PART II

THE REGULATORY FRAMEWORK FOR PPP IN WATER INDUSRTY

Study on Government Regulatory Framework in Water Sector

Part I: Activities and Summary in the Study

1 Introduction

1.1 Project Overview

In order to assist the government of the People's Republic of China (PRC) with its ongoing policy reform in urban infrastructure financing, construction and operation, the Asian Development Bank (ADB) created the TA NO. 4095: Policy Reform Support (TA). Pricewaterhousecoopers (PWC), in association with Tsinghua University has been contracted by the ADB and the MOC to provide consultancy services for the technical assistance project.

Through the ADB's process of selecting consultants, one international and two domestic consultants have been retained to conduct the TA.
The overall objectives of the TA are: (i) to provide a quick response mechanism that allows ADB to react quickly to support policy reform initiatives at a time when the Government is ready to deal with the issue; (ii) to stimulate discussions of policy reforms that will have major implications for the PRC's transition to a market economy; and (iii) to analyze and address the main problems in the marketizatoin process of public utilities and to promote the establishment and implementation of the Public Private Partnership (PPP) approach in Water Sector.

The scope of the TA includes three parts: (i) Part I: Drafting the working paper on key issues/constraints and Recommendations; (ii) Part II: The Government Regulatory Framework for PPP in Water Sector; and (iii) Part III: Organizing an international seminar to discuss the TA Findings.

The outputs of the TA are: (i) to accomplish a working paper on the key issues of private investment in China water sector; (ii) to accomplish a study report on government regulatory framework in water sector; and (iii) to propose the recommendations on the regulation for concession management of urban public utilities issued by the MOC.

1.2 Objectives of Domestic Urban Infrastructure Expert

The study objectives of the domestic urban infrastructure development expert include:

(i) To assist other experts with preparing the working paper on the key issues of PPP in China water sector, highlighting the major problems like lack of competition, technology standards, clearly-defined mechanisms and instruments to ensure the investment efficiency, entrance barriers, and local monopoly and protection.

(ii) To develop the Government Regulatory Framework in Water Sector to promote the implementation of private investment and PPP.

(iii) To cooperate with the domestic BOT expert for proposing the comments and recommendations on the concession management of urban public utilities. and

(iv) To exchange and discuss with the international experts and resource persons based on the TA findings. To draft a concise policy note in Chinese that could be submitted for consideration of relevant government authorities for promoting the private sector participation in the urban infrastructure development.

1.3 Structure of the Report

This report is structured in three parts:

- Part 1 summarises the activities during the TA study, including the project overview, phase meetings and survey activities.
- Part 2 describes the detailed work findings and outputs for the TA study, including the development background of China urban water sector, the review of existing policies and statues in water sector, the findings of government regulatory framework in water sector, the change of governments' role and responsibilities, the findings of the reform of property rights in China urban water sector and the models of financing for urban water sector.
- Part 3 summaries the findings of cases study, including the Chengdu No.6 Water Supply Plant, Shanghai Zhuyuan Sewerage Treatment Plant and Xuzhou Sanbahe Sewerage Treatment Plant.

2 Activities Summary

2.1 Phase Meetings

The TA kick-off meeting among the ADB, the MOC and the TA consultants was held on March 8, 2004. The MOC introduced the recent development and ongoing work in the urban infrastructure construction of China, mainly focus on the development of urban water sector, the process of promoting the investment by market principles and the study on the changes in government functions in terms of the marketlization. The MOC expected the TA outcomes could assist China government to establish a regulatory framework to push the PPP development in the marketlization of urban infrastructures. The ADB accepted the comments of the MOC, and emphasized the TA scope should accord with the TA overall objectives and the need of policy reform for China urban infrastructures. The MOC also required the TA consultants to propose

the comments and recommendations on the ordinance of concession management for public utilities, as should be included in the TA scope.

The delay in recruitment of consultants was due to the SARS breakout in 2003. The TA program has therefore been rescheduled and will be completed in September 2004.

Considering the urgency of the TA, a TA Inception Tripartite Review Meeting among the ADB, the MOC and the TA consultants was held on May 19, 2004. The three parts discussed the activities and interim process of the TA. The meeting detailed the consultants' scope and confirmed the final outputs.

On July 1, 2004, a review meeting between the MOC and the TA consultants was held again to detail the contents in the final outputs.

2.2 Case Studies

In order to take a further view of current marketlization development of China urban water sector, several typical cities, such as Chengdu, Shanghai, Shenzhen and Xuzhou, were selected for the case studies. Furthermore, a forum on the marketlization reform of urban water sector was organized in Chengshu, Jiangsu Province.

The field investigation in Chengdu and Shanghai lasted for 5 days from April 8 to 12, 2004. Our work group organized relative forums in the two cities respectively. The persons from relevant sectors were invited to attend the forum and to discuss the development of local urban industry, the institutional arrangement and related policies and regulations, including the local Bureau of Construction, the local Water Authority, the local commission of development and reform, the local Bureau of Pricing, the local Water Supply Plant, the local Drainage Sector and the Association of Urban Water Supply and Drainage. The work group also went to Chengdu No.6 Water Supply Plant and Shanghai Zhuyuan Sewerage Treatment Plant for the first-hand investigation.

The field investigation in Xuzhou lasted for 2 days from May 28 to 29, 2004. The work group interviewed the concerned person from Xuzhou Municipal Administration Bureau and Xuzhou Environmental Protection Bureau respectively. Therewith, the work group visited Xuzhou Sanbahe Sewerage Treatment Plant and took a discussion with the rector of the invest sector, Xuzhou Qiangyuan Company (a private company).

The field investigation in Shenzhen lasted for 3 days from June 16 to 18, 2004. The work group contacted with Shenzhen Water Authority and Shenzhen Water Group respectively for detailed talking and discussion. The discussion mainly focused on the reform of the property right of Shenzhen Water Group and the implementation of the government regulatory policy.

In order to ensure the investigation efficiency and validity, the work group made a well preparation for each investigation arrangement. The work group submitted the question list to local relevant sectors before the field survey, as made the

investigations more efficient. Based on the understanding of the first-hand materials and documents, the work group developed main findings as following:

- To conduct a comparison research among the investigated BOT Water projects, including Chengdu No.6 Water Supply Plant (which is the first water BOT project approved by the National Development and Reform Commission), Shanghai Zhuyuan Sewerage Treatment Plant and Xuzhou Sanbahe Sewerage Treatment Plant. To analyze and evaluate the main problems existing in normative BOT water projects.
- To gain a deeper insight and overview on the existing operation mechanism of urban water sector by the field investigations.
- To help the experts gain a further understanding on the current problems and restraints in the marketlization of urban water sector. To propose the feasible recommendations for the government method of concession management.
- To help the expert make a better analysis and identification on the priority field of government regulation for water sector, and develop an operable government regulatory framework.

The main outcomes of case studies are summarized in Part 3 of this report.

Part II: Study Report on Government Regulatory Framework

1 History of the Development in China Urban Water Sector

1.1 The characteristics of Urban Water sector

Urban Water sector directly influences and controls the three major factors of the social development: public health, social stability and economic growth. Different from the other common competitive industries, the urban water sector possesses some extinguished characteristics, which determine the regulatory role and responsibilities of government in water sector.

- The natural monopoly of operation Forms

In economics, the natural monopoly is defined in terms of the weak additivity of cost, which means that the total costs for definite outputs produced by the single enterprise are less than the ones produced by the multiple enterprise under the situation of single product; or the total costs of the total definite amount of the multiple produced by the single enterprise produces are less than the ones produced by multiple enterprises under the situation of multiple products. The service characteristic of urban water sector is natural monopolized because it is such a service sector based on the pipes network system.

- Water sector is the basic condition for the public health

Water is an important environmental resource for living, also is one of the most basic conditions for surviving and developing the human society can depend. The development of urban water sector is closely linked with the public health; therefore, the main mission of urban water sector is to provide eligible service for the public.

- Urban water sector provides quasi-public goods for the public

Urban water supply is a kind of quasi-public goods and has three basic characteristics: (1) partial exclusivity, such as the decreased water pressure in water stress, and the water supply scheme by time and regions; (2) limited non-competitiveness, for instance, any water consumer doesn't impact the others within a certain consumption capacity, but the contest for water will appear instead of the non-competitiveness in water use in case the consumption amount exceeds the critical point; and (3) disequilibrium of consumption amount, for instance, the acquired effective water amount for each water user is different. Therefore, water supply, as quasi-public goods, could be priced and the economic subjects could make choices and decisions for production or consumption in terms of the market principles and the actual demand. The economic subject would produce and provide the product as long as it is profitable; thus, it is possible to introduce the private sector to provide the product or service by applying the market mechanism.

- Low recompense of investment

Due to the water sector is natural monopolized and quasi-public goods, the government must strengthen the regulation on return of investment, especially on the price regulation based on the costs. The government has to restrict the return of investment in water sector to make it in a low recompense of investment. However, the hidden high profits are promoted by the intensified competition within the marketlization reform.

- High risk in policy

Lack of a perfect legal system on water sector increases the policy risk. The existing policies on water sector are changeable and the recompense of investment largely depends on the human factor. Meanwhile, the long duration of concession contract in water sector also increases the policy risk greatly.

- Indispensability and low-alterability

With the growing development of the social economy, especially the progress of industrialization, modernization and urbanization, the product and service of urban water supply sector has already been an indispensable necessity for human living, and also an essential input factor for most of the enterprises. The operators of the water supply enterprises have responsibilities to provide all users the basic water service in the served areas. The water providers must supply the users water service with the unified charge though the water supply costs may be different in terms of the regional difference.

- High stabilization of the operating return

Water is a necessity for public. Therefore, the profits of water enterprises would be stale and the cash flow for enterprises is well as long as the water service forms.

- Highly dead and specialized capital in water sector

The operation and served areas of the urban water sector must depend on the pipe network, as decides the specialized investment of pipe network and results a large dead capital. It means to build redundant pipe network in the same region is low efficient because the cost for multi enterprises to operate the pipe networks competitively is to result in a tremendous dead cost.

- Low demand elasticity of products

Due to the essential and non-alterable characteristics of the water product, the price change has little influence on the demand.

- Evident regional limitation and difference

Limited by the urban scale and the pipes network of water supply, the urban water sector has an evident regional limitation. It is difficult to build a national level pipes network crossing several cities. Furthermore, the supply-demand situation and service level of urban water supply in different cities would vary because of the city scale, the level of economic development, the level of urbanization, the government financial

ability, the consumption level of residents, the operation and management capacities of water supply enterprises, and the resource condition.

1.2 Objectives of Urban Water Sector Management

The government regulatory department should set up a clear-defined target of sector management in terms of the new situation within the marketlization of urban water sector. With the changes of the construction subjects and management subjects happening in urban water sector, the management functions of government regulatory department will also change as well. In general, the overall objectives of urban water sector management should include as following:

- To match the requirements of the watershed management and environmental management better;
- To achieve the benefit of scale economy of operating the water enterprises;
- To increase the efficiency by introducing the competition mechanism;
- To meet the social, political and economic outputs by introducing the commercial skills
- To increase the investment by broadening the financing channels

1.3 Background of the Marketlization of China Urban Water Sector

With the rapid development of urbanization, China has made a remarkable progress in constructing urban water infrastructure. By the end of 2003, 275 of all Chinese cities have established 612 wastewater treatment plants (WWTP). The total treatment capacity is 42.5million m^3/day, and the treatment rate is 42.38%. Not only the number of the WWTPs increases, but also a great progress has been made for the technological level and treatment quality. About 80% of existing WWTPs are secondary or tertiary treatment plants.

Nowadays, the central and local governments are exploring and deepening the internal reform of enterprises in urban water sector. At present, the industrialization and marketlization reform of China water sector has been listed in the governments' agenda. Therefore, the marketlization of the urban water sector is an inevitable choice for China urban water management. The development background of marketlization in China water sector would be discussed as following:

Viewed from the political aspect, the marketlization reform has been propelled overall in China and the governments are withdrawing from the field of asset operation and management in general. Together with deepening the marketlization reform, the Third Session of the Sixteenth Central Committee of the Party claimed to open the market of public utilities and to allow the social capital investing in the public utilities sector

in order to meet the demand of national economic and social development and to achieve the tertiary phase reform goals. Furthermore, the Third Session also claimed to broaden the market approval for monopolized sectors and to introduce the competition mechanism. In this case, China urban water sector, the core component of urban environmental infrastructure, is facing a revolutionary reform and the strategies on industrialization and marketlization of water sector have been listed in the governments' agenda and substantially taken into practice.

Viewed from the international development aspect, it is the government or public utilities department that provides wastewater treatment service traditionally and it is the public institutions that take charge of the construction and operation of water sector in general, even in many developed countries like US. However, the development of commercialization in water sector is given a strong impetus and the marketlization is still the mainstream of the development of international water sector.

Viewed from the policy aspect, the State Council, the National Development and Reform Commission (former State Development Planning Commission), the MOC and the EPA have already issued a variety of policies and documents to promote the industrialization and marketlization reform in water sector. Some of provinces and cities also have issued the corresponding documents. Yet there is not any legal document on the reform of China water sector and the existing policies are lack of systematicness.

Viewed from the sector development aspect, China has a tremendous investment demand on constructing and updating the water facilities with the rapid urbanization during the past years.

