



Singapore: Water Treatment & Wastewater Recycling Systems

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Date (05/2008)

Summary

The market in Singapore is ripe for new and innovative water treatment and wastewater recycling systems as it continues its effort to achieve water independence. Singapore is a small country of only 4.6 million people with limited water resources. The country imports approximately 52% of its water from Malaysia. However, two water agreements with its neighbor are due to expire in 2011 and 2061.

There is concern about Singapore's future water security, and to meet its water challenges, the island city-state has invested heavily in research and technology over the last four decades and has also developed world-class capabilities in total water management.

Singapore is becoming more self-sufficient due to development of major national water projects such as NEWater (recycled water), the Deep Tunnel Sewerage System (DTSS), desalination and rainfall storage at the Marina Barrage. The result is a thriving water industry with more than 50 international and local companies active in the Singapore market. Singapore's strategic location in Asia has also attracted major global players to use the country as a launching pad to expand into the region as well as a test-bed for new water technologies.

Market Demand

Since 2001, the Public Utilities Board (PUB), Singapore's national water authority, has outsourced some \$3.0 billion worth of water infrastructure projects, such as the Deep Tunnel Sewerage System, Marina Barrage, NEWater facilities and desalination plants, to the private sector. In addition, the Government of Singapore (GOS) is encouraging industrial users to conserve and recycle water through a media campaign, legislation and economic incentives.

The water conservation and recycling equipment market is growing in tandem with the flourishing water sector. The current size of the market for water conservation and recycling systems is estimated at \$950 million. The recent economic upturn significantly increased water demand. In the past year, some trade sources reported that their sales of water conservation and recycling systems improved by as much as 50%. The sector has also seen much greater sales to the Government of Singapore.

The size of the market for water conservation and recycling systems is projected to expand by 10%-15% annually over the next three years. This growth will emanate from a strong demand for government projects including the construction of new desalination plants and NEWater facilities. Market prospects for industrial users are also good and future demand could be greater as Singapore's economy is expected to continue robust growth.

Singapore's water supply is currently derived from four main sources: water from local catchments, imported water from Malaysia, NEWater and desalination water. The local water catchments comprise 14 reservoirs and a network of stormwater collection ponds that help prevent flooding during heavy rains. By 2009, the local catchments will increase from half to two-thirds of Singapore's land surface when the reservoir program, including the Marina Reservoir project, is completed. A series of pipelines are being built so that excess water can be pumped from one reservoir to another for storage. With these Reservoir Integration Programs, the yield from existing reservoirs will be increased. At the same time, advanced membrane technology will enable the PUB to undertake a wider range of activities in catchment areas without compromising the quality of reservoir water.

Singapore is importing water under the terms of two bilateral agreements with Malaysia. The first agreement, which will expire in 2011, provides Singapore with 100 million gallons per day (mgd) of raw water that Singapore treats at its own facilities. The second deal, which expires in 2061, gives the city-state a further 250mgd of untreated water. Singapore is striving to be self-sufficient in its water needs by 2061 when the second supply contract with Malaysia expires.

Currently, Singapore's four NEWater plants process more than 45mgd. With the latest award of contract for the fifth and largest NEWater plant at Changi to Sembcorp Utilities, NEWater will meet 30% of Singapore's current water needs by 2010, doubling the original target of 15%. NEWater is produced using state-of-the-art dual membrane (microfiltration and reverse osmosis) and ultraviolet treatment process.

Although Singapore has already put in place a sustainable water supply system through diversification of its water resources, PUB continues to invest in advanced water technologies and R&D work to look for even more efficient treatment processes. For example, the Bedok NEWater Factory was the first in the world to introduce the 16-inch reverse osmosis membrane in water reclamation in 2006. Another technology is the membrane bioreactor, which the PUB would like to use to streamline the NEWater production process and make it even cheaper.

As Singapore's population and economy grow, demand for water will rise. PUB is responding by looking for more sustainable ways to augment the country's water supply. As an island nation, the surrounding sea holds obvious potential. Hence, Singapore's first large-scale seawater desalination plant was built and commissioned in late 2005 by Hyflux. Under a 20-year build-own-operate arrangement with the PUB, the \$167 million desalination facility produces 30 million gallons of potable water a day that is pumped into PUB's potable water distribution main. With the successful implementation of the first desalination facility, it is expected that more desalination plants will be built in the years ahead. As it stands now, power generation company PowerSeraya (PS) launched its 10,000 cubic meter per day reverse osmosis desalination plant in January 2008. PS's plant is the first in the world to use the cutting-edge 16-inch membrane which results in a higher water yield and also cost savings, as it uses 30% less electricity than conventional small membrane plants. PS is interested in scaling up and building bigger desalination plants to supply the industrial needs as and when the PUB liberalize the water market.

