

China Water Treatment Chemicals. Surfing the Solution Wave

On 9 July 2012, China's State Council outlined seven Strategic & Emerging industries together with their associated components of the 12th Five-Year Plan. The guidelines enhance the importance of water treatment within Energy Saving & Environmental Protection, one of the seven Strategic & Emerging industries. Top governmental priorities for water treatment include the industrialization of new equipment, the R&D of new solutions, and the development of associated services, which together will promote the evolution of China's water treatment chemical sector towards specialty products, solutions, and on-site services.

Between 2008 and 2011, the Chinese government issued a series of regulations to promote wastewater treatment and water conservation, accompanied by investment of hundreds of billions of renminbi well into the 12th Five-Year Plan period. Along the water value chain, the water treatment chemical sector is still in its infancy, but is expected to grow rapidly, especially in terms of specialty chemicals, solutions, and services.



Steady demand growth, with greater opportunities in industrial applications

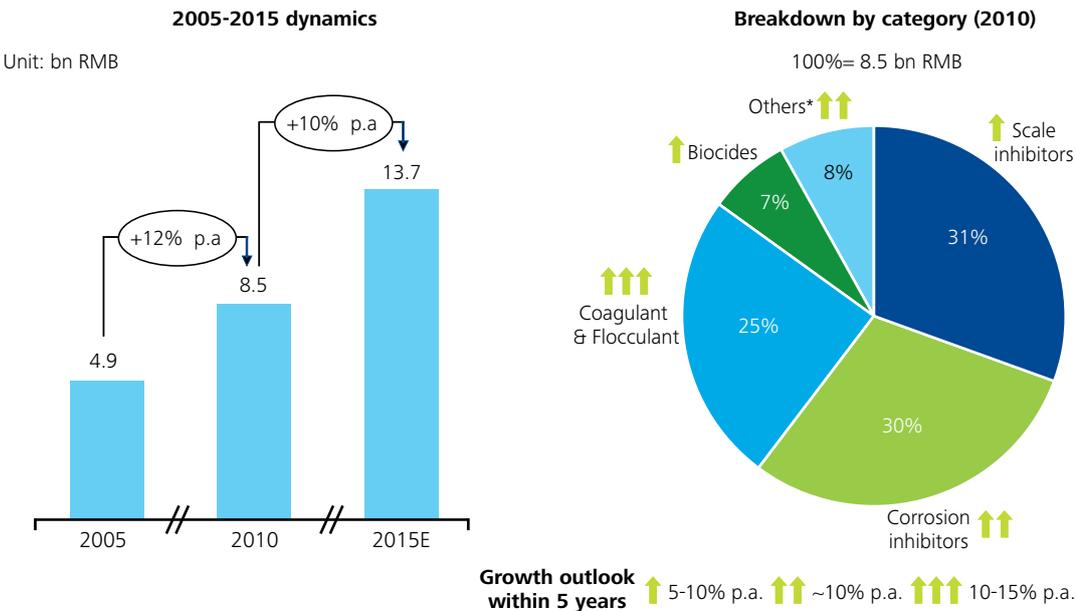
China’s demand for water treatment chemicals has grown rapidly (+12% p.a. in value between 2005 and 2010) to reach approximately RMB 8.5bn in 2010 (chemical products only). This pace is expected to be sustained in the years to come (+10% p.a. between 2010 and 2015), while the relevant market for chemical & solution players is much larger. For reference in the industrial application, the overall market value is four to six times the chemical product demand (including equipment, chemical solutions & services, and other supplies).

The strong demand for water treatment chemicals in China is driven by *not only policies and regulations, resource shortage and water price hikes, and environmental concerns, but also technology improvement*. As the water crisis worsens in China and environmental concerns deepen, the Chinese government has decided to impose higher targets and stricter requirements on water and wastewater treatment, and has

increased enforcements of the policies and regulations. On the technology side, water treatment equipment (e.g., membrane) is replacing low-end chemicals, while specialty chemicals and chemicals associated with membrane technology are being promoted.

