

SOLUTIONS ^{No 3}

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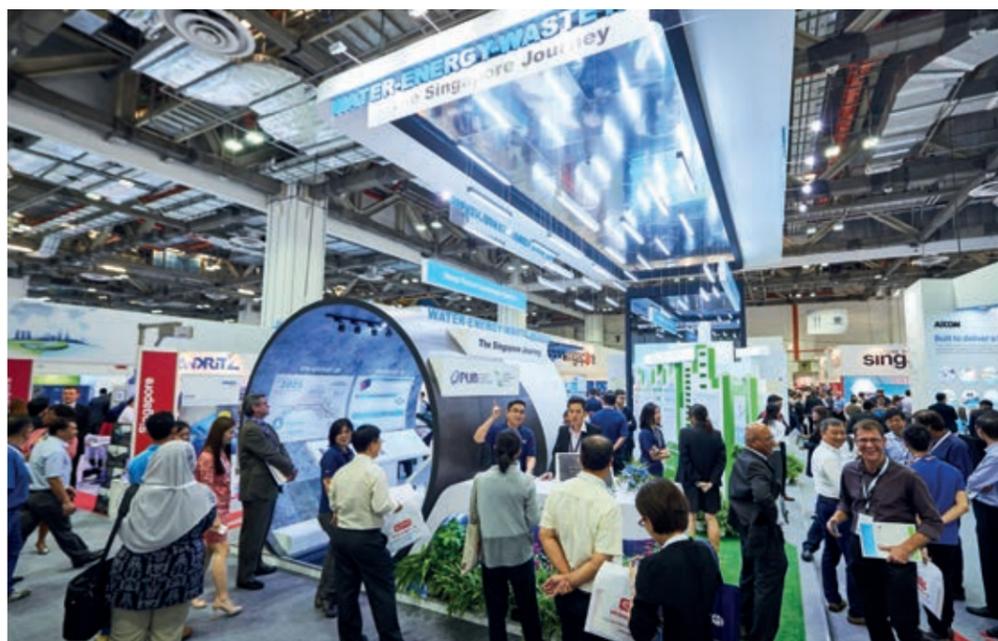
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LIVE COVERAGE @ Sands Expo & Convention Centre, Marina Bay Sands, Singapore

WHAT'S HOT? CITIES, WATER AND ENVIRONMENTAL HASHTAGS TREND IN SINGAPORE

Conversations spark as people listen, learn and share at WCS, SIWW and CESS

By Joseph Jones



The joint sessions of WCS, SIWW and CESS captured Singapore's attention this week. Over the past few days, each session's respective hashtag – #worldcitiessummit, #SIWW2016 and #CESS2016 – trended on Twitter as a succession of speakers, panels and workshops tackled the big issues facing the world today.

In WCS, the hot topics of discussion online were liveability and sustainability, with Taipei Mayor Ko Wen-je (@KP_Taipei) keen to discuss city challenges. The discussion between Singapore's Deputy Prime Minister Tharman Shanmugaratnam and Professor Tommy Koh, Ambassador-at-Large,

Ministry of Foreign Affairs, on how to create liveable cities also prompted a flurry of online discussion. Both agreed that long-termism was key, with Professor Koh asking if Singapore could become the best place to grow old in. Mr Shanmugaratnam commented that short-termism is the enemy of efforts to create liveable cities. At the Building Resilient Cities and Communities session, Mr Henk Ovink (@henkovink), Special Envoy for International Water Affairs for the Kingdom of the Netherlands, tweeted his admiration for the

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SUSTAINABLE DEVELOPMENT POTENTIAL SOUTHEAST ASIA AND CHINA

By Joseph Jones



(L-R) Executive Director and Chairman of the Centre for Liveable Cities with two Chinese dignitaries at the book launch

The topics of transformation and development were on everyone's lips at both the Southeast Asia and China Business Forums.

The China Business Forum saw the debut of the English-language edition of *Challenges and Reforms in Urban Governance: Insights from the development experience of China and Singapore*, a joint publication by Singapore's Centre for Liveable Cities (CLC) and the Development Research Centre of the State Council of the People's Republic of China (DRC). The publication aims to capture and distil the knowledge and insights gleaned from the development of both China and Singapore. It focuses on four key topics: an overview of urbanisation, public housing, urban planning and infrastructure financing (download it at clc.gov.sg).

Representatives from CLC and DRC emphasised the close ties and mutually beneficial relationship between China and Singapore. Dr Liu Thai Ker, Chairman, CLC Advisory Board, expanded upon the book's topics, saying that China's

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DAILY HIGHLIGHTS

<p>Expo Hall F, Basement 2</p> <p>WATER-ENERGY-WASTE NEXUS: THE SINGAPORE JOURNEY</p> <p>9.30-12.00</p>	<p>Civic District, Empress Lawn</p> <p>CLOSING DINNER</p> <p>18.00-21.00</p>	<p>Sands Grand Ballroom E, Level 5</p> <p>FINANCING A SUSTAINABLE URBAN FUTURE</p> <p>9.00-12.30</p>	<p>Begonia 3002, Level 3</p> <p>WATER CONVENTION CLOSING PLENARY</p> <p>16.00-17.30</p>	<p>Melati Ballroom, Level 4</p> <p>CIRCULAR ECONOMY FOR GREATER COMPETITIVENESS</p> <p>10.45-12.15</p>
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WHAT'S HOT? CITIES, WATER AND ENVIRONMENTAL HASHTAGS TREND IN SINGAPORE

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inclusive approach of Mr Simon Hansen, Director of Regions, C40, to climate change resilience in cities.

At SIWW, online conversations flowed around technology, innovation and process. Some of the most popular topics included water infrastructure investments, sustainability and the use of robot swans to monitor Singapore's water. European Union (EU) Ambassador to Singapore Dr Michael Pulch (@MichaelPulchEU) tweeted about the SIWW business forums, and the opportunity for EU-Asian collaboration. Elsewhere, there was a flurry of congratulatory tweets for the 2016 Lee Kuan Yew Water Prize winner Professor John Anthony Cherry for his work on groundwater.

Over at CESS, one of the buzzwords on social media was "reduction" – the reduction of waste, packaging and marine litter all featured in a series of engaging panel discussions and online

chats. Singapore journalist Ms Kirsten Han (@kixes) attended the CESS Innovation Pitch and sparked a back-and-forth on Twitter around the topic of waste as a resource. One of the barriers to working with food waste: "it's gooey, it's messy and it stinks!" wrote Han, who was deeply impressed by biological solutions provider VRM Biologik's proposal to process food waste and use it as a resource. Mr Philip Heylen (@PhilipHeylen), Vice Mayor, Antwerp, was also heavily retweeted as he addressed the Clean Environment Regulators Roundtable.

Across all conversations, there was a willingness to share ideas and experiences, and learn from others. This online peer-to-peer exchange echoed the physical networking and interactions taking place across the floors and rooms of WCS, SIWW and CESS.

