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# *Cleantech in China:*

## *Opportunities to improve clean water access and efficiency*

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China's industrialization over the past 30 years has transformed the country from a developing nation, known only for low-cost manufacturing, to a strategic growth destination. While the speed and scale of China's growth is unprecedented, it has also caused a significant impact on the environment.

### ***An obstacle to economic growth***

The Chinese government is challenged with striking a balance between alleviating its environmental issues and allowing its industries and businesses to continue growing, as an economic slowdown could potentially disrupt social harmony.

Among China's serious environmental challenges, major water shortages are looming high on the list. The government has taken commendable steps to begin rectifying the situation, but there is still a long road ahead. Recent Chinese government studies show that two-thirds of all cities in China are experiencing water shortages and nearly 300 million rural Chinese do not have access to safe drinking water<sup>1</sup>. And, according to China's Ministry of Water Resources, only 2,100 cubic meters of water resources are available per capita, approximately 28% of the global average<sup>2</sup>.

In January 2012, the State Council issued the strictest decree to date on water resources management, which calls for capping the overall use of water, improving efficiency, reducing water pollution and promoting water conservation<sup>3</sup>. And, as part of the goals laid out in the 12th Five Year Plan (2011-2015), China has committed to investing \$636 billion in water-related projects through 2020 and reducing water usage by 30% for every new dollar of industrial output<sup>4</sup>. Other measures to spur energy efficiency and conservation, such as new restrictions on water-intensive industries like coal production, are also aimed at helping to decrease freshwater usage.

### ***Business opportunities in the water sector***

China's water-related goals and objectives have significant implications and present a range of business opportunities in the water sector. According to the China Greentech Initiative (CGTI), of which PwC is a strategic partner, major commercial opportunities exist in the following areas:

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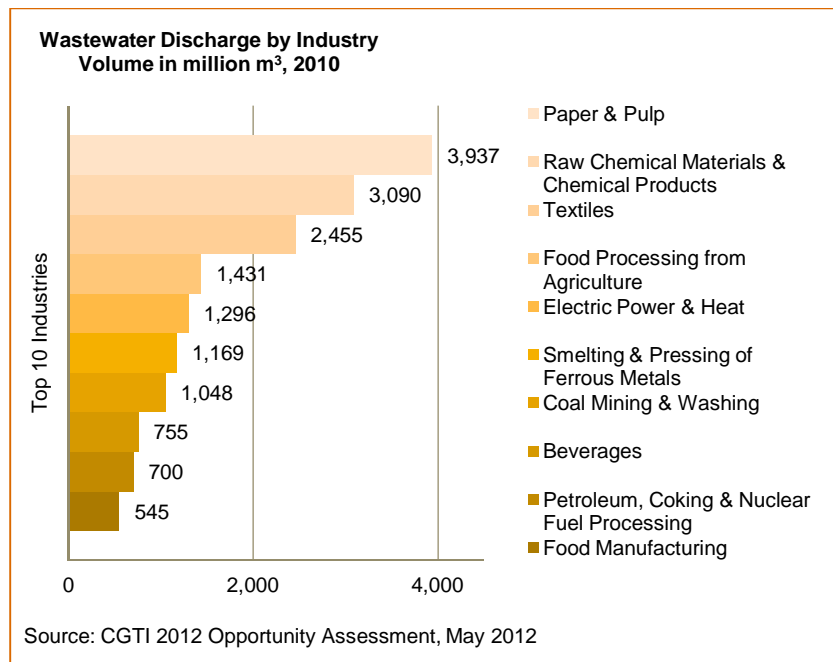
<sup>1</sup> Hook, Leslie, "China warns on growing water shortages", *Financial Times*, February 16, 2012, <http://www.ft.com/intl/cms/s/0/131bb6dc-588f-11e1-9f28-00144feabdco.html>

<sup>2</sup> "Water shortage, pollution threaten China's growth: official", *Xinhua*, February 6, 2012, [http://news.xinhuanet.com/english/china/2012-02/16/c\\_131414176.htm](http://news.xinhuanet.com/english/china/2012-02/16/c_131414176.htm)

<sup>3</sup> Speech by Hu Siyi, Vice Minister of Water Resources, February 16, 2012, [http://www.china.org.cn/china/2012-02/17/content\\_24664293.htm](http://www.china.org.cn/china/2012-02/17/content_24664293.htm)

<sup>4</sup> Fu, Jing, "Beijing to invest \$636b in water-related projects", *China Daily*, March 15, 2011 [http://www.chinadaily.com.cn/china/2012-03/15/content\\_14837146.htm](http://www.chinadaily.com.cn/china/2012-03/15/content_14837146.htm)

- *Sludge treatment and disposal* – The sludge treatment and disposal market is at the very early stages of development in China. The number of municipal wastewater treatment plants in China nearly quadrupled from 718 in 2005 to 2,823 in 2010 and is expected to nearly double to 5,200 in 2012 in order to deal with the high volume of industrial wastewater generated<sup>5</sup>. This means that the output of sludge – the resulting by-product that is often harmful and requires proper treatment and disposal – will also grow rapidly. The 12<sup>th</sup> Five-Year Plan includes ambitious national goals for safe sludge treatment – in some cases up to 80% – while also reinforcing a 2010 rule that requires all municipal wastewater treatment plants to install sludge treatment capabilities by 2012.



