
Investment opportunities in the Chinese Water Industry



An introductory overview

August 2010

Introduction

This report has been prepared by The Guthrie Group (“Guthrie”) to give a brief overview to Western investors of the opportunities currently available in the water industry in China.

China is currently in a state of fast growth and economic, political and social transition. This is resulting in opportunities in many industries, and water is an example where historic under provision, the demands of rapid industrialisation and urbanisation combine to demand change on a substantial and rapid scale. Despite its size and resources, China alone cannot meet these demands in the required timescale, and so there are clear opportunities for Western capital, technology and management skills. However, it is important to view these opportunities in the light of the Chinese experience. It is not possible to import wholesale Western solutions – technological, managerial or economic – and expect them to work in the Chinese context. A successful investor will adapt the Western experience to China, and the assistance of local professionals familiar with Western business is critical. Guthrie is well-placed to help in this situation, with good local Chinese contacts as well as substantial experience of structuring transactions in many jurisdictions.

China’s regulatory, corporate disclosure and information requirements are substantially different from those we are used to in the West. It is frequently difficult to get reliable information on which to base judgements. The information used in this report is believed to come from reliable sources, but no warranty is made as to its accuracy, and we would advise carrying out appropriate due diligence in the context of any transaction. We would be pleased to assist with such a process for interested parties. Acknowledgement is made to those sources which have been drawn upon, which are referred to in the sourcing footnotes and in the Appendix.

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Contents



1. Executive summary
2. Overview of China and its water needs
3. The role of Government in the water industry
4. The urban drinking water industry
5. The wastewater treatment industry
6. Investment review
7. How Guthrie can help
8. Appendices

Executive Summary



"a viable and attractive investment opportunity for western companies"

Executive Summary

- China is the largest country in the world in terms of population (1.33 billion), yet it suffers from severe water shortages due to underdeveloped infrastructure, the level of pollution and sheer size of the country. Despite abundant raw water, China ranks 13th in the world in terms of water need, with per capita resources only 25% of the West. Wastewater treatment is a particular issue, with half of wastewater discharged untreated into the resources pool. Water shortages represent a significant threat to China's future economic development.
- Developing China's water industry is a priority for the Chinese government. The most recent (11th) Five-Year Plan sets specific, ambitious targets for the water sector and the government plans on RMB 470 billion (USD 70 billion) investment over five years. A significant part of this will come from external (foreign investment) sources.
- This represents a very viable and attractive investment opportunity for western companies, bringing capital, technology and management expertise to bear. Western companies have invested several billions of dollars in the industry, and in some cases already seen good returns through local market IPO's. We envisage a continued stream of such opportunities as the infrastructure development program continues. The government is broadly supportive of such foreign involvement, although the rules of the game are not always straightforward.
- Local capital is also active in the market, and recent IPO activity strong. The market is relatively immature in this respect, and we do not regard current valuations as always realistic. Nevertheless, the strong local interest and flow of capital is real and substantial.
- Investing in China's water industry is not without its pitfalls. Government complexities, expansive geography, disparities between supply and demand, lack of public information are just some of the many reasons why one needs an experienced team to assist an investor through this.

Overview of China and its water needs



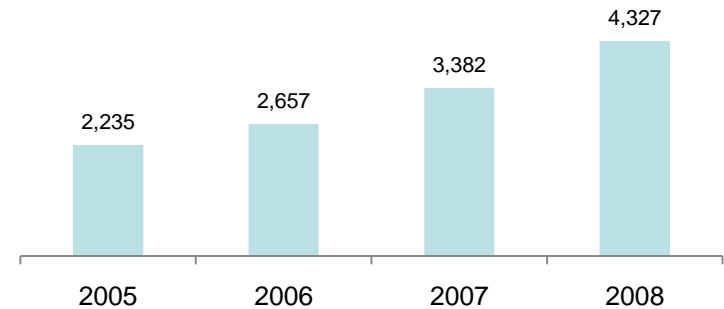
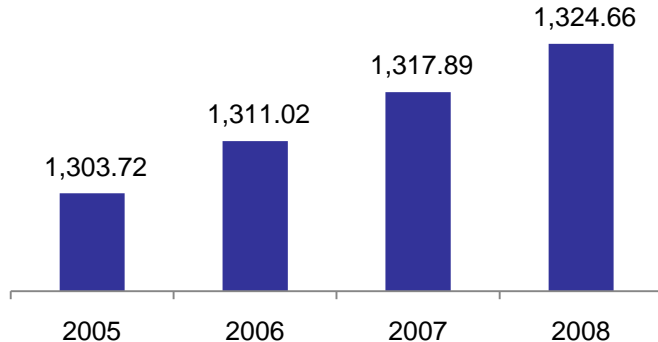
"98% of the urban population of China have access to adequate water resources, but only 81% of the rural population"

China – a Growing Economy and Population

- China is one of the largest and fastest growing countries in the world with a population of 1.33 billion (the world's largest) and GDP (2008) of USD 4.4 trillion (3rd largest). Between 2005 and 2008 its economy grew by 48% and even in the face of a western recession, grew by 8.7% in 2009

China Population (2005-2008) in millions

China GDP in USD billions



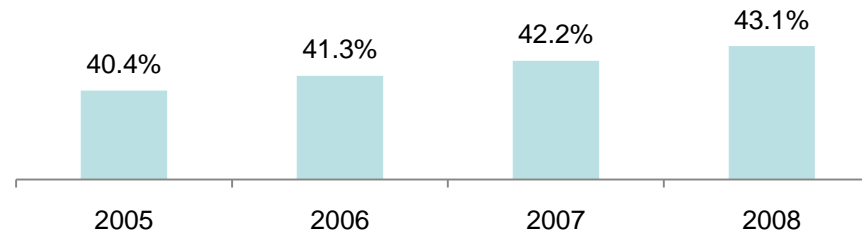
Source: The World Bank

Source: The World Bank

- China's population growth has moderated following the introduction of the "one child per family" policy, but is still positive in absolute terms representing a net annual addition on average of 7 million, the population of a country the size of Sweden each year.
- Between 2000-2007 the demand for water has risen by 0.8% CAGR. This is double the growth of water supply (0.4%) during the same time period and is symptomatic of the water crisis facing China.

Urban Population of China

- China's population is urbanizing rapidly:

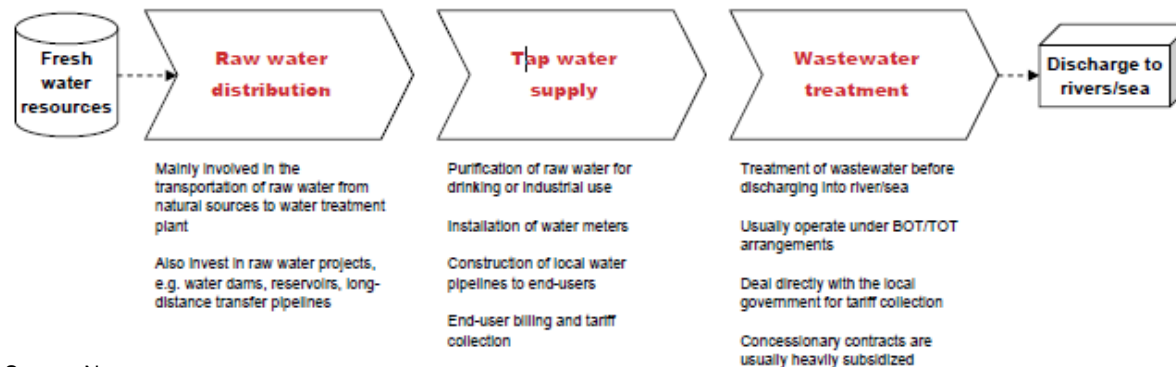


Source: The World Bank

- See Appendix 1 for a summary of China's economy prepared following a recent IMF visit.