Water treatment chemicals are mainly used in municipal and industrial water treatment applications. Desalination treatment is mainly completed via non-chemical methods (membrane and thermal, etc.) where chemicals (detergent, scale inhibitors, biocides, etc.) only account for 10 to 15% of operating cost (half of the market average; for reference, chemicals represent 25 to 50% of the operating cost of industrial wastewater treatment facilities). In the municipal application, non-chemical methods (filters and membranes) will likely grow faster than the use of chemicals. These non-chemical methods offer less pollution with higher hygiene, and thus are preferred by municipalities when addressing the treatment needs.

China water treatment chemical consumption (value, product only, excl. solutions & services)



Source: Freedonia, Press search, Expert interview, Deloitte forecast, Deloitte analysis
 Note: (*) Others include ion exchange resins, detergent, defoamer, deoxidizer etc.

As compared to municipal applications, industrial applications typically impose higher-volume and more sophisticated demand for chemicals, especially for recycling water and wastewater treatment. In water supply, the requirements of most industrial applications are on average lower than the municipal ones, but several sectors can be found with higher water quality requirements and additional treatment needs. In the case of water supply for pharmaceuticals and food processing, reaching sterility level will be critical to ensuring health & safety. In industrial water recycling and wastewater treatment, there is usually a need for high-value chemicals with the general trend shifting toward more effective specialty chemicals (to remove pollution with less energy consumption), and to packaged solutions rather than sole chemical use for the water treatment.

The industrial application is multi-niche since different sectors demand different water treatment chemical products/solutions. Major sectors for industrial wastewater treatment are paper (comprising 19% of China's wastewater discharges in 2009), oil & chemicals (17%), textiles (11%), power generation (7%), and steel & metallurgy (6%). For instance, wastewater discharged by paper manufacturers contains oil, ink, fiber, and organic pollutants, and therefore needs coagulants and flocculants for treatment.

The evolution of all those applications and their associated needs for water treatment chemicals inevitably impacts the size and growth dynamics of the chemical product categories, which can be split into four main groups with specific, non-substitutable functionalities – **scale inhibitors** (31% of the China consumption value in 2010), **corrosion inhibitors** (30%), **coagulant & flocculants** (25%), and **biocides** (7%). Scale inhibitors, corrosion inhibitors and biocides are mainly used for circulating water in the industrial application, and are expected to maintain steady growth. Coagulants and flocculants are mostly used for municipal water treatment and selective industrial applications such as oil and chemicals. The latter sub-application will likely grow faster, since it can be used not only for water treatment, but also as a degreaser in the oil & petrochemical sector. In general, new offerings are being introduced for better performance with lower toxicity and at lower cost in response to increasing need for efficiency and environmental friendliness.

Highly fragmented industry with consolidation expected

Despite the high market attractiveness of water treatment chemicals in China, this industry is currently highly fragmented and dominated by domestic private players. The main reason for such fragmentation is the relatively low market entry barriers for commodity chemicals, which have attracted hundreds of small players in China.

In 2009, the Top 10 players accounted for less than 50% of market share in value. Multinational companies (MNC) have already well positioned themselves with four players in the Top 10: SNF, Nalco [Ecolab Nalco Group], Ashland and Arch [Lonza Group].

The consolidation expected to occur over the next three to five years will see gains by stronger existing players and new entrants with marketable capabilities. Furthermore, the evolution of customer needs towards higher-end chemical products will raise entry barriers and eliminate weaker players in support of consolidation. Rapidly growing water treatment systems (e.g., filters and membranes) are replacing low-end chemicals, and small players lacking scale or technology are being phased out.

While most players focus solely on chemical manufacturing, a few companies led by MNCs such as Nalco, Ashland and Arch have begun to provide customized solution packages (specialty chemicals and formulations), leveraging their R&D and technical service capabilities. Those MNCs are global leaders with established production and R&D centers in China. For instance, Ashland has already set up three R&D centers in China.



Most players (MNCs, R&D institutes and POEs) cover both municipal and industrial applications, while SOE-affiliated companies focus mainly on industrial applications.

Domestic research institutes or university-affiliated companies usually have stronger R&D capabilities and better technologies than other domestic players. Some of those research institutes are linked to large SOEs such as Sinopec and Sinochem, which provide easy access to clients. Research institutes also offer full solution packages for various industries, but their business activity is very small.