SUSTAINABLE DEVELOPMENT POTENTIAL SOUTHEAST ASIA AND CHINA

► Continued from P1

economic transformation presented both challenges and opportunities for sustainable, green urban development.

This was also a theme taken up by Dr Chen Changsheng, Deputy Director-General, Department of Macroeconomic Research, DRC. He praised Sino-Singapore cooperation and argued that China is currently in a state of transition similar to when it went from a planned to open market economy. He acknowledged that in the past, China had used its formidable growth to offset the errors in its urban planning and development. "But that is impossible in the future," said Dr Chen. "To succeed, China must overcome the risk inherent in the transformation into its new phase of development."

Meanwhile at the Southeast Asia Business Forum, government officials and utilities leaders presented policy changes and upcoming projects.

Mr Jordan Schwartz, Director, Infrastructure and Urban Development Hub, The World Bank, Singapore, acknowledged the geographical, linguistic and political diversity of the region when he said, "The only thing the countries in Southeast Asia have in common is their differences." However, he also pointed to a commonality of trends around urban development. "Typically, we went to the development of basic services infrastructure in the 1950s and 1960s. But as economies of the region grew more complex, a greater share has gone to trade, agricultural and environmental infrastructures, urban renewal, and slum upgrading," he said.

This drive towards urban development was echoed all over Southeast Asia. The Southeast Asia Business Forum closed with a series of presentations showcasing the exciting new developments in capital cities across the region, including Manila, Yangon, Hanoi and Jakarta.

VIEW FROM THE FLOOR WASTE-TO-ENERGY A "FINAL SOLUTION" FOR ASIA: JFE ENGINEERING

Increasingly, waste will be a valuable resource for producing clean power across the region



Mr Daniel Pintado, Business Analyst at JFE Engineering believes waste-to-energy will become a major source of power in Asia

This year's WCS, SIWW and CESS have all emphasised the importance of waste as a resource and the need for nations to transition from linear economies to circular economies. Among the many facets of the circular economy, waste-to-energy (WTE) is among the most significant; it disposes of waste in an effective, controlled and highly regulated manner, and can also generate clean electricity and diminish the reliance of cities and nations on conventional fossil fuels.

Speaking to *Solutions*, Mr Daniel Pintado, Business Analyst at JFE Engineering, explained, "WTE is important because it helps those countries that apply this technology to make

their waste management more efficient and reduce the volume of their waste."

Mr Pintado said that traditionally, countries would take their waste and dump it – at best into a sanitary landfill, and at worst into an open-air dump. This would generate huge problems, from the obvious ones, like the smell, to the generation of methane, which is far more harmful to the atmosphere than carbon dioxide. "With WTE, you can recover the energy and transform the waste into electricity, heating or cooling. The waste can then actually be considered a resource," he added.

As a means of generating power, WTE has much growth potential. However, in order to realise this, legal and regulatory matters, as well as infrastructure developments, need to be

further advanced. "The ideal case, and the holistic approach, would be for regulators to establish a system in their respective countries that makes the people of those countries reduce the amount of waste that they generate," he said.

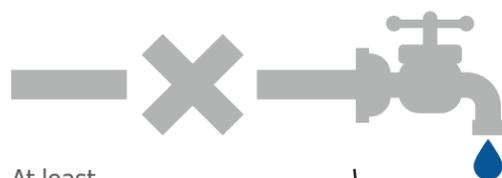
Mr Pintado added that this system should also educate people and get them to take responsibility for their own waste, rather than just dumping it wherever. It should get people to reduce, separate, segregate and recycle waste. He concluded, "With that system in place, WTE should be a final solution. First you should reduce, then separate, and then recycle. Once you have waste that you really cannot do anything about – then it should be sent to the WTE facilities."

WCS

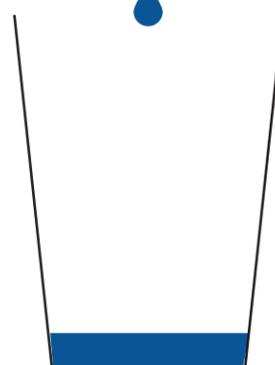
72% of cities **outperform** the **economies** of their countries



SIWW



At least
663 million
people **lack access to safe drinking water**



CESS

One person
generates
1.2kg
of solid waste
per day



CELEBRATE IN THE HEART OF THE CITY

By **Daniel Seifert**

This year's WCS, SIWW and CESS Closing Dinner takes to the streets of Singapore



City Hall, Singapore

This year, delegates are invited to experience Singapore in a whole new way when the closing dinner of the three co-located events moves outside of the traditional ballroom setting and into the city's historical downtown district.

Guests-of-honour Mr Lawrence Wong, Singapore's Minister for National Development, and Mr Masagos Zulkifli, Singapore's Minister for the Environment and Water Resources, will join delegates for a casual canapé dinner at Singapore's Civic District.

The birthplace of modern Singapore, the Civic District is home to Sir Stamford Raffles' landing site along the Singapore River and was earmarked for government use in Raffles' blueprint for development in 1822.

Delegates can tour displays of Asian cultures that have contributed to Singapore's heritage at the Asian Civilisations Museum, located within Empress Place Building, formerly known as the Government Office. They can also admire the recently renovated Victoria Theatre and Concert Hall, the oldest sections of which served as Singapore's Town Hall in 1862.

Also in the Civic District, the National Gallery Singapore, which opened in November 2015, comprises two national heritage buildings, the Supreme Court Building and City Hall. It is the focal point of Singapore's vision to become a global city for the arts. Delegates are entitled to free admission to tour the world's largest collection of art pieces from Singapore and Southeast Asia.

INDIA'S DEVELOPMENT MEGA-PLANS

By **Amala Pillai**

Business Forum reveals exciting prospects for developers



Bangalore skyline, India

The World Bank forecasts 7.6% growth for India. Over the next 15 years, India's cities will claim 40% of the country's population and 75% of its GDP. During this period, some 400 million people are expected to migrate to cities, putting pressure on basic services, infrastructure, utilities and the environment. In the face of new challenges, India will need to build new cities, retrofit existing ones and create new jobs.

At the India Business Forum, prominent speakers will share deep business insights, discuss development plans and reveal project announcements related to India's development mega-schemes, including the Smart Cities Mission, the Atal Mission for Rejuvenation and Urban Transformation,

Housing for All and the Clean India Mission. Entitled "The Challenge of India's Inclusive Growth – Development Aspirations and Investment Opportunities", the India Business Forum invites infrastructure providers and project owners who are looking for capable, experienced solution providers, policymakers and government officials to exchange best practices with one another.

It is one of four Business Forums to highlight opportunities for investment and partnership, translating discussions into real opportunities; the other three focus on China, Latin America and Southeast Asia.

The India Business Forum will be staged on 13 July 2016, 10.00–12.00, Basement 2, Expo Hall D, Sands Expo and Convention Centre.

LATIN AMERICA — IN TRANSITION

By **Amala Pillai**

Opportunities for investments and partnerships at the Latin America Business Forum

An estimated 80% of Latin America's 625 million inhabitants are expected to live in cities by the end of 2016. While the lives of residents and citizens have improved through sound economic policies and steady growth throughout the region, governments and industries in Latin America now need to manage their urban expectations and balance complex agendas of growth and sustainability.

