaining risks to the party most able to carry it at the lowest overall cost to the project. There are a number of tools that can be applied to each of the four tactics. These are examined as they pertain to uncontrollable and controllable risks that water supply BOT projects are likely to encounter in the PRC at the present time.

Managing Uncontrollable Risks

Force Majeure

This consists of casualty losses from fire, flood, and earthquake, and noncasualty losses from strikers, war, or civil disturbance (UNIDO 1995b). Parties to a BOT agreement cannot predict or control these risks, which usually excuse them from performance and the legal consequences of non-performance. Deciding on what constitutes force majeure, however, can take considerable negotiation.

The principal tool for managing this risk is monetizing and transferring it to a third party for a premium. Many bilateral export credit agencies sell insurance to investors that covers some or all force majeure risks, including expropriation, war, and civil disturbance. The Multilateral Investment Guarantee Agency of the World Bank also provides insurance against these eventualities. Another tool is a “partial risk guarantee” offered by both the Asian Development Bank (ADB) and the World Bank whereby commercial lenders are protected against delays or interruptions caused by political force majeure events such as war and civil disturbance. However, these require counter-guarantees from the Government (Ministry of Finance or People’s Bank of China) and count as part of the overall lending program to the PRC. To date, these guarantees have been used only in very large infrastructure investments (e.g., the \$1.1 billion Yangzhou Thermal Power Project).

Forced Buyouts

This relates to the risk of expropriation, requisition, confiscation, or nationalization of the completed facility. In many cases, local parties in a BOT will insist that these risks be treated as force majeure and managed accordingly. Insurance is the principal tool for dealing with this risk, but another is “equity structuring” of the overall project involving a strong domestic partner and including a multilateral agency as an equity partner. Both ADB’s Private Sector Group and the International Finance Corporation can invest in private infrastructure in the PRC.

Debt structuring is another tool that can be used to minimize the risk of forced buyouts. If project financing is done by a syndicate of commercial banks friendly to the PRC, the risk is considered to be reduced by commercial lenders. In addition, debt can be structured with either ADB or International Finance Corporation becoming the “lender of record” (principal lender). ADB’s “complementary financing scheme” is used to share its preferred creditor status; the similar International Finance Corporation program is called “B Loans.” Other possible tools are guarantees provided by government agencies to prevent a forced buyout or (if that proves impossible) to compensate the project at fair market value. In the absence of guarantees, sponsors may seek “comfort letters” that, although they show support to the project, are not legally binding.

Regulatory Changes

A major perceived risk to sponsors and lenders is the possibility of various government agencies making unexpected changes to regulations affecting a BOT project, that could increase costs, decrease revenues, or delay operations. An example of regulatory change might be a decision to increase the quality standards of treated water, which could add to project costs. There is a wide range of changes to environmental, labor, taxation, and pricing regulations that could affect BOT projects.

Sponsors will seek to transfer these risks to local parties since there is very little that the project company can do to manage regulatory changes. This is typically done in the offtake purchase agreement, whereby the purchase price of treated water is adjusted to compensate for increased costs and operational delays caused by unforeseen regulatory changes. The term of the concession can also be extended to provide the project company with additional revenue to offset these costs.

Contract Enforcement

The ability to enforce various contracts underlying a BOT agreement is of fundamental importance. While the PRC Government has made great strides, the actual enforcement of contract law appears to vary among provinces and cities. Sponsors may seek the transfer as much as possible of this risk offshore, to a jurisdiction with a history of enforcement of contract law.

Bidding and Negotiation Risk

The costs for the project sponsors in identifying a BOT opportunity and investing in proposal preparation can range from 3 to 5 percent of the project cost because of the extensive legal, technical, and financial assessment required. Equity structuring can minimize to a certain degree the risk by increasing the number of equity providers in order to spread development risk and increase capital for contingencies. Incorporating local parties into the sponsorship team can facilitate approvals of local contracts. Risks related to the competitive bidding can be mitigated through designing the competition process to international standards.

In terms of project award, local governments face two options. The first is to negotiate with a single proponent, therefore foregoing the benefit of alternative proposals. The second is to pursue a competitive bidding but hope to induce the best proponents to bid. Governments in the PRC must recognize that BOT is gaining favor worldwide, not only in developing countries, resulting in increased international competition to secure the most experienced sponsors for water projects. Few sponsors will waste time and money on bids that are not solicited and evaluated with fairness and transparency. Properly designed competitive bidding can transform procurement into a more controllable risk.