CGTI analysis of a major sludge treatment project in Dalian shows that a technologically advanced plant has the potential to be economically practical. However, the viability of such installations will depend greatly on the rate of adoption and utilization<sup>6</sup>. Thus far, the development of the sludge treatment market has been hampered by issues such as limited China-specific operational and technical expertise as well as significant operating costs in handling, treatment and disposal.

<sup>5</sup> “The China Greentech Report 2012”, China Greentech Initiative, April 2012, pg. 152

<sup>6</sup> “The China Greentech Report 2012”, China Greentech Initiative, April 2012, pg. 157

- *Industrial water use efficiency* – Industrial water use accounted for 24% of total water use in China in 2010 and is expected to keep increasing as per capita income rises<sup>7</sup>. Interestingly, half of China's major industrial bases are located in water-scarce regions. For sectors where water is a major input (e.g., energy, paper and pulp, raw chemicals and textiles), this is a significant consideration. China has defined target caps for total national water use and set targets to reduce industrial water use per output by 8.6% annually through 2030, with the success of these goals depending in great part on local implementation<sup>8</sup>.

A wide range of solutions are available for increasing the efficiency of water use for industrial processes, from heat exchange and cooling systems to wastewater treatment and reuse systems. However, a number of significant barriers remain in increasing industrial water use efficiency, including the sheer number of manufacturing and processing companies in China that must be monitored. These issues are exacerbated by the notion that declining water quality has increased the difficulty in treating wastewater for reuse, as well as the fact that very slim profit margins in some water-intensive industries reduce the incentive to make significant investments in water efficiency<sup>9</sup>.

- *Graywater systems* – Although non-industrial buildings consume 12% of China's total water resources, they discharge 60% of total wastewater<sup>10</sup>. Half of this discharged wastewater is classified as graywater, slightly polluted water from sources such as laundry and showers. Cost-effective graywater systems range from low-cost diversion devices for direct reuse to complex treatment and storage methods that can be easily integrated into new construction (versus costly retrofits), making China's ongoing residential and commercial building construction market a prime opportunity. Graywater recycling systems also qualify for green building certification, such as Leadership in Energy Efficiency Design (LEED) and China's domestic 3-Star, which has seen a five-fold increase since 2010<sup>11</sup>.

Buildings in major cities such as Beijing, Shenzhen and Tianjin are rapidly adopting graywater systems, but national regulators have tended to focus on large-scale centralized wastewater treatment and reclamation. Although data on graywater operating costs have shown that they can be economically attractive, even in light of relatively low water prices, uptake of graywater systems has been slow. This is often attributed to market fragmentation that has resulted in varying quality

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<sup>7</sup> "CGTI 2012 Opportunity Assessment", China Greentech Initiative, May 2012, pg. 7

<sup>8</sup> "CGTI 2012 Opportunity Assessment", China Greentech Initiative, May 2012, pg. 9-10

<sup>9</sup> "CGTI 2012 Opportunity Assessment", China Greentech Initiative, May 2012, pg. 19

<sup>10</sup> "The China Greentech Report 2012", China Greentech Initiative, April 2012, pg. 162

<sup>11</sup> "The China Greentech Report 2012", China Greentech Initiative, April 2012, pg. 163

and service; lack of collaboration between systems providers, building developers and water users; and lack of public awareness and acceptance<sup>12</sup>.

With strong government backing in the form of policy and financial support, market opportunities for entrepreneurs as well as established companies exist across the entire water value chain. At the same time, there is significant competition from public and private Chinese investment. This increased market activity and competition will continue to vary by region and industry, but it's clear that the water shortage and water quality issues in China provide a significant business opportunity for those companies with the products and services to improve clean water access and efficiency.

In order to successfully access these opportunities, it is important to keep in mind some of the challenges that continue to face US companies investing in China. The regulatory environment continues to evolve quickly, and priority sectors such as water are likely to receive significant attention from the government. Among other issues, US companies in this sector will also need to consider the localized, relationship-driven culture as well as how to protect the intellectual property rights of their technology. Ultimately, doing business and investing in China remains complex, and the companies that are able to be agile and adaptive to changing market conditions can be better positioned for success.

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<sup>12</sup> "The China Greentech Report 2012", China Greentech Initiative, April 2012, pg. 165