In order to keep the city-state ahead in water technology, the Government of Singapore earmarked \$40 million to fund world-class water research centers over the next five years. The money will be used to train a new generation of researchers and help start-up firms turn ideas into reality. The first beneficiary of the program is the Singapore-Delft Water Alliance, an inter-disciplinary research center set up jointly by the National University of Singapore, Dutch water specialist Delft Hydraulics and the PUB. Other international water companies are also taking advantage of the opportunities and infrastructure by establishing operations here. Some of these companies are now partnering the PUB in pilot R&D projects and technology trials. US-based GE Water & Process Technologies signed an agreement to set up a research center dedicated to water technology at the National University of Singapore. GE Water will invest \$87 million over the next 10 years in the research center with specific focus on water treatment and system integration, fundamental chemical and membrane application, and ion exchange technology. Black & Veatch will also invest \$60 million over the next five years with a view to strengthen its Singapore base as a hub for desalination and engineering projects. Several other international players such as Marmon Water, Siemens Water Technologies, Deltares and Kiwa Water Research of the Netherlands and local firms Keppel Integrated Engineering, Hyflux, Salcon and Singapore Utilities International are significantly expanding their scope of activities in Singapore. Their strategic investments highlight the remarkable progress made in the water sector, reinforcing Singapore's vision to become a Global Hydrohub.

Market Data

There are no published statistics to accurately depict the actual size of the Singapore market for water treatment and recycling equipment. Trade sources estimate that sales totalled about \$950 million in 2006. Of this amount, approximately \$700 million is for government projects and \$250 million for sales to private or industrial users.

The Singapore market grew at a rate of about 15%- 20% per year in the early 2000s. The price of water is high in Singapore, which makes conservation and recycling viable. In addition, the GOS has the money and intention to invest in water treatment and conservation facilities. Furthermore, it encourages industrial users to conserve and recycle water through legislation, the media and incentive programs.

Over the longer term, future growth is estimated at 20%-25% annually. Part of this expansion is likely to be the result of new investments in the GOS' desalination plants. More industrial users will purchase systems as the technology proves itself and people gain awareness and knowledge of various systems. Water conservation will become increasingly important in Singapore as water prices for household and industrial use continue to rise due to the use of costlier water from desalination plants. Therefore, there is room for significant growth in the water conservation and recycling equipment market in Singapore.

Best Sales Prospects

Sales prospects are better for water recycling systems and technology than for conservation systems. Feedback from the industry indicated that their water conservation efforts are relatively insignificant and do not involve special equipment or systems. One supplier of water conservation systems reported that Singapore buyers are unwilling to allow suppliers to examine their manufacturing processes and make suggestions.

In the area of water recycling systems, the previous trend was "end-of-pipe" treatment of wastewater. Suppliers are now working with industrial users to segregate and treat their wastewater at the point of production.

Water recycling systems with the best sales prospects include advanced membrane technologies like membrane bioreactor systems, microfiltration, reverse osmosis, and water disinfection with ultraviolet light. There are also good opportunities for the sales of entire systems as well as pumps, valves, sterilizers, crystallizers and other related components.

Major government projects are likely to include desalination plants, NEWater infrastructure and enhancement of water catchment areas.

Key Suppliers

The U.S. has the major share of the market for water treatment and recycling systems with an estimated 40%. Other major suppliers include Europe (35%) and Japan (25%). Among the European suppliers are firms from the Netherlands, Sweden, the United Kingdom and Germany. Australian companies also have a presence in the market.

The PUB, National University of Singapore, and the Dutch water consulting agency Delft Hydraulics signed a memorandum of understanding with the goal of developing a regional center of excellence for water knowledge. Delft Hydraulics set up a branch office here and is also working on a \$3.2 million consultancy project on the Marina Reservoir.

