

SELLING INTO CHINA

Shifting tides in China make for challenges and opportunities for water technology

In the first of two articles examining the Chinese water technology market, GWI and China Channel Partners outline the changing water priorities in the country, how this filters through to opportunities for water tech companies, and the best way to make an entrance.

China's \$100 billion-a-year water market has attracted the attention of hundreds of international water technology companies aiming to make a splash, from large multi-service conglomerates to budding start-ups.

According to GWI WaterData, every one of the ten largest global water technology companies by revenue has established a presence in China's water market. For small- to medium-sized technology companies, however, the picture has been much harder. GWI surveyed more than 40 small- to medium-sized technology companies operating in China to build up a picture of how to succeed in one of the

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Wong Jin Yong, Fluence China

world's largest – and hardest-to-tackle – markets. The informal survey found that more than half had struggled to live up to their aspirations for growth and profitability in China.

Five-year plans

The Chinese water market is highly policy-driven. The five-year targets (see chart,

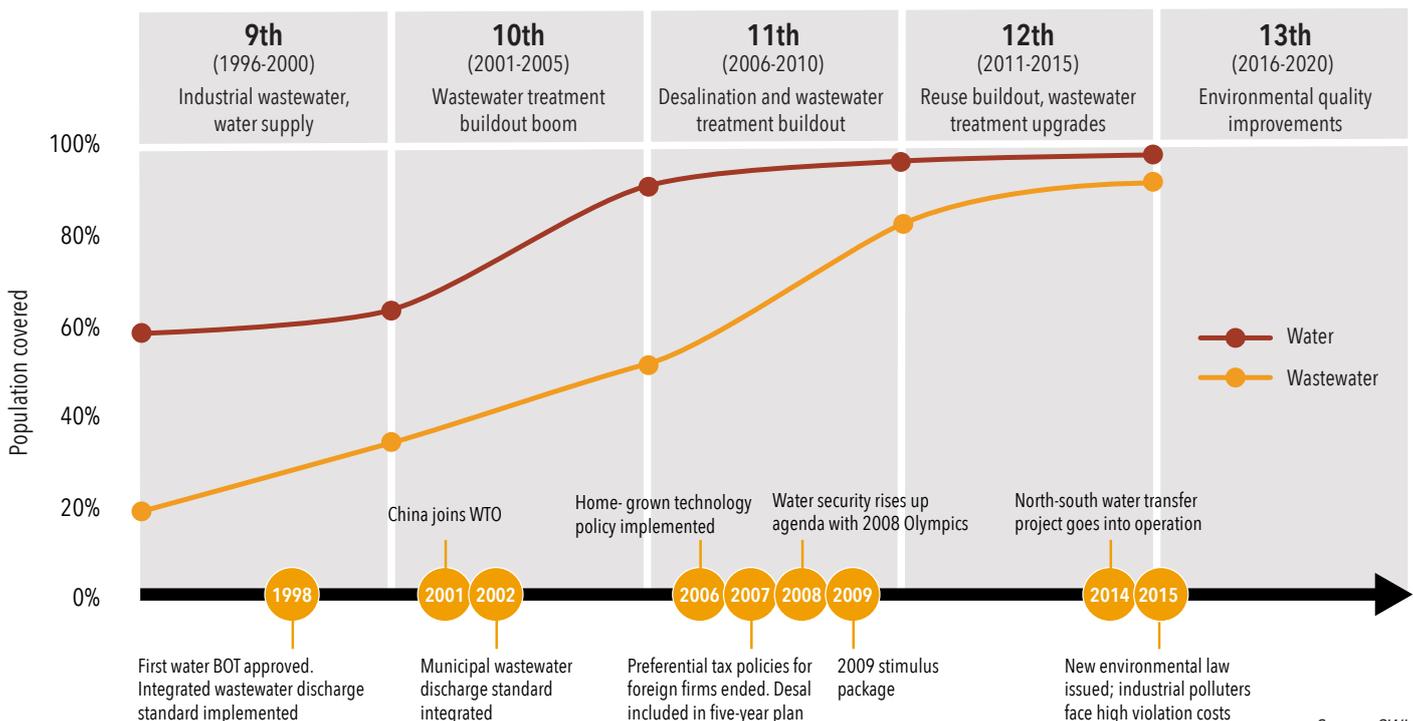
below) set by the central government place pressure on potential water technology clients at every level, from city governors to state-owned enterprises.