Overview of Chinese Water Industry

- The Chinese water industry is undergoing substantial change, away from a traditionally municipally dominated industry towards private ownership and/or management, and what was once a free good is now a charged resource with major social and economic implications.
- The water industry consists of 5 major stages:
 1. **Fresh Water Resource.** The management of lakes, reservoirs and other sources.
 2. **Raw Water Distribution.** Primarily the transporting of untreated freshwater from its source to water treatment plants and/or water reservoirs or other preservation projects.
 3. **Tap Water Supply.** Raw water passes a series of filtration and decontamination systems to purify it for use, for either drinking or industry. This includes developing the necessary infrastructure to transport and distribute the water from treatment facility to end user by of local water pipelines and installation of water meters at private residences and commercial sites. Payment of tariffs for use takes place at this point.
 4. **Wastewater Treatment.** Wastewater is treated at specialized water treatment plants before being discharged into local water sources. Characterized by BOT/TOT based operations and a heightened local government involvement, especially concerning tariff collection and government subsidies.
 5. **Treated water** is discharged into local water (rivers/ocean).

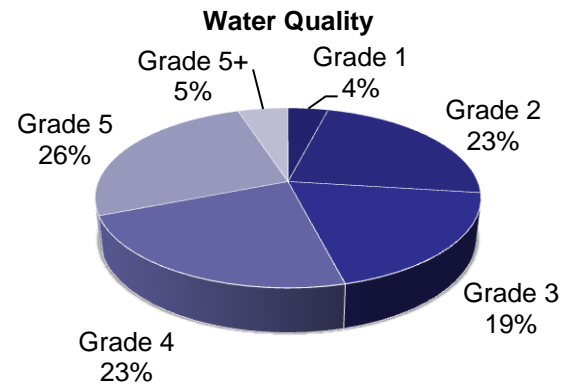


Source: Nomura

A Looming Water Crisis?

- According to the World Bank in 2006, 98% of the urban population of China have access to adequate water resources, but only 81% of the rural population have such access (adequate water is the availability of at least 20 liters per person per day from a source within 1 kilometer of residence – not a very demanding standard). Sources commonly include household connection, public standpipe, borehole, protected well or spring.
- This shortage has only worsened in recent years; in 2009, China ranked 13th in terms of water inadequacy in the world, along with countries in sub-Saharan Africa, with water resources (gross, not treated or available for consumption) per person of 2,156 m³, compared to the global average of 8,462 m³.
- China nevertheless has the fourth largest overall water resource in the world, with annual water resources of 2.8bn m³. Despite this natural abundance, because of supply issues, pollution and wastage, in 2006 an estimated 312 million didn't have access to safe drinking water. More than 400 cities experienced severe water shortages.
- Water quality is measured on a 6 point scale
 - Grade 1,2 (drinkable water)
 - Grade 3 (undrinkable but suitable for human contact)
 - Grade 4 (intended for industrial and recreational use)
 - Grade 5 (agricultural and landscaping use)
 - Grade 5+ (useless)

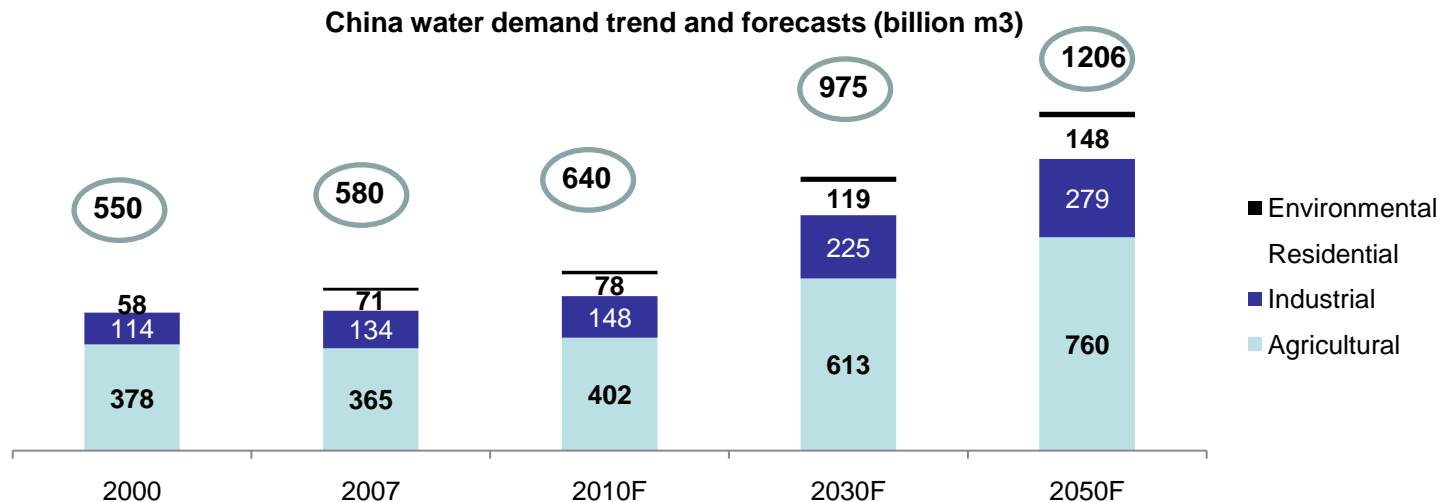
In the end, only 27% of all of China's water is actually safe to drink



Source: State Environment Protection Agency

A Looming Water Crisis? (2)

- The combination of China's population growth and rampant levels of pollution exacerbate the levels of water scarcity:
 - According to the Ministry of Water Resources, China's population will reach an estimated 1.6bn by 2050, yet the per capita water resources will be reduced to approximately 1,700 m³ (-21%)
 - In 2007 it is estimated that approximately half of China's wastewater was reintroduced into the water resource pool untreated. 62% of the water from the seven main rivers of China have been rated as non-potable by the State Environment Protection Agency (SEPA).
 - In 2006, SEPA categorized 59% of China's 161 emergency incidents as water-related.
- We estimate that to reach a minimum acceptable (least demanding western) standard of water supply and quality, total in investment of in excess of RMB2,709bn (USD400bn) is required between 2010 and 2025. This is approximately 10% of China's current GDP, a demanding target even for one of the world's fastest growing economies
- Water demand is expected to more than double by 2050:



Source: Nomura

The Role of Government in the Water Industry



"The 11th Five-Year Plan has set a demanding target for the development, expansion, and improvement of the water industry"

Chinese Style of Government

- China has been ruled by the Chinese Communist Party (CCP) since 1949. However, unlike similar communist - style governments which are characterized as rarely deviating from a rigid hierarchal and authoritarian style, China's government is very complex, diffuse, and competitive amongst its many different stakeholders. This is exacerbated by the demands of its massive geography. Nevertheless, China's government is becoming increasingly market-oriented as it seeks to map out its path towards a new style of socialist future.
- The Central Chinese government oversees three separate layers of authority that make up the expansive Chinese countryside:
 - 34 Provincial-level governments
 - Nearly 300 Municipal-level governments
 - Over 43,000 Local Governments (3,000 prefecture-level and 40,000 township-level)
- The complexity and inconsistency of these levels of government stems from the Chinese constitution which allows them to “conduct the administrative work concerning the economy, education, science, culture, public health, physical culture, urban and rural development, finance, civil affairs, public security, nationalities affairs, judicial administration, supervision and family planning in their respective administrative areas.”
- In order to successfully invest/operate in China one must be prepared to be able to deal with the extensive level of government bureaucracy and complexity that comes with the large government structure, and the high (albeit reducing) levels of corruption within the separate local government bodies,.
- Building effective networks within government at all levels is central to the success of any organization wanting to become involved in China. This requires substantial time and effort.