Viewed from the financial aspect, local governments are the main investors of water sector during the past two decades, but the governments are facing a great capital gap and short of enough effective financing channels for the construction in water sector. Meanwhile, a great amount of social capitals have no credible access to invest in water sector. Therefore, the promotion of marketlization reform is hopeful to address the financing and investing problems in China urban water sector.

1.4 Analysis of the Resistance Factors in the Marketlization of Water Sector

1.4.1 Conflicts between the New and Old Institutions

The marketlization is a revolutionary reform for China urban water sector, and it is critical to create an adaptable institution and to convert the subjects and their responsibilities. The interest groups of traditional institutions always impede the reform process as well as in water sector. In order to promote the process of marketlizaton of water sector, the relevant central ministries and commissions have issued corresponding policies to separate the government functions from the enterprise management. However, the local construction department and traditional

water enterprises, the interest groups in traditional water sector, are blocking the progress of marketlization. For instance, the MOC has transferred the power, but the local construction departments have not yet separated the government functions from the enterprise management.

1.4.2 Power Balancing within Different Actors

Contending for power & profit and lack of clarified responsibilities for water agencies are the major problems of management system in China water sector. Some of the strategies conducted by the departments of water resource management, which protest the centralized management approach and are expanding the right in water management, have impeded the marketlization process of water sector. During the changes of management functions in water sector, the Ministry of Water Resource (MOWR) takes charge of the water resource management and holds major rights in water management. Within the marketlization reform of water sector, the MOWR plans to expand its influence to the field of water industries like urban water supply to contend more power and profits. Moreover, the MOWR has set up water corporations in virtue of the privilege in water management to compete with others, as contravenes the market competition principles. The contention for power and profits among water agencies, which is a severe exhaustion by internal strife, has hindered the water market to develop in a well way.

1.4.3 Public Protestation to the Increased Water Price

Within the marketlization process of water sector, “water” is not the traditional “public welfare goods” but the “commodity goods”; therefore, the adjustment of water price is an important part in the marketlization reform. The major problems in existing water price policy include: the water price is too low to cover the cost; and the income of current water charge could not sustain the basic return of investment in water sector. Nowadays, the reform of water price mainly focus on the adjustment within the 4 elements of water price, and the water resource tariff will be a kind of taxation which would not be brought into the public hearing system.

Furthermore, the collection of wastewater treatment charge will be implemented gradually in all cities. By 2002, the highest charge standard for wastewater treatment within the cities that have conducted to collect the wastewater treatment charge is 1.15 RMB/ ton which could cover the pull cost, practiced in Suzhou City and Changzhou City; the lowest standard is only 0.10 RMB/ton, which is much lower than the operation cost, practiced in 14 cities including Ningbo City and Nanchang City. The charge standards of urban wastewater treatment in 2002 are shown in table 1.1, and the collection rate in 2002 are shown in table 1.2.

Table 1.1 Charge Standards of Urban Wastewater Treatment in 2002

Charge Standard	<0.30 RMB/ton	0.30-0.50 RMB/ton	0.50-0.70 RMB/ton	>0.70 RMB/ton
Numbers of cities	112	80	17	10
Percentage	51.1%	36.5%	7.8%	4.6%

Table 1.2 Collection Rate of Urban Wastewater Treatment in 2002

Collection Rate	<30%	30-50%	50-70%	70-90%	>90%
Numbers of cities	16	31	56	69	40
percentage	7.5%	14.6%	26.4%	32.6%	18.9%

As mentioned above, to increase water price is imperative under the current water price level much lower than the cost. However, the reforms of water price encounter different degrees of public protestation in various cities.

1.4.4 Theoretical Disputes on the Marketlization

So far, there are different disputes both in the theoretical and practical field on whether the marketlization reform of water sector is effective and applicable for China urban water sector. Therefore, it impacts the decision of part of local governments.

2 Existing System of State Policies, Rules and Regulations

Looking through the development histories of urban water marketlization around the world, solid rules and regulations have been the necessary premises of success. The state policies are essential in guiding and directing the development of urban water sector, investment of private capital. It is therefore quite necessary to establish and improve corresponding system of roles and regulations for boosting the water sector marketlization.

2.1 Overview of Sector Policies, Rules and Regulations

Together with the development and deepening of the state economic reform, primary consensus from the central to local governments has been formed towards the marketlization of urban water sector, and a series of policies at various levels have been deployed to boost the process.

2.1.1 Central Policies, Rules and Regulations

In order to accelerate the marketlization of urban infrastructure, the State Council, the National Development and Reform Commission (former State Development Planning Commission), and the Ministry of Construction etc. have jointly issued a series of related rules and regulations, which have accelerated the unification of consensus of

local governments and the public towards the reform of urban water and solid waste sectors. Some representative documents are as follows:

- "The Circular of Enhancing the Water Price Reform, Saving Water and Protecting Water Resource" by the General Office of State Council (No. 2004-36)
- "The Administrative Method of Urban Utilities Concession" by the Ministry of Construction, effective from May 01 2004.
- "The Ordinance of Supervision on China Urban Water-Supply Quality" by the Ministry of Construction, March 2004.
- "Circular on Tariffing and Industrializing the Urban Solid Waste Disposal" by the State Council, the State Development and Planning Commission, the Ministry of Construction, and the State Environmental Protection Administration (No. 2002-872)
- "Circular on Further Enhancing the Reform of Urban Water Prices" by the State Development and Planning Commission, the Ministry of Construction, and other three ministries and commissions (No.2002-515).
- "Circular on Accelerating Pre-phase Work on Projects to Boost the Industrialization of Urban Waste Water and Solid Waste Treatment" by the General Office of the State Development and Planning Commission (No. 2002-1451)
- "Advices on Accelerating the Marketlization of Urban Utility Sector" by the Ministry of Construction (No.2002-272).
- " Circular on Strengthening the levy of Waste Water Treatment, Setting up the System of Urban Waste Water Drainage and Pooling Treatment" by the State Development and Planning Commission, the Ministry of Construction, and the State Environmental Protection Administration. (No. 1999-1192)

2.1.2 Local Policies, Rules and Regulations

In terms of local policies, local governments has followed the direction and principal of the state micro-policies and set up practical rules and guidance based on the active study on local experiences. The governments in Fujian, Liaoning, Shangdong and Hainan have issued regulations on pushing forward the industrialization of urban waste water treatment. Shanxi, Jiangsu, and Guangdong have successively come out with the administrative methods on urban waste water tariff and practicing guidance. The municipalities of Jiangsu and Hebei have given their advice on further promoting the reform of urban utilities. Shenzhen, Hebei, and Beijing have issued the Administrative Method of Urban Utilities Concession.

The compliance of local governments has enhanced the marketlization of urban water sector. It has been approved in field researches that the marketlization of urban water sector has been widely accepted.

2.2 Overview of Marketlization Policies

Expanding the financing channels, constructing and perfecting the investment market are the fundamental tasks in commercializing the urban water sector. It was pointed out at the Third General Meeting of the Chinese Communist Party that the public utilities are encouraged to be open to non-governmental capital. This was regarded as the prelude of the reform of investment in water market. In order to boost and regulate the openness and development of the investment in this market, the central government has successively issued a number of rules, some of which related to urban water sector are the follows:

On May 27 2000, "The Temporary Rule on Foreign Investment in Urban Utilities" was issued and put into force by the Ministry of Construction, on the purpose of regulating the loans from international financial institutions and foreign governments since the mid-1980s, and the BOT hotness since the mid-1990s.

In December 2001, the former State Development and Planning Commission issued "Some Advice on Improving and Guiding Private Investment", stating that "…encourage and guide private-capital's participation in water supply, waste water treatment, solid waste treatment, and construction of roads, bridges and other infrastructure, in the form of sole ownership, joint-venture, partnership, shareholding, concession etc…". This was the first document that explicitly attracts non-governmental capital into water sector.

On March 4 2002, the former State Development and Planning Commission, the former State Economy and Trade Commission, and the former Ministry of Foreign Economy and Trade jointly issued new "Guidance Catalogue of Foreign Investment Industries", which took effective on April 1 2002. Foreign investment, thereafter, has been allowed to participate in the construction and operation of urban water supply plants, waste water treatment plants, solid waste treatment plants, hazardous waste treatment plants (incineration and landfill), and other environmental protection facilities. The biggest outbreak was that the construction and operation of water pipeline network was first listed in the category of limited foreign investment.

On September 10 2002, the Ministry of Construction, the State Environmental Protection Administration and the former State Development and Planning Commission jointly issued "Circular on boosting industrialization of urban waste water and solid waste treatment", which ascertained the direction of industrialization as follows: reform the pricing mechanism and administrative system, encourage all types of economies to participate in the investment and operation, and set up the investment, finance, operation, and administrative system adapted to the socialist market economy, in order to get investors diversified, operating identities to become

enterprises, and operation and management commercialized, which in turn comes out with an open and competitive status.

On December 27, the Ministry of Construction issued “Circular on Accelerating the Marketlization of Urban Utilities”, encouraging private and foreign capital to participate in the construction of urban utilities in the form of sole ownership, joint venture or partnership etc. In constructing operating urban utilities like water supply, waste water treatment, and solid waste treatment, public tender offering should be employed to get the investor. Companies in other regions or other industries are allowed to enter into urban utility business. Concession is awarded to the operating company by the government through public tender offering in the fields of water supply, public traffic, waste water treatment, and solid waste treatment.

In May 2003, the National Development and Reform Commission issued the “Circular on Perfecting the Current Investment to Boost the Economy”. And thereafter on May 21, a TV & Telephone meeting on the same topic was hold, stating that “Domestic non-governmental capital may enter all areas that foreign investment is allowed to enter, except those otherwise regulated”.

It is obviously from the above documents that the issuance of such rules with repeated content has demonstrated the government’s will of opening the water market and strengthening the confidence of both domestic and foreign investors. Of course, as urban water market inherently has the nature of monopoly, which is distinctive from other common competitive sectors, the government should take the role of supervision to protect the interest of the public. The administrative method of concession is a key way to supervise the companies.

2.3 Analysis of Other Related Policies

2.3.1 Abolishment of Fixed Return

2.3.1.1 Overview

In the very beginning of opening water market, local governments used to guarantee the fixed rate of return to lower the investment risk in the purpose of attracting more foreign investment. This policy did bring more foreign investment into the water sector in the form of BOT. The issue of fixed-return could be discussed based on the development of China’s financial market. During the mid-1990s of last century, the domestic banking interest rates were relatively high, which justified the prevailing investment return levels of more than 10% at that time. However, as the financial market has been progressing gradually, which has brought the investors more financing channels and lower interest rates, the historical high rates of return become abnormal. The government therefore issued some rules to prevent such “fixed return” projects.

In 1994, the former Ministry of Foreign Economy and Trade issued "Circular on Some Issues in Attracting Foreign Investment through BOT", which set the regulations on foreign investment in domestic roads, railways, telephones, waste water treatment etc. It is specified in the Circular that BOT projects with foreign investment should comply with the related laws and rules, and that the government or affiliated organizations should not make any guarantee in any forms, such as foreign exchange guarantee, loan guarantee, etc.. If the project does need guarantee, permission from the corresponding governmental organizations should be obtained. But actually many local governments promised the "fixed return" to the foreign investors, which later on became the heavy burden to them.

"Circular on Strengthening Foreign Exchange and Foreign Debt Management" was issued by the State Council in September 1998 and later on another "Circular on Further Strengthening and Improving Foreign Exchange Clearance Management" issued in April 2001. Consequently, local governments started to correct and liquidate projects promising foreign investors fixed returns. On September 10 2002, the State Council further issued "Circular on Appropriate Treatment of Existing Foreign Investment Projects with Fixed Returns", requiring that those projects be corrected, acquired, converted, or liquidated. "Correcting" refers to canceling or modifying the fixed return term in original contracts. "Acquiring" refers to that Chinese investors may acquire the stake hold by foreign investors at fair prices. "Converting" refers to converting the initial foreign investment into foreign debt based on reasonable conditions. "Liquidating" refers to terminating the initial contracts and according to relevant laws and regulations liquidating the project companies, which suffered heavy loss or can not continue their businesses.

2.3.1.2 Legal Disputes Regarding Fixed Returns

During the abolishment of fixed return water projects, quite a few disputes arose between the governments and foreign investors. Some of the used-to-be active foreign investors evacuated the Chinese market, like Hong Kong Guotai International. The recent fairly hot case of Changchun Huijin has not come into final conclusion yet.

2.3.1.3 BOT Projects are NOT Fixed-Return Projects

The State Council required three times from 1998 to 2002 that fixed return projects be abolished and no foreign capital invested projects be allowed to promise fixed returns. This did impact some BOT projects in the water market. However, no laws or rules have specified the exact definition of "fixed return" or its legal judgement, which therefore has caused obstacle, disputes, and confusion to the work.

For current BOT projects, the governments often guarantee the investors the minimum capacity of water, which is legally called "Pay without Negotiation" or "Take or Pay" term. The corresponding prices are also stipulated in such BOT contracts. The guarantee of certain capacity and price raises the dispute on whether

BOT projects fall into the category of fixed returns. Changchun Huijin waste water treatment project was a latest typical case reflecting this dispute.

As a matter of fact, real case of urban water projects with fixed return does exist. Beijing Holding, one of the Hong Kong listed companies from the Mainland, invested RMB1.5 billion to acquire the concession of operating Beijing No 9 Water Plant (First Phase) with a contract-specified rate of return at 14%. Beijing Water Co., Ltd. is still in charge of the construction, operation, and management and Beijing Holding will not be impacted by the eventual result of running this plant.