The Latin America Business Forum, titled "Challenges and Opportunities Amid a Transitioning Urban Population", analyses trade and investment linkages between Latin America and the rest of the world, including the Trans-Pacific Partnership. This landmark agreement among 12 nations – namely Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the US and Vietnam – will lower trade barriers and tariffs between them.



Santiago, Chile

The forum, which will be held this morning, features a panel of public and private sector experts who will offer insights on what is in store for industry players, professionals and individuals interested in Latin American markets, and reveal upcoming city-level projects, development hotspots, industry trends and policies.

It is one of four Business Forums at World Cities Summit 2016 that aim to highlight

opportunities for investment and partnership, translating discussions into real opportunities; the other three focus on India, China and Southeast Asia.

The Latin America Business Forum: Challenges and Opportunities Amid a Transitioning Urban Population, will be held on Wednesday, 13 July 2016, 9.00–11.40, Level 5, Grand Ballroom D, Sands Expo and Convention Centre.



QUALITIES OF GOOD URBAN GOVERNANCE

By **Chin Wei Lien**

What happens when a city's vision comes in conflict with national development goals?



Mr Won Hee-ryong sharing his city's conservation efforts at the Mayors Taking Charge thematic track

City-level governments often have different priorities from their national counterpart. How, then, should local leaders strike a balance between the two?

Mr Won Hee-ryong, Governor of Jeju Special Self-Governing Province in South Korea, highlighted this dilemma at yesterday's Mayors Taking Charge thematic track. In the case of Jeju, with 13 million visiting tourists each year, Mr Won's priority is to harmonise national development interests with the city's conservation goals – a task that is not always easy.

Mr Didier Vancutsem, Secretary General of ISOCARP, and Professor Luis Bettencourt, Complex Systems, Santa Fe Institute, offered some ideas. "We need to have a bottom-up approach when it comes to governance," Mr Vancutsem said. "Transparency and public participation are very important."

Professor Bettencourt believes that cities and national governments need to work with each other on individual problems. This involves knowledge management, establishing urban planning labs, as well as sharing ideas across cities.

COPING WITH AN UNCERTAIN FUTURE

By **Zhan Hao Wen**

WCS panels discuss how to build physical and social resilience



Prominent urbanists discuss the challenges associated with city resilience, sharing personal experiences and solutions

City resilience is not only about the way cities can bounce back from shocks and stresses, but how we can learn from one another's best practices to prepare for an uncertain future. Mr Henk Ovink, Special Envoy for International Water Affairs, Kingdom of the Netherlands, shared at the first session

on "Strengthening the Physical City" of the WCS thematic track on Building Resilient Cities and Communities.

The discussion brought together mayors, representatives from the private sector and non-profit sector, as well as academia to share their experiences and best practices.

The second panel discussion, which focused on the topic of "Enhancing Social Resilience", was moderated by Mr Michael Berkowitz, who is President of 100 Resilient Cities.

Both sessions highlighted that resilience is as much about people as it is about infrastructure. Mr Berkowitz shared that a network of friendly neighbours and cooperative people allows cities to better survive disasters.

BUILDING SUSTAINABLE CITIES TOGETHER

By **Vicki Yang**

Sustainable cities are not the vision of one person but require different stakeholders to work together

A sustainable city is built by everyone in partnership, be they from the top echelons of governments or a citizenry on the ground. That was the key message of the WCS session titled "Can We Make the Cities We Want?" Moderated by Professor Chan Heng Chee, Chairperson of the Lee Kuan Yew Centre for Innovative Cities at the Singapore University of Technology and Design, the session had urban planners and related organisations from Indonesia, Australia, Singapore and France discussing the collaborations that build such cities.

Stressing the importance of urban planners in managing partnerships with various stakeholders in society – the private sector in particular – was Professor Wulf Daseking from the University of Freiburg, Germany. Paraphrasing renowned urban planner and architect Jaime Lerner, Prof Daseking said, "Cities are like



Professor Wulf Daseking from the University of Freiburg stressed the role that urban planners play in guiding investments into making a sustainable city

turtles, you do not see when they are dying; it takes time. But we as planners have to look behind the mountains and tell investors which way the investment has to go."

A second session followed where city planners from other countries, including Singapore's Housing and Development Board, shared how affordable housing is imperative in the making of a sustainable city.

HOW CULTURE MAKES CITIES GREAT

By **Vicki Yang**

Professor Tommy Koh lays out the reasons why cultural policy can give a city an edge over others

To Professor Tommy Koh, Ambassador-at-Large, Ministry of Foreign Affairs, Singapore, a great city is not defined by its land mass. As keynote speaker of the session, titled "Culture – Should Cities Care?", Prof Koh gave pointers on the making of a great city, primarily through the harnessing of culture.

"You have to keep your heritage, you have to be authentic," said Prof Koh. "We want to have a coexistence of old and new." Using Singapore as an example, Prof Koh admitted that "we demolished too much and lost the original authenticity" in Chinatown. "We did not make that mistake in Little India nor the Arab quarter."

As such, the case for the consideration of culture in urban policy planning is crucial. Prof Koh said that Glasgow and Liverpool for example, have benefitted immensely



Singapore's Ambassador-at-Large, Ministry of Foreign Affairs and keynote speaker Professor Tommy Koh explains what makes a city great

from being named cultural cities under the aegis of the European Capital of Culture project.

To illustrate how cities incorporate culture into their urban policies, a panel session followed with each city's approach showcased by its representative speakers, including those from Australia, Singapore, Hong Kong and Malaysia.



SMART SOLUTIONS ARE HUMAN ONES

By **Luke Clark**

Get the design of your projects right from the start, and focus on improving the plight of those who need them most. Despite the high-tech thrills of many smart city projects, these are ultimately the factors that will make or break a public-private partnership.

This was the overall theme of the two Smart City panel sessions yesterday, titled "Innovative Solutions for a Smart City" and "Smart Towns: Urban Innovations That Are Scalable, Sustainable and User-Friendly".

In the first panel session, Dr Vivian Balakrishnan, Minister-in-Charge, Smart Nation Programme Office, Singapore, noted that in designing technology-driven programmes, the key is openness. This means openness to experimentation, open standards, the use of open source and open data frameworks, and an open society. Smart city practitioners, he said, need to be open to experimentation – and not try to retrofit a final solution into place. In the long run, the goal is to create a more open society that allows for strategic data sharing among



Dr Janil Puthuchery, Minister of State, Ministry of Education and Ministry of Communications and Information, Singapore

stakeholders, yet carefully safeguards personal privacy.

In the second session, Dr Janil Puthuchery, Minister of State, Ministry of Education and Ministry of Communications and Information, Singapore emphasised that these smart city projects must be tested against the improvements that they bring to people's lives. "Smart solutions are about people: creating a liveable environment, and building communities."