Domestic private companies are flexible in operations and strategies, and can quickly adapt to changing market dynamics. Many are able to sell commodity products at low prices, and are thus competitive in the low-end market. They usually have a broad and diverse client base.

SOE-affiliated companies have usually a narrow industry focus, as they mainly serve internal clients and often only play in the industry of their parent company. Since those parent companies (Baotou Steel, Wisco Steel) are rather large conglomerates, they can still reach a big captive base of clients.

Solution and onsite service as key levers for capturing future value

Overall China’s water treatment chemical manufacturing displays good profitability with EBIT margin between 9% and 14% in 2009 based on plant samples across three types of players (MNCs, domestic private companies, and SOE-affiliated companies).

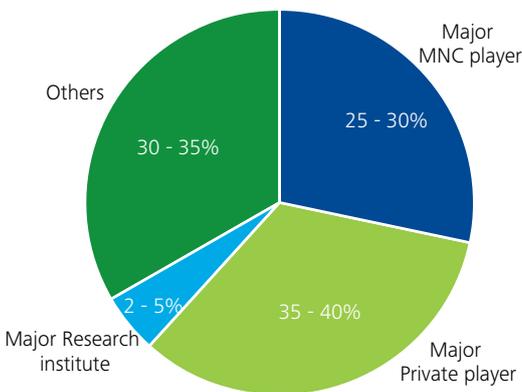
Solution packages and onsite service are regarded as key levers to improving profitability in this sector. Associated gross margin can reach above 50% for first-tier players, and between 30% and 40% for second-tier players.

Multinational companies are leading the sector in terms of solution packages and onsite services. For instance, in industrial water treatment applications, MNCs tend to have a broad industry focus, as well as sophisticated and wide-ranging product and service lines (from commodity chemicals to specialty chemicals, solution packages and onsite services). Nalco has been a global pioneer in this field, pushing the solution concept up to consulting services to help their clients optimize their processing steps—e.g., for a paper mill, targets such as "reduce energy consumption by x%" and/or "reduce [not only waste water but also] water consumption by y%". Additionally, some MNC players have further integrated technology and systems (membrane) from the water value chain. A few players, such as GE, have gone further and integrated the whole water

China water treatment chemical industry

Market share (2009, value)

100% = 7.0-8.0 billion RMB (2009)



Source: Deloitte estimation, Deloitte analysis

Competitive landscape (2012)

	Focus	Examples
MNCs		<ul style="list-style-type: none"> • SNF • Nalco • GE Water
Research institutes	Both municipal & industrial water treatment	<ul style="list-style-type: none"> • CNOOC2) Tianjin Design and Research Institute • Nanjing University of Science & Technology water treatment institute
Chinese private companies (POE)		<ul style="list-style-type: none"> • Shandong Ruite • Shandong Tianze
SOE affiliated companies	Mainly industrial water treatment	<ul style="list-style-type: none"> • Baotou Steel water treatment chemical company • WISCO1) Water Supply Factory

value chain including EPC (engineering, procurement and construction) and OM (Operations and Maintenance) (See sidebar for the GE case).

Traditionally, Chinese private companies have focused on chemical manufacturing, especially commodity chemicals for water treatment. However, some players such as Jianghai Chemical and Xiba Technology have shifted to more sophisticated offerings by extending their product/service portfolios toward specialty chemicals, solution packages and onsite services.

In order to secure competitive advantage and meet the evolution of the demand in terms of water treatment chemicals, Chinese players will need to move from commodity chemicals to specialty chemicals, if not up to solutions and services. Any of these initiatives will require R&D and technical service capabilities as key success factors for building their future profitability and sustainable growth.

