



*For immediate release*

## **Singapore's water industry doubles to 100 companies**

*With technology as the key driver, the strong growth in Singapore's water sector carries on in 2011 with the addition of \$130 million in annual value-add and 460 jobs.*

Singapore, 7 June 2012 – Since being identified as a strategic growth industry in 2006, Singapore's water sector has experienced rapid growth, with the total number of companies doubling from 50 to about 100. Over the same period, Singapore-based water companies also secured over 100 international projects worth close to S\$9 billion.

### **Industry Update and Strategies**

Singapore's water industry continued its growth momentum in 2011 with investments which will add S\$130 million of annual value-add and generate 460 jobs when fully realised.

“The growth of the water industry over the last five years is backed by a strong foundation in water management that has propelled Singapore from a water-challenged nation to an internationally-recognised name in the global water community. With an integrated approach to water management, sound water policies and investments in water technologies, Singapore has turned its vulnerability into a valuable asset today. R&D and technology is a key driver of this vibrant eco-system that spans the entire water value chain from consultancy to O&M, to equipment suppliers,” said Mr Chew Men Leong, Chief Executive of national water agency PUB and Executive Director of EWI.

Leading efforts in making Singapore a global hydrohub is the Environment and Water Industry Programme Office (EWI) - an inter-agency body led by PUB, the national water agency, and involving the Economic Development Board (EDB), International Enterprise (IE) Singapore and SPRING Singapore. EWI has identified technology development, cluster development and internationalisation of Singapore-based companies as three strategic thrusts to grow the water industry.

Underpinning these strategies is Singapore's firm emphasis on water technology R&D and testbedding. To-date, S\$470 million in cumulative research funding has been committed by the National Research Foundation (NRF) through EWI to drive public and private sector water research. This has resulted in the establishment of 25 private and public R&D centres, up from just three in 2006.

In addition, PUB has also taken a major role in generating research and innovation activities in water technologies by collaborating with R&D centres and private water companies. Some of these collaborations have been facilitated by EWI schemes like TechPioneer which encourages water companies to tap on Singapore as a Living Laboratory so that cutting edge technology can be testbedded and commercialised in a real-life environment. PUB, together with the local research community has undertaken 348 R&D projects valued at S\$221 million.

The research efforts undertaken by R&D centres such as Nanyang Environment & Water Research Institutes (NEWRI), NUS Environmental Research Institute (NERI) and PUB, are



steadily bearing fruit and the resulting technologies and solutions are making their way into the local and global marketplace. This trend has been spurred by another EWI scheme called Fast-Tech. One major commercialisation outcome has been the proliferation of new water technology enterprises like HydroVision Asia, Aquaporin Asia, Visenti, Fluigen and Water Optics (refer to Annex A for more details).

For example, Danish aquaporin membrane company Aquaporin A/S, with the support of EWI funding, has collaborated with the Singapore Membrane Technology Centre (SMTC) of NEWRI to develop a novel aquaporin enhanced biomimetic membrane for application in desalination and water reclamation. Aquaporins are proteins embedded in cell membranes that nature uses to selectively shuttle water in and out of cells with minimal resistance while blocking out salts. The use of aquaporins enhances the performance of the membranes by allowing water to flow through more rapidly while still stopping the salts and pollutants. As a next step to bring the new membrane technology closer to market, a new joint venture called Aquaporin Asia was set up to conduct further R&D and piloting and eventually manufacturing in Singapore.

EWI's efforts have also been centred round attracting water companies to establish high-value business activities in Singapore. Companies like PWN Technologies, Toshiba, Mann+Hummel (refer to Annex B for more details) are just some of the companies that have, in the past year alone, added to the vibrant ecosystem of local and foreign water companies in Singapore. These companies conduct a variety of activities in Singapore including R&D, regional headquarters, supply chain management, and manufacturing.