The panels in yesterday's sessions focused on innovative smart city projects in various destinations, including Hamburg, Seoul, Singapore and India by companies including Cisco, ENGIE, the Seoul Metropolitan Government, C40 Cities, 3M and Hyundai Engineering. As Dr Puthuchery highlighted, successful projects mean bringing technology and the citizen together. "Technologies can exacerbate the digital divides," he noted. "So it has to be an enabler to close the divide, rather than making it worse."

WCS PLENARY: CITIES OF TOMORROW

By **Jennifer Eveland**

Innovation for the people, by the people

The cities of tomorrow can be driven by their citizens, who have the greatest stake in ensuring a sustainable and liveable future, said Mr Peter Ho, Chairman of the Urban Redevelopment Authority, Singapore and chairperson for the WCS Closing Plenary entitled "Cities of Tomorrow: Driven By Citizen Innovation?" The role of government, he said, should be to foster innovation through funding incentives and arrangements, and via flexible, rather than restrictive, regulations.

During the plenary, Dr Fang Jin, Deputy Secretary General, China Development Research Foundation and Mr Bambang

Susantono, Vice-President, Knowledge Management and Sustainable Development, Asian Development Bank, discussed the inevitability of urbanisation, particularly in Asia, and the resulting need to learn to live with and manage the risks. Furthermore, the role of technology will impact not only the economic structure of cities, but also the way in which municipal governments interact with their citizens.

Delivering the WCS Grand Summary, "Connect the Dots", Dr Liu Thai Ker, Chairman of the Centre for Liveable Cities (CLC) Advisory Board, Singapore, observed a change in this year's WCS deliberations from those of previous summits.



Dr Liu Thai Ker, Chairman of Singapore's Centre for Liveable Cities (CLC) Advisory Board shares his vision of tomorrow's cities

"In looking back to 2010 and 2012, the issues raised were more conceptual," he said. "This time I felt the issues were more concrete and specific. That, to me, reflects a better understanding of urban issues."

Dr Liu posed a thoughtful reflection to the audience in the form of 12 pairs of words in four parts – the relationship of each word-pair being the consideration for creating better cities.

On the role of planning, he presented dual concepts of people and land being liveable and sustainable, and the function of legislation and planning. On the role of the government, he spoke about the government versus the professionals, particularly with

regard to the government's understanding of "what" needs to be done versus the professional knowledge of "how" to do so, and the government's knowledge of the "needs" of the people versus the "skills" of professionals.

The third set of word-pairs he shared were on the role of professionals such as planners and engineers with regard to building up basic skills versus aiming for innovation; developing systems versus implementing projects; and design versus technology, in the sense that design should lead technology.

The final set, he said, was on the role of administrations, particularly ideas of position versus opinions, action versus authority and goals versus politics.

After his speech, Dr Liu invited the guest of honour Mr Desmond Lee, Senior Minister of State, Ministry of Home Affairs and Ministry of National Development, Singapore to the stage, where he presented Mr Lee with the newly launched book *Urban Redevelopment: From Urban Squalor to Global City*, published by the CLC as part of its *Urban Systems Studies* series.

Mr Lee closed the plenary with thoughts about the benefit of technology and outreach to get people involved, "letting citizen activism help as part of the solution," he said, "and at the highest level working side by side with people to identify the problems and design the solutions."

TODAY'S HIGHLIGHTS

Pick-up point:
In front of Hall C,
MBS

WCS SITE VISIT:
LIVEABLE CITY CENTRE

14.00-18.00



Pick-up point:
In front of Hall C,
MBS

WCS SITE VISIT:
SINGAPORE BOTANIC
GARDENS

14.00-18.00



Pick-up point:
In front of Hall C,
MBS

WCS SITE VISIT:
SMART GREEN DESIGN

14.00-18.00



Pick-up point:
In front of Hall C,
MBS

WCS SITE VISIT:
SINGAPORE SPORTS
HUB

14.00-18.00





TAKE ACTION NOW TO SAFEGUARD WATER

By **Luke Clark**

World water leaders call for urgent measures to prevent a water crisis



(L-R) Mr Ng Joo Hee, CE of Singapore's national water agency PUB; Mr Peter Brabeck-Letmathe, Chairman of Nestlé SA; Mr Venkatesh Kini, President, India and Southwest Asia, Coca-Cola; Dr David Molden of the International Centre for Integrated Mountain Development

The world's water stakeholders need to show greater unity and embrace tough decisions now, according to the Water Leaders Summit meeting titled "Future of World's Water Beyond 2030".

Session chairperson Professor Asit K Biswas of the Lee Kuan Yew School of Public Policy in Singapore warned delegates that the world faces multiple issues, ranging from a growing lack of consumer trust in publicly supplied water, to some serious challenges from water pollution – given that 80% of waste water is being discharged without treatment. A water crisis is avoidable, he noted, but only if the resource is managed properly. "If we continue as we are doing now, there is no question we are going to face a crisis of unprecedented magnitude," he said.

Mr Peter Brabeck-Letmathe, Chairman of Nestlé SA, noted that Nestlé's strides in water conservation started with giving the resource – traditionally considered a free commodity in some industries – an internal economic value: US\$1 per cubic litre of rainwater, and US\$5 per cubic litre in water-stressed areas. Tackling water shortage ultimately meant readdressing basic business assumptions, he stressed. "The more you are using, the higher the price has to be."

Mr Ng Joo Hee, CE of Singapore's national water agency PUB, said water availability remains an "existential challenge" for the nation. "The challenge for Singapore when it comes to water will always be scarcity." This has been tackled through water recycling, desalination and rainwater storage and treatment. Equally, citizens are charged nominal fees for water consumption, reminding them of its intrinsic value.

Mr Venkatesh Kini, President, India and Southwest Asia, Coca-Cola, said the company was working to reduce its water footprint from agriculture, particularly for the mangoes used in its juices. Going forward, he called for creativity to evoke smarter consumer decisions. "A radical suggestion would be much greater transparency in the true water footprint of everything we consume," he said. "People would be surprised to know how much water is used."

Dr David Molden of the International Centre for Integrated Mountain Development warned that the "tremendous decline" of mountain glaciers in areas such as Everest meant a shrinking water storage, and knock-on effects ranging from droughts and floods, to rising water levels. "Take care of your sources of water," he urged. "And recognise the impacts on mountain people."

IN THE NEWS

SINGAPORE WATER ACADEMY SIGNS TWO MOUS TO COLLABORATE ON CAPACITY BUILDING PROGRAMMES AND WATER-RELATED TRAINING

At the launch of the Singapore Water Academy yesterday, the academy signed two Memorandums of Understanding (MoUs). The first was with Surbana Jurong, a Singapore urban infrastructure and engineering solutions consultant. Surbana Jurong will leverage the Academy's expertise in water infrastructure planning to provide capacity-building programmes to both Surbana Jurong staff and their clients. The second MoU was signed with the Singapore Cooperation Enterprise and will see the Academy conduct water-related training for Singapore Cooperation Enterprise clients.