Studies have concluded that fixed return is a kind of indirect business loan that has fixed interest rate by applying project financing or equity financing. Any other projects should not be treated as fixed return ones. BOT is an internationally accepted project financing model and "Pay without Negotiation" or "Take or Pay" term should not fall into fixed returns. The application of "fixed return" to BOT projects should be strictly limited, otherwise it will be manipulated by local governments in some projects, which in turn will damage the government's reputation.

Of course, Changchun Huijin project had unfair price, which of the water treatment was as high as 0.6 yuan per ton. But this could be settled by negotiation. There is no point to abolish BOT projects in the name of fixed return. At present, most of the BOT projects, especially those semi-BOT projects, have some features similar to Huijin Project. Investigation has showed that some governments implicitly or indirectly defaulted in some projects, but the investors have not taken legal actions to solve the disputes. If Changchun Government's default is eventually acknowledged by the law, the marketlization process of our urban utilities will be negatively impacted.

"Pay without Negotiation" and agreement on the price etc. are the key nature and basic assurance of such project financing projects, like BOT projects. Governments should obey the game rule if they accepted this kind of project financing, BOT, otherwise they could have selected other financing tools. Whether the other financing tools have "Pay without Negotiation" or agreed price terms will be directly related to the investment risk and indirectly determine the financing cost.

As far as the two parties in the cooperation are concerned, the key to the success of a BOT project is how to set all conditions during the negotiation scientifically and reasonably. This requires a lot of systematic and perfect preparatory work and experience and professional service institutions should be selected. The government should not transfer to the company the bad result due to its insufficient preliminary work. On the other hand, "fixed return" issue should have brought some thought to strategic investors in urban water market. They should realize that only reasonable and fair cooperation will be long and lasting in the infrastructure area where the government is also on the strong side.

2.3.2 Policies on Enterprise Reforms and Ownership Transfer

Ownership transfer and enterprise reform is a key step in water market commercialization. After the Sixteenth Meeting of China Communist Party, Document (2002)859, issued by the former State Economy and Trade Commission, and Document (2002)313, issued by the Ministry of Finance, gave policy reference and practicing guide to local SOEs (State Owned Enterprises) reforms. The former document offered some practicing guide on settle the abundant labor while the latter raised some regulations on State-owned capital management and financial treatment during enterprise reforms.

The Sixteenth Meeting had an essential adjustment to the State-owned asset management system, where it renders the local governments to play the role of investors. State-owned assets used to be solely owned by the state as a whole the local governments managed them based on different levels. Now the central and local governments can represent the state to act as investors and have the ownership. This has fully suggested that the local governments have been transferred to investors and can determine by themselves whether the affiliated assets should be auctioned or sold based on the allocation of local resources.

December 27 2002, the Ministry of Construction issued “Circular on Accelerating the Marketlization of Urban Utilities”, which was an essential guide on enterprise reform and ownership transfer. In terms of opening the urban utilities, the Circular encourages non-governmental capital and foreign capital to participate in the construction of urban utilities in the form of sole ownership, joint venture, or partnership etc., which can enrich the investment structure. Moreover, companies in other regions or industries are also allowed to enter the urban utilities, which benefits the process of marketlization.

In order to supervise the ownership transfer, besides the above documents, the State Council and its affiliated organizations have issued a series of documents. On November 1 2002, the China Security Regulation Committee issued “Circular on Transfer the Non-tradable Shares of Listed Companies to Foreign Investors”. In November 2002, the former State Economy and Trade Commission and the Ministry of Finance jointly issued the “Temporary Regulation on Reforming the State-owned Enterprises Using Foreign Investment”. On May 13 2003, the State Council issued the “Temporary Ordinance on Supervising State-owned Assets in Enterprises”. On February 1 2004, the State-owned Assets Supervision and Administration Commission issued the “Temporary Administrative Methods on State-owned Equity Transfer”. The detailed content will be introduced in following context.

3 Government Regulatory Framework

In terms of the reform and changes of government functions, the state government claims a guideline as following: economy adjustment, market regulation, public service and social management. Within the market economy, the governments have two major instruments to regulate any sector in the national economy: indirect macro-

control and direct government regulation. Both are government economic behavior and aim to create an objective environment for developing the national economy well. Both are an entity for government economic function, but appear in different aspect.

In principle, the macro-control, which aims to adjust the unbalance between total supply and total demand, refers to an indirect overall control approach. It impacts on the market directly by applying fiscal method and monetary policy while influences the enterprises' performance indirectly by changing the market factors. The government regulation, which aims to improve the efficiency for resource allocation and prevent the market malfunction, vis a vis emphasizes a direct individual regulation approach. It restricts the enterprises' performance by policies and regulations.

Urban water sector is one of public utilities, and it is natural monopolized. Thus, the governments could not regulate the water sector with the common instruments applied in general industries, but need a much stronger regulation and more effective measures.

3.1 Objectives of government regulation

Urban water sector is the basis of public health, which impacts the public interests directly. With the marketlization reform of water sector, the introduction of competition mechanism could improve the efficiency in the whole industry system, as well as it could reveal the market defect that the private sector damages the public interests in order to enlarge their own interests. Accordingly, the government regulation is crucial to reclaim the market defect and guarantee the public interests. The objectives of government regulation include: (1) to set, supervise and enforce the industry standards; (2) to impulse the enterprises to improve the service quality and production efficiency; (3) to respond to the market defect caused by the natural monopoly of water sector; (4) to establish the benchmarking system to promote the development of water market by introducing the comparative competition; and (5) to protect the consumers' interests.

3.2 Major policies for government regulation

According to the characteristics of urban water sector, the governmental regulatory framework in water sector consists of the regulatory policies on approval, the regulatory policies on cost and pricing and the regulatory policies on water quality and water service.

3.2.1 Regulatory Policies on approval

The approval regulation is a common direct regulatory instrument aiming at the natural monopolized sector, including the entry approval and the withdraw approval.

The *entry* refers to an enterprise starts to product or to provide service in a new business field; on the contrary, the *withdraw* refers to an enterprise stops producing or providing service and leaves the specified market. In general, the governments approves the enterprise to enter a market in two ways. One is an approval regulation on the common industries, such as the registration system; the other is a peculiar approval regulation on special sectors, like the concession management system on the natural monopolized sector. Furthermore, the regulation of withdraw is mainly applied for the natural monopolized sectors. The governments restrict the enterprises to withdraw from the market in order to ensure an effective supply for the special commodity and service.

3.2.1.1 Concession Management

The concession management is one of the principal strategies of approval regulation for natural monopolized industries. Promoted by the MOC, the policy on concession management has been the core issue of the marketlization of urban water sector.

The concession management system in public utilities like urban water supply and wastewater treatment refers to the government awards the concession right to the enterprise, with which the enterprise could operate and manage the appointed public product or service in the definite period and scope. The government clarifies the rights and obligations between it and the enterprise with concession right by contracts.

On December 27, 2002, the MOC issued *the Circular on Accelerating Marketlization of Urban Utilities.* It is the first time for national government to claim to establish the concession management system for public utilities. The Circular defines the acquirement of concession right, the qualifications for the enterprises that want to apply the concession right, the details in the concession contract, and the change and stop of the concession right. Hereafter, Beijing, Shenzhen and Hebei Province issued the local concession management method of urban utilities successively to orient the marketlization process of local urban utilities.

In April 2004, the MOC issued *the Administrative Method of Urban Utilities Concessions*, which was executed from May 1, 2004. Furthermore, *the Contract of Urban Utilities Concessions* is oncoming to guide the details for implementing the concession management. The Method is a detailed document based on "…to establish the concession management system for urban utilities" in *the Circular on Accelerating Marketlization of Urban Utilities* issued by the MOC in December 2002. Both The Method and the coming Contract are the basis for the future legislation.

However, *the Administrative Method of Urban Utilities* issued by the MOC is meeting some problems, such as the problem of the legal status, the unbalance between the enterprise and the government, the limitation of the applicability of the method and etc.

3.2.1.2 Parity between both sides in Concession Contract

The concession contract is the core of BOT project. It is a legal document to stipulate the rights and obligations for the authorizer and the authorized sector. For a BOT project, the standard concession contract should comprise two parts: (1) the agreement of government authorization in which the both sides are the government and the Project Corporation; and (2) the service contract in which the both sides are the Water Supply Corporation (or the Sewerage Corporation) and the Project Corporation.

Due to the separation in the concession contract, the parity problem between both sides in the contract should be handled respectively. In regard to the agreement of government authorization, the government and the Project Corporation are not the equal civil subjects. Thus, the disputes should be dealt with the Administrative Procedural Law. In regard to the service contract, the both sides in the contract are equal civil subjects. Thus, the disputes should be addressed with the Civil Procedural Law. As a matter of cause, arbitration is a better way to solve disputes than litigation.

The reasons for the parity problems in contract include the objective reasons and the subjective ones. Objectively, on account of the unaccomplished institutional reform of the Water Supply Corporations or the Sewerage Corporations, there is no an appropriate enterprise subject to sign the contract with the project corporation and it is the government sector that redeems the obligations of the enterprises. For the subjective reasons, the investor doubts the capacity of the water supply corporation or the sewerage corporation to keep the promise, so that the investor requests to sign the economic contract with the government; meanwhile, the government is anxious to attract capital, as such the government make the promises over its authorities. Based on the above mentions reasons, the government signs an economic contract that it should not do, or signs some economic items in the authorization agreement. In the writer's opinion, it is the key cause for the dispute on the property of the concession contract.

To establish a normative regulation rules for concession management is the key and core to address the above parity problem in the concession contract. The strategy could be implemented in two ways: (1) to achieve the complete separation of government and enterprise; (2) to promote the development of industrialization in water sector, and to shape the institutional structure in the water supply corporation or the sewerage corporation to be an independent civil subject.

3.2.2 Regulatory Policies on Pricing and Cost

Water price regulation is the core part of the government regulatory framework. Now we are pricing water based on cost, so cost regulation is the foundation of the price regulation.

3.2.2.1 Mechanism of Price Regulation

There are two major mechanisms on price regulation: (1) regulation based on the recompense rate of investment, and (2) regulation based on the price cap.

- Regulation based on the recompense rate of investment

Recompense rate of investment regulation, as a traditional method and which is used in many countries (USA), limits price as real cost plus the fixed recompense of investment. This method can ensure the income, which is limited in an equity degree, and restrict monopoly effectively. But it is not useful to stimulate company improve efficiency, because if the recompense of investment is fixed, water company will chose the capital intensive technology, or increase investment unreasonably. The information expenditure is also higher, because regulators need the real cost.

Box: Price regulation mechanism for water companies in USA

The utility regulators in USA apply recompense of investment regulation to limit the recompense ratio, control price indirectly. This model can be expressed as:

$$R(p,q) = C + S(RB)$$

R: function of revenue, limited by price and quantity; C: total cost; S: recompense of investment set by government; RB: rate base, total capital investment.

This method makes the comparisons between companies with different scale conveniently. Recompense of investment is defined as:

$$S = \frac{pQ - wL - uK}{p_k K}$$

p: price; Q: quantity; w: salary; L: labor cost; u: capital cost; K: capital investment;

The model of recompense of investment regulation is useful to encourage company to invest in infrastructure, but at the same time, there are many problems. Firstly, this method may be cause A-J effect. Secondly, the negotiation about recompense ratio between regulators and companies may cause high exchange cost. Thirdly if the recompense ratio is fixed in a certain period, companies lack incentive to improve efficiency. Fourthly, it is difficult for regulators to determine the sound ratio.

- Regulation based on the price cap

Price cap regulation, also called expenditure fixed approach, can inspirit water companies to decrease cost and make up the lake of recompense of investment regulation. Price cap regulation has worked well in the water sector in E&W. The perfect directive price regulation policy can reduce price but not decrease efficiency. For a company, if revenue is fixed, profit will be higher as cost lower.

Box: Price Regulation of Water Supply in the UK – PRI+K Model

All of the regulators of privatized utilities in the UK use the RPI+K approach in setting price limits. This model can be expressed as:

$$RPI + K \quad (K = -X + Q)$$

RPI (Retail Price Index) means inflation, K is the regulative factor set by regulators, and is different between companies, Q is the cost spent to reach the quality standard of UK and Europe.

This model means the price limit is positive with inflation and quality standard, and negative to the technology advance. The price limit can stimulate companies getting profit by decrease cost in certain period.

But in the water sector, unlike most other regulated industries, the companies have been required to deliver a large capital investment to finance obligatory environmental and quality improvements. So it is difficult to decrease cost, and can cause the recompense ratio of investment too low to cover cost.

Compared to recompense of investment regulation, price cap regulation is easier for regulators, because which can reduce the information requirements. Regulators only need to set a factor (K), without setting recompense ratio of investment and check the base of recompense ratio.

Recompense ratio of investment regulation can attract a great deal of investment into urban water sector. Price cap regulation can inspirit water companies to reform technology, decrease cost and improve efficiency. The choice between these two regulation approaches lies on many factors, which depend on market framework and state political system to a great extent.

3.2.2.2 Existing Policies on Water Price

At present, to increase the water price is the keynote of urban water management, because the water price in China always keeps a low level that could not reflect the scarcity of water. In order to save water effectively and attract more investors, the national and local governments have conducted some work on increasing water price.

