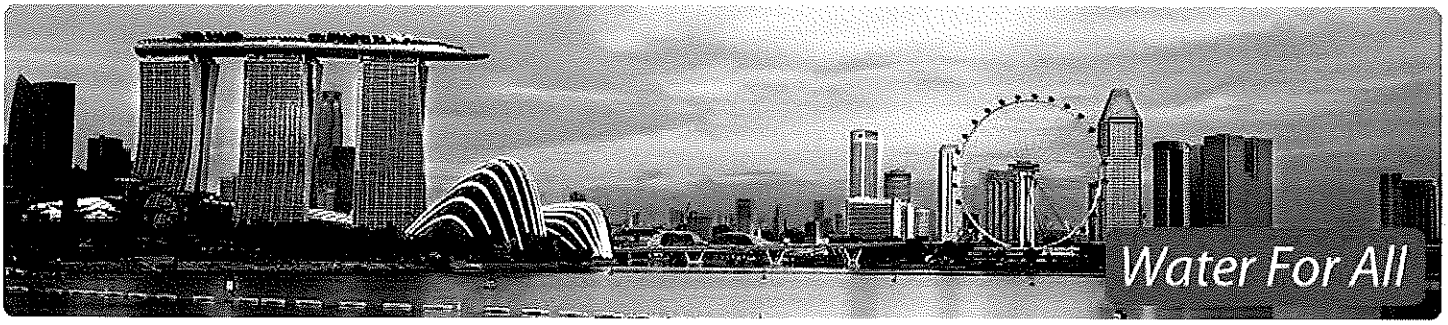

Local Catchment Water
Imported Water
NEWater
Desalinated Water

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The Singapore Water Story

Water: From Vulnerability to Strength

Singapore has little land to collect and store rainwater. We have faced drought, floods and water pollution in the early years when we established the nation. These challenges have inspired us to innovate and develop capabilities in this area, turning our weakness into strength.

Looking back through Singapore's water journey over half a century, we have, through investment in research and technology, found an integrated, effective and cost-efficient way to solve our water challenges.

Our experience in effectively addressing our water challenges has earned us international recognition as a model city for water management and an emerging global hydrohub.

Quest for a Diversified and Sustainable Supply of Water
Water Conservation
Engaging the Community
Global Hydrohub

Quest for a Diversified and Sustainable Supply of Water

Over the last 50 years, through strategic planning and investment in research and technology, Singapore's national water agency PUB has built a robust and diversified supply of water known as the 'Four National Taps'. The water supply comprises (1) local catchment water, (2) imported water, (3) highly-purified reclaimed water known as NEWater, and (4) desalinated water. Both NEWater and Desalinated Water augment our water supply, allowing Singapore to be more resilient to weather variability.

Local Catchment Water

Singapore has two separate systems to collect rainwater and used water. Rainwater is collected through a comprehensive network of drains, canals, rivers, storm-water collection ponds and reservoirs before it is treated for drinking water supply. This makes Singapore one of the few countries in the world to harvest urban storm-water on a large-scale for its water supply.

Local catchment water is a pillar of our sustainable water supply. Since 2011, the water catchment area has been increased from half to two-thirds of Singapore's land surface with the completion of the Marina, Punggol and Serangoon Reservoir.

With all the major estuaries already dammed to create reservoirs, PUB aims to harness water from the remaining streams and rivulets near the shoreline using technology that can treat water of varying salinity. This will boost Singapore's water catchment area to 90% in the long term.

Imported Water

Singapore has been importing water from Johor, Malaysia, under two bilateral agreements. The first agreement expired in August 2011 and second agreement will expire in 2061.

NEWater

A Singapore success story and the pillar of Singapore's water sustainability, NEWater is high-grade reclaimed water produced from treated used water that is further purified using advanced membrane technologies and ultra-violet disinfection, making it ultra-clean and safe to drink.

In 2010, Singapore's latest and largest NEWater plant was completed. Together, Singapore's four NEWater plants can meet up to 30% of the nation's current water needs.

By 2060, we plan to expand the current NEWater capacity so that NEWater can meet up to 55% of our future water demand.

Desalinated Water

Another technology-based water source is desalinated water. Singapore has one of Asia's largest seawater reverse-osmosis plant, which produces 30 million gallons of water a day (136,000 cubic metres) to meet about 10% of Singapore's water needs. A second and larger desalination plant with a capacity of 70 million gallons of water a day or 318,500 cubic metres of desalinated water per day, the Tuaspring Desalination Plant opened in September 2013. Today, desalinated water with a total capacity of 100 million gallons of water a day from two plants can meet up to 25% of Singapore's current water demand.

By 2060, we intend to ramp up desalination capacity so that desalinated water can meet up to 25% of our water demand in the long term.

Multiple water projects were also initiated to ensure a sustainable water supply for Singapore. These include clean-up of the Singapore River, building the Marina Barrage and creating the Deep Tunnel Sewerage System.

Reservoir In the City

An iconic structure at the mouth of the Marina Channel and the vision of Minister Mentor Lee Kuan Yew more than twenty years ago, Marina Barrage creates Singapore's fifteenth reservoir, the Marina Reservoir.

The barrage serves three benefits: it creates a freshwater lake to boost Singapore's water supply, acts as a tidal barrier to prevent flooding in low-lying city areas, and keeps the water level consistent, offering a venue for water-based activities in the heart of the city.

In addition, there are opportunities abound for people to connect with water at the barrage. This helps to nurture ownership of Singapore's precious water resources, so people will do their part to keep our waters clean. At the same time, it is also a celebration of the beauty and preciousness of Singapore's waters.