11th 5-Year Plan

- China's most recent (11th) Five-Year plan (2006-2011) overall objectives are :
 - Maintaining balanced and fairly **rapid economic development**
 - Speeding up the **transformation** of economic growth pattern
 - Improving the capability of **independent innovation**
 - Promoting **balanced development** between urban and rural areas and among regions
 - Strengthening the building of **harmonious society**
 - Deepening **reform** and opening-up persistently
- The plan has set a demanding target for the development, expansion, and improvement of the water industry, including plant, pipeline, infrastructure, maintenance, environmental and quality improvements in order to:
 - Increase water supply to a further 100 million people in rural areas (737 million people in rural China in 2006, 435 million of whom had water supplied)
 - Increase urban water supply by 40 million cubic meters
 - Reduce water consumption per unit of GDP by 20%
 - Increase the sewage treatment ratio to 70% from 52% in 2005
- The Chinese government proposes to allocate **Rmb 470 bn** (USD 70 bn) for water improvement. **Rmb330 bn** has been allocated towards wastewater treatment and the remaining **Rmb143 bn** for water supply (raised internally and through foreign investment).
- According to the Pipeline Reconstruction Policy issued by the Ministry of Construction and NDRC this investment will be used to reduce leakage by 5%, which would reduce non-revenue water by 1 billion m³; improve water service stability and hygienic conditions of water pipeline; restore even water pressure over pipelines to reduce bottleneck problems; increase water supply operation by 5%, benefiting a population of 229 million (non-agricultural population is 159mm).
- The 12th 5 Year-Plan is still in the developmental stage, but is said to continue China's focus on the environment and specifically the water industry.
- In the end, an adequate supply of water is a clear priority of the government.

Regulation and Tariff Reform

- The regulation of tariffs in the water industry is an emotive subject and one with which Government is intimately concerned. It also one of the main value drivers in the industry.
- Three government ministries are involved in the water industry:
 - **The Ministry of Water Resources** was founded in 1949. Its primary responsibilities are to ensure water resource development and utilization, provide guidance through research and supervision of the water supply sector, developing and implementing water protection/conservation plans, and policing the industry to ensure no illegal incidents
 - **The Ministry of Construction** oversees the development of the water resources and conservation, i.e. water engineering; water usage in both the residential and commercial user markets and residential wastewater discharge
 - **The Ministry of Environmental Protection's** primary objective within China's water sector is to regulate the levels of environmental pollution emitted by both the commercial and industrial wastewater discharge systems.
- In practice, local and central government roles and responsibilities are somewhat complex and overlapping
- Prior to 1985, water was **provided free of cost** to China's population – its cost being borne entirely by the municipality and other relevant government entity. Since then, there has been a number of substantial reforms to the associated tariffs, reflecting the need to promote water conservation.
- Until 1994 the Central Government set a single water tariff for the whole country, thereafter pricing power was devolved to provincial governments under a regime which sought to **derive a low profit from domestic users and a reasonable profit from commercial users.**
- From 1998 the process was further decentralised to municipal and county levels, with each such level of government having its own price administration office. This has resulted in overall price increases but with very **wide disparities**, with urban users at the forefront of tariff reform

Regulation and Tariff Reform (2)

- Water tariffs are now set in accordance with the PRC Price Law of 1997 and 1998's Administrative Method on Urban Water Supply Price. Central government requires that tariff increases are required to support the investment needed:
 - To develop water supply so as to meet the needs of economic development and domestic users
 - To provide incentives for water conservation
 - To ensure water is affordable to the people
 - To regulate the market and control the cost of water companies
- However, securing such increases is a complicated local political process. Tariff increases involves these phases:
 1. The **Planning** phase involves the actual water company that the pricing will concern.
 2. The **decision-making process** moves through several steps before the plan is executed: Local Government and Local Price Authority; a public hearing; followed by input from local associations, experts, researchers, and the consumers.
 3. The final stage of passing a new pricing policy is **supervision of the policy** which is head up by the Higher-level Price Authority.
- The following case study illustrates the difficulty of tariff reform in practice.

Pricing Case Study - Lanzhou Veolia Water

- In 2005, the state-owned water utility of **Lanzhou city** (Pop: 3.2 million) began to reform. The company was financially burdened and running monthly losses. Its facility was in poor shape and capacity could not meet demand. The local government decided to sell a part of its stake in the utility and issued a tender in 2006. **Beijing Capital** placed a Rmb280m bid, **Sino French Water** Rmb450m and **Veolia Water** Rmb1.71bn, showing an interesting disparity in third party valuation. In 2007, Veolia Water was awarded a 30-year concession with Lanzhou Water Supply and acquired 45% of the utility.
- The new joint venture, named **Lanzhou Veolia Water**, manages several water-treatment plants. Considerable controversy arose from this deal. Despite several hikes in the water price in Lanzhou since 2005, Lanzhou Veolia Water further increased tariffs after it took over the operation. Reports suggest that from December 2005 to early 2009 the water price increased from Rmb0.9/m³ to Rmb1.45/m³, still cheap in international terms but nevertheless a large percentage increase. The application in 2009 asked for a raise from Rmb1.45/m³ to Rmb2.16/m³. The company said it lost money as costs had increased because of rising labour and other input costs.
- The provincial NDRC accepted there was a cause to consider an adjustment. To verify costs, authorities asked the Gansu provincial price bureau to review the supporting documents submitted by Lanzhou Veolia Water. The price bureau broadly confirmed the company's cost base, although it did not use an independent assessor for verification.
- Public reaction to yet another round of price increases was very negative. An official from one community in the Chengguan district surveyed 10% of Lanzhou's 2,400 households and 95% of them objected to the rate adjustment. In July 2009, a public hearing was held but only two participants present disagreed with the proposal. This reflected the lack of accountability and transparency of official processes and justified most people's distrust in the system.
- In October 2009, the Lanzhou government announced a hike in the tariff for domestic users, from Rmb1.45/m³ to Rmb1.75/m³, due to high operation cost. While the utility did not get what they asked for, an increase was permitted despite public objections. The public were dissatisfied; the company still argues that it operates below cost; and the government produced what was broadly a fudge based on flawed economics and process. However, prices did rise.

Regulation and Tariff Reform (3)

- Water prices have now been steadily increasing for the past decade. From 2000-2007 water prices increased by 11% CAGR.
- It is speculated that tariffs in wastewater treatment will in future rise at a steeper rate than that of water supply. To obtain these high levels of treated water such as the central government's target of 70% sewage treatment ratio, new facilities, pipeline systems, and repairs must be put in place. The large increases in tariffs are needed to increase the incentives to attract outside investors to fund this development.
- Over the next 10 years both drinking and wastewater tariffs are expected to rise appreciably, with some commentators forecasting rises of 10-15% annually.

South – North Water Diversion Project

- A key current government priority is the South-North water diversion project (SNWDP)
- In view of its overall water shortage, and more particularly structural/geographic water imbalances, China is accelerating the construction of this massive project, aimed at diverting water to meet growing demand in the parched north. SNWDP will divert water from the Yangtze River in the South to the dry North via three routes: eastern, middle and western. This has considerable economic, political and environmental consequences, not least in the relocation of vast numbers of people and submerging of previously fertile agricultural land.



- A number of construction projects have been completed or are near completion. By the end of 2009, over Rmb 40 bn (USD 6 bn) had been spent in constructing the middle and central routes, from the earmarked total of Rmb 90 bn (USD 13 bn).
- A tunnel on the eastern route, 70 meters below the northern section of the Yellow River, is being dug in Shandong Province, so that water from the Yangtze River can pass under the Yellow River. Another tunnel for the middle route will be completed in 2010. The dam of Danjiangkou Reservoir which forms the border between central Hubei and Henan provinces, from which the water is channelled to the north in the middle route, has been heightened from 162 meters to 176.6 meters, doubling the water volume to 29.05 billion cubic meters.