In September 1998, the former National Planning Commission (the National Development and Reform Commission) and the MOC issued *the Management Method on Urban Water Supply Price*, which defined the classified price for urban water supply. According to the use purpose, the water use is sorted as following: water for resident living, water for industry production, water for administrative affairs, water for commerce purpose and service, and water for special purpose. The method defines the water price should comprise the cost of water supply, expense, taxation and profit. The rational average return rate for water supply enterprises is about 8-10% of the asset profit rate, which will be decided by the local government and the competent authorities based on the capital resource. For the projects invested mainly by the government, the maximum net asset profit rate of enterprises is 6%; while for the ones invested mainly by the enterprises, including the enterprise loans, introduction of foreign capital, and issuing bonds and shares, the maximum net asset profit rate is 12% in the period for refunding the loans. In addition, the governments will gradually promote the two sector pricing strategy or the step pricing strategy combined with the base water price and estimated water price in the future.

In 1999, *the Circular on establishing central wastewater treatment mechanism and charging for the wastewater treatment,* which was issued by the NPC (now it has been renamed as the NDRC), the MOC and the EPA, claims to surplus the wastewater

treatment charge, which should be decided based on the cost for operating and maintaining the sewerage pipes and wastewater treatment facilities, to the water supply price and to establish the central wastewater treatment/discharge system. The details for wastewater treatment and the implementation strategy could be decided by local government based on the local conditions and enduring capacity. The Circular requires the cities with serious pollution in the Three River Watersheds (Huai River, Hai River and Liao River) and the Three Lake Watersheds (Tai Laik, Cao Lake and DianChi Lake) to institute the wastewater treatment charge standards to meet the operation and maintain cost of the sewerage pipes and the central treatment facilities (there is still a big gap in the real situation). The governments are hopeful to intensify the capacities on collecting and managing, and to increase the efficiency of collecting the wastewater treatment charge.

In November 2000, the No.36 Document of State Council, *Circular on enhancing water savings for urban water supply and preventing water pollution*, claims to invest in small cities and towns and the Western Region for constructing wastewater treatment facilities, to collect the wastewater treatment charge; to release the value-added tax for wastewater treatment charge; and to accelerate depreciation for urban water supply/wastewater treatment facilities. The Circular also clarifies that it is the most effective strategy for water saving to increase water price, therefore, the state government calls for accelerating the reform of urban water price, regulating the water supply price in a good way, and establishing a rational water price system based on water saving incentive. In order to control the exploitation of groundwater, it is prescribed to increase the tariff on groundwater resource in the Circular. All cities are requested to make and implement the strategy of collecting wastewater treatment charge by steps. The principles on adjusting the water supply price and regulating the standard of wastewater treatment should make a priority on increasing the wastewater treatment charge to meet the demand of constructing and operating the service facilities.

In April 2002, *the Circular on Promoting the Reform of Urban Water Supply Price,* issued by the NDRC (the former NPC), the MOF, the MOC, the MOWR and EPA, claims to promote the reform of water price, to establish the rational water pricing mechanism based on the local urban characters, and to execute the seasonal water price to abate the seasonal water supply problems. The Circular emphasizes to establish a rational relationship between the reused water price and the water supply price, to set a pricing mechanism that could stimulate the public to use more reclaimed water instead of fresh water, and to accelerate the construction of wastewater treatment and reclaimed facilities.

As mentioned above, it is hopeful to establish a rational water pricing mechanism based on water saving within the reform. By the end of 2003, all cities should commence to collect wastewater treatment charge, also adapt to the watershed or regional planning of water pollution prevention and the urban overall planning. By the end of 2006, the wastewater treatment plants should be built up and operated. Furthermore, the standard of wastewater treatment charge should be adjusted to meet

the cost with a few profits. It is important to allocation water resource effective by pricing system.

The Circular proposes to combine the enterprise reform in water sector and the shift of operation mechanism within the price reform of urban water supply for the first time. It clarifies the key for institutional reform of water enterprises (including water supply and wastewater treatment enterprises) is to introduce the market competition mechanism. The wastewater treatment plants operated with market-based approach should make a further progress for the operation and management mechanism; while the ones operated by government-sponsored institutions should make a progress in the institutional reform to business management. In principle, the water supply and wastewater treatment corporations in the large and medium cuties should accomplish the institutional reform in the 10^{th} Five Years Planning. It is crucial to separate the government functions and business management, to clearly define the obligations and rights for the governments and enterprises respectively, and to shift the water enterprises as the independent operation subjects. The local government could conduct different reform strategies to establish the operation and management system that adapts to the socialist market economy based on the actual situation in terms of the Corporation Law.

The Management Method of Water Price in Hydro Projects conducted in January 2004 means the water supply in hydro projects will be managed as a commodity good, and the water price will be decided based on market principles instead of the traditional administrative approach. The water price of hydro projects will be managed hierarchically under the integrated policy, and be decided by local government in terms of the national economical policies and bearing capacities of water users to stimulate the private sector to invest the hydro projects at local level. In regard to the objects for water supply, the water price is classified as the water price for agricultural use which is decided based on the cost of water production and the expense except the profit and taxation; and the one for non-agricultural use which is decided based on the cost of water production, expense, taxation as well as the profit that is calculated based on the net asset and the rate is 2-3% more than the long term loan rate of domestic commercial banks.

The No.34 document of State Council, *the Circular on accelerating the reform of water price, promoting water saving and protecting water resource (2004)*, clearly defines the 4 major component of water price for the first time: water resource tariff, water fee for hydro project, charge for water supply and charge for wastewater treatment. The Circular emphasizes to adjust the water supply price to a rational level, to clarify the structure of water price, to expand the scope of collecting the water resource tariff and to increase the tariff standards. In regard to the regions without collecting water resource tariff, it should implement the tariff collection scheme as soon as possible and gradually increase the tariff standards in terms of the local actual situation. According to *the Management Method of Water Price in Hydro Projects*, it is urgent to increase the water price for agricultural use to meet the cost level, as well as to apply reclaimed wastewater in regions with water scarity. Furthermore, the

Method requests to implement and promote the step water price strategy gradually by the end of 2005.

3.2.2.3 The instrument of cost regulation — Benchmarking

Cost regulation is the important foundation of price regulation. But government can't know the detail information about the actual level of cost. The Ministry of construction has made great effort to find effective instruments to grasp the actual level of cost. Benchmarking is the one of them. Researching and establishing a benchmarking system for urban water sector are important parts of government worksheet.

At the end of the 1970s, Xerox implemented benchmarking initiatives. Benchmarking is defined as a systematic process, aiming to improve the performance of an organization continually through comparison with relevant and achievable internal or external organizations and standards. Implement benchmarking in urban water sector began in the end of 1990s. Benchmarking in urban water sector means to select an integrated set of performance indicators, collecting data, measuring and comparing between different water companies, and finally improving the performance of water companies. Benchmarking is a effective instrument, through which government can grasp the real cost level of companies, set reasonable price limit, restrict unrestrained hanker for benefit, protect public right, and supervise state-owned assets effectively, the actual effective and transparent of public supervise can be promoted. OFWAT (the industry regulator in England and Wales) has carried out benchmarking in urban water and wastewater sector for several years.

Box: International application of benchmarking for urban water sector

- **World bank**

The World bank developed benchmarking system of water and sanitation utilities-Start-up Kit. The core performance indicators, which was discussed by experts coming from bank, consult, government, mainly includes ten categories 27 key performance indicators: Coverage, Water Consumption and Production, Unaccounted-for Water, Metering Practices, Pipe Network Performance, Cost and Staffing, Quality of Service, Billings and Collections, Financial Performance, Capital Investment.

- **AWWA**

By the initiative of AWWA Research Foundation and Water Environment Research Foundation (WEF) a QualServe Benchmarking Clearinghouse was recently chartered, with the main aim of providing associated members with information, services and tools for water and wastewater facilities. Utility profile and performance measure, databases of water and wastewater operational data, summary result from QualServe self-assessments and peer reviews, identification of best practices and online network for partnering are the main topics include.

A project to develop performance indicators was approved for funding by AwwaRF in 2001. Finally Benchmarking Clearinghouse provides 22 key benchmarks or

performance indicators in five areas of water and wastewater utility operation: Organizational Development, Customer Relations, Business Operations, Water Operations, and Wastewater Operations.

- **The "New Benchmarking System" in Dutch**

In an effort to gain a complete, balance picture of the institutional commitments of water companies, a benchmarking study carried out by Vewin. The "New Benchmarking System" was set up in 1997, which compares data on water quality, environment, quality of service and grant transparency for drinking water sector in the Netherlands. To ensure an objective comparison of water companies, without distortion by their different organizational structures, the benchmarking exercise is based on the most commonly used work processes. The model consists of for key processes: production, distribution, sales, general processes.

- **IWA**

The real interest in an feasibility of developing generally accepted procedures and methodologies, able to provide decision makers with an overall perception of the utility performance as a strong support in making strategic choices, was strongly underlined by IWA since 1997. IWA was promoted to define a common reference for performance indicators and benchmarking methodologies to extent the application of benchmarking. The Task Force on performance Indicators (operating inside the IWA Operation and Management Specialist Group) edited the Manual of Best Practice "Performance Indicators for Water Supply Services" in 2000 and "Performance Indicators for Wastewater Treatment Services" in 2002.

- **OFWAT**

OFWAT (the Office of Water Services, the industry regulator in England and Wales) has used benchmarking as an effective instrument to regulate water companies for several years. Water companies have to provide data based on performance indicators, mainly including six categories consumer services, quality and environment, water distribute and loss, operating cost, capital expenditure and financial. OFWAT scored these performance indicators, and publicatilized the result of scored-card to promote water companies to improve their efficiency. International comparative exercises have been carried out to allow independent comparison of the privatized water companies in E&W against water enterprises operating, under different regulatory regimes, in Australia and in western Europe and the United States.

- **Nordic "Six Cities"**

In 1995 the Six Cities group- Copenhagen, Oslo, Helsinki, Stockholm, Gothenburg and Malmö- the water and wastewater utilities in which are fully owned by the cities, decided to start a joint co-operate project with the aim of developing performance indicators that would facilitate comparisons between the cities and give a better bade for discussions with politicians and perhaps lead to ideas for improving the running of the utilities.

The Six Cities group defined a set of performance indicators suitable for comparisons over time within one company and between companies. The PIs will cover:

- Customer satisfaction: PIs and measuring methods to reflect customer expectations and appraisal of the water services;

- Quality: PIs to complement economic PIs and customer satisfaction PIs;
- Availability: PIs describing the operational reliability of the system;
- Environment: PIs illustrating the utility's environmental achievements;
- Organization/ personnel: PIs describing efficiency and the relationship between 'in-house work' and external services; and
- Economy: PIs comparing costs on an overall level.

Now, the Ministry of construction is starting up benchmarking study, plan to get elementary outcome at the end of 2004, carry out case study within 5 years. The regulation object of benchmarking in water supply industry is water supply company, in wastewater sector is the wastewater treatment plant.

3.2.3 Regulatory Policies on Water Quality and Service

The regulation on water quality and water service is one of the principal functions of government regulation. China has made some progress in the regulation on water quality and now is improving it. However, there exists a gap for the regulation on water service, it is urgent to establish a strict regulation system on water service.

3.2.3.1 Regulation on Water Quality

Three governmental functional departments respond to the regulation on urban water quality: the MOC takes charge of the sector management for urban water supply; the Ministry of Public Health enacts the national standards for drink water; and the EPA is responsible for the discharge standards and enforcement. In 2002, the MOC set the national water quality supervise and inspect center with the sponsor of UNDP, which strengthened the regulatory capacity building of urban water supply quality and contributed to perfect the institutional arrangement for water quality regulation.

At present, the oncoming new standards on water supply quality are being revised. The new standards with 88 indexes (there are 36 indexes in the exiting national standards) will meet the international standards. However, the water resources are facing serious pollution because of the lagged protection.

The Pollutant Discharge Standard of Urban Sewerage Treatment Plants (GB18918-2002) issued in 2002 requires higher standards for discharge of urban sewerage treatment plants, especially the standards for the total nitrogen and total phosphorus in discharge and the new standards for sludge disposal. Thus, the treatment technology will be improved to meet the new standards and the cost of sewerage treatment will increase. Meanwhile, the EPA will manage and enforce the relative policies more strictly.

In terms of the characteristics of urban water sector, which impact the public daily life and the urban sustainable development directly, the government must implement a rigorous regulation on water services. In order to guarantee the public interests, the

government has issued various relevant regulations, such as *the Administrative Provisions on Urban Water Supply Quality* issued by the MOC in February 1999.

3.2.3.2 Regulation on Water Service Quality

Urban water sector is one of important public utilities, which is closed relative to public interests. Thus, the regulation on water service is an important component in the government regulatory framework. In the traditional model of government operation, the public have a low requirement on service quality as well as the governments are lack of the awareness of public service. With the rapid social development and the enhanced living standards, the public concern with the service quality of urban sewerage treatment. Meanwhile, the public are also concerned for the service quality with the private sectors involving in the field of water supply and sewerage treatment, because it is possible for the private sector to supple low-quality or insecure service in order to maximum the enterprise's interests. Therefore, it is critical to protect public health and interests by governments' effective and efficient regulation on water service.