The variety of recreational activities available at the barrage has made it the new hotspot in the city centre, with more than 3.5 million visitors since its opening.

In 2011, Marina Reservoir with Punggol and Serangoon Reservoirs, which are our 16th and 17th reservoirs, increased Singapore's water catchment from half to two-thirds of Singapore's land surface.

Used Water Superhighway

The Deep Tunnel Sewerage System (DTSS), a 48-kilometer-long used water superhighway, conveys used water from the northern and eastern parts of Singapore to the centralised Changi Water Reclamation Plant for treatment before the treated used water is further purified into NEWater.

We are now planning for Phase 2 of the DTSS. Similar to DTSS Phase 1, DTSS Phase 2 will consist of four components: a deep tunnel (South Tunnel), associated link sewers, a centralized WRP integrated with NEWater facilities and deep sea outfall. It will cover the western part of Singapore, including the downtown city area and major upcoming developments such as Tengah New Town, and is targeted for completion in 2022.

Water Conservation

Securing an adequate supply is only half of the water equation - managing the demand side is just as crucial. PUB has a wide-ranging water conservation plan that encourages customers to use water wisely. Singapore's per capita domestic water consumption has been brought down from 165 litres per day in 2003 to the current 151 litres. The target is to lower it to 147 litres by 2020 and 140 litres by 2030.

Programmes cover the domestic and non-domestic sectors including good water saving habits and Water Efficient Building Certification.

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Engaging the Community

Achieving an adequate and affordable water supply is not enough. Equally important is to get public buy-in, to have greater ownership of and to value our water resources.

PUB has embarked on a new shift in Singapore water management. The water agencies encourage everyone in the 3P (People, Public and Private) sectors to take joint ownership of Singapore's water resource management. Known as the 3P

approach, this is embodied in PUB's tagline – Water for All: Conserve, Value, Enjoy.

Central to this new approach is the Active, Beautiful, Clean Waters(ABC Waters) Programme which will transform Singapore's reservoirs and water bodies into beautiful and clean streams, rivers and lakes, creating a vibrant City of Gardens and Water. At the same time, these new community spaces bring people closer to water, so they better appreciate and cherish this precious resource. Over 100 potential locations have been identified for the implementation of the programme by 2030. Over 20 projects have been completed island-wide, and more will be rolled out between now and 2017 to various parts of Singapore.

In addition, PUB has a host of programmes to reach out to the community:

The Water Network panel is a high-level panel representing different stakeholders in the water industry and people from the community. They provide feedback and alternate perspectives on PUB's projects and programmes.

Water conservation programmes like 10% Challenge and 10-Litre Challenge encourage industries and households to use water wisely, and save 10% of their water consumption, and 10 litres of water a day respectively.

The Watermark Award is an annual award to recognise individuals and organisations for their outstanding contributions towards the water cause.

Friends of Water is a programme that recognises individuals and organisations who contribute towards raising awareness about water and sustaining Singapore's water supply.

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Singapore – Global Hydrohub

Singapore has identified water and environment technologies as a key growth sector since 2006, and we are now well-placed to take the lead as an R&D base and as a wellspring of water solutions. Through the Environment and Water Programme Office (EWI), which spearheads the growth of Singapore's water industry, the National Research Foundation (NRF) has committed $470 million to promote R&D in the water sector.

EWI, an inter-agency outfit led by PUB, is spearheading efforts to transform Singapore into a global hydrohub. Through funding promising research projects, the EWI aims to foster leading-edge technologies and create a thriving and vibrant research community in Singapore.

Today, Singapore has a thriving cluster of over 130 water companies and 26 research centres. PUB is actively working with the industry to come up with new, innovative ideas that may make a difference to the water world.

In line with our aspirations to grow the global hydrohub, Singapore has also successfully hosted the Singapore International Water Week, a meeting place for the who's who in the water industry, in the last five years.

Singapore International Water Week 2014

The complexity of water issues also requires a systems approach - policy-makers, industry, researchers and academia need to collaborate on sustainable water solutions for long term. We see tremendous benefits in collaborating with water agencies, government entities and private sector companies around the world. Singapore plays a key role in forging dialogue amongst the policymakers, water experts and industry leaders on water issues, challenges and solutions, through hosting the Singapore International Water Week (SIWW), a meeting place for the thought leaders and significant stakeholders in the water industry, and a global platform for the sharing and co-creation of water solutions. Since its inception in 2008, SIWW has gained traction as one of the leading water events in the world.

The latest edition of Singapore International Water Week (SIWW) was held from 1-5 June 2014, and saw S$14.5 billion in total value for the announcements on projects awarded, tenders, investments and MOUs concluded at the event. Held in conjunction with the World Cities Summit and CleanEnviro Summit Singapore, the event attracted more than 20,000 participants from 118 countries/regions spanning the government, international organisations, industry, and academia sectors. The Water Expo at this year's SIWW was the largest edition to date with more than 800 participating companies and 24 Group Pavilions exhibiting over 23,000sqm of covered space. Various announcements on company investments, R&D collaborations and project partnerships were made, underscoring Singapore's stature as a global hydrohub and SIWW's role as the global platform for the co-creation of water solutions.

The 7th Singapore International Water Week will be held from 10 – 14 July 2016. In the lead-up to SIWW 2016, we hosted the inaugural SIWW Technology and Innovation Summit (STIS) from 16 to 17 June 2015. The Summit is an exclusive by-invitation event that brought together global thought leaders and key influencers, to develop a blueprint for municipal and industrial water solutions. The discussion outcomes from STIS will be showcased at SIWW 2016.

Log on to www.siww.com.sg

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