South – North Water Diversion Project (2)

- Under SNWDP, in 2009-11 200 million cubic meters of water will be transferred from three reservoirs in Hebei province to Beijing, whilst other related projects have already transferred 435 million cubic meters of water to the capital, 330 million of which was received, a measure of the scale of water losses in the project. Beijing is still in dire need of 200 million to 600 million cubic meters per year from Hebei until 2014.
- Despite the water transfer efforts and underground water exploitation, there is still a lack of 400 million cubic meters of water every year in Beijing, where experts says that the gap between water supply and demand has reached a critical point.
- Approximately 3 million people have been affected by SNWDP. A further 230,000 people in Hubei and Henan provinces are to be relocated before the middle route is completed and water diverted to northern China in 2014.
- These relocations have had a political backlash, both domestic and international. The impact of this backlash, in a very typical Chinese style, is not to prevent the project going ahead, but to limit the degrees of freedom of government in the future and to make the hierarchy wary of pushing too much too quickly on an unwilling population. This style of reaction is an important lesson when considering the ability of government, central and local, to force through much-needed changes including increases in the water tariff in the future. What is economically desirable may not be politically and practically possible except over an extended time period.
- The major works are being carried out by local Chinese companies under contracts let by the Central government and its agencies. Western companies have some involvement in the design elements of the projects, but this area of the water resource plans is largely a domestic affair.

Urban Water Supply

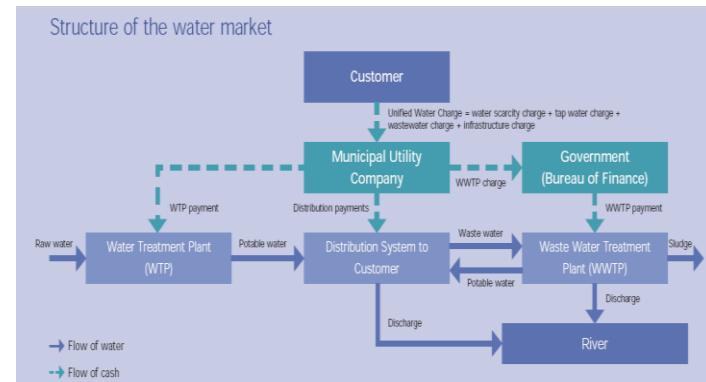


" An increase in urban water provision is expected to continue and expand in the years to come. This will need to be largely funded by non-governmental sources "

Major Cities and their Supply Arrangements

- Of the 160 major (1 million + population) cities in China, approximately 70% are judged to have an inadequate supply of drinking water, and only two (Beijing and Shanghai) approach levels of availability, service and water quality which approach Western levels although service here is still quite patchy.

- By the end of 2007 there were over 1,700 separate water supply companies in urban areas serving a total population of approximately 350 million, or 26% of China's total. The vast majority of these are municipal-owned and operated entities, and in many cases their networks date back to the middle decades of the 20th Century. The Supply Chain is represented in the accompanying diagram.



- In the period 2005-2007 the length of the urban water supply network increased by nearly 8% annually as municipalities sought to meet rising demand, and that increase in provision is expected to continue and expand in the years to come. This will need to be largely funded by non-governmental sources.

- A key fact is that the availability of water resources and population are almost exactly mismatched, which means that the urban drinking water supply industry offers perhaps the greatest investment opportunity in the immediate future

Water per capita by province, 2007



Source: National Bureau of Statistics, Civic Exchange, CLSA Asia-Pacific Markets

Urban Tariff Structures

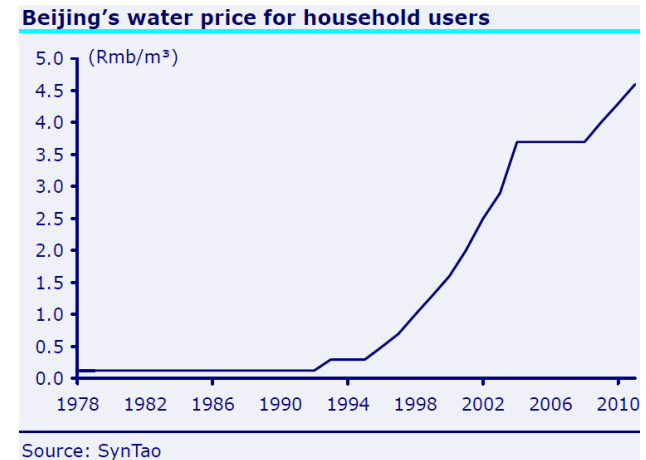
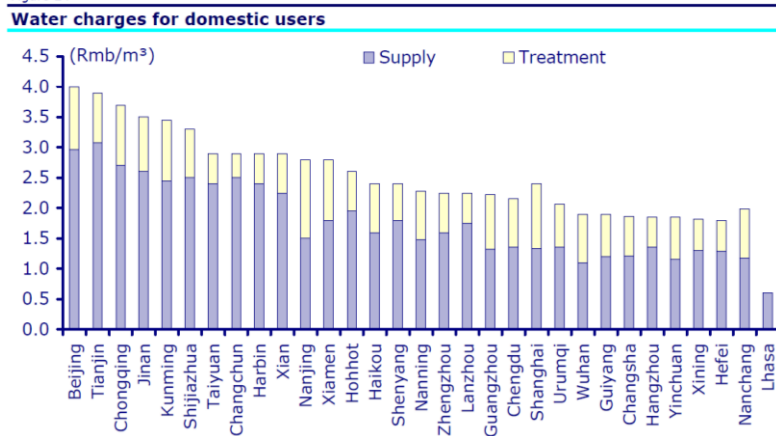
- Water tariffs vary from city to city. For instance, Beijing has the highest tariff in the whole country at Rmb 4/m³, which is nearly seven times higher than in Lhasa, Tibet (Rmb 0.6/m³). The large variation is due to the cost of accessing water in different localities. Generally speaking, tariffs are higher in the dry north and lower in the more-water-abundant south
- Urban water tariffs in China comprise of four types of fees:
 - **Hydraulic-facility fee (HFF):** This is the price of hydraulic engineering, and is based on the cost of the raw-water infrastructure built by the government
 - **Water-resource fee (WRF):** This is set according to the degree of water scarcity, thus the fee is higher in water-scarce areas. WRF is supposed to go to local and central governments as part of general revenue but in practice most of it is retained by local governments for water-resource development, conservation, protection and management. For example, part of Beijing's WRF goes to fund the South-North Water Diversion Project
 - **Water-supply fee (WSF):** WSF covers utilities' capital and operation/maintenance costs as well as relevant expenses, taxes and profit
 - **Wastewater-treatment fee (WWTF):** This is based on the actual water consumed and set to cover operation and maintenance costs for treatment.
- In practice, these fees are somewhat arbitrary and confusing and inconsistently applied, as the following table shows. Nevertheless the message is clear – urban water tariffs are rising across the board

Breakdown of water-tariff increases in five cities, 2009					
(Rmb/m ³)	Beijing	Shanghai	Tianjin	Shenyang	Nanjing
Month adjustment	Sep	Jun	Apr	Jul	Apr
WRF	0.42	0.00	0.00	0.00	0.00
HFF	0.00	0.00	0.38 ²	0.00	0.00
WSF	0.00	0.60	0.12	0.40	0.10
WWTF	0.48	0.40	0	0.10	0.20
Total increases	0.90	0.96 ¹	0.50	0.50	0.30

¹ Consumers pay only 90% of the WWTF. ² Pay for South-North Diversion Project. Source: SynTao

Urban Tariff structures (2)