The urban water supply service is the principle requisite for social production and living, as well as impacts the consumers' health. Thus, the public are quite sensitive to the changes in water quality and water supply service. In general, the government regulation on water supply service mainly includes drinking water quality, capacity of water supply, served population, leakage repair, and respond to complains and etc.

In urban sewerage treatment aspect, the government regulation includes served area and population, service level, respond to complains, and addressing troubles and etc.

The urban water service quality usually depends on the relevant legal framework. It is important to stipulate the enterprises' legal obligation that the enterprises must guarantee to provide secure and reliable water supply and sewerage treatment service. The security of water means the water quality must meet the national secure water standards. The reliability of water means the enterprises must ensure the public could acquire the water service any time. Furthermore, it is necessary to enact reasonable legal items to require the enterprises to respond to monitor and control water quality, and to construct necessary infrastructure for quality control. Therewith, the Public Health Sector and the Water Competent Sector should establish independent monitoring system to control the water quality on-line, and the information on water quality should be opened to the public free.

Based on the strict legal rules, it is also important to establish a rational stimulation mechanism to promote the improvement of service quality, for instance, to open the operation information of enterprises to the public that could supervise, to define the compensation rules for enterprises' violation behaviors, to combine the service quality and price control, and to strengthen the public participation and etc.

4 Changes of Government's Role and Responsibilities

Enterprise and government are the major two subjects of the marketlization. It is a key efficiency factor for market mechanism that the governments could find their right niche in the new marketlization condition. Basically, the governments have to protect the public interests.

4.1 From Sector management to Market Regulation

With the deeper progress of the marketlization reform, China government sets herself to the asset reform aspect of traditional state-owned system within the marketlization. A variety of traditional industries, such light industry, coal industry, have transformed from government management to market management.

The evolution of the urban construction department has changed many times. The traditional management system in urban construction departments are: the government manages the enterprises' human affairs by appointing; takes charge of the financing by investing and constructing; and fulfilling the affairs by sector management. Traditionally, it is the government or under division that has the responsibilities of constructing and managing the urban infrastructure.

Nowadays, the institutions of urban water management are meeting revolutionary changes while the market-based institutional structure has been established and developed, and the private capital has been involved in water sector and being expanded. It is quite critical to introduce a new management system which differs from the traditional one. Therefore, the management system and organizational structure in water sector must be restructured while the roles and responsibilities of relevant interest groups have to be redefined.

Based on the marketlization reform of water sector, the cost and profit of water sector must be decided by the market principles. It is urgent to change the unclear-defined relationships between the governments and enterprises and to clarify the obligation, rights and mutual relationships among the governments, enterprises and consumers.

The construction departments at all levels have been always engaged in the construction and management of urban water sector that they have an advantaged occupation in the marketlization reform of urban water sector. Herewith, the traditional leading awareness and responsibilities definition for all level construction departments have hampered the reform of role convert for local construction departments though the MOC has issued a series of concession management policies to help the local departments find the right niche.

Nevertheless, it is the governments' essential role to be the represent of public interests in the market economy condition, as well as to respond to the market regulation.

4.2 Withdraw of Government

In the new management system of urban water sector within the marketlization reform, the governments have to deliver the detailed service functions to the enterprises subjects and withdraw from the operation and service in water sector. In general, the governments withdraw from the detailed services and management in two ways:

(1) To clarify the responsibilities and obligations with the traditional enterprises. To deeper develop the property reform of water sector and separate the government functions from the business management in water sector. To make a clear definition of the "regulating-regulated" relationships between the government regulators and the business operators instead of the traditional "parent-child" relationship

(2) To introduce the social responsible subject into the water sector. There would be some vacancies in water sector due to withdraw of governments, thus the social enterprise subjects will be introduced for the vacancies. The concession contract could define the mutual obligation and rights between government and enterprises legally.

However, it is important to clarify that the withdraw of the government from the water sector doesn't mean the government will withdraw from the investment in water sector.

Based on the fix characteristics of water sector, the investments in water resource protection, sewerage pipes construction and maintains are non-profit making asset, therefore, such investment should be paid by government financing in terms of the social benefit. On the other hand, the governments have the responsibilities to provide part of preliminary capital for implementing the strategies of water saving and technology introduction. The above government investment should not be concluded in the basic value for calculating the investment return. Furthermore, some special projects linked to various sectors and the allocation of resource have to be invested and implemented by governments.

The urban water sector has significant internal profit which is the direct economic benefit of investors and operators in water sector, and prominent external profit which appears in the environmental benefit. The urban water sector is an important part in urban infrastructure system and a well functioned water system could improve the urban development conditions and investment environment. In this sense, the external profit of water sector is more than the internal one.

With the marketlization of urban water sector, various investment subjects will be introduced in this market, however, the governments could not withdraw from the investment market of water sector due to the special profit structure in water sector. The governments have to respond to the investment in water sector for the public welfare, leading and subsidy aspect which could not be delivered to the private sectors or the public.

Nowadays, China is meeting the peak time of economic development and urban construction, and there is a great demand for investing in urban infrastructure. So far, 42% urban wastewater has been treated according to the statistics reports, indeed, only about 20% urban wastewater is treated effectively. China is encountering a tremendous gap for wastewater treatment in the rural regions as well as the construction of sewerage pipes. Furthermore, the tap water has not been pervaded over rural areas, while the pipes network for urban water supply has been aging that impacts the water quality and security. Thus, the governments are the indispensable subject in the investment system of water sector in order to develop the water system well.

The government role in the investment system doesn't impede the government to withdraw from the service aspect of water sector. It is a key to create an adaptable market mechanism combined with the government investment and financing with market-based approach. The details will be discussed later.

4.2 Changes of Government Function

Changing the government's role means to shift the traditional constructor and manager as the market regulator. The responsibilities of governments are not sector management but market regulation in the marketlization. While the governments are the represents of public interests, but not the ones of enterprises interests. The government functions also include the policy making and macro control in water sector, in this part, we will focus on the discussion on the changes of government's roles.

The governments have been always the leading role in the construction, management and service in water sector. Under the planned economic, the governments manage the urban water sector (including water supply and wastewater treatment) by directly controlling the human affairs, assets and properties. With the marketlizating process, the governments are meeting a revolutionary shift for the functions both in urban management and sector management.

The marketlization of water sector could not be regarded as attracting investment in a simple sense; it should include the overall regulation obligation through the investing, constructing, operating and managing, and servicing. The marketlization is an instrument applied in the reform of water sector. It aims to achieve both the public profits and social profits; in brief, it is to improve the operation efficiency of water sector by market-based approach and to provide the high quality public product and service with less payment while to protect the environment. To open the marketlization of water sector should include not only the opening of investment market, but also the introduction of experienced operators. Indeed, the mayors in charge of urban management couldn't throw off the burden of water sector, but will be endued with new arduous responsibilities on regulating

In a word, it is significant for the construction departments to change their role and responsibilities within the marketlization reform.

5 Reform of Property Rights for Urban Water sector

For the government, reform of property rights is not only the core issue of marketlization of urban water sector but also the premise for private capital's entry into the water sector. This reform will force the traditional water enterprises to restructure their organizations in order to meet the demand of the coming new time. It is also a big task for the local government authorities who must guide this reform to fulfill the marketlization of urban water sector.

5.1 Separating Capital Management from the Government -- Premise of the Property Rights Reform

Marketlization on public utility started in 2000 and was approved by the central government including The Construction Ministry and The State Council in the recent two years. In 2003,it was clearly specified in the documents of the Third Session of the National Congress of the Chinese Communist Party that the private capitals are allowed to invest in the public utilities which pushed the real development of the marketlization of urban water sector.

For marketlization, the government is facing huge changes. According to the documents of The Third Session there should be three separations—government separates from enterprise, government separates from undertaking and government separates from capital. The separation between government and capital is the basis of the separation between government and enterprise, especially in the public utilities industry. For general competitive industries, government will not have the functions of capital management after marketlization, and the functions of resources disposal and management are taken by the mechanism of market and competition. But in the public sector, things are different; because of the monopolistic nature of the urban water sector, the public are not free to choose what they want, they can only rely on the government in controlling and regulating the quality, cost, price and service of water.

The government should take the role as the agent for the public interests instead of capital. In typical natural monopoly industry like urban water sector with huge sunk investment and low rate of return, the enormous sunk assets invested by the government must be well arranged and managed and moreover, there exists necessity and possibility of huge continuing investment. Therefore, the state capital have existed and will continue to exist in the long run. This requires the role of the government to be split into two parts--capital management and industry administration. The capital management role is responsible for the already invested state owned assets and their employees, while the industry administration role is for the regulation of the industry on behalf of the public. Here the double-role

government is actually quite contradictory—as asset manager she should expect value added so as to contribute to local economy, but as industry regulator she must ensure the public get the best quality and service with the lowest price.

The decision of "to be or not to be" is based on how the municipal governments make balance or make choice between economic growth and public interests. What we should emphasize is that the state owned investment on urban water sector should not expect high return and even any return. At the meantime, the assignment of the concession should be governed by the industry regulating department rather than the asset management department. When marketlization goes further and matures, an effective management model should be found out to break the dilemma of the government's double roles by combining the state-owned capital with the private one effectively.

It is necessary to harmonize the relationship between public management sector and state asset management sector, and the separation of government from capital works as basis and premise of the separation of government from enterprise.

5.2 Adjustment of the Capital Structure Bases Mechanism of Marketlization

Industrialization and marketlization of urban water sector are not solitary stories, on the contrast they are mutual effective parties. Industrialization bases the marketlization, while the marketlization must be built on healthy industrial situation, and finally well-organized market mechanism leads and push the industry for highly efficient development. Without a healthy industrial basis the market mechanism is out of the question since it is based on industrialization.

For examples, sophisticated and excellent enterprises make efficient competition. Otherwise the competition leads to merely low efficient price shooting. Merketlization based on poor industrialization will rocket the enterprises' management risks, make the government's regulation out of control and in the end harm the public interests and social benefits. On the other hand, industrialization without market mechanism cannot ensure the industry's efficient operation because the key point of industrialization is to upgrade of traditional investment, construction and operation system.

Therefore, reform of China's urban water sector should aim at building a new industrialization system according to the rules of free market, and the core of industrialization is the identification of ownership.

5.3 History of the Property Rights Reform of Urban Water Sector

With the rapid development of urbanization and up-rising demands on environmental protection and quality of water, the total investment on urban water sector seems insufficient. Thus people's interests are turned to investment reform of urban water sector which is actually closely connected with property rights.

In the 1980's, the first stage of urban water investment reform began with the invitation of investment when inter-government loans or international institution loans were obtained with direct or indirect government guarantee. More than 100 projects scattered over almost all the big cities were involved in this turn of investment invitation, but none of the problem of property rights and business relationship was touched.

After the local governments were prohibited by the central government from participating in direct financing activities such as guarantee, the second stage of investment started in mid-1990's when the foreign capital was introduced, with guarantee of fixed return, into the urban water plant projects (the other critical part of the industry, pipeline networks were not included) in the form of cooperative joint-venture. The problem of property rights was also avoided, but the return of investment was ensured.

The third stage came in late 1990's when BOT became popular in the urban water sector. For the first time, the property rights of the industry was touched. In the BOT model, limited property rights of single newly-built projects (mainly water plant) was opened for a limited of time period, and efficient project financing was realized with 25-40% of self-investment and 60-75% investment from project financing. However, the issues of how to manage the urban water system comprehensively and how to settle the assets already existed in the water sector were not tackled.

The exploration on the reform of property rights in urban water enterprises went much further with the deepening of the restructure of the urban water enterprises, and the separation of the government's public administration functions from capital investor's function, especially after the 16th National Congress of the Communist Party. Enterprises in the water sector in Shanghai and Shenzhen have been experimenting in transferring part of their shares in package.

Because of the sensitivity of property rights, the issue of property rights was usually avoided not only in the reform of urban water sector but also the reform of China's economic system. The reform often focuses only on the adjustment of economic relationship in hope to enhance efficiency of various kinds of resources and encourage the initiatives of all participants. However for a real and healthy development the property rights as the basis of economy will surely be touched as a core issue when investment in urban water sector needs clear investment model and rejects the adjustment of economic relations in a round-about way.

Resources are disposed according to the market rules in the market economy, there are two heroes in the marketlized urban water sector—one is the government as the rule-maker and the regulator and the other is the enterprises as competing entities. For the enterprises, the problem of property rights is the problem of ownership and the most critical problem. The backwardness of reform and development of the water sector derives from the nature of public welfares of urban water sector. To correct the property rights is the final solution for the problems of industry structure, insufficiency of investment, the unclear identity of government and enterprise, and the

low efficiency which deterred the development of the water sector. It is obvious that the reform of the urban water sector has come to a cross-road where we are clearly implied that without solving the problem of property rights and reform of the ownership system, all the other reforms can hardly go any further.

5.4 The Principles for Adjusting Urban Water Capital Structure

In order to push the reform of property rights at the target of forming an investment system with multiple investors, the government, considering the present situation of capital structure for urban water sector, must first complete the adjustment on the capital structure of urban water sector according to the requirements of assets management separating from the government. The following principles should be kept during the assets restructuring.

5.4.1 The Principle of Keeping the Integrity of Main Works

To keep the integrity of water market operation is the precondition of the reform of property rights. The mistakes on investment management to split the water plants, pipelines and services should not be repeated. The assets of the urban water sector can be owned by different main bodies, but the operation of urban water system (including pipelines) must be integrated. And for those assets outside of the reform of property rights can also be under integrated operation by leasing or under concession so that the marketlized enterprises face the end users directly.