Various suppliers have different strengths. In terms of wastewater treatment, the Europeans and Japanese have been more active in Southeast Asia than U.S. suppliers. However, U.S. technologies are regarded as more advanced and innovative. The Europeans and Japanese are better known for their

strength in desalination technology.

European and Japanese contractors installing water conservation and recycling systems have a tendency to purchase components from their home countries rather than from U.S. suppliers.

Local companies are also fast developing their capabilities in the water arena. Hyflux won two government tenders to build NEWater plants and Singapore's very first desalination project. Besides Hyflux, other Singaporean companies, such as Keppel Engineering, SembCorp, Dayen Environmental, Salcon and Singapore Utilities International, are also active players.

At least 50 companies currently compete in Singapore. Major U.S. companies that have a presence in Singapore include GE Water, Black & Veatch, CH2M Hill, ITT and 3M.

The market positions of various suppliers of water treatment and recycling systems are not expected to change in the foreseeable future. The market is becoming increasingly competitive, and technology differences in the industry are narrowing. The firms that are the most aggressive, cost competitive, and offer the best service/support will likely be more successful.

Buyers of water treatment and recycling systems in Singapore are very receptive to U.S. products. The U.S. has a good reputation for innovative technology and quality products.

Prospective Buyers

An important end-user of water treatment and recycling equipment is the Government of Singapore, such as its Public Utilities Board under the purview of the Ministry of The Environment and Water Resources.

Singapore's fourth and latest NEWater plant opened in March 2007. The contract for the construction of the fifth NEWater plant was awarded to Sembcorp Utilities in late 2007. This fifth NEWater plant at Changi will have an initial capacity of 15 mgd when completed in 2009, which will eventually produce 50 mgd by 2010. Two other NEWater plants – Kranji and Bedok – will undergo large-scale expansion in the near future. The five plants' combined capacity means NEWater will meet 30% of Singapore's water needs by 2010. Other projects to be undertaken by the PUB can be viewed at http://www.pub.gov.sg/info_center/lcTenders.aspx?l1=4&l2=20.

The other key end-user is the industrial sector. Non-manufacturing buyers include construction sites, hotels and restaurants. The electronics, chemical and petroleum industries are among the largest users in the manufacturing sector. Recent reports from the PUB indicate that the electronics sector accounted for 46% of total water consumption in the manufacturing industry in 2007 while the chemical sector purchased 25%.

One of the companies interviewed for this study suggested that new-to-market U.S. companies focus their efforts on breaking into the industrial market. The GOS desalination projects are "one-time" activities, while there is more potential for on-going business in the industrial sector. There is significant room for growth in this sector with many US\$6-12 million dollar projects to be implemented. In addition, many local companies are also venturing overseas to clinch water projects in China, India, Indonesia, Thailand, Vietnam and the Middle East, particularly in Saudi Arabia, UAE and Qatar.

Market Entry

Many American exporters use agents or distributors to serve the Singapore and other markets in Southeast Asia. Finding prospective partners presents no problem. Singapore firms are aggressive when it comes to representing new products and usually respond enthusiastically to new opportunities. In addition, most Singaporean companies are open to joint venture proposals and many are interested in manufacturing under license.

Technology, price and after-sales service are the main selling factors in Singapore. Prospective exporters to Singapore should be aware that competition is strong and that buyers expect good after-sales service. Selling techniques vary according to industry or the product involved, but they are comparable to the techniques used in any other sophisticated market. It is also important for U.S. firms to visit their representatives and maintain a good relationship with them.

Appointment of Distributor/Agents: Singapore has not promulgated legislation governing agency relationships and agreements. In the absence of more specific legislation, Singapore's Common Law of Practice applies to agency arrangements.

Methods of Operation for American Companies: the principal methods of operations for American companies in the Singapore market are through:

- A branch of the American firm or an associated company incorporated as a full subsidiary based in Singapore.
- A representative sent out from the United States and stationed permanently in the area. He or she may not be directly responsible for obtaining orders and making sales, but supervises local distributors and/or agents.
- An agent appointed in Singapore. Local firms which act as agents range from small trading companies, working on a small project basis to large engineering installers representing a number of manufacturers in several categories of water related equipment. Such organizations handle a large share of the water treatment and recycling equipment business and generally have branches throughout the area.
- Direct sales on an open market basis. This method is only successful if the U.S. suppliers have already developed well-established connections.