GE Water Case

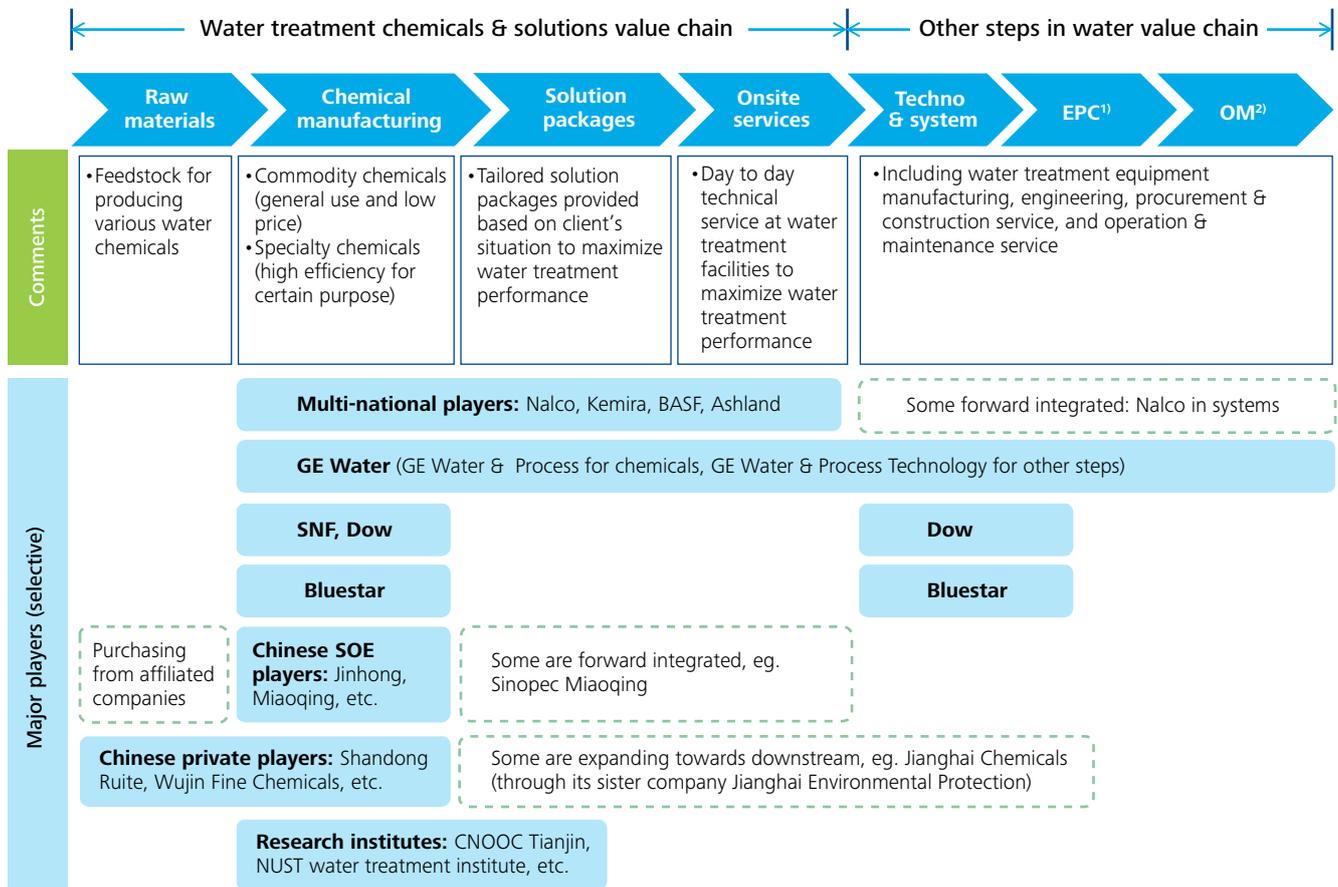
GE covers a whole value chain in water industry in China, from chemicals to operation & maintenance services, by its two entities in China

- GE Water & Process (Wuxi) Co., Ltd:
 - Mainly focuses on water treatment membrane
 - Also produces & sells associated chemicals for its membrane
- GE Water & Process Technology Company:
 - Mainly focuses on EPC and O&M services

GE sees China as a strategically important market, and continues to invest in the country.

- As part of GE's 2 billion investment in China between 2010 and 2013, its Wuxi site's capacity will be doubled, mainly in membrane

China water value chain (2012)



Source: Deloitte analysis Note: 1) Engineering, Procurement and Construction, 2) Operations and Maintenance

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