“Singapore has built a vibrant water industry cluster. Companies have set up operations here which span the value chain, including R&D centres, equipment suppliers, system integrators and EPC firms, project developers and financing organisations. This is integral to our vision of developing Singapore as a Global Waterhub. Water companies can synergise and foster partnerships to develop and deliver integrated water solutions to worldwide customers from Singapore. We are confident that this critical mass and comprehensive range of activities resonate strongly with the industry and will help us attract even more companies to Singapore,” said Mr Yeoh Keat Chuan, Assistant Managing Director of EDB and Deputy Executive Director of EWI.

Contributing to the vibrancy of the water ecosystem are also the local small and medium sized enterprises (SMEs) such as MattenPlant and Memiontec, which are offering innovative water solutions to global companies. SPRING helps local SMEs compete regionally by strengthening their capabilities in developing new technologies and innovative solutions in the water industry.

“Environmental issues have become a priority in rapidly growing cities. Hence, there are increasing opportunities for SMEs offering innovative water solutions to showcase their potential and create niche business opportunities in Singapore and the international market. As a result of their innovative technologies and products, many water SMEs have successfully regionalised, boosting Singapore's reputation as a global waterhub,” said Mr John Lu, Deputy Director (Manufacturing and Engineering), SPRING Singapore.

To enable SMEs with little research capabilities to take on technology development, SPRING partnered Ngee Ann Polytechnic to set up the Environmental and Water Technology Centre of Innovation (EWT COI) in 2006. The Centre provides SMEs the

technical expertise to develop new technologies and translate intellectual property into applications. EWT COI has since worked with companies to develop more than 60 water and waste water technology projects, to help in the growth of the industry.

Besides attracting investments into Singapore, homegrown champions like Hyflux, Keppel, Moya Asia, Salcon and Sembcorp have also successfully exported water expertise to key overseas markets such as China and the Middle East region. Last year, Moya Asia clinched a S\$145 million 25-year Build-Operate-Transfer (BOT) project on a fresh water treatment complex in Tangerang City, West Java, Indonesia<sup>1</sup>. The BOT project will be rolled out in three zones, with a combined capacity of 168,480 m<sup>3</sup>/day when fully completed in 2016.

Said Mr Kow Juan Tiang, Group Director, Environment and Infrastructure Solutions, IE Singapore, "The track record built up by Singapore companies gives them strong leverage to share and export their services globally. This not only benefits the companies in their overseas expansion; the international experience gained in turn adds to the development of Singapore's water industry. To help the water players sustain long-term growth, we will look at strengthening presence in more traditional markets such as China and the Middle East, while also diversifying into other markets like Southeast Asia and Latin America, where there are rising water needs for both municipal and industrial purposes."

### **Looking forward**

Since the inception of EWI, Singapore has developed deep capabilities serving the municipal water segment. EWI has identified three key areas for Singapore to focus on in the next phase of growth, namely industrial water solutions, smart water and the energy-water-waste nexus (refer to Annex D for more details).

### **Industrial water solutions**

The global industrial water market is the fastest growing segment of the water industry, driven by factors such as rapid industrialisation, tightening water discharge regulations and increased pressures by industrial water users to reduce their water footprint. EWI intends to diversify our efforts into the industrial water segment by leveraging our existing capabilities and strengths in the municipal water and wastewater sectors.

### **Intelligent Water Management Systems**

Cities and utilities around the world are increasingly looking at Intelligent Water Management Systems (IWMS)<sup>2</sup> to better control water quality, manage water assets, forecast demand and predict disruptions across the entire water cycle. The EWI hopes to position Singapore as a key innovator and fast adopter of IWMS, which will pave the way for water companies to scale up and commercialise IWMS solutions from Singapore.

### **Water-energy-waste nexus**

The production of energy requires a significant amount of water; and the production of potable and industrial water also necessitates energy consumption. Both the production of energy and water also produces significant amount of waste in the form of sludge, brine and waste heat. As energy prices climb and water becomes an increasingly scarce and valuable

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<sup>1</sup> The BOT contract was signed between PT Moya Indonesia (a wholly-owned subsidiary of Moya Asia Limited) and Perusahaan Daerah Air Minum Tirta Benteng Kota Tangerang (PDAM Tangerang).