LIQUID LEARNINGS

By **Chin Wei Lien**

The Singapore Water Academy – a centre of excellence for professional education in water – makes a splash at SIWW 2016

PUB, Singapore's national water agency, has set up the Singapore Water Academy, an institution for learning for the local and international sector. This was announced by Mr Masagos Zukifli, the city-state's Minister for the Environment and Water Resources, at the Singapore International Water Week (SIWW) 2016.

Besides addressing the operational requirements of PUB, the Academy will act as a training institute for water management professionals from the Singapore and global stages.

"The Singapore Water Academy plans, designs, delivers, places and coordinates all training and development in PUB. But in addition to catering for PUB's own needs, it is fully empowered to serve the larger water services sector in Singapore. The Academy is also well appointed to deliver high-quality training for the international water professional. Ultimately, our aim is to guarantee that everyone who comes through the portals of the Singapore Water Academy will acquire the skills, competencies and proficiencies he



Mr Masagos Zukifli, Singapore's Minister for the Environment and Water Resources, at the Singapore Water Academy booth

requires to do a great job," said Mr Ng Joo Hee, Chief Executive, PUB.

Drawing on Singapore's experience in urban water management, the Singapore Water Management (SgWM) series includes courses that highlight the core strengths of the Singapore experience: water quality and treatment, urban flood management and the ABC Waters Programme, water reuse, and water supply networks.

The SgWM is targeted at senior utility and industry technical practitioners. Prominent faculty members such as Professor Joan Rose from Michigan State University and Mr Harry Seah, PUB's Chief Engineering and Technology Officer, will share their knowledge, bringing best practices in urban water management into the classroom.

ACHIEVING CLEAN WATER BOOSTS OTHER TYPES OF SUSTAINABILITY

Water Convention session reveals working on one sustainability goal, such as clean water, may advance the effort in other areas

SIWW delegates yesterday saw four veterans in water management and sustainability present their take on "Water's Contribution to Sustainable Development Goals". This was discussed under "Water for Liveability and Resilience", one of five themes posed at the Water Convention.



(L-R) Professor John Thwaites, Ms Corinne Trommsdorff, Professor Tony Wong and Mr John Batten

The speakers were Professor John Thwaites, Chairman of the Monash Sustainability Institute; Professor Tony Wong, Director and CEO of the Centre for Water Sensitive Cities in Monash University; Mr John Batten, Global Director of the Big Urban Clients programme in Arcadis; and Ms Corinne Trommsdorff, Programme Manager of the International Water Association.

They referred to the 17 United Nations Sustainable Development Goals (SDG) passed in 2015, and described how meeting the goal of clean water and sanitation could boost the effort to achieve other targets stated in the SDG.

"Goal-setting is important because it absolutely drives political decision-

making," stressed Prof Thwaites. He focused on the link between achieving clean water and the other goals. Prof Wong spoke about how to operationalise the SDG, suggesting a series of steps municipal authorities could adopt.

Focusing on water resiliency, Mr Batten described how cities are gauged on Arcadis' Sustainable Cities Water Index, and noted that many cities are now appointing Chief Resilience Officers. Finally, Ms Trommsdorff advised that municipal authorities, whether or not a city is resource-rich, need to heed the principle of "replenish, reduce, reuse". She said, "A water-wise city is one that has a regenerative water system, water-sensitive urban design, and has connections to its water basin."



SMART WATER FOR A SMARTER WORLD

By **Howard James**

Leveraging real-time analytics, the Internet of Things, mobile connectivity and more is transforming how water is managed

Smart water technologies are transforming operations, planning and research and development (R&D) within the water industry. Encompassing all areas of the water management and leveraging the power of advanced big data analytics, automated systems and robotics, smart water is allowing public utilities to monitor usage and quality in real-time, as well as warn authorities of potential leaks and floods in seconds.

According to a McKinsey Global Institute report, by 2025 around 80% of utilities in

advanced-economy cities and 50% of utilities in developing-economy cities will have adopted smart water systems, creating a potential value of up to US\$25 billion in 2025. Driving this growth is Internet-of-Things (IoT) technology, which has emerged as a dynamic, data-driven platform for the efficient management of urban infrastructure and critical urban resources including water systems.

Singapore's role in the development of smart water technologies is noteworthy. With R&D as a key pillar in the city-state's journey



towards water sustainability, Singapore's national water agency PUB works closely with the private and public sectors to develop potential solutions to keep the water supply sustainable and affordable.

PUB adopts smart water technologies in various aspects of Singapore's water management to achieve greater efficiency and improvements in planning, operations and service delivery. These technologies range from the use of image analytics for earth control monitoring at construction sites, to a smart water assessment network for continuous real-time water quality monitoring.

Some of these technologies are showcased at the Smart Water Solutions Pavilion at Singapore International Water Week (SIWW). They include image analytics for clean and

free-flowing waterways; the development of smart water assessment networks; and use of unmanned aerial vehicles to inspect the Deep Tunnel Sewerage System.

"With the advent of smart technologies, global utilities are also increasingly leveraging smart water technologies to better manage their network performance and improve customer service," says Mr Bernard Tan, Managing Director of SIWW. "Leading-edge innovation is a key part of SIWW, and hence, this year's SIWW will focus on the use of these technologies for enhancing planning and operations in water management."

For more information, visit the Smart Water Solutions Showcase located on Level 1, in the Exhibition Hall at the Sands Expo and Convention Centre.

OPPORTUNITIES AND CHALLENGES IN INDUSTRIAL WATER

By **Chua Kim Beng**

How business can capitalise on shortcomings and openings in the industrial segment

Industries face numerous challenges when it comes to the issue of water management. Not only is this resource becoming scarcer, but the pressure to go green, remain sustainable, and meet ever-tightening standards could cost a pretty penny. The industrial water solutions market is estimated to be worth US\$52.8 billion (S\$71 billion) by Global Water Intelligence, a body that reports on major water projects around the world and comments on emerging trends in that sector.

The Industrial Water Solutions Forum, part of Singapore International Water Week, is a valuable platform to gain insight into issues surrounding industrial water management. The stature of this forum is underlined by the fact that Mr Masagos Zulkifli, Singapore's Minister

for the Environment and Water Resources, will be delivering the keynote address.

Other high-level personalities gracing the event include Professor Asit K. Biswas, Distinguished Visiting Professor, Lee Kuan Yew School of Public Policy, Singapore; Mr Joppe Cramwinckel, Director of Water, World Business Council for Sustainable Development; and Dr Glen Daigger, President, One Water Solutions, and Professor of Engineering Practice, Department of Environmental Engineering, University of Michigan. They will respectively be chairing panels on the importance of meeting environmental performance indicators, how the environmental agenda affects investments, and optimising infrastructure to increase productivity and lower costs.

TOWARDS WATER MANAGEMENT EXCELLENCE 4 CORE THEMES

By **Howard James**

Familiar topics that are dominating today's water management debate

Throughout this year's SIWW, four themes have remained prominent. It was therefore fitting that the Water Convention Keynote Plenary addressed these; the views, ideas and experiences of some of the world's foremost water professionals were also showcased. Speakers included Mr Jonathan Clement, CEO of PWN Technologies; Dr Rebekah Brown, Director, Monash Sustainability Institute, Monash University; Mr Bruce Gordon, Coordinator of Water, Sanitation, Hygiene and Health, World Health Organisation; and Mr Peter Nicol, President, Water Business Group, CH2M.