- The disparity that this regime has brought about, and the steep urban tariff increases in some areas, are apparent from the following charts:

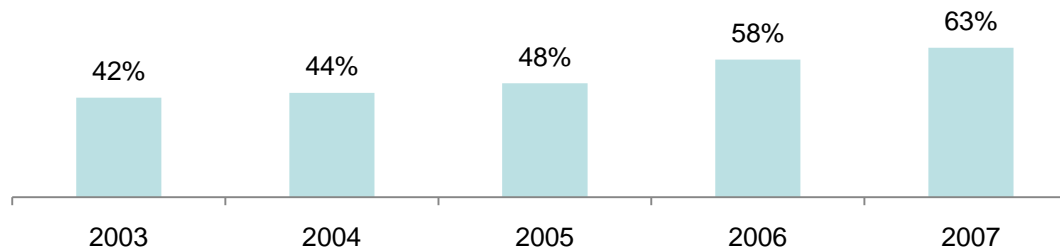


- The key takeaways for investors are that tariff reform is clearly on the agenda; that is being driven through by municipalities; but that the economic opportunities vary widely by region and by municipality. Understanding and being in a position to influence local authorities is key to success

The Wastewater Treatment Industry

- China produces an annual volume of 33.8 billion m³ of wastewater. However, only 13.5 billion m³ (40%) is actually treated before being released into China's rivers and surrounding oceans. Only 22.3% of domestic wastewater is treated before being released. Western standards require treatment of over 95% of wastewater indicating the scale of the problem.
- China has more than 660 cities and 17,000 towns. Fewer than half (310) of the cities have municipal constructed wastewater treatment facilities. The majority of the 17,000 towns have no treatment facility.

Percent of China's wastewater urban treatment ratio



- In order for the wastewater to be deemed “treated”, it must be purified to a certain level by a series of treatments. The four most common types of wastewater treatment are:
 - Screening
 - Primary sedimentation
 - Conventional activated sludge
 - Secondary sedimentation
- Newer facilities use more advanced technology such as absorption-biodegrading process, anaerobic-anoxic-aerobic activated sludge process, cyclic activated sludge systems, sequencing batch reactor, activated sludge processing, oxidation ditches, and stabilizing ponds.

The Wastewater Treatment Industry (2)

- Until recently, all wastewater plants and their associated pipeline was municipal owned. Now, with government consent, companies are beginning to enter this industry through transferring of ownership as in TOT and BOT's.
- Wastewater treatment is potentially a hidden gem within China's water sector. This is on account of China operating at approximately 50% efficiency in terms of treating wastewater, incomplete sewage systems within cities, rising levels of water pollution, severity of situation brought under intense scrutiny due to recent water pollution incidents (eg Tai Lake incident), severe undercapitalization under development, and few existing competitors from the private sector. Under these conditions it is very unlikely that China will hit its 11th Five-Year Plan concerning wastewater without increasing the amount of foreign investment/involvement.

Investment Review



"China's water scarcity, growing demand, pollution issues and government mindset combine to present potentially attractive opportunities for foreign investors"

Investment Opportunities – the Big Picture

- China's water scarcity, growing demand, pollution issues and government mindset combine to present potentially attractive opportunities for foreign investors. These range across a spectrum from passive investment in companies, Western or Chinese, with exposure to the market, to direct equity (joint venture) engagement in resource provision.
- Because of the legislative basis for investment in China, most direct Western investment has taken the form of joint venture operations with municipalities or Chinese companies. There were some early examples of this which fell foul of changing Chinese legislation and Government requirements, including Thames Water which made an ignominious exit from the industry in the mid 1990's.
- Global market leaders, such as Veolia and Suez, have been active in Asia for many years and over the past decade have begun to be involved in China. More recently local Chinese companies, often funded by wealthy locals and now going public on the buoyant local stock market, have become active. High local market valuations have often caused or permitted such companies to bid aggressively on contracts. Local Chinese companies' political connections and the relaxed enforcement of intellectual property rights in China have also given these an advantage.
- With China's stimulus package and its favorable domestic credit environment, experts predict a surge in water-related infrastructure beginning in 2010 and continuing over the next few years, as local governments fast-track project approvals for operations in wastewater treatment and water supply. Some analysts believe that Beijing has assigned more than Rmb 75billion (USD 10billion) in the soon-to-be-announced 12th five-year plan for 2011 to 2015 to build sewage treatment plants to improve water quality.
- China Guodian Corporation (CGC), a major electricity company, has also recently bought into the Chinese wastewater market, through a USD 102 million acquisition of state-owned Shenyang Zhenxing Environmental Protection Company (SZEP), the biggest wastewater company in northeast China, serving the provinces of Liaoning, Heilongjiang and Jilin. This is perhaps a sign of the market maturing as it develops, attracting the interest of non-water infrastructure players as well as industry incumbents. We believe that as the market matures, company and project valuations will become more realistic.

Drinking Water or Wastewater?

Drinking Water Supply

- Building on the political reforms in the water industry that began in 2000, central government policies encourage local authorities to privatize/commercialize water utilities. Tap water supply plants in China have continuously operated at poor returns (4.1% net margin and 0.8% ROA in 2007) due to their previous status as public welfare enterprises. However, under government pressure to improve water quality, reasonable investment returns are being offered to foreign and domestic investors to take over poorly-performing operations and turn around operations and profitability.
- The tap water supply segment has certain advantages over wastewater treatment, since the latter's standalone operations receive fixed and highly subsidized tariffs from the government as its main effective customer. Water supply tariffs are generally passed onto and directly collected from end users, with fewer regulatory and collection risks. Tap water supply plants are also involved in pipeline expansion and meter installation, which provide additional revenue opportunities.

Wastewater Treatment

- As noted, the rapid growth in industrial activities and urbanization has resulted in over 50% of the country's wastewater being released directly into rivers and the sea without any treatment. Shanghai, for example, is surrounded by rivers but still has one of the lowest water resources per capita in the country, partly due to its large population growth and water pollution in upstream areas.
- China's wastewater treatment has to reach 121 million m³ by 2010 (a 19% CAGR) to meet the government's target sewage treatment ratio of 70%. However, only 100 million m³ is included in the government's original plan, indicating more favorable policies are required to meet this target. Not surprisingly, experts have predicted significant growth potential in the near term (according to Global Water Intelligence, China's wastewater sector anticipates 3,000-4,000 new wastewater plants in the next five years).
- However, despite positive signals from government, the regulatory risks of reliance on local government contracts makes large wastewater projects arguably more risky.

Investment Opportunities – Overseas Players

- Opportunities for foreign partnership with water supply and wastewater service providers depend to a large degree on the operation's location. Foreign ownership in the urban water treatment market is quite liberal, as there are no maximum shareholding restrictions in this category. For the water distribution market, foreign ownership restrictions depend on the size of the city:
 - Foreign investors in large cities can invest in distribution networks by securing a minority position (up to 49%) in a joint venture with a municipal utility company
 - In small and medium-sized cities, foreign shareholders are given more operational control. They are allowed, for example, to build and operate water supply and drainage networks. In addition, there are no formal restrictions on ownership of water and wastewater pipe networks.
- For the wastewater treatment market, foreigners are able to invest in wholly-owned companies and to partner with a local Chinese partner in a joint venture. In practice, joint ventures are the norm in this market also, although this may change over time
- France's Suez Environment is one of the success stories within China's water industry and has been the most active recent investor in the water treatment sector. It has completed a major treatment and supply facility in Shanghai, Shanghai Chemical Industry Park, and has taken a minority stake in several other ventures. In January 2006, Chongqing Water Investment Co. Ltd (CWIC) was formed by the municipally-owned Chongqing Water Group and Sino-French Water Investment Co Ltd, a joint venture between of Suez and a HK company, to invest Rmb 2 billion (USD 300m) into Chongqing urban waste-water treatment projects and water supply projects in the following 2 years. CWIC went public in March 2010 with an extraordinary capitalisation of Rmb 8.9 billion, giving Suez a paper profit of Rmb 500 million (230%) on its investment. Case studies on Suez and on Chongqing follow in the next few pages.
- There are considerable opportunities also for equipment suppliers. Very often these opportunities revolve around being close to those specifying the equipment, usually the municipality or its project managers. Many projects are let through competitive international or national bidding, and projects with World Bank funding usually have the most open and straightforward process.