“Currently in the municipal sector, there are three focuses: rural wastewater treatment, upgrading of wastewater treatment plants and river cleanup,” Wong Jin Yong, general manager of Fluence ▶

WATER AND WASTEWATER UNDER CHINA'S FIVE-YEAR PLANS (1995-2020)

Water policy in China is highly centralised and based on the government's regular five-year plans. This means that priorities in terms of spending allocation, approach to technology and areas of growth can change dramatically in the course of just a few years, making it harder for specialised companies to adopt a strategy that works in the long term. Water policies were initially focused on

increasing levels of utility service coverage, but as these approached the 100% level post-2010, priorities have shifted for the government. The 13th five-year plan, covering the period 2016-2020, has pushed environmental improvement to the top of the agenda in China, opening up new avenues for the international water and wastewater sector.



Source: GWI

China told GWI. The Australia-listed decentralised wastewater specialist has already secured ten commercial contracts to supply its membrane aerated biofilm reactors (MABR) technology with the purpose of cleaning up China’s rural areas in 2018, with Wong adding: “more are in the pipeline.”

However, success under one five-year plan does not necessarily translate into success under the next, and so the ability to quickly reposition in the fast-changing market is essential. The full operation of the massive South-North water transfer project in 2014 squeezed desalination out of the government’s top agenda to ensure water security in northern regions, leading to the exit of international desalters who were excited about what had previously been seen as a highly promising market. Desal-focused companies that pivoted away from China in this period included Norwegian specialist Aqualyng and Spain’s Abengoa.

Israeli firm IDE Technologies switched its focus from seawater desalination to brine concentration and began to build up a new focus on the industrial sector. “The biggest market for IDE is still in municipal desalination,” Wang Shuangcheng, general manager of IDE China told GWI, “However, now the government’s interest is not strong. We have invested heavily in developing this market, including essential government relationships, but current-

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Imran Jaferey, Nanostone Water

ly the payoff time is uncertain.” Australian firm Osmoflo, meanwhile, has to-date avoided the Chinese market, even though its former shareholder Marubeni (2011-2018) had a well-established presence in the Chinese water sector.

As policy focus shifts from water supply to disposal standards, zero liquid discharge (ZLD) specialists have become a more common sight in the Chinese market, with companies such as US-based Gradiant, its compatriot Saltworks, Australia’s CleanTeQ and UK-based Modern Water all looking to establish footholds.

Looking for entry points

Identifying the right target sector is a key part of making a successful entry into the market, particularly for products where in-country piloting and testing is needed (*see table, below*).

“The Chinese market is willing to accept new technology and make decisions fairly quickly if you have a good value proposition, especially in the industrial sector,” Imran Jaferey, chief commercial officer at ceramic membrane specialist Nanostone Water told GWI.

“It’s very quick compared to the US market. We only launched our new product in 2017 and already have many references in the Chinese power and coal-to-chemical industries after piloting to prove the technology.”

“The market likes something new, something differential,” Alex Zhang, managing partner at Amane Advisors China told GWI. “New technology could not only help the technology to stand out from the fierce competition, but also gives higher margin as the clients have no idea about the price.”

For technologies requiring commercialisation and scaling up, China is a difficult market to crack. Few international water technologies have been successfully incubated in China as the market can be hostile for development due to poor protection of IP and a lack of patience for incubation. The average annual R&D funding at most of China’s leading water technology companies is less than 3% of their revenue. According to GWI’s research, less than 20% of the desalination-related patents registered in China were based on Chinese intellectual property, despite a ▶

CURRENT TECHNOLOGY NEEDS IN THE CHINESE WATER MARKET

GWI spoke to 10 key players in the Chinese water market to get an insight into the technology needs, particularly where it would lead to the opportunity to establish pilot projects. The picture that emerged was very different based on the different needs of clients in the industrial, municipal and ecological sectors.

Technologies	Industrial Sector	Municipal Sector	Ecological Sector
Biological treatment	<ul style="list-style-type: none"> • COD removal for wastewater with high salinity • COD removal for hard-to-degrade wastewater • Fenton fluidised bed technology • Anammox for wastewater with high nitrogen 	<ul style="list-style-type: none"> • Energy-efficient aeration technology • Decentralised wastewater treatment • Total nitrogen removal at low C/N level or low temp • Nutrient Recovery • Aerobic granular sludge treatment 	<ul style="list-style-type: none"> • Ecological dredging with low disturbance • Groundwater remediation • Petroleum contaminated soil remediation • Heavy metal contaminated farmland remediation
Dissolved solids removal	<ul style="list-style-type: none"> • Hardness removal of wastewater with high hardness and low alkalinity • Efficient silicon removal process • Anti-fouling nanofiltration technology for wastewater with high COD/salinity • Zero liquid discharge 		
Sludge management		<ul style="list-style-type: none"> • Anaerobic digestion • Sludge dewatering technology • Resource utilisation for sludge 	
Smart water technology		<ul style="list-style-type: none"> • Smart water technologies for water/wastewater treatment plants and network operation 	

Source: GWI survey

“ Domestic references are very important in China, especially when the client is a government- or state-owned enterprise.