Speakers touched on the need for strong business leadership, saying that

companies must attract and develop water leaders of tomorrow. Another topic discussed related to liveable and resilient cities, and how the role of robust policies and citizen engagement will lead to the realisation of these.

Water quality and health was also addressed, where it was acknowledged that while a number of solutions – ranging from technological to behavioural – exist, there is still much that can be done in emerging economies to improve water quality standards. And last, the importance of having a robust business strategy that enables effective water management was discussed. The session concluded with speakers agreeing that in order to advance the water industry, greater collaboration, communication and partnerships among all stakeholders and across all stages of the value chain is needed.

TODAY'S HIGHLIGHTS

Expo Hall D, Basement 2

DESALINATION AND WATER REUSE BUSINESS FORUM

14.00-16.40

Heliconia 3404, Level 3

INDUSTRIAL WATER SOLUTIONS FORUM

9.00-17.00

Begonia Jr 3111, Level 3

WATER CONVENTION: WATER FOR LIVEABILITY AND RESILIENCE

9.00-15.30

Cassia Jr 3311, Level 3

WATER CONVENTION: WATER FOR INDUSTRIES

9.00-15.30



TOWARDS ZERO WASTE

By **Amala Pillai**

Working together key to solving global waste management issues

There are few cities around the world that are waste-free. According to panellists at the opening plenary of the Clean Environment Convention, titled "SMART Solutions for Growing Cities", at the heart of the world's waste challenges is the amount of items manufactured from new materials, like plastics and woods.

Mr Philip Heylen, Vice Mayor for the City of Antwerp, Belgium, said that people need to become aware of what they actually need and what they do not. "There is too much plastic in the world. Governments should be strict with plastic," he said.

Mr Masagos Zulkifli, Singapore's Minister for the Environment and Water Resources, noted that while the plastic debate is valid, one has to be careful when replacing one commodity with another, and that a culture of responsible waste management must be established. "Paper bags, at the end of the whole system cycle, take up a larger carbon footprint than plastic bags," said Mr Zulkifli. He added, "Many countries have proven that the culture of a country has the biggest role to play."

According to Mr Zulkifli, the culture issue accounts for 70% of the problem, and that awareness is key when trying to change mindsets.

In Antwerp, 71% of household waste is sorted and recycled at source with less than 1% of waste heading to a landfill, and the amount of landfill waste has decreased by over 70% from 1997 to 2011. "It took us three decades to get where we are through creating awareness, providing information to all stakeholders, implementing supporting legislature and the cooperation of everyone," said Mr Heylen.

Businesses may be able to contribute greatly to waste management too. "Recycling as a concept has more to do with businesses now than ever before," remarked Mr Peter Lacy, Global Managing Director for Sustainability Services, Accenture Strategy. "Businesses need to recognise the potential of this industry. Caterpillar, for example, has a business set up solely to remanufacture its equipment; it has become the most profitable part of their business. They use 90% less energy and 80% less natural resources to manufacture."



(L – R) Peter Lacy, Global Managing Director for Sustainability Services, Accenture; Philip Heylen, Vice Mayor for Culture, Economy, City Maintenance and Property Management for the City of Antwerp, Belgium; Masagos Zulkifli, Minister for the Environment and Water Resources; Dr Peter Hug, Managing Director of the European Cleaning Machine; David Newman, President of the International Solid Waste Association and Han Fook Kwang, Editor at Large, Singapore Press Holdings

Mr Lacy noted how companies that use digital technology, robotics, artificial intelligence and the Internet of Things are developing new and disruptive business models, which are adding a competitive advantage. "These companies, like Uber, are creating a sharing economy, product life extension, replacing the linear with renewable resources in terms of circular supply chains," Mr Lacy insisted.

While economic development remains important for countries, Mr Lacy believes there is a need to "decouple what we want from our economy: prosperity, wealth, economic developments; from what we do not want: harmful use of natural resources." He added, "This is where we need to talk about delivering sustainable development, where the discussion is not so much in a physical sense but more towards a waste in existing assets. It is about an economic systems change."

Supporting this viewpoint, Mr David Newman, President of the International Solid Waste Association enthused, "The data revolution is really exciting – we have the possibility of tracing your waste in real time. You can communicate with your waste collection workers."

The answer, panellists agreed, is for citizens, businesses and governments to take ownership of the waste that they produce, and for all parties to buy into the circular economy, where waste as a resource is used in preference to natural materials. Furthermore, they concurred that there is a need for everybody to consider the livelihood of future generations, and how today's actions will impact the future.

"If you look at the big picture, our planet is our spaceship – then there are no passengers, only crew," concluded Mr Heylen.

PERSPECTIVES WITH PETER LACY

Managing Director, Accenture Strategy, Sustainability Services



Accenture created the term "circular advantage". What does this mean, and what are its benefits to businesses?

Circular economy is essentially an economic model where growth and impact on resources and environment are decoupled. Businesses that have adopted this model have reduced exposure to market volatility and have developed new capabilities and business models that provide them with an advantage over their peers.

The benefits of circular economy varies from business to business, with some of the benefits that come as a by-product of an irrelevant drive. For example, manufacturers of complex equipment often offer refurbishment services as well as refurbished equipment at a lower cost, because they need to have better control of

second-hand transactions to maintain good reputation and quality. But the refurbishment service has significant environmental and economic benefits, and creates jobs. So circular economy can result in the usual benefits such as reduced resource use, reduced energy consumption, job creation; as well as others such as better customer relationship, and good control on end-of-life products among many others.

Furthermore, there is growing recognition that a holistic approach is needed to combat climate change and other global issues. Circular economy is an important building block of such an approach. It also provides a framework to think about sustainable development and structure actions in a holistic way.

What can governments do to encourage greater participation in the circular economy among private companies?

In theory, the involvement of government should decrease as profitability increases. So government intervention could range from heavily regulating, to providing the supporting infrastructure, to merely observing. They might also include: sending price signals to the market by setting tariff/tax; using public procurement to drive market demand; and influencing behaviours through public education.

What technologies are supporting circular business models, and which of these are disrupting how companies operate?

Circular economy is an important building block in a holistic approach to combat climate change and other global issues



Three types of technologies are key to the transition: digital, engineering and hybrid. Engineering and hybrid technologies such as material science, modular design and 3D printing are transforming manufacturing and recycling industries; while digital technologies such as machine-to-machine communication, cloud, data analytics are revolutionising the way products and services are offered and consumed, some having huge impacts on industries such as automobile and real estate.

An interesting case from China is how mobile phone and computer repair services have now moved onto mobile platforms to enable door-to-door service, transparency on quality, and secure channels for refurbish and recycling, while freeing these vendors from having to rent a space. It is a new business model that offers the vendors more flexibility, better visibility and relationship-building with their customers, at lesser cost. The implication of this on

commercial real estate is huge – all of a sudden, hundreds of small shops could become useless.