<sup>2</sup> Intelligent Water Management Systems ("IWMS") refers to the integration of sensors, communications, computer modelling and analytics technologies to monitor and optimise traditional water supply networks.



resource, there is a need to re-think the way water, waste and energy are managed. Technology is evolving to allow us to harness synergies at this water-energy-waste nexus, and Singapore is taking steps to encourage and work with companies and research institutes to develop such technologies.

### **Singapore International Water Week**

Complementing EWI's efforts to grow Singapore into a hub for water technologies and research is the Singapore International Water Week, a premier water event for the who's who in the global water community to share and discuss practical solutions to pressing water challenges.

"As the global platform for the sharing and co-creation of innovative water solutions, the Singapore International Water Week is perhaps the best showcase of our global hydrohub aspirations. Through this platform, we aim to facilitate and drive more R&D collaborations and partnerships amongst the water players in the public and private sectors to come up with sustainable water solutions," added Mr Chew.

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### **About Environment and Water Industry Programme Office**

The Environment & Water Industry Programme Office (EWI) was set up in May 2006 to spearhead the development of the environment and water industry. Led by PUB and working with partner agencies such as EDB Singapore, IE Singapore and SPRING Singapore, EWI adopts a three-pronged strategy with technology as a key pillar. Our vision is to grow value-added (VA) contribution from the water sector from \$0.5 billion (0.3% of GDP) in 2003 to \$1.7 billion (0.6% of GDP) by 2015.

### **About Economic Development Board**

The Singapore Economic Development Board (EDB) is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre. EDB dreams, designs and delivers solutions that create value for investors and companies in Singapore. Our mission is to create for Singapore, sustainable economic growth with vibrant business and good job opportunities. Visit [www.sedb.com](http://www.sedb.com) for more information.

### **About IE Singapore**

International Enterprise (IE) Singapore is the government agency driving Singapore's external economy. We promote international trade and spearhead the overseas growth of Singapore-based companies to grow Globally Competitive Companies. IE Singapore attracts global commodities traders to establish their home base in Singapore. Today, Singapore is a thriving trading hub for the energy, agri-commodities and metals & minerals trading clusters. Through our Global Company Partnership, we work with Singapore-based companies to customise total solutions in capability building, market access and financing for their internationalisation. Our global network of overseas centres in over 35 locations provides the necessary connections in many developed and emerging markets. Visit [www.iesingapore.com](http://www.iesingapore.com) for more information.



### **About SPRING Singapore**

SPRING Singapore is an agency under the Ministry of Trade and Industry responsible for helping Singapore enterprises grow and building trust in Singapore products and services. As the enterprise development agency, SPRING works with partners to help enterprises in financing, capability and management development, technology and innovation, and access to markets. As the national standards and accreditation body, SPRING develops and promotes an internationally-recognised standards and quality assurance infrastructure. SPRING also oversees the safety of general consumer goods in Singapore. Visit [www.spring.gov.sg](http://www.spring.gov.sg) for more information.

### **About PUB**

PUB is a statutory board under the Ministry of the Environment and Water Resources. It is the water agency that manages Singapore's water supply, water catchment and used water in an integrated way. Visit [www.pub.gov.sg](http://www.pub.gov.sg) for more information.

### **About PUB's tagline: Water for All: Conserve, Value, Enjoy**

PUB has ensured a diversified and sustainable supply of water for Singapore with the Four National Taps (local catchment water, imported water, NEWater, desalinated water). To provide water for all, PUB calls on all to play our part to conserve water, keep our water catchments and waterways clean and build a relationship with water so we can enjoy our water resources. If we all play our part, we can have enough water for all our needs – for industry, for living, for life.