Interest Rate Changes

In the PRC, sponsors are subject to interest rate risk in two ways. They will attempt to structure as much debt as possible in local currency, since most of their capital costs will be incurred locally. However, their access to domestic credit may be limited, and domestic interest rate fluctuation is of concern. The foreign portion of project debt can be arranged in single or multicurrency loans from a single bank or syndicate. Multiple currencies carry divergent interest rates; thus, due diligence by sponsors

and their advisors is essential in determining the optimal mix of foreign currencies to minimize risk of interest rate changes. Loans with floating rates can be used for the debt tranches in project financing; reasonable interest rate assumptions are critical to proper financing. Methods to minimize the risk in interest rate changes include hedging tools such as interest rate future contracts, caps, and swaps.

Price Movements

Important price movements concern raw water and, to a lesser extent, construction material and labor. This latter risk is most often handled through contingencies applied against unexpected cost increases. For risk of movements in raw water price, sponsors will seek long-term, fixed-price supply contracts from local governments and their water resource agencies, or may seek covenants in the offtake agreement seeking price adjustments or extensions to recover unexpected increases.

Inflation

Given the volatility of inflation in the PRC in recent years, sponsors will seek provisions in the offtake agreements to review prices regularly and either to effect increases according to prevailing rates of inflation or to prolong the concession period.

Payback Period

A principal factor underlying most financial risks in water supply BOT projects is the long payback period (often 20 or 30 years) compared with other forms of infrastructure. If tariffs were increased to market levels, sponsors could recoup their investments more quickly and BOTs would revert to government ownership much sooner.

Currency Risks

Sponsors and lenders have long been concerned with the convertibility of local currency, availability of foreign exchange, and possible restrictions on remittance offshore. The PRC is making considerable progress in moving to partial and full convertibility and in making foreign exchange available on swap and interbank markets. At present, given PRC foreign

exchange reserves, there is not much worry over currency risk. Should this situation change, sponsors can employ partial risk guarantees from ADB, the World Bank, Export Credit Agency and Multilateral Investment Guarantee Agency insurance, and foreign exchange derivatives as risk management tools.

Raw Water Supply

About 77 percent of urban water in PRC is obtained from surface sources with the remainder coming from groundwater. Agricultural run-offs and industrial effluent (particularly around urban water intakes) are polluting many surface sources; groundwater sources are also being contaminated. Despite efforts by the National Environmental Protection Agency and the local environmental protection bureaus, water quality appears to be deteriorating, which poses a risk to project sponsors. Deteriorating raw water quality may increase costs associated with high treatment or improvement to the treatment facilities, both of which can affect the financial viability of a project.

Availability of raw water supply, particularly in the north and northeast, where many of the cities are suffering severe shortages, is a concern as are the competing demands for raw water, and the risk of raw water being diverted to other uses and locations. Local governments and sponsors should comprehensively ascertain the probabilities of raw water supply for their BOT projects. Sponsors may seek guarantees of supply from water resources bureaus. Incorporating upstream water diversion and intake projects into a water treatment plant project is another possibility, although it will increase costs with consequent impact on the pricing of treated water.

Valuation of Local Assets

A final, major, uncontrollable risk for the sponsors is the valuation of local assets including land-use rights. While traditionally these are the responsibility of local administration bureaus, sponsors may find independent market appraisal to be helpful. There have been instances in other industrial sectors where central agencies have declared local valuations inadequate, requiring renegotiations. Sponsors may seek central approval of fixed asset valuation prior to finalization of local agreements or include a covenant in the offtake agreement to compensate them for the additional costs incurred through revaluation.

Controllable Risks

Sponsor Commitment

Given that the operational success of a BOT project rests largely with the project sponsor, both local governments and lenders will seek to maximize the sponsor's commitment to the project. The most effective tool for ensuring sponsor commitment is for local governments to provide adequate financial incentives. Lenders will also review the equity structuring to ensure sufficient cash investment has been made by sponsors. They will seek sponsors to commit support loans and/or standby credit facilities to cover unexpected events, complete pledges of project assets, and agreement of sponsors to lodge payments from offtake purchasers in an offshore escrow account until debt is fully retired.