What opportunities does the circular economy bring to Asia?

Although circular economy opportunities differ for each business, industry, value chain and certainly for each city and country, there are some unique characteristics of Asia as a whole.

First, many Asian countries face issues with resource scarcity. Many countries in the region are net importers of resources, which expose them to risks of supply and price volatility.

Second, many Asian countries have rapid adoption of new technologies and business models where there are clear values. This makes places such as China great innovation labs for many new digital and mobile solutions and unique business models. Businesses that adopt such models grow rapidly, such as Di Di Taxi in China.

Third, because many countries in this region are still developing, there is little infrastructure legacy that often stands in the way of new infrastructure. This enables many countries to leap forward and implement the latest infrastructure quickly.

Finally, many Asian businesses are going global. It provides an opportunity to take a lot of the "Asian innovation lab" experience to the developed markets.



PITCHING GREEN IDEAS

By **Shanti Anne Morais**



Representative from Intraix presenting his product

The inaugural Innovation Pitch zeroed in on "Waste-as-a-Resource" and "Smart Systems for the Environment", with representatives from EcoWorth Tech, Zerowaste Asia, VRM Biologik, BlueRen, Republic Polytechnic, Envichem Technologies, Winnow, LightHaus, Muratec and Intraix presenting solutions aimed at making our environment cleaner, safer and more sustainable.

The entrants for Waste-as-a-Resource sought to create a more sustainable environment while keeping solutions cost-effective. Solutions included a lightweight, highly absorbent carbon fibre aerogel material, and high-value nano-additives called Carbon NanoTubes.

The four pitches for "Smart Systems for the Environment" were also on-track, with solutions to monitor food waste and labour-saving cleaning robots. In all, the innovations indicate that our sustainability sphere is getting greener.

SMALL ACTIONS, BIG IMPACT SHAPING MINDSET AND BEHAVIOURS

By **Amala Pillai**

Panellists discussed how habits and attitudes towards recycling and other green initiatives can be changed

The "Small Actions, Big Impact: Shaping Mindset and Behaviours" panel reached a consensus that before any government-initiated measures to promote recycling and reuse can be successful, the public must be aware of the issue. "This is done via effective communication. If people do not see the benefits of recycling, there will be no change," said Ms Kathryn Warren, Principal Consultant at Ricardo Energy and Environment.

Dr William Wan, General Secretary of the Singapore Kindness Movement, added that people also need to be made aware of the recycling process. He said, "There is mistrust among some that separating waste yields nothing at the end of the day because they end up in the same location. The public needs to be made aware that their separation efforts are important."

Ms Warren noted, "With half the world's population online, there is no reason not to engage them, especially through social media, which is a wonderful communication tool."



Dr William Wan, General Secretary of the Singapore Kindness Movement

HONOURING WASTE REDUCTION - THE 3R PACKAGING AWARDS 2016 WINNERS

By **Howard James**

Champions of The Singapore Packaging Agreement were recognised for their efforts at CESS



Winners of the 3R Packaging Awards 2016, with Mr Masagos Zulkifli, Minister for the Environment and Water Resources (centre) and members of the Singapore Packaging Agreement Governing Board

There are many benefits to reducing packaging waste. To this end, the Singapore Packaging Agreement (SPA) was launched in 2007 to engage businesses in reviewing their packaging practices and design, with the

aim of implementing changes that lead to less waste. "To date, 177 signatories have come on board the SPA," said Mr Masagos Zulkifli, Singapore's Minister for the Environment and Water Resources, at the 3R Packaging Awards

ceremony. The awards recognise the efforts of Singapore-based companies that have made notable achievements in the 3Rs - reduce, reuse and recycle.

"Between 2007 and 2016, the signatories cumulatively reduced more than 32,000 tonnes of packaging waste, and reaped cumulative savings of S\$75 million in material costs - it is a win for the companies, and also a win for the environment," Mr Zulkifli enthused.

This year's awards saw 20 winners in four categories. While commending the winners, Mr Zulkifli noted that there is still room for improvement: "The amount of packaging waste reduced constitutes less than 1% of the annual amount of packaging waste disposed of in Singapore. More needs to be done."

Winners of the 3R Packaging Awards 2016

- | | |
|--|--|
| Distinction Award Winners <ul style="list-style-type: none"> • Carlsberg Singapore • Nestlé Singapore • Tetra Pak Jurong • Toshiba TEC Singapore | <ul style="list-style-type: none"> • Sunfresh Singapore • Thong Siek Food Industry • Unilever Singapore • Vismark Food Industries |
| Merit Award Winners <ul style="list-style-type: none"> • Abbott • Asia Pacific Breweries (Singapore) • Coca-Cola Singapore Beverages • Dell Global • F&N Foods • Greenpac • Ha Li Fa • Hewlett Packard Enterprise • IKEA Singapore • Marina Bay Sands • Oviyam International • Sin Hwa Dee Foodstuff Industries | Platinum Award Winners <ul style="list-style-type: none"> • Nestlé Singapore • Tetra Pak Jurong Gold Award Winners <ul style="list-style-type: none"> • Abbott • Coca-Cola Singapore Beverages • F&N Foods • Greenpac • Ha Li Fa • Hewlett Packard Enterprise • Sunfresh Singapore • Thong Siek Food Industry • Toshiba TEC Singapore |

TODAY'S HIGHLIGHTS

Melati Ballroom
Level 4

CLEAN ENVIRONMENT
CONVENTION
NETWORKING
BREAKFAST

8.30-10.30



Melati Ballroom
Level 4

CAN CITIES
UNLOCK THE
RESOURCE
POTENTIAL OF
FOOD WASTE?

14.00-15.30



Orchid Ballroom
Level 4

SUSTAINABLE
BUSINESS MODELS
FOR BETTER
CLEANING
PERFORMANCE

16.00-17.30



Melati Ballroom
Level 4

SMART SOLUTIONS
TO MAXIMISE VALUE
OF WASTE

16.00-17.30



SMART NATION SINGAPORE

PART 3

By **Jennifer Eveland**

High-tech solutions for urban challenges



This is the final part of a three-part series on Singapore's Smart Nation initiative. Part one - published on Monday - described the initiative and how it will power a sustainable Singapore. Part two - published on Tuesday - focused on the implementation of the initiative. Today's edition, looks at Singapore's goal of reaching out and sharing innovations and best practices with cities and countries from around the world, helping them address their challenges as it addresses its own.

Under the Smart Nation initiative, Singapore has the broad scope necessary to tackle sustainable development issues on a national level, and boasts a small-scale setting that is ideal for pilot-testing of new innovations. Successful projects can be scaled-up and deployed relatively easily and quickly, assisted by the country's single-level government structure, stable economy and easy access to major markets.