Case Study – Suez Environment

- Suez Environment’s Shanghai Chemical Industry Park is one Asia’s largest water supply side facilities, providing both drinking water and industrial use water. Suez’s successful experience within China has been through a series of Joint ventures with companies with the highest level of local expertise in their fields. Within SCIP there is Sino French Water Development, which is a JV between Suez and Hong Kong’s New World Development. Suez’s SCIP was engineered and constructed by Degremont, a subsidiary of Suez that specializes in the design, construction, maintenance, and operation of water treatment plants.
- Suez has been very involved in China’s water industry, having completed 23 joint ventures for both water supply and wastewater in 17 separate municipalities, designing more than 190 water treatment plants (Degremont), and opening the first industrial water supply and wastewater treatment research based R&D centre in China.
- Suez has been highly successful within Shanghai with its SCIP because of the cost savings that they are able to pass on to the customer, driven by operational efficiencies and flexibility based on over 30 years experience within in the water industry.
- Suez’s Chief Executive Officer Jean-Louis Chaussade said in an interview with Bloomberg TV in 2009, “In Asia and especially China and Australia the economies are booming,” and “It is time in China to get market share.” The country is clearly a major focus area for the group.
- Suez’s most recent activity within the China water industry was its investment in Chongqing Water. With its recent IPO, Chongqing became the largest publicly traded water supplier in China, supplying water and wastewater services to 8 million people in Chongqing. A case study of CWG is found on page 32.
- Even with 85% of the company being state owned prior to the IPO, it is worth noting that taking the company public took almost 3 years from initial proposal in 2007 to approval by the Securities Regulatory Commission (SRC) on December 30, 2009.

Local Market Companies

- Over the past three years the local Chinese (Shenzen and Shanghai) stock exchanges have seen a succession of water-related IPOs. These have been met with considerable enthusiasm, with IPOs generally oversubscribed and post-IPO share price performance strong. Some commentators argue (and we agree) that the valuation levels implied by these offerings are unrealistic and unsustainable, representing something of a 'Water Bubble' along the lines of the dotcom boom. Key offerings and their performance include:

First-day stock performance of recent Chinese water IPOs

Company	IPO date	Issue price	Closing price on day one	Change
Beijing Origin Water	21-Apr-10	RMB69.00	RMB152.00	120%
Beijing Water Business Doctor	26-Feb-10	RMB65.69	RMB81.30	23.76%
Chongqing Water Group	29-Mar-10	RMB6.98	RMB12.10	73.35%
Duoyuan Global Water	24-Jun-09	\$16.00	\$21.87	36.69%
Tri-Tech Holding	10-Sep-09	\$6.75	\$8.75	29.63%

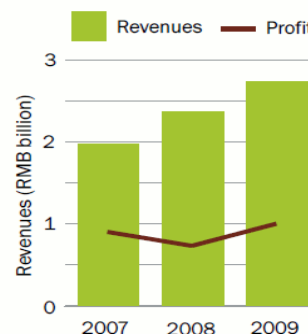
- We would argue that the water investment game in China, at least in the public markets, is at an early stage where the realities of specific risks and returns have not yet been adequately filtered into the investment mindset. Specifically, we believe that there is market naivety in the following areas:
 - Price trends.** Water prices will (*must*) certainly increase in China. However, we do not expect this to happen in a neat, predictable and geographically uniform pattern, which makes the inbuilt expectations for any given company somewhat tenuous
 - Regulation.** Whilst the overall intention of government is clear, how this manifests itself, particularly at local level, varies by time and place. There is no certainty of a continuing level playing field in the future
 - Industry economics.** Not every venture in a growing market automatically makes abnormal returns. Today's stars, which tend to be the technology (eg, membrane) -led companies, may pale besides those which control the overall business system (integrated water suppliers) . A dynamic understanding of how the business system in China will evolve is necessary for success
 - The 'Chinese veil'.** Accounting rules, tax practices, management structures and the desire to 'maintain face' serve to cloud many issues and make it difficult for investors (Western in particular) to gain a true appreciation of underlying cash flows

Case Study: Chongqing Water Group (CWG)

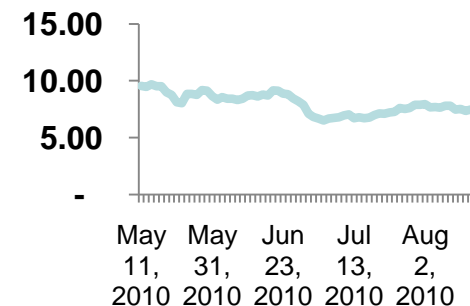
- In 2007, the company was awarded a 30-year concession by the Chongqing government to provide water and wastewater services in the Chongqing urban area, where it currently enjoys a market share of 54% for water and 96% for wastewater. The city is growing quickly, and the central government is accelerating pollution treatment in the Three Gorges area, leading to more wastewater treatment opportunities for CWG. In terms of future growth, CWG aims to invest in hydroelectric power using treated wastewater, as well as in an RMB8 billion (\$1.17 billion) programme to expand its water supply business by 60% and its wastewater treatment capacity by 100% by 2015.
- CWG went public in March 2010 raising USD510 million . Prior to the IPO, 85% of CWG's shares were held by state-controlled Chongqing Water Assets Operation Corporation, with the remainder held jointly by Suez Environment and New World, following the 2008 acquisition of 15% of the company for RMB1.5 billion. The IPO took Chongqing Water AOC's stake down to 75.1%, while the stake held by Suez and New World dropped to 13.44%. The only non-Chinese investor to buy in to the deal at pricing was Fortis Bank, which purchased 540,000 shares.
- The IPO was priced at 59 times historic earnings (market capitalisation: USD8.5 bn) and was 67 times oversubscribed. The money raised in the IPO will go towards six new water supply projects (adding 400,000m³/d of capacity), and nine new wastewater treatment projects (adding 250,000m³/d to the total volume treated by the company). The projects are to be completed between 2010 and 2012.

- Since its establishment in 2001, CWG has seen its revenue increase nine fold, but its recent performance is hardly remarkable:

Chongqing Water's key financials

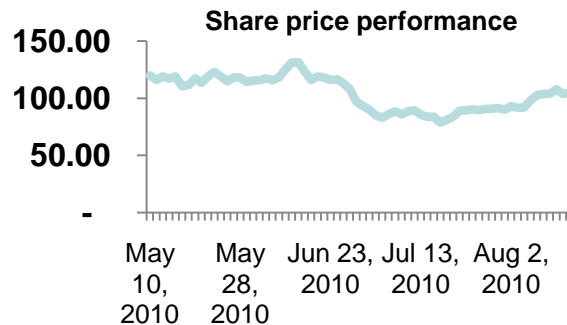


Share price performance



Case Study: Origin Water

- Origin Water is primarily a membrane manufacturer specialising in supplying and installing membrane bio-reactor (MBR) technology, although it also builds and operates wastewater treatment plants. In 2007, it built the world's largest MBR plant, the 100,000m³/d Wen Yu River facility which supplied the Beijing Olympic games, and in September 2009 signed a contract to build a 150,000m³/d MBR plant at Qing He. As of the end of 2009, it claimed to have a wastewater treatment reference capacity of over 550,000m³/d.
- The company claims a 50% share of the Chinese MBR market, although its sales are largely confined to the Beijing region, and rival Motimo produces 50% more membranes per year in terms of surface area.
- Out of a total of 147 million Origin Water shares, 37 million were offered to the market, of which 7.4 million were reserved for institutional investors. The so-called "online" portion was 62 times oversubscribed, while the "offline" institutional portion was covered 118 times. The only significant foreign investor was Stanford University's investment fund, which purchased 28,800 shares.
- Origin had initially announced in 2008 that it hoped to raise up to Rmb 600 million from an IPO, but in the event, it raised Rmb 2.5 billion (\$374 million).
- In spite of its recent successes, Origin Water does not have a long history in the water sector. Its first membrane manufacturing plant was only established in 2008, and this only enables the company to meet 30% of its customers' requirements (it has to import the remaining 70% to honour its clients' orders).
- The fact that company's relationship with Beijing's municipal water sector centres on strong government connections – most of Origin Water's senior managers have at one time or another held government office – could also make it difficult for the company to expand its operations outside of Beijing.