In view of the competitive nature of the local business environment, it is recommended that any new-to-market American company appoint a local representative. Once business has matured, the establishment of a representative office might then be desirable to serve as a launching pad into the region.

Trade promotion and advertising: There are specialized trade magazines in Singapore and many trade fairs (<http://www.sgmeetings.com>) that could serve as venues to promote U.S. water treatment and recycling equipment and technologies. The major English language daily newspapers are the Straits Times and the Business Times and are available at <http://www.asiaone.com>. The business magazine that has the relevant features on water related themes is "Water & Wastewater Asia" published by Pablo Publishing Pte Ltd (<http://www.pabloasia.com>). The major Chinese daily is Lianhe Zaobao (<http://www.zaobao.com>). E-Commerce websites can be found at <http://www.ida.gov.sg> and at <http://www.sg>. Leads for local advertising and promotional service agencies are located at <http://www.yellowpages.com.sg>.

Financial: Shipments to Singapore are generally made under letters of credit and sight drafts, depending on the exporter's preference and the extent of past dealings with the purchaser. Standard credit terms are 30 to 90 days. The foreign departments of most major banks are well equipped to provide service and advice on matters of foreign trading and credit.

Quotations should be on a C&F basis whenever possible. The prices given may be either in Singapore or U.S. dollars. Exporters making quotations in Singapore dollars should consult their banks for the prevailing exchange rate. Singapore uses the metric system, so it is often beneficial for price/quantity quotations to be prepared accordingly.

Market Access & Obstacles

There are excellent opportunities for U.S. firms to sell water technologies and wastewater recycling equipment into the Singapore market as the country is virtually a free port. There are no duties, taxes or tariffs on imports to Singapore of all types of water related equipment from the U.S. and elsewhere in the world. The challenge is in competing with all the other suppliers from the world since it is such an open economy.

All imported goods meant for local consumption are taxable under the Goods and Services Tax (GST), which is levied at 7.0%. Goods kept in the Free Trade Zone are not subject to GST, however GST will be charged if they are later released for local consumption.

Technical Requirements and Standards: The electrical power supply specifications in Singapore are 230 volts, 50 cycles, single phase and 415 volts, 50 cycles, 3 phase. American equipment for use in Singapore must conform to these electrical requirements.

Internationally recognized standards, such as the American National Standards Institute, are fully acceptable. SPRING Singapore (the Standards, Productivity & Innovation Board) is the government organization that oversees the formulation of industrial standards for almost every industry sector. Any queries relating to industrial standards should be directed to SPRING Singapore at 2 Bukit Merah Central, Singapore 159835; Tel: (65) 6279-1847, Fax: (65) 6272-1937, Contact: Ms. Susan Chong, Director, Standardization Division, email: suchong@spring.gov.sg.

Intellectual Property Rights: A legal framework that specifically provides for copyright protection of Intellectual Property has been put in place under the Copyright Act. A bilateral agreement between Singapore and the United States on the protection of Intellectual Property Rights has since been in force. However, American owners must also register their copyrights in Singapore before they are enforced locally. Infringement of copyrights should be referred to the U.S. Embassy for advice and guidance.

Trade Event

Singapore International Water Week
June 23 – 27, 2008
<http://www.siww.com.sg>

References & Key Contacts:

(A) Government Agencies:

Ministry of Environment and Water Resources
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Public Utilities Board
Deep Tunnel Sewerage System Project
DTSS HQ @ 10 Changi East Coast
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Tel: (65) 6389-7715
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Website: http://www.pub.gov.sg/our_services/UsedWaterDTSS.aspx?l1=2&l2=9&l3=11
Contact: Mr. YOUNG Joo Chye, Deputy Director
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(B) Trade Associations:

Singapore Water Association
WaterHub
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Contact: Ms. Cecilia TAN, Manager
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Waste Management and Recycling Association of Singapore
WMRAS Secretariat
1003 Bukit Merah Central #02-10
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Tel: (65) 6278-2538
Fax: (65) 6278-7518
Web Site: <http://www.wmras.org.sg>
Contact: Mr. Michael Ho, Chairman
Email: secretariat@epc.com.sg

For More Information

The U.S. Commercial Service in Singapore can be contacted via e-mail at: Hawcheng.Ng@mail.doc.gov; Phone: (65) 6476-9037; Fax: (65) 6476-9080 or visit our website: <http://www.buyusa.gov/singapore>.

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