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government target set in 2007 to have at least 90% of desalination equipment used in the country to come from domestic innovation by 2020.

“When we first entered the market, we put our focus on R&D to strengthen our technology,” one insider from an international membrane manufacturer who entered the Chinese market in the late 2000’s told GWI. “However, domestic companies who just copied others’ technologies grew much faster than us and we missed out on the best growing period. Now we have learned and switched our focus more on developing market networks and setting up local partnerships.”

Forward osmosis specialist Oasys Water came very close to success in the Chinese market as an early-stage technology, securing industrial wastewater company Beijing Woteer as its minority shareholder in 2013 and winning three high-profile ZLD projects in the country. “We have spent around RMB200 million (\$40 million) in total on introducing this brine concentration technology into the market, including the equity investment back in 2013, R&D spending and pilot tests costs,” Zhang Chengci, COO of Woteer told GWI.

However, the high-profile projects attracted criticism from competitors claiming that energy consumption was too

high and the technology was not efficient enough. Following this, a failed merger with Woteer led to Oasys’ bankruptcy in 2017.

Woteer’s parent company – state-owned China CAMC Engineering – later acquired Oasys’s IP and physical assets in June 2018.

More and more international water start-ups are now looking to secure strategic investment from Chinese investors, with the aim of leveraging the help to scale up their business or lower the cost of expanding in China (see table, below). The growing capability of Chinese investors, combined with wider access to international resources, has made strategic investment into water start-ups more common.

Domestic references

“Domestic references are very important in China, especially when the client is a government- or state-owned enterprise,” Wong told GWI. “Even though we have references elsewhere in the world, our Aspiral membrane aerated biofilm reactor system is a new technology for the Chinese market. We have spent the last two years introducing our technology, doing demonstration projects, visiting clients and asking for feedback from pilot tests to build trust with clients.”

References outside China may satisfy some minimum bidding requirements, but in the majority of cases will not be enough, with local references essential. Norwegian sludge and biowaste specialist Cambi invited government officials from the Ministry of Housing and Urban-Rural Development to visit its UK reference in 2010, when the company had no Chinese references, and was seeking market approval.

Another insider who had worked on a project for the government told GWI: “We initially successfully [secured a deal for] a foreign technology to be used for sediment treatment at the Shenzhen Maozhou River project, however, the government withdrew the decision in the last minute because the technology had no precedent in China.”

Pilot projects are usually a common strategy to access markets, but unlike many other global markets, technology companies entering China need to undertake almost all the cost of pilot tests. The clients only provide the utilities, place and labour. Zhu Ming of China Channel Partners said. ■

China Channel Partners is a UK-Chinese joint venture set up by managing director Zhu Ming and Global Water Intelligence to help international water companies identify the points of opportunity in China's water market, grasp the direction of the market, establish iconic references and successfully benefit from the country's huge environmental drive. For more information, contact zming@globalwaterintel.com

CHINESE INVESTMENT FLOWS INTO FOREIGN WATER TECHNOLOGY (2014-18)

Chinese investors have been a prolific source of early-stage funding for international water technology companies in recent years. However fears over the security of intellectual property in the Chinese market have made some operators wary.

Company	Area of operations	Chinese investor	Year
Modern Water	Forward osmosis desalination, Brine concentration	Hangzhou Sunup	2018
Organica	Biological wastewater treatment	CITIC Capital Silk Road Fund	2018
Atlantis Technologies	Wastewater desalination via radial deionisation	CentreGold Capital (Nanfeng Zhongjin Environment Co., Ltd.)	2018
Phoslock	Phosphorus removal	China Environmental Corporation	2017
Clean TeQ	Desalination/produced water treatment	Shanghai Pengxin Group	2017
Porifera, Inc.	Forward osmosis membranes	Baosteel Group	2017
Fluid Technology Solutions	Forward osmosis membrane systems	Shanghai Yuanmai Trade Co., Ltd.	2017
BioGill	Biomimetic MBRs for wastewater treatment	SoftBank China Capital	2016
SolaQuaGen International	Low-cost thermal desalination	Unnamed Chinese investors	2016
Gradiant	Industrial wastewater treatment via carrier gas extraction	Shanghai Electric	2016
MTI Environment Group Ltd.	Wastewater EPC contractor	SIIC Environment Holdings Ltd. (\$4m)	2015
Aquaporin	Biomimetic membranes	Poten Environment/Heilongjiang Interchina Water	2014

Source: GWI WaterData