Major Western-Sponsored Projects and Events in the Chinese Water Industry

- As the following table shows, to date there have been 25 or so significant deals in the Chinese water industry involving Western companies. We are aware of several more in the pipeline, at different points in the value chain, and we expect the pace of dealmaking to pick up substantially in the coming months and years.

Location	Year	Project Type / Event	Duration (Years)	Population Served
Hong Kong	1992	Suez Environment and NWS Holdings Limited established a joint venture - Sino French Water		
Zhongshan (Sino French Water)	1992	Management of water production and distribution in Tanzhou	35	170,000
Shanghai (Thames)	1996	BOT of Dachang Water Plant	20	N/A
Tianjin (Veolia)	1997	Renovation and operation of drinking water production facility	20	1.85 million
Chengdu (Veolia)	1998	BOT of drinking water facility	18	2.66 million
Zhengzhou (Sino French Water)	2001	Zhongzhou Water Supply Corporation and Raw Water Corporation	30	N/A
Beijing	2002	The Central Government revised Catalogue for the Guidance of Foreign Investment Industries		
Zhuhai (Veolia)	2002	Construction and operation of two new wastewater treatment plants	30	330,000
Shanghai (Veolia)	2002	Management of water production and distribution in Pudong	50	2.6 million
Qingdao (Sino French Water)	2002	Management of water production and distribution	25	2.5 million
Chongqing (Sino French Water)	2002	Sino French Water has 60% share of the joint venture, while Chongqing Water Group holds 40%	50	1 million
Qingdao (Veolia)	2003	Construction and operation of a new wastewater treatment plant	25	820,000
Sanya (Sino French Water)	2004	Management of water production and distribution	30	280,000
Shenzhen (Veolia)	2004	Management of water production and distribution, and wastewater facility	50	7.61 million
Hohhot (Veolia)	2004	Renovation and operation of drinking water facility	30	1 million
Shanghai	2004	Shanghai Shibei Water Works bought out Thames' BOT contract		
Urumqi (Veolia)	2005	Renovation and operation of wastewater facility	23	1.14 million
Changzhou (Veolia)	2005	Management of water production and distribution	30	1.2 million
Kunming (Veolia)	2005	Management of water production and distribution	30	2.5 million
Liuzhou (Veolia)	2006	Management of water production and distribution	30	1 million
Lanzhou (Veolia)	2006	Management of water treatment and distribution	30	1.9 million
Changshu (Sino French Water)	2006	Management of water production and distribution	30	1.8 million
Haikou (Veolia)	2007	Management of water production and distribution	30	800,000
Xi'an	2008	Xi'an Water Supply Corporation rejected Veolia's tender offer		
Tianjin (Sino French Water)	2009	Renovation and operation of drinking water production facility	30	1.5 million
Nationwide	2009	Dozens of cities increased or plan to increase urban water prices		

Specific projects are referenced in normal type; Major industry events are highlighted in **bold type**

Key success factors in dealmaking in the Chinese water industry

Investing in any emerging market has its pitfalls, and China is no exception. In our experience, amongst the key success factors in doing a deal, regardless of industry, are the following:

	Issues	Implications
Understand business system	<ul style="list-style-type: none">• Economic relationships are not always clearly stated or documented; may rely on informal (unenforceable) agreements and practices• Accounting and financial management practices may not be as straightforward as first appear	<ul style="list-style-type: none">• Conduct extensive due diligence at corporate, operational and plant level• Use local (possibly forensic) accounting skills• Enquire deeply into and follow free cash flow
Have trusted local partner	<ul style="list-style-type: none">• Western companies are treated with suspicion, sometimes hostility• Local management is unlikely to be open about problems, and may disguise matters	<ul style="list-style-type: none">• It is critical to have your own, employed, Mandarin-speaking local Chinese representative to manage your interests• Do not always take explanations at face value
Get close to Government	<ul style="list-style-type: none">• Government (at all levels) is a key source of opportunity, and a potential blocker if not properly engaged• Good government relations can help resolve other issues with partners, regulators etc• IPO flow and public market access is government-controlled	<ul style="list-style-type: none">• Investors must devote significant time and resource to managing government relations• The mechanics of the Party mean that officials are rewarded by recognition: be clear how helping you helps them
Get the contract right	<ul style="list-style-type: none">• Many important matters may not be included in a standard contract – and may not be honoured• Legal procedures (eg possession of company seals) confer significant powers beyond contract	<ul style="list-style-type: none">• Use a good local lawyer experienced in foreign investment deals• Keep control of the bank accounts
Recognise the changing game	<ul style="list-style-type: none">• How the business system works today may change rapidly through law, practice or market development• Implied market pricing may not be the same tomorrow	<ul style="list-style-type: none">• Build in flexibility and options where possible• Be prepared to realise/exit when the time is right

How Guthrie can help



"The Guthrie Group is a leading, independent consultancy firm, focused on the initiation, facilitation and completion of transactions."

How Guthrie can assist

- The Guthrie Group is a leading, independent principal investing and advisory firm, focused on the initiation, facilitation and completion of transactions, with particular focus on making and actively managing direct investments in mainland Chinese companies as principal and on behalf of selected co-investors. We seek to acquire equity stakes in companies with growth prospects, usually in the form of pre-IPO funding, with a view to assisting them with their continued development managerially and strategically and ultimately securing a realization of our investment through floatation or sale.
- In certain industries we work closely with existing management to improve operations, to develop innovative marketing strategies, to evaluate and enter new markets and to improve overall positioning to maximize the revenue and profit base and take the company to a new growth trajectory.
- In other cases where we have less direct industrial experience we support management with our strategic insight, ways of doing business and guidance based on our substantial collective experience in many different industries and geographies. Here we work more like pro-active non-executive directors and consultants, dealing both with specific issues and supporting new opportunities as they arise.
- In these and other cases, we add value through financial engineering. This may be providing capital for a timely acquisition or a refinancing, but also includes planning where and when is the best place to raise finance and from whom; when and how to exit; and how to package a company and its operations so that it is ready for market, whether an IPO or a trade sale

Note on legal/structural considerations for foreign investment in China

Broadly, only Chinese investors are permitted to invest in domestic companies. Foreign investors can however invest through a structure in which a foreign-invested enterprise (“FIE”) is formed to invest in a Chinese company. This can prove a beneficial route, particularly for investment in funds rather than operating companies. Some of the procedures are, however, complicated.

In many cases the intermediate holding structure is through a British Virgin Islands company. There are usually restrictions on the percentage shareholding such a company can control. This holding structure may also be inefficient from tax and capital utilization perspectives, and may not be practicable due to regulatory risks and uncertainties. The regulations governing these issues are complex and subject to change of both underlying directive and administrative interpretation.