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## ANNEX A

### Examples of Key Investments in 2011

**PWN Technologies (PWNT)** is the technology arm of PWN Water Supply Company North-Holland, the fourth largest utility based in the Netherlands. PWNT has developed a ceramic membrane system known as CeraMac, which is cost competitive compared to polymeric membrane systems. In 2011, PWNT set up a site at PUB's Choa Chu Kang Waterworks to optimise and demonstrate the capabilities of CeraMac, supported by EWI's Techpioneer scheme. It also recently opened its Singapore office, the first outside of the Netherlands. Post-demonstration, it intends to use Singapore as the base for engineering, design and sales for its business in Asia Pacific.

**Mann+Hummel** is a German manufacturer of automotive filters and water treatment systems. It has located the global headquarters of its water filtration division in Singapore. Apart from expanding its membrane manufacturing capacity and capabilities in Singapore, Mann+Hummel has also set up a research laboratory to further develop polymeric ultrafiltration membranes.

**Toshiba Corporation** is a manufacturer of diversified electrical products based in Japan. In 2012, it set up the Aqua Research Centre in Singapore, its first water treatment R&D centre outside Japan. Toshiba will also collaborate with PUB to develop and test a new adsorbent named "Functional Powder" to remove toxic elements in semiconductor wastewater. It intends to verify this technology through field testing and demonstrations under real-life site conditions. Going forward, Toshiba will continue to champion this technology and establish itself as a global business in industrial wastewater treatment.

## ANNEX B

### Commercialisation of New Technologies

\*These spin-offs arise from R&D efforts supported by EWI and will be showcased at the Singapore International Water Week's Water Innovations@SIWW Showcase and TechXchange workshop.

\***Aquaporin Asia Pte Ltd** is a start-up joint venture between DHI Environment & Water (Singapore) Pte Ltd, NTU Ventures and Aquaporin A/S, a Denmark-based company that develops biomimetic membranes based on aquaporins. The joint venture is a spin-off arising from an EWI-funded Request-For-Proposal project between Singapore Membrane Technology Centre and Aquaporin A/S to develop such membranes for water reuse and desalination. Upon successful piloting, Aquaporin Asia intends to set up a commercial scale membrane manufacturing plant in Singapore.

\***HydroVision Asia Pte Ltd** is a start-up set up by HydroVision GmbH, a flow meter supplier headquartered in Bavaria, Germany. The company is a spin-off resulting from an EWI-funded Research-For-Proposal project between DHI-NTU R&D centre and HydroVision GmbH to develop acoustic flow, sediment and mass flow meters.



**\*Visenti Pte Ltd** is a smart water spin-off company arising from the research by Singapore-MIT Alliance for Research and Technology (SMART). Visenti has been working with the PUB since 2008 to deploy its WaterWiSe technology in Singapore. The WaterWiSe technology is an end-to-end integrated hardware and software system for real time monitoring, analyzing and modelling urban water distribution systems. Visenti has decided to commercialise its technology globally through Singapore, testament to Singapore's efforts in encouraging smart water adoption and innovation here. It recently won the 'Most Innovative Company' award in the Cleantech Category at the Singapore Venture Capital and Private Equity Association Annual Awards in 2011.

**\*Fluigen Pte Ltd** is a start-up based in Singapore developing integrated waterborne pathogen monitoring systems for municipal and industrial applications. It has developed a high efficiency water concentration instrument that can filter up to a thousand litres of tap water in 30 minutes without clogging and damaging the sample, as well as capture pathogens recovered from the filter at a near-100% recovery rate. The instrument operates automatically and all its parts, including the filter unit, are self-regenerable, greatly reducing the time and the manpower required to process water samples.

**\*Water Optics Technology Pte Ltd** is start-up from NTU that aims to provide real-time water quality monitoring solutions in response to growing demand for water safety. Parasitometer, a standalone device using laser technology to detect ultra-low concentration of waterborne pathogens in drinking water distribution in real time, is the company's pioneer product, slated for commercial launch in late 2012. The technology works by directing water flow through a tiny channel within a small chip and shining a laser through the treated water – any microscopic contaminants can be detected from the way laser light bounces off and through it. The Parasitometer is affordable, can be operated automatically, requires low levels of maintenance and can be easily integrated into any conventional potable water treatment plant.