Sufficient Financing

Before signing a BOT agreement, local parties will seek assurance that sufficient equity and debt financing has been secured. This will require due diligence from local governments through financial advisers. One of the biggest problems is obtaining debt financing to extend through the BOT project period. Since foreign commercial banks usually extend loans only for seven to ten years, this leaves a debt maturity gap that must often be filled. A useful tool for managing this financing risk is a "partial credit guarantee" from ADB or the World Bank, which provides lenders with the confidence to extend debt maturity periods. Although these require counter-commitments from Central Government, multilateral guarantees greatly improve the chance of obtaining sufficient project financing.

Creditworthiness

Although debt financing relies on revenue streams from the project, lenders will pay close attention to the creditworthiness of sponsors and assess the expertise, experience, reliability, and financial strength of the sponsorship team and its contractors. Lenders receive tangible demonstration of this creditworthiness through standby credit facilities, support loans, and asset pledges. The sponsors will also need to establish the creditworthiness of offtake purchasers.

Effective Market Demand

Demand risk should be assessed by independent advisers to ensure there will be sufficient demand for treated water throughout the BOT period and that consumers can pay, or that subsidies are realistic and sustainable.

Willingness to Pay

In addition to the ability to pay, consumers must be willing to pay for treated water. Recent research in 43 cities across PRC indicates that, on average, households spend less than 1 percent of their total expenditures on water (ADB, 1996b), which suggests heavy municipal subsidy.

Predatory Competition

Sponsors and lenders may perceive a risk, however small, that water supply companies might eventually construct a competing intake and may seek guarantees from local government that this will not occur unless demands exceed the supply capacity of the project. Some may also seek contractual commitments precluding such competition, or the right of first refusal to develop this capacity.

Delay in Approvals

Delays represent a significant risk to both sponsors and lenders, since revenue cannot occur until the offtake agreement becomes effective. Sponsors may seek guarantees from local governments or provision in the offtake agreement to compensate them for the costs of delays.

Construction Delays and Cost Overrun

Proper due diligence and competition in selecting contractors are ultimately the most effective tools for mitigating construction risk. Most water supply BOT projects in the PRC are likely to be implemented on the basis of a turnkey, fixed-price contract. Penalty provisions can also be included in construction contracts for specified events, including contractor error that delays construction. Subcontracts to suppliers should be fixed price and include penalty provisions. Contractors should be required to provide

third-party performance bonds to sponsors (assignable to lenders) for which payments are secured against nonperformance.

Technical Failure and Quality of Facility

Technical failure can occur at any time after commissioning. Performance bonds (failure attributable to the contractor) generally extend for several months or years after completion, and equipment failure is covered by warranties. However, both of these tools expire quickly relative to the length of a BOT project, and the risk of technical repairs and replacement needs to be absorbed by the project company through operating contingencies, standby credit, and support loans. Sponsors may also build replacement contingencies into their life-cycle pricing of the overall project.

Operational Performance

Local governments and water supply companies will be anxious to ensure that the completed facility delivers the promised volume of water of the standard agreed in the concession contract, while sponsors and lenders will obviously want to ensure that performance standards measure up to those set in the offtake agreement. Usually operators must provide performance bonds. The project company and local governments can monitor the operator's progress through inspection programs. Lenders will have their debt secured by mortgage, asset pledges, and offtake escrow accounts; however, they may also institute their own periodical inspection programs.

The risks enumerated above are likely to exist in varying degrees in most water supply BOT projects in the PRC. Two patterns in the management framework need to be emphasized. The first is that full disclosure of all pertinent information to all parties is common as a management tool for all "controllable" risks. The second is the strong prevalence of contracts as allocative tools for managing "controllable risks," suggesting that contracts need to be very carefully prepared and completely understood by all parties. For local governments in the PRC, this will require new specialized legal and management expertise at the municipal level.

CONCLUSIONS

CJV or BOT?

CJVs have proven themselves to be viable vehicles for direct foreign investment in water supply in several cities across the PRC. However, the question arises whether CJVs are being used because they are an inherently effective vehicle for both local and foreign parties, or simply because there is no other present alternative. CJVs are solely negotiated, and there is no framework to protect investors or local governments from misinterpretation or abuse of the offtake and concession agreements. CJVs are also expected to come under much closer scrutiny from central authorities as the PRC tries to control inflation and manage foreign exchange. Despite these and other concerns, CJVs work well when structured properly with real commitment. The main inherent limitation, however, relates to the capital financing base: few water supply projects requiring investments over \$30 million can, at present, be handled only through foreign equity and corporate debt, without project financing.