5.4.2 The Principle of Separating the Subordinate Works from the Main Works

Although urban water sector is a natural monopolized industry, its business can also be divided into monopolized business and non-monopolized one. The state owned capital should retreat from those non-monopolized subordinate business such as maintenance, engineering, technology, equipments, drinkable water and parts of the service, and choose sub-contractors for those subordinate business through market competition under the premise of keeping the integrity of the main works.

5.4.3 The Principle of Reasonable Recompense of Capital

Under precondition that the operation of urban water sector is integrated, the assets can be covered by the reform of multi-ownership step by step. According to the water price, fiscal power, situation of assets of each city and taking average industrial investment return for reference, the percentage of the main bodies for transfer can be figured out. Considering the characteristics of the sunk capital, the government should keep some amounts of non-profit sunk capital (such as waste water pipelines) and expand the area of reform of multi-ownership with the adjustment of water fare to a more reasonable price.

5.4.4 The Principle of Identification of Assets

It is necessary to set up a capital structure with clear recompense between the government as one investor and the multi others , and to leave rooms for the entry of multi-capital. But the reform of investment must be stable which means the government cannot shift the policy freely by their own willing like what is called non separation of enterprises from the government.

5.4.5 The Principle of Taking Regulation as Important as Management

Enterprises get concession automatically when they take over property rights from the government, and strict and standard regulations on the cost, service and water quality should be established by the government at the same time. How far the reform of property rights go shall depends on the capability of regulation to ensure that the result of multi-capital investment is mutual benefit for both public and investors whose profit mainly come from improved efficiency.

5.4.6 The Principle of Specialty of Pipelines

Investment on pipelines are usually sunk investment, thus it seems impractical to introduce private investment until the water fare high enough to support full cost and recompense. However, considering the sensitivity of water price and the welfare of sewage, the assets of the sewage networks can be included in the government package of permanent non-profit assets if the city's fiscal conditions permit.

5.4.7 The Principle of Combination of Government Investment and Market Mechanism

For newly-built projects with clear identification of investment structure, it is workable that the enterprises invest the main works and the government invests the subordinates or offers specific subsidies. Those parts invested by the government are under name of state owner but can also be authorized to marketlized enterprises for integrated management which is called assets operation authorization model.

5.5 Models of Settlement of Water Sector Assets

Four models are specified for the combination of the state-owned assets with the market capital and the introduction of social capital into the urban water sector.

5.5.1 Model of Opening the Second Project Market

The model of opening second market means that the assets of urban water sector as an integrity (mainly pipelines) are held by the government, and the services to the consumers and fare collecting are fulfilled by the state-owned companies, while water plants' building and operation as second market open to the society or sell the state-

owned shares. This model is now the dominating one with representative cities as Shanghai and Beijing.

With the opening of the second market, the sunk assets remain in the hand of the government, which is good for ensuring investment return and assets identification. It is an easier marketlization model to attract large capitals and improve the efficiency of single plants.

However many problems still exist in the industry. Firstly, services with the greatest potential efficiency are not open for competition. For a few projects which are claimed to have beenopened are actually similar to project financing. Numerous critical problems still existing in the whole water company and sewage group are not exposed. Secondly, the fulfillment of various water projects breaks and splits the water system, which creates many problems for the operation management and cannot meet the requirements of the water sector. Thirdly, in a water systems with multiple connecting joints, the operation and management costs are sure to increase, and the same are the complexity and costs of the control and regulation of the whole system. Fourthly, the water plant units are broken away from the urban water system and thus the market mechanism cannot face the final customers. This model can be considered as a “fixed return on investment” model, and furthermore, becomes the obstacle for later marketlization of the entire water system. In one word, high efficiency of separate units and low efficiency of the system as a whole are the obvious disadvantages of the model.

The model of project financing represented by BOT is a typical example of this model in practice. BOT is an internationally practiced marketlized project operation model which has been widely adopted in countries during economic transform, such is the case in China, especially in the recent years. The popularity of BOT in China is greatly related to the level of industrialization of the urban water sector in the country. In most of the cities in China, the basis of industrialization of the water sector is very weak, the ownership is not clear, and the development level of the industry and payment ability of the public cannot afford or very difficult to afford the marketlization of all the components of the entire system. Therefore, separating single water plant unit (to by built or completed) from the water system becomes the only feasible options for marketlization for it is easier to clarify the property rights and investment return of the single plant.

5.5.2 The Entire Transfer Model

In the entire transfer model, the entire city or a clearly identified administrative district of the city is considered as an integrated body of assets transfer and the property rights of all the water service enterprises of the integrated body are transferred unholdingly, holdingly or entirely.

The entire transfer of the property rights of the urban water sector is a much more marketlized model and meanwhile a model more suitable for the characteristics of the

urban water sector. In this model, the integrity of the water infrastructure, sewage networks and service in a city or a certain district of city are kept, and marketlization reaches the end users. This meets the characteristics and requirements of the urban water sector and represents the direction of international water sector development.

However, the property rights entire transfer model is based on the conditions of industrialization. At present, successful cases of entire shares transfer in China are nearly all in the area where the condition of industrialization are better and ownerships are clear. IN 2002, the international giant, Weiliya bougt 50% of the shares of Shanghai Pudong Water Company. This is an entire transfer of the networks and services. An important reason for the success of this project is that Pudong is a new urban district without any historial problems and the identification of the ownership and business are clear, which make it easy for marketlization. In the same year, Chongqing Jiangbei Water Company sold 60% of its property rights to China-France Water Company. The reason for this success is the same; Jiangbei water company located in the new district and its ownership was clear. The success of the transfer of the shares of SWH in 2003 also comes from the fact that Shenzhen was a newly developed special economic zone where government was separated from capital earlier than any other Chinese cities, where conditions of industrialization was better and government transformation was completed, and where existed a market mechanism which was much healthier than that of other cities. All these make it possible for the marketlization of the entire water sector.

The entire transfer model ensured the integrity of the main works. But as the sewage network was also included in the investment return consideration by the Shenzhen Government, the losses incurred on the waste water company and the great amount of sunk assets such as sewage networks imposed pressure on the water price to rise.

Box : The Transfer of the Property Rights of Shenzhen Water Group(SWG) – the largest merger case ever taken place in China water sector

As the benchmark of Chinese State-owned enterprises, SWG is one of the first large water enterprises that were reorganized. Shenzhen Water Holdings Co.,Ltd(SWH) was formed out of the merger of the former SWG with the former Shenzhen Sewage Administration on 28,December 2001. This is the first water group that has transformed from a water company to a company with both water service and wastewater service. With total assets of over RMB six billion yuan which include 5 water plants,4 wastewater processing plants,5 branches,4 sewage system and 15 fully-owned or holding companies, the state-owned SWH has a daily water-supply capacity of 1.67 million tons and a daily wastewater processing capacity of 1.08 million tons. It's real annual water supply and wastewater processed is about 500 million tons and 300 million tons respectively, and its annual turnover is over RMB one billion.

Later 2002,Shenzhen Municipal Government began to sell part of the shares of 5 state-owned companies with profitable assets through international bidding., among which SWH planned to sell 45%of its shares.

In December 2003, joint-venture held by Beijing Capital Investment Co.,Ltd and Weiliya Group won the bidding by getting 40% and 5% of the shares of SWH

respectively. As a water supply and sewage company SWH's total asset amounts to RMB 6.6 billion and net assets to RMB 5.9 billion, of which about RMB 2 billion is from the former SWG and about RMB 4 billion from sewage assets. The said 45% shares of SWH was sold at the price of RMB 3.3 billion, which is the largest merger has ever occurred in China water sector.

According to the agreement, the mergered SWH got the water concession of the Shenzhen Special Economic Zone. In the concession contract, tasks and targets are specified for SWH to check the cost, improve management and provide the citizens with better water service as well as to ensure that by 2005, 80% of the wastewater of the Zone be treated, that by 2010, the water be drinkable.

5.5.3 The Utility Rent Operation Model: Lease Contract

Utility rent operation is an international practice to improve to operation efficiency. As property rights remains unchanged while competition is introduced into operation, this model is designed for governments with abundant financial resources. And this is the dominative practice in many of the developed countries, especially those whose facilities have almost completed, for instance, France.

As the facilities are completed with government investment and private sectors are only introduced to operate the facilities at the purpose of improving operating efficiency with their advantages in technology and management, this model cannot attract investment. Thus, during this peak time of constructions and development, Chinese city authorities are reluctant to adopt it.

Actually, this model should be quite effective in the water sector. As there is no pressure for investment return, thus the water fare collected from the public is used only to cover the operation costs. Cities of stronger economy should take this model as a preferred option.

Box: The necessity of integrated operation of the wastewater treatment and pipe network

Analysis on the present conditions of separate operation of the waste water treatment network.

(1) The Reasons for Integrated Operation

Setting targets based on results and meanwhile analyzing and studying the clients' management plans for wastewater discharging, sewage network and wastewater treatment, in an effort to find out the optimum overall plan to guarantee that the received water reach environmental protection standards.

The components of the wastewater treatment system will inter-react and affect each other. For instance, a failure in the control of the wastewater discharging will surely affect the operation of various pipeline networks, the next wastewater treatment plant and the quality of the treated water discharged into rivers. The operating conditions of the water pumps will affect the following treatment as well as the quality of the water

discharged.

Usually, integrated management of the sewage system makes it possible to make comprehensive plans to cater the operation of the various components of the system to investment demand, and furthermore, to deal actively with problems such as the constructions of the connection lines, the change of branch pipeline from river pipeline, the enlargement of the discharging capacity of the loop pipelines as well as the treating capacity of the wastewater treatment plant. A belief widely accepted by the international water companies is that any plan or management without an integrated system is far from complete and would most probably result in unnecessary extra investment and higher water price.

Management of raining season flow is vitally important to some systems. The problems of overflow of sewage pipelines and river pipelines and the problem of ground flow of the rain water would affect one another, and thus comprehensive solutions are necessary. Therefore, wastewater management plans adopts comprehensive management to solve all these problems.

In the system with hybrid sewage for rain water and wastewater, rain water flow to the wastewater treatment plant in the raining days. Separate sewage can reduce the discharge of some pollutants, but may also increase the discharge of other materials. These problems should be considered in the plan for sewage and treatment plant.

Sewage fare is an effective means to encourage the clients to improve efficiency and reduce the quantity of water and pollutants in the sewage. As a result, the capital cost and the operation cost of the sewage infrastructure are reduced. It is quite beneficial to bring the price setting and assets management for the whole system into comprehensive consideration.

(2) Reasons for plan and operation coordination

It is hardly possible to make appropriate decisions and figure out projects preferences according to the overall demand of the whole system in a industry structure in which the operation and investment decisions of sewage connection line, branch line, trunk line and waster water treatment are separated and independent. If only single component of the system is considered, the decisions on capital investment and operation expenditure will lead to the waste of investment, investment failure or higher long-term cost. In a large-scale sewage system, a single control center is needed to make sure that the modern automatic control system be effective, and therefore, the optimization of the operations of all the related components be safeguarded.

The responsibility of service to clients cannot be clearly clarified if the management responsibility for the trunk sewage (for instance, Beijing Sewage Group and Beijing Urban Infrastructure Department) and the subordinate sewage (for instance, residential quarters) is separated. Every component can have problems and the clients need service. The clients should know whom to call when they have problems. The separations of responsibility will result in inefficiency and higher costs compared to comprehensive management. Efficiency and effectiveness can be improved through mergering separated resources and simplifying work procedures.

5.5.4 The combination of Government Capital and Market Mechanism

Recent years, the combination of government capital and market mechanism is considered by the international infrastructure investment as the appropriate direction, for this combination provides solutions not only to the problem of efficiency of public investment but also to the problem of water price pressure of free market investment.

In this model, government capital (for instance, bonds money) becomes the main investment for such sunk investment as sewage network. When the construction completed, the property rights remain state-owned. And to keep the integrity of the water system, the government transfers(by authorization or leasing) the system to a market entity to operate, while the former will keep regulating on the later.

The main advantage of this model is that operation efficiency can be improved by managing and operating the plants and sewage systems comprehensively according to the characteristics of sewage networks. Comprehensive operation is internationally certified as an effective operation model, especially for sewage infrastructure construction.

Moreover, when adopting this model, government investments are suggested to offer subsidies in stead of investing directly. This mechanism can break the black hole of the construction management by the governmental departments, and therefore greatly raising the efficiency of capital expenditure.

6 Financial Mechanisms for Urban Water Sector

At present, insufficient investment has long been a bottleneck hindering urban waster sector development in China. How to develop financial channels and encourage the private sector investment became as one of major tasks for promoting the marketlization in the water sector.

The scale of investment in the water sector is related with the economic development stage. The national environmental policy, institutional system, and financial method are also the important elements, which influencing the investment in the water sector. Consideration of the current situation, the direction of the water sector reform, and financial system reform, and development of the appropriate financial tools will be very important and urgent work for providing the better financial environment for meeting the huge construction demand in China.

6.1 Transition of Financial Mechanisms for Urban Water Sector in China

The development of financial mechanisms for urban water sector in China can be broadly classified into three stages. The first stage is before the mid-1990s that mainly depended on government, in particular depend on local governmental income, loans, and administrative fee. The common understanding of the marketlization has not been

confirmed yet. Water sector requires a huge capital investment. Local government is the main investment body for water sector, due to conventional system and considering water sector as the public goods.