Additionally, there are restrictions on which companies can obtain a listing for their shares, and where to list. In effect, the Government controls access to the domestic capital markets and maintains a queue of applicants based on a number of parameters including importance of the company and the industry.

Whilst there are foreign exchange controls in place in China, in practice remitting dividends and capital is possible with careful planning.

As with all things in business in China, it is necessary to take good local advice prior to embarking on a transaction. Guthrie has good relationships with a number of Western-focussed local lawyers to whom we can make appropriate introductions for clients.

Appendix 1 - International Monetary Fund Bi-annual Assessment



IMF Executive Board Concludes 2010 Article IV Consultation with China
Public Information Notice (PIN) No. 10/100 July 27, 2010

On July 26, 2010, the Executive Board of the International Monetary Fund (IMF) concluded the Article IV consultation with China

Background

China was hit hard by the global financial crisis. However, the authorities quick, determined, and effective policy response has helped mitigate the impact on the economy and ensured that China has led the global recovery. Public infrastructure spending was quickly increased, taxes were lowered, the government put in place incentives to boost purchases of consumer durables, and pensions, social transfers, healthcare and education spending were all raised. At the same time, interest rates and reserve requirements were lowered and limits on credit growth were removed, leading to an extraordinary surge in bank lending.

These policies were instrumental in arresting the downward momentum to both activity and confidence. Growth began to pick up in the second quarter of 2009 and reached an average for the year of 9.1 percent. Inflation moved into negative territory for much of 2009 but has since registered a modest increase, the bulk of which has been directly attributable to higher food prices. In the 12 months to May, the nominal effective exchange rate has depreciated by 1¼ percent while the real effective exchange rate has depreciated by 0.1 percent.

China's recovery had significant positive spill-over to the region and the global economy, initially through increased demand for commodities—contributing to an upswing in global commodity prices—and later through higher imports of capital goods. The balance of payments saw a dramatic shift with the current account falling quickly as exports slowed and imports surged. Despite the lower current account, reserve accumulation has continued to be rapid.

With the recovery becoming increasingly well established, the government has begun to unwind some of its crisis response measures. Credit growth has been slowed, reserve requirements were modestly increased, and prudential requirements related to property lending were tightened. The government also announced that it was returning to the managed floating regime that had been in place from July 2005 to July 2008. Fiscal policy, however, continues to provide important support to the economy.

Executive Board Assessment

Executive Directors commended China's proactive and decisive policy response to the global economic crisis. Growth is expected to continue to be robust, while the inflation outlook appears benign. The policy challenge now is to calibrate the pace and sequencing of exit from the fiscal stimulus and credit expansion, while making further progress in reorienting the economy toward private consumption. Directors commended the Chinese authorities for their commitment to the G-20 framework for strong, sustainable, and balanced growth.

Appendix 1 - International Monetary Fund Bi-annual Assessment (cont)

Directors considered it appropriate that the 2010 budget maintains support for a steady resumption of private demand. They saw room for further reorientation of the stimulus package toward measures that promote private consumption, raise household income, lessen income inequality, and improve the social safety net, building on recent progress. Directors supported a gradual phase out of the fiscal stimulus in 2011, provided the current trajectory for the economy is maintained.

Directors agreed that the targeted reduction in broad money growth this year balances well the need to provide continued support to the economy with the desire to safeguard the health of bank balance sheets. They encouraged the authorities to rely more on market-based instruments to achieve this goal, including via open market operations, higher interest rates, and reserve requirements. Directors highlighted the need for regulatory and supervisory vigilance to manage any deterioration in credit quality, and for increased transparency in lending to local government financing vehicles. At the same time, it would also be important to continue to liberalize the financial system; the ongoing FSAP will provide useful guidance for the content and sequencing of the necessary reform measures.

Directors welcomed the recent decision to return to the managed floating exchange rate regime. This decision will increase the central bank's flexibility to tighten monetary conditions. Several Directors agreed that the exchange rate is undervalued. However, a number of others disagreed with the staff's assessment of the level of the exchange rate, noting that it is based on uncertain forecasts of the current account surplus. Many Directors stressed that, over time, a stronger renminbi would help facilitate a shift from exports and investment to private consumption as the principal driver of economic growth. A number of Directors pointed to signs that a structural shift in the balance of payments is already underway, reflecting the reforms already put in place to strengthen consumption.

Directors commended the government for its pragmatic deployment of a range of countervailing prudential measures to contain property price inflation. Additional measures could be needed to address the fundamental causes of property price inflation, possibly including consideration of a property tax and broader financial market development to provide alternative savings vehicles.

Directors commended the authorities for the progress made in building a more effective system of social insurance. They encouraged further steps to improve health care, expand pension coverage, foster labor mobility, and reduce corporate savings.

Appendix 1: Selected Economic Indicators

	2005	2006	2007	2008	2009	2010E
	(Annual percentage change, unless otherwise specified)					
National accounts and employment						
Real GDP	11.3	12.7	14.2	9.6	9.1	10.5
Total domestic demand	9.2	11.5	12.7	9.7	14.8	11.5
Consumption	8.1	9.8	11.1	8.6	9.9	13.2
Investment	10.6	13.6	14.7	11.0	20.4	9.7
Fixed	11.9	12.8	13.4	9.7	24.6	10.1
Inventories ^{1/}	-0.3	0.6	0.8	0.8	-1.0	0.0
Net exports ^{1/}	2.6	2.0	2.5	0.8	-4.3	-0.5
Consumer prices						
End of period	1.4	2.0	6.6	2.5	0.7	3.5
Average	1.8	1.5	4.8	5.9	-0.7	3.5
Unemployment rate (annual average)	4.2	4.1	4.0	4.2	4.3	4.1

Appendix 1: Selected Economic Indicators (cont)

	2005	2006	2007	2008	2009	2010E
External debt and balance of payments			(In percent of GDP)			
Current account	7.1	9.3	10.6	9.6	6.0	5.0
Trade balance	5.9	8.0	9.0	8.0	5.0	4.0
Exports of goods	33.8	35.7	34.9	31.7	24.1	30.3
Imports of goods	27.8	27.7	25.9	23.8	19.1	26.3
Gross external debt	13.1	12.5	11.1	8.6	8.6	8.9
Saving and investment						
Gross domestic investment	42.1	43.0	41.7	44.0	47.7	50.0
National saving	49.2	52.3	52.4	53.7	53.6	55.0
Government	6.3	8.7	10.5	9.9	9.9	8.8
Non-Government	42.9	43.6	41.9	43.8	43.7	46.2
Public sector finance						
General government gross debt	17.6	16.5	19.8	16.8	18.6	20.1
	(Annual percentage change)					
Real effective exchange rate	-0.3	2.2	5.0	8.5	2.7	...

Source: IMF Report

Appendix 2 – Sources and acknowledgments

There is a surprising dearth of reliable information and analysis about the water industry in China. In preparing the information in this report we have found the following sources helpful, and acknowledge their input where indicated in the text and footnotes:

Asia Water Project China

The Asia Water Project: China is a non-profit initiative designed to help investors and business understand and manage China's water risks. AWP's web portal, launched in February 2010, offers access to relevant information on water issues, as well as showcases AWP's own commissioned research: <http://www.asiawaterproject.org>

CLSA

CLSA Asia-Pacific Markets is one of the region's largest and most highly rated independent equity brokers and financial-services groups. A report on China water trends can be found at: <http://www.asiawaterproject.org/wp-content/uploads/2010/05/CLSAU-Bluebook-WaterPrice-1005101.pdf>

Nomura Securities

Nomura, a respected research house, has produced a report ("*Water/China: Turning Hot Again!*," February 2009) which can be accessed through their website or through the Asia Water Project portal