**\*ZWEEC Analytics Pte Ltd** is set up to bring the Fish Activity Monitoring System (FAMS) technology to the global water market. Developed with PUB and A\*STAR and test-bedded in PUB's installations, this technology uses the motion of tropical fish, detected using cameras and analysed with a specially designed software, to detect changes in water quality. The technology functions on the basis that changes in water quality affect the motion of fish, which will prompt the system to send an alert to a central monitoring location. This technology acts as a first line of defence against contaminants in water, allowing faster response to changes in water quality.

## **ANNEX C**

### **Examples of Local SMEs in the Water Industry**

**Memiontec** provides total water solutions to global companies. The company makes use of reverse osmosis, ion exchange and chemical treatment for ultra pure water purification or wastewater treatment. While headquartered in Singapore, it has established two subsidiaries in China and Indonesia and has secured projects internationally, in countries such as Vietnam, Indonesia, China and Oman. Memiontec was supported by SPRING under the BrandPact programme to revitalise its branding efforts.

**Mattenplant** specialises in the manufacturing and distribution of a comprehensive range of standard, modular and packaged water systems using ultra-filtration, reverse osmosis and ion exchange technologies, among others. Through their distribution network, they have managed to extend their international footprint to Australia, Indonesia, Malaysia, Vietnam, Bangladesh, Pakistan etc. These distribution networks have also allowed the company to enter niche markets, such as oil and gas, mining, pharmaceutical industries, apart from other industrial and commercial applications. They have been supported by SPRING under the Technology Innovation Programme for their innovation and development of Ultra-Filtration (UF) membrane treatment systems.

## ANNEX D

### Looking forward – new growth areas

#### **Industrial water solutions**

The global industrial water market is the fastest growing segment of the water industry, driven by factors such as rapid industrialisation, tightening water discharge regulations and increased pressures by industrial water users to reduce their water footprint in mitigating operational risks and environmental concerns. Much of the growth will be captured in Asia, where industrial activity is booming.

The manufacturing sector in Singapore, which includes industries like Chemicals, Biomedical Sciences, Electronics, F&B and Marine makes up 21% of Singapore's GDP, and is responsible for more than half of Singapore's water consumption. Singapore is also located in close proximity to neighbouring economics home to water-intensive industries such as Pulp & Paper, Mining, Palm Oil, Oil & Gas production and so on. The EWI hopes to leverage Singapore's industrial base and proximity to countries with water-intensive industries to foster innovation and test-bedding and assist industrial water solutions providers in expanding their presence in Asia.

#### **Intelligent Water Management Systems**

Cities and utilities around the world are increasingly looking at Intelligent Water Management Systems (IWMS) to better control water quality, manage water assets, forecast demand and predict disruptions across the entire water cycle. IWMS refers to the integration of sensors, communications, computer modelling and analytics technologies to monitor and optimise traditional water supply networks. The EWI hopes to position Singapore as a key innovator and fast adopter of IWMS. In 2011, PUB partnered with ST Electronics to roll out the first phase of a revolutionary IWMS infrastructure, which will pave the way for the scale up and commercialisation of IWMS solutions from Singapore.

#### **Water-energy-waste nexus**

The production of energy requires a significant amount of water; and potable and industrial water production also necessitates energy consumption. Both the production of energy and water also produces a significant amount of waste in the form of sludge, brine and waste heat. As energy prices climb and water becomes an increasingly scarce and valuable resource, there is a need to rethink the way water, waste and energy are managed.



Technology is evolving to allow us to harness synergies at this water-energy-waste nexus, and Singapore is taking steps to encourage and work with companies and research institutes to develop such technologies. For example, EWI is funding research in low-energy desalination processes as well as energy efficient and low sludge wastewater treatment processes. On the issue of waste, EWI is also looking at tapping waste heat from energy production for water treatment, as well as harvesting energy from sludge produced in wastewater treatment, both of which view waste as a form of resource. EWI will work with water companies to expand such efforts and help them capture global business opportunities arising from a resource constrained, high energy price and water-stressed future.