The second stage is from the late 1990s to now. Due to rapid urbanization, shortage of funds is getting more and more serious in urban water sector. Financial ability of local government is limited. Development of urban water sector in China requires at least CNY500 billion before 2010. If considering the demand for property right reform, the requirements of investment will reach CNY1000 billion. The gap between demand and supply determined that market-based approach should be introduced instead of government-run system. Expansion of construction fund is the basic motivation for local governments to promote reform. Characteristics of urban water sector shift pure public goods to private goods. Accompanying with the implementation of price policy, capital market and financial service organizations are developing rapidly. Project finance based on the activities of enterprise (BOT and TOT, etc) and policy-based finance (Government Development Fund, and policy based loan, etc) became the major financial methods.

The third is the developed stage with completely reformed through introducing market-based approach and changing the governmental role. Development of capital market will improve the structure of investment and finance urban water. The government and the enterprise can access low cost fund, in particular through the bond and fund market. In these years, Beijing Capital CO., Ltd. adopted the purchase of the property to realize its business expansion, which means several major companies have started to utilize the capital market for financing urban water. On the other hand, if the central government allows local government to issue municipal bond as the tool of low financial cost, local government may be come back act as the major investor in urban water filed.

China is experiencing the transition period of economic and institutional reform. Development of financial mechanisms in urban water sector is in the second stage. Chinese government has already decided the reform direction of introducing the market-based approach in the water sector.

The Central government keeps the strong control of financial system and tax system. The central government will strengthen the macro control power within its financial and tax system. However, almost all local governments do not have the effective financial channels. The problems of capital market can be summarized as lack of financial tools and methods, and the weak securities for investors.

6.2 Basic Principles of Investment and Financing for Urban Water Sector

6.2.1 Basic Principles

According to future economic development, governments' financial capacity would be strengthened, and private financing capacity will also grow. Therefore, it is

necessary to draw up a long-term financing and investment plan for UEI based on the expected economic development. There are two methods that could be considered. The first is to achieve diversification of financial sources under the government run systems, and elaborating a fund repayment plan from a long-term viewpoint. It must not depend only on tax revenues. Construction costs must be supplied by a mixture of various methods such as national and local bond issues, loans from foreign governments or multilateral financial agencies, and policy based schemes. Payment of the principal and interest must be completed from the gain accompanying with its rapid economic growth. The second is to open the market to the private sector, expecting its achievement as already demonstrated in France, the UK, and some countries in Southeast Asia and Latin America. In this study, this is generically called a PPP system. In this system, the government takes charge of public works, a private company also participates, and funds are raised by loans from commercial banks, stocks, and corporate bonds (Figure 1).

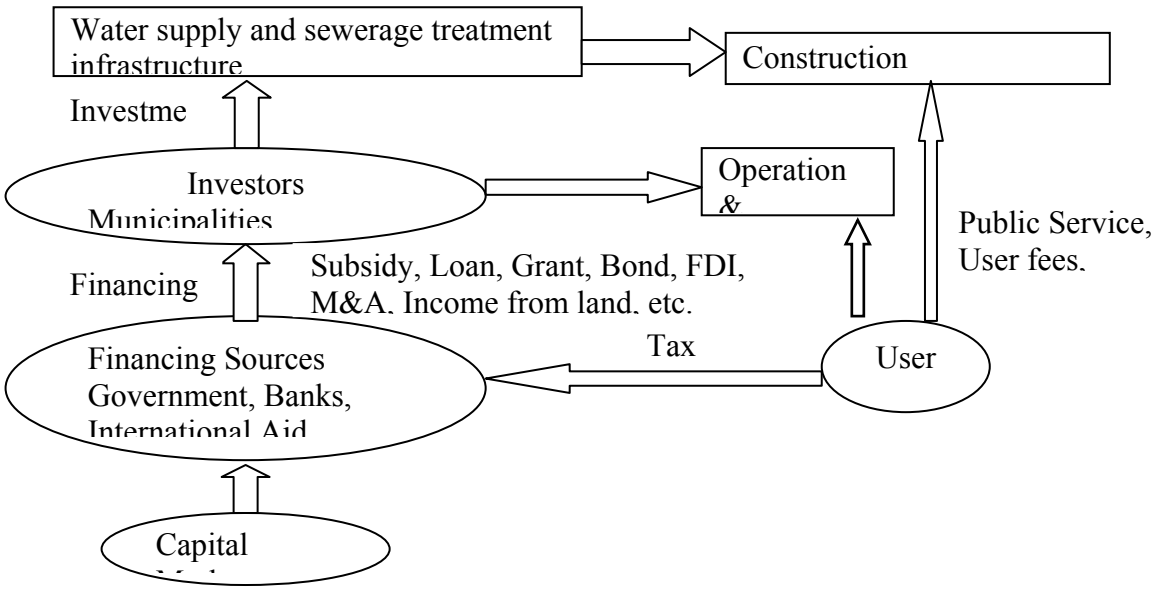

Figure 1 Investment and Financing for Urban Water Sector

Developed country introduces PPP/PFI for improving the efficiency to reduce the burden on the government's budget and cut a government budget deficit. Developing country encourages the private sector participation for expanding of construction fund, and improvement of efficiency through introducing the advanced technology and management know-how.

6.2.2 The Principles for Establishment of Financial Mechanisms for Urban Water Sector

Establishment of financial mechanisms for urban water sector should incorporate the polluter-pays principle and the user-pays principle. The environmental goal, efficient financing, and the social objectives of equity and fairness social equity (equity between well-off and impoverished population/regional distribution) should also be

met. The roles of various actors in investment should be clearly defined. Under the requirements of solving the governmental financial difficulties and improving the efficiency, it is necessary to encourage the participation of other investors, apart from government agencies and pollutors in the investment of the facilities, establishing the well organized commercial financial channels and tools.

6.2.3 The Development Stage of Urban Water Financial Mechanisms

The World Bank Report pointed out that the development of financial mechanisms is accompanying with the domestic capital market maturity, its economic development, and the improvement of administrative capacity. It can be divided as the following three stages (World Bank 1994). The first is depend on tax revenues or governmental financial scheme, according to World Development Report 1994 (World Bank), there are more than 90% funds from tax revenues or the governmental financial organizations for developing the infrastructure. The capital market mechanism has not formed yet. It is difficult to access the fund from the long-term capital market. The grant or loan from international development organizations and ODA is the major financial source for developing the infrastructure in developing countries.

The second is under the development of the domestic capital market and financial organizations, but it has not been improved completely yet. Some of the middle-income countries introduce the project finance as the effective financial method. Somehow it requires much higher management capacity. The technical support from international development organizations is necessary. Strengthening of policy based finance (establishment of Specific Financial Organization for Infrastructure Construction) for securing the credit of borrower, and setting up the governmental aid infrastructure development fund for providing the guarantee and low interest loan is usually used during its transition period, in order to improve the capacity of assessment and guarantee for promoting the domestic capital market. This stage faces the huge construction demands. The governmental investment cannot meet the market requirements. Expansion of financial channels is urgent task.

The third is the stage of well-developed market based mechanisms. There are many long-term capital looking for the investment fields. Utilization of capital market and privatlization will be the major direction of financing and investment in urban water sector including fully using bond market, stock market, and trust fund, etc. In basic, the process of financial mechanism development in the water sector is like this, but which method should be introduced might be decided by the political and financial system in that country, in particular considering the role sharing of the central government and local government, and the responsibility between the public sector and private sector in investment for water infrastructure. Water facilities are the quasi-public goods. The characteristic of this field is a natural monopoly with long-term investment, low profit, and high policy risk. Governmental fund is very important, and the governmental fund should be fully utilized, but the role of governmental fund is changeable, which might be adjusted according to the policy demand. The share of

direct investment by the central and local governments is high in America and Japan, where the economic is strong.

6.3 Governmental fund

6.3.1 the Role of Governmental Fund in Urban Water Sector

Government plays the major role in urban water development. Government is the major financial body for securing the investment in urban water sector, also guiding the direction of investment. The governmental role can be considered as following:

- The major financial source for developing urban water in many countries；
- Expand domestic demand while its economic growth；
- Policy based loan including the low interest loan for guiding the private sector investment for the water sector, as well as acting as the seed money through Fund for Urban Infrastructure Development run by government. Assist the borrower to set up their trust and provide the guaranties;
- Reduce the financial cost;
- Social responsibility (i.e., income redistribution, re-adjustment of regional gaps).

The role of government changes with the economic development, policy demand, and institutional reform. According to the international experiences, the economic development stage is the major element to influence water policy. For example, UK and France started to develop water supply and sewerage treatment facilities earlier through private sector participation while the governmental financial capacity was weak in the early economic development stage. The relationship between the public sector and private sector show us the repeated cycle as shifting from privatization to state-operated, and from state-operated to privatization. This is the result of policy decision for solving “government failure” and “market failure”.

6.3.2 Financial Sources for Local Governmental

There are four financial sources for local government to get the funds.

6.3.2.1 Grants from central government

Grants from central government can be effectively used in the whole country in speeding up the construction during the certain period. The detail implementation schemes is decided by financial and tax system in each country. The transfer grant from the higher authorities can be fully utilized while its developing stage normally from 10 years to 20 years, in particular useful in the area with regional gaps. But if

this system is implemented for a long period, local government will rely on central government much, even though the demand of construction is not huge, they will still continue to apply the grants causing the uncertain aim of budget, low efficiency. Therefore this measure cannot be used in long-term, it is the financial policy with historic mission.

6.3.2.2 Local Tax Revenue

It is necessary to secure the investment in urban water sector, but however it is hard to add the new type of tax. Establishment of the specific account is a useful measure to secure the investment scale in urban water sector.

6.3.2.3 User Charge

The implementation of price policy is the basic condition for realizing water infrastructure construction and market-oriented operation. It is the central concern in public work reform. It is important to definite the principle of setting price including considering the cost, the profit ratio, and tariff policy. The proportion of tax and user charge is different in each country decided by the rule of cost burden.

6.3.2.4 Other Financial Methods

Local government can get the loan through the banking system or issue municipal bonds through the capital market. The other investment bodies like international development organizations or ODA also can finance local government. Enterprise can access the loan from commercial bank or issue corporate bond, and utilize stock market.

6.3.3 Difficulties in Government-run System for Financing Urban Water

At present, taking a look of financial mechanisms of urban water sector in China, governmental investment is faced some difficulties considering as shortage of governmental finance, the low efficiency of central governmental finance (such as treasury bonds), and the lack of local commercial financing. Shortage of governmental finance in urban water sector is inevitable result accompanying with rapid development demand. The government decided to take urban water sector as profitable goods, but not the public utilities due to limitation of governmental financial capability. Considering its profitability, the government will be surely to request the social capital participation through the commercial financing.

Regard to the commercial capital, the advantages of investment in urban water sector is that the natural monopolised protection for capital, low market risk, highly stables cash flow. On the other hand, the disadvantages is that huge investment, highly dead and specialized capital, long-term recovery, low profit, and low policy risk. At the same time, the importance of water resource strategies is getting raised in china, and the human life is getting closely relation with water, which making the water sector

more attractive than other general infrastructure. It is necessary to emphasize that the basic premise for demonstrating the advantages of the investment in urban water sector is to set up standards of policy environment and competition environment. Otherwise there is high policy risk, and no advantage at all.

From the investment characteristics, urban water sector is looking for the long-term and stable capital with low financing cost. In theoretically, the most suitable financial sources for the water sector is treasury bonds, municipal bonds, governmental fund, and policy-based finance with its low financing costs and the long-term repayment, the low interest loan form international development organizations, and ODA, and pension funds and insurance funds. Therefore, government is the most available financial body in the water sector.

However, as the major financial body, the government faces the two problems, one is inefficiency of investment, and another one is institutional barriers. Financial channels for urban water developed by the central government are broad, but it did not match with local characteristics. It caused low investment efficiency. For example, taking the case of Treasury bond, due to the long time for permission, miss control of project scale, heavy load of work and lack of responsibility body, problems occurred in the management of Treasury bond funds and the implementation of projects. Basically the reason is lack of the effective grant transfer mechanisms (financing by central government, investing by local government) between the central government and local government. Municipalities now are prohibited from issuing municipal bonds except for special regulation and regulation of the State Council due to the Budget Law in China. But issuing municipal bonds is a common approach in developed countries for financing urban water projects. It is the bottleneck that local governments cannot access the capital through the channel of municipal bond.

The financial system and tax system is closely related with the macro economic situation. The development of municipal bond is slow being influenced by the undeveloped market economy system. Since 2003, China is facing the inflationary trend, it delay the issuing of municipal bonds, which has already hoped to be test in the pilot cities in a short term.

6.4 Local Government Commercial Financing

The marketlization in the water sector does not mean that government should quit the investment body. Well-developed market can make government utilize the low cost capital effectively through the capital market, as well as carry out the joint investment in the water sector with enterprises by using the reasonable investment structure. During the market transition period, the lack of investment and financing capacity is significant in local government, in particular at the level of municipality, which seriously restricts the development of urban water sector and the promotion of the marketlization.

There are many common problems happened while promoting the water sector reform at the municipal level. It can be summarized as: low price for selling the existing capital, transferring the investment responsibility to citizens, unreasonable price increases, issue municipal bonds against the regulation through issuance of corporate bonds by local domestic company, and infringement of the investor profits by administration participation, etc.