CJVs have a distinct niche in smaller water supply projects that BOT will find difficult to fill. Sponsors of projects costing under \$100 million will be hard pressed to find non- or limited-recourse financing in today's debt markets. BOT projects are designed for larger projects that the financing structure of CJVs simply cannot accommodate. Accordingly, the most appropriate regulatory response is not to limit or forbid CJVs, but to adjust their structure and mandate in order to respond to the concerns of central economic agencies.

Structuring Water Supply BOT Projects in the PRC

Since water supply BOT projects are relatively new in the PRC, the opportunity exists to avoid some of the problems that have occurred with BOT in other sectors and in other parts of the world. An important issue for foreign sponsors is the basis of compensation offered in a BOT. Given the growing competition around the world for the attention of relatively few internationally experienced operators in this sector, the PRC will need to ensure that the basis of compensation offered in its BOT is at least as attractive as in other countries.

Another important issue that must be addressed is how to structure projects so that they can attract international project financing. Two options are proposed. The first is to enlarge the project size by including investments in the intakes, water treatment plants, and distribution networks in order to raise the investment levels to the critical mass required by project financiers. Central agencies should review the experience of other countries in involving foreign investors in the distribution networks. One advantage, if structured properly, is that foreign investors would have a strong incentive to ensure that distribution networks are properly maintained with minimum leakage.

The second option is to pool small and medium-sized projects into single, large portfolios that can attract project financing from international debt markets. However, this raises many difficult institutional questions. Who should be responsible for pooling these projects, government or foreign investors? Which mechanisms can ensure balance among the projects and coordination of their implementation? Who will finance the development and management costs of this pooling?

Decentralization

The upcoming BOT decree and model contracts could be extremely useful in attracting foreign interest in the water sector in the PRC. However, there is a wide divergence of market conditions, and technical and managerial skills in the PRC. The sheer number of cities and consumers creates immense logistical difficulties for central control and management of local water supply BOT projects. Means must be found to decentralize control within a regulatory framework acceptable to the Central Government.

Attracting Foreign Investors

There is a general perception among financial investors that return from other sectors such as power, telecommunications, and transport are much more financially attractive than from water. As investors move their money to where they perceive the greatest opportunities to be, means must be found to communicate to foreign investors that there is money to be made in the water sector in the PRC.

Capacity-Building and Institutional Development

There is an overriding need to develop managerial, professional, and technical capabilities at the local government level. Testing of mechanisms for BOT delivery is required. Extensive training of local officials is also required in the rationale for and structure of BOT, in conducting assessments and BOT project preparation to international standards, in designing and implementing fair and transparent international competitions for BOT projects, and in negotiating BOT agreements with foreign companies. Research, analysis, and dissemination of findings on problems and opportunities inherent in the BOT approach will also be needed.

Possible Roles for International Agencies

There is a growing pool of experience and knowledge in BOT within the ADB, the World Bank, United Nations Industrial Development Organization (UNIDO), and some bilateral aid agencies that can be applied through technical assistance in (i) structuring water supply BOT projects, (ii) pooling water supply projects into portfolios for project financing, (iii) developing international programs for promoting foreign investment, and (iv) training and human resource development in most aspects of BOT. Multilateral and bilateral agencies can also finance the preparation of BOT projects or even fund equity investment in BOT companies (perhaps CJV as well) through development financing institutions. The partial credit and risk guarantees currently offered by ADB and the World Bank could be also useful for water supply BOT projects in the PRC, although the possibility of reducing or eliminating sovereign counter-guarantees needs to be explored.

BOT is one approach to delivering water supply infrastructure. They are complex, carrying a wide range of risks and requiring sophisticated forms of financing that are still relatively new in the PRC. Nevertheless, experience in other countries has shown that BOT does work in delivering safe water to consumers at a price most can afford. The applicability of this approach in the PRC will depend on the economic costs and benefits of this approach compared with other forms of infrastructure financing, and the degree to which foreign investors are willing to take on water supply project risks. Governments, at both central and local levels, can assist in this process by minimizing those risks over which they have control.