How to develop the scientific and reasonable financial channels? Government should predict the economic development, and make the long-term investment and financing plan for the water sector. Development of their own investment and financing system should be considered two aspects: One is to expand the governmental investment channels including the application of treasury bonds, special fund, the increase of expenditure, utilization of the existing facilities through the reform of property rights, and the issuance of well function municipal bonds. But the principal and interest should match with its long-term economic development. The other one is to open the market to the social capital, encourage enterprises investment. Normally, it is called as Public-Private Partnerships (PPP).

The Government must improve the financial environment and provide the multiple channels for enterprises to finance the water projects, and identify the property right of existing utilities and its investment and financing structure for clarifying the investment responsibility and profit sharing between the government and the enterprise. It is necessary to establish Water Industrial Concession Management System for regulating the responsibilities, rights and profit between the Government and the investors, and set up Public Monitoring and Management System for regulating the service quality and service price, and securing the public right. Government and social investor will work together. The major financial sources are from commercial banks, stock market, and corporate bonds, etc. Implementation of PPP can also realize the expansion of fund and introduction of the advanced technology and management know-how to improve the efficiency. Which methods are adopted depending on the financial capacity of municipal government and the financial and tax policy, it also changes with its economic development situation and the development of innovative financial tools.

Recently, Chinese government will kick off the specific fund for the project of South-to-North water diversion. It can utilize price increases, and rely on the national project to charge the water resource fee within the water price. The provincial and municipal governments will be the main bodies to use this fund. It is an innovative financial mechanism. It can change the water price structure, and solve the urgent problem of shortages of governmental finance.

At the same time, the grant transfer mechanism in the central government will be gradually improved, which can improve the efficiency of treasury bonds. The autonomy ability of local financial and tax system strengthens gradually, that will be a basic solution for the local governments to investment and financing the water sector.

Part III: Case Studies

With the acceleration of Chinese municipality, the opening of marketlization of municipal water has been promoted drastically due to large shortage of fund. It's more correct to say that water marketlization is recognized by the government by high investment requirement on municipal water business than by the promotion of governmental policies.

Since the construction of Plant B of Chengdu No. 6 Water Supply Plant by BOT in 1998 which became a test field of national BOT mode, BOT mode developed swiftly in municipal water business. In recent years, BOT has almost become terminology for municipal water marketlization in China. Previously traditional BOT was internationalized by inputting personnel, fund resource, and financing modes. Representing projects, besides Chengdu, include also A Plant of Beijing 10th Water Plant, etc. At present, a pre-BOT mode is in lead. As per incomplete statistics, number of various BOT has reached hundreds, especially obvious in wastewater treatment plants, and investors are getting more "nationalized".

From many BOT projects under research, as a conventional international financing mode, standard BOT projects may avoid obstacles of prevailing laws. Basically there occurred no decisive disputes in some legal matter mostly focused, such as asset mortgage and concession impawn, equality in agreement, governmental supervision, etc.

At present, investment mode of nongovernmental capital featuring BOT has become the leading mode to attract fund for Chinese water marketlization. Via analyzing the very influencing BOT projects constructed or under construction in water business in China, this Part is for understanding some widespread issues in present Chinese water market.

1 Case Study of Chengdu No. 6 Water Supply Plant

1.1 Project profile

Plant B of Chengdu No. 6 Water Supply Plant, once 4th Phase of Chengdu Water 6th Plant, is one of BOT projects of municipal public affairs approved by previous China Planning Commission. In Sept. of 1997, this project was officially opened to invite international bidding. Foreign companies or company unions of 33 countries participated in the bid and French company Veolia and MARUBENI CORPORATION won out. In Aug. 1999, BOT project agreement was officially signed, with concession period of 18 years, incl. construction period of over two years. The project company formed by French company Veolia and MARUBENI CORPORATION, Chengdu General Water-Marubeni Water Supply Ltd. shall be responsible for financing, design, construction, and operation in concession; after the end of concession, the water plant shall be returned to Chengdu Municipality without charging any payment.

Main construction content of Chengdu Water Plant BOT is comprised of taking water of 800,000m3/day, water cleaning plant of 400,000 m3/day, and water transportation pipeline of 2,700m. Total investment of the project amounts to USD107,600,000, 30% of which shall be directly invested by shareholders of project company (60% by French company Veolia, and 40% by Japanese Marubeni); remained 70% shall come

from finance by Asia Development Bank, European Investment Bank, and other 5 commercial banks headed by Lyons Credit Bank. Dadiqiao Consulting and professional law fairs are employed during the performance of the complete project.

The construction of the project was finished in Dec. 2001. Formal water supply started on Feb. 07, 2002, with daily water supply of 400,000m3. During the concession of 15 years, the average water charge shall remain RMB1.27/ m3. B Plant applied water-inducing technology of high concentration of Veolia, focusing on idea designing, tight workmanship, and land-saving. Construction of the plant emphasized on saving and performance so as to lower the cost. The cost is only about RMB0.10/ m3, excluding financial cost. Total employment totals 32 people.

1.2 Project evaluation

- To break the monopoly of nation-ownership on traditional municipal infrastructure

Plant B of Chengdu No. 6 Water Supply Plant is one of 1st set of BOT test projects approved by the government. This project broke the tradition that water infrastructure facilities are completely operated by various levels of governments by applying for direct investment of financial capital. During the execution of the project, all required capital for the construction is borne by foreign side, while Chengdu municipality doesn't invest financial capital. The project started the mode to open the direct investment from foreigners for municipal infrastructure and allow foreign sole investment.

- To create project financing mode based on market

The import and operation of BOT mode open up a new channel for financing for construction project of Chinese municipal infrastructure. Different from traditional direct financial investment, operation of BOT shall be abided by market rules and fair competition.

Multiple financing channels shall be explored during marketlization for municipal infrastructure in the future.

- Foreign stones might bear jade

During the process of construction of B Plant, special attention is paid to idea design, performance of facilities, and tight design. B Plant applies design idea of concentration, maximum design optimum incl. change of thickness of pipeline walls, tight workmanship, and decrease of land occupation area from originally designed 100 mu to 70 mu. Compared with Chinese traditional design, investment construction and operation cost are drastically reduced, while investment effect is increased.

In management, B Plant applies the adjustment mechanism recognized internationally, fully automatic, and maximally reduced number of employment to only 32.

B Plant belongs to heavy-load design and saved much cost, but the whole system is relatively fragile.

2 Case Study of Shanghai Youlian Zhuyuan WWTP

2.1 Project profile

Shanghai Youlian Zhuyuan Wastewater Treatment Plant is divided into two phases. Zhuyuan Plant I (Zhuyuan wastewater phase I) began in 2001 with designed capacity of 1,7m t/d and of first class reinforced treatment technology. By May 2002 the invitation of investment was finished and Shanghai Youlian Group won the bid by the price of RMB0.222/ton with the concession of 20 years. The bidding price covers total cost including depreciation and profit, with rate of return at 6%. The project began in Jun. 2002 and field construction started in Oct. of same year. Presently it's almost finished and is under commissioning. With the putting into operation of Plant I, the lowest daily-nominated water treatment capacity is 1.4m m3. In case of shortage of incoming water, water drainage company shall settle with lowest nominated water volume.

Zhuyuan Plant II (Zhuyuan Wastewater 2nd Phase) started by the end of 2003 with treatment scale of 500,000 ton/day and with class II treatment technology. With present personnel and facilities, Shanghai Youlian Group optimized the compatibility to lower cost and was awarded the bid with lowest price of RMB0.299/t. The concession is 25 years and signing of the contract shall be finished soon.

Shanghai Youlian was a civilly owned enterprise dealing mainly with 3rd industries such as real estate, golf playground, taxi, etc. Zhuyuan project led the group into the field of wastewater treatment. In 2002 the group set up an investment development limited company of Shanghai Youlian Zhuyuan 1st WWTP by gathering a set of outstanding technology, business, and management personnel on water supply and drainage, wastewater treatment, and automation. Employees graduated from universities or with higher degrees are over 80% of total employment of the company. It's said that investment of Zhuyuan project is mainly from outside, and mostly from overseas.

During the execution of the project of Shanghai Youlian Zhuyuan WWTP, Shanghai International Tender Co. is invited as the consultor for the project. Meanwhile drainage company has employed professional law firm.

2.2 Project evaluation

- BOT imported competition and multi-financing modes

As an economically strong city, Shanghai invests much in municipal infrastructure with around RMB10 billion per year. Since 1995, drainage projects are seldom financially supported by governments. Therefore drainage industry in Shanghai is still facing the shortage of fund. To drainage industry in Shanghai, the import of BOT is the beginning of importing competition and multi-financing modes. However, both the government and enterprises shall establish a correct understanding towards fierce competition and risks in market, make careful choices, and carry out no blind decisions.

- Effectively lower cost by competition

As per the budget of cost made by Shanghai Zhuyuan 1st WWTP for original design, without considering profit of return, treatment cost shall be RMB0.38/m3 excluding payoff, and operation cost RMB0.28/m3 excluding depreciation. However Shanghai Youlian Group won the bid by RMB0.222/m3. Obviously, drainage companies lower cost to a large extent by inviting investment and market competition.

- High credit of Shanghai municipality lowers policy risk and cost of investment

Policy risk forms a critical risk factor for carrying out BOT projects. Bid on Zhuyuan Wastewater 1st Plant was prior to the release of relevant regulation on concession in Shanghai. Therefore, willingness of Shanghai Youlian Group to accept the construction and operation of Zhuyuan Wastewater 1st Plant without any investment experience in WWT shows great confidence of high credit of Shanghai Municipality. Enterprises consider that governmental credit directly effects policy risk in investment and investment cost of projects.

- "More bitterness in negotiation, less trouble in performance"

BOT project in municipal water sector particulars in long circle, large investment, and high risks. Therefore consideration is necessary during negotiation and performance. Each detail needs discretion. Complicated and hard discussion guarantees future work.

3 Case Study of Xuzhou Sanba River WWTP

3.1 Project profile

Sanba River WWTP, Xuzhou is invested and performed by a civilly owned enterprise, Xuzhou Yuanquan Environment Protection Engineering Ltd. via BOT (It's not standard BOT defined by World Bank since it's not real project finance). Its construction began in 2000 and finished by the end of 2002. Water passing running started by Mar. 2003. Scale of the plant is 100,000 tons per day and capacity after 1st phase construction is 30,000 tons per day. Total investment of construction of the plant is RMB36m, including 43.28 mu of land, 5.4km of waste blocking pipelines, and inner facilities of WWTP. Sanba River WWTP, Xuzhou is invested, designed (with cooperation), constructed, and operated by Xuzhou Yuanquan Environment Protection Engineering Ltd., with concession of 25 years. During the concession, Xuzhou municipality pay operation fee of RMB0.80 for treating each cubic meter as per scale of 30,000 m3/d of wastewater treatment; after the concession, WWTP shall be returned to government without charging any payment.

After the investors optimized the technology and structure, and selected national equipment, estimated investment cost dropped from RMB70m estimated by government to RMB36m agreed by both parties, water plant among which only occupied RMB6m for each 10,000 tons. During the process, because the government fixed total investment of RMB36m as the basis, investors enthusiasm was increased and actual cost was further lowered to RMB31.7m (some technical cost on design was reduced). Actual cost might be even lower. The investor used to be a environment protection engineering company with limited capital. RMB12m of project capital was the commercial bank loan of 3 years with asset mortgage and third party guarantee. The financial cost is relatively high（6.8%）.

- Large space of cost compression appears in budgeting system under planning system

Under traditional WWT system, no governmental units, designing institutes, or constructors tried for further lowering cost. Key reason lies in the profit-related relation between relevant units and invested amount. Some governments functioned as investors, resulting in improper supervision.

- Realization of wastewater charge is the premise to actualize wastewater treatment

Under present investment and finance systems in China, as the main responsible party for WWT, local governments feel confined for running construction capital by system. Therefore, either applying marketlization or non-marketlization mechanism, realization of wastewater charge is the premise to actualize wastewater treatment. RMB0.85/t charged by Xuzhou for wastewater is higher than payment of Sanba River project. As per national regulation, it shall not be moved for other uses. This fixes a solid basis for carrying out the project smoothly. At present water plants of many cities are not running well after construction or the government could not pay running expense of investors on time, and the core reason is due to shortage of wastewater charge. Xuzhou case proves that so long as the wastewater charge is available, even medium advanced regions can promote good circulation of wastewater treatment in an ideal way (Present rate of municipal wastewater treatment in Xuzhou actually reaches higher than 90%).

- Pre-BOT mode of traditional environment protection engineering companies are expecting a future

Core of marketizaion is to modify the originally unseparable wastewater treatment building and running system between government and enterprises so as to increase efficiency radically. From the execution of Sanba River project, we may tell that under the premise of reasonable supervision by government, nongovernmental capital and force enable the maximum investment and reasonable saving of running cost. A set of traditional environment protection companies with technology and experience may enter construction and running market of medium-sized and small WWTP under scientific supervision, marketlization mode, and pre-BOT mode. From this point of view, Xuzhou Sanba River project bears the value for promotion for medium-sized and small WWTP. However, the nature for pursuing for profit of nongovernmental capital shall not be neglected. Due to the fact that low quality of main body of investors for environment protection projects, scientific supervision and fair competition are two premises to be simultaneously taken into consideration.