Government efforts to build a vibrant and conducive environment for innovation have spawned a booming tech start-up ecosystem. Indeed, in 2013, Singapore-based tech firms clinched some US\$1.7 billion (S\$2.3 billion) in venture capital, ahead of Japan, South Korea and Hong Kong, according to the Asian Venture Capital Journal. And between 2005 and 2014, the number of start-ups in Singapore more than doubled, from 24,000 to 55,000.

Amid Singapore's thriving entrepreneurial culture, the government is laying the infrastructure for smart technology initiatives, establishing a reliable and consistent regulatory framework, educating innovators at top universities, offering research and development grants, and providing access to global markets through free-trade agreements.

The "Towards a Smart and Sustainable Singapore" pavilion, an integrated showcase located within the City Solutions Singapore expo, highlights a number of case studies and best practices for the application of smart technology and innovations, featuring projects and innovations at various stages of development.

Incorporating multiple exhibitions staged by various government agencies, the "Towards a Smart and Sustainable Singapore" pavilion also showcases cutting-edge solutions that seek to improve the quality of life of Singapore citizens and residents, strengthen businesses and help government agencies to serve citizens better. Located a level below are the pavilion's hospitality suites, where sponsors will have their latest technologies and innovations on display.

Visit the "Towards a Smart and Sustainable Singapore" pavilion today, on Level 5, 9.00 to 18.00.

SINGAPORE DIGS DEEP TO MANAGE USED WATER AND WASTE

By **Chua Kim Beng**

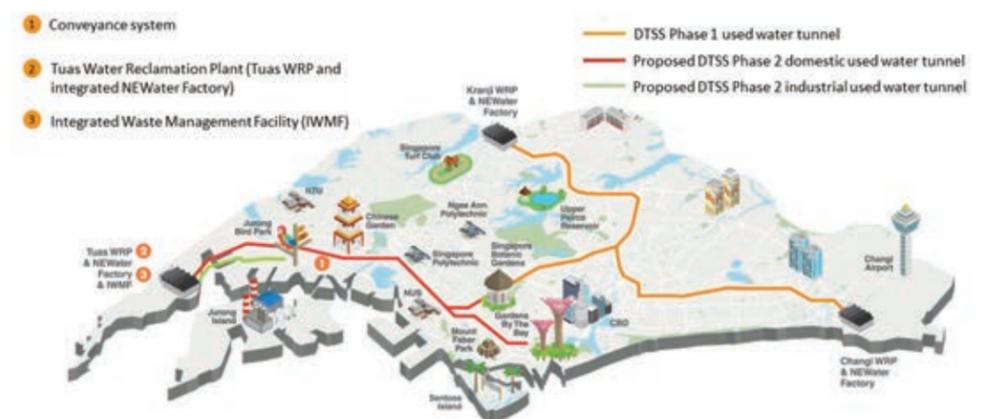
Singapore implements plans to handle future used water and waste management needs while freeing up space for residents

With only 719.1 square kilometres to house 5.5 million residents, Singapore needs solutions to overcome its lack of space and resources.

With this goal in mind, 150 hectares of land formerly occupied by used-water infrastructure will be freed up with the full implementation of PUB's Deep Tunnel Sewerage System (DTSS). The completion of DTSS will see the progressive phasing out of

five conventional water reclamation plants as well as some 130 sewage pumping stations scattered across the island. Not only does this system liberate land for higher-value developments, it is also more cost-effective and sustainable.

The DTSS uses deep tunnel sewers to convey used water entirely by gravity to centralised water reclamation plants (WRPs) located at the coastal areas. The used water is then



OVERVIEW OF DTSS

THE BIG INTERVIEW

Solutions speaks to HE Park Won-soon, Mayor of Seoul, South Korea



You have been referred to as “the listening mayor”, as you built Seoul’s Citizens Speech Stand and the Big Ear as platforms for citizens to share their views publicly. What motivated you to introduce these?

It is important to listen to people – even when they are complaining – as I see their views as a good source of information when implementing policies. The Citizens Speech Stand, which is also known as “I have something to say”, was launched to allow citizens to freely discuss their concerns about diverse social issues, as well as suggest new ideas to their leaders.

While it could be argued that a consultative approach prolongs the whole process, the

advantages of doing things this way by far outweigh its lengthiness. This is because citizens are more receptive to new policies when they are included as part of the discussion. Therefore, public dialogue actually makes things easier.

What new ideas or policies have you launched, which have tackled present-day challenges?

There have been many. Regarding energy, for instance, I have tried to reduce the city’s reliance on conventional forms of energy, by incorporating renewable power. The national solution has been to build Generation IV sodium-cooled fast reactors that use waste from conventional reactors as fuel. We launched our One Less Nuclear Power Plant initiative, which encouraged citizens to eliminate the need for a nuclear plant by saving energy and generating renewable energy at home.

Tell us about your “one-day citizen-mayor” project?

The initiative lets citizens witness the way a mayor does a job, and in turn, these people tell others how difficult the job is! There is also an honorary mayor programme, where participants communicate the views of the people to high-ranking city officials regarding social issues. As such, they have the mandate to introduce citizen ideas into the bureaucratic system. It is therefore a way to communicate the ideas of the citizens to policymakers.

You have a sizeable social media following. What are your views on the role of social media in communicating with residents?

Through social media, the visions of citizens can reach their mayor directly. In Seoul, residents can connect with me directly – whether to complain or to speak to me about something positive. Social media also allows me to have an idea of what is going on at the grass-roots level.

Both Seoul and Singapore house an ageing population and shrinking workforce. What can these two cities do to overcome these issues?

Life expectancies are becoming longer and birth rates are declining – both of which lead to an ageing population, and this is challenging. To overcome these, we need

innovative ideas. We need to engage the older generation during their remaining years so that they can contribute to the younger generation with pride. Members of the baby-boomer generation have wisdom and experience to share, and we should not waste this asset. They can add purpose to their lives again, so we are trying to train and educate them. One way to achieve this is to connect them with members of the younger generation who have new ideas – these older people can add to that their experience and wisdom.

What are some takeaways from this year’s WCS Mayors Forum?

Good governance is important, and there have been many successful stories told this year. The summit attracts many mayors from around the world, who are often happy to share their best practices.



treated and further purified into ultra-clean, high-grade reclaimed water called NEWater, with excess treated effluent discharged to the sea through outfalls.

Phase 1 of the DTSS, completed in 2008, conveys used water from the eastern half of the island to Changi WRP. In 2010, a NEWater factory was built on the roof of Changi WRP to facilitate large-scale water recycling.

DTSS Phase 2, which is ongoing and scheduled for completion in 2025, will transport used water from the western half of Singapore to Tuas WRP. It is estimated that DTSS Phase 2, which includes enhanced deep tunnels with advanced sensing and maintenance features, associated link sewers, Tuas WRP and an integrated NEWater factory, will cost some S\$6.5 billion (US\$4.8 billion).

A particular highlight of Tuas WRP is its co-location with the National Environment Agency’s Integrated Waste Management Facility (IWMF). The co-location of the two facilities is Singapore’s first initiative to integrate used water and solid waste treatment processes to reap the potential synergies of the water-energy-waste nexus, while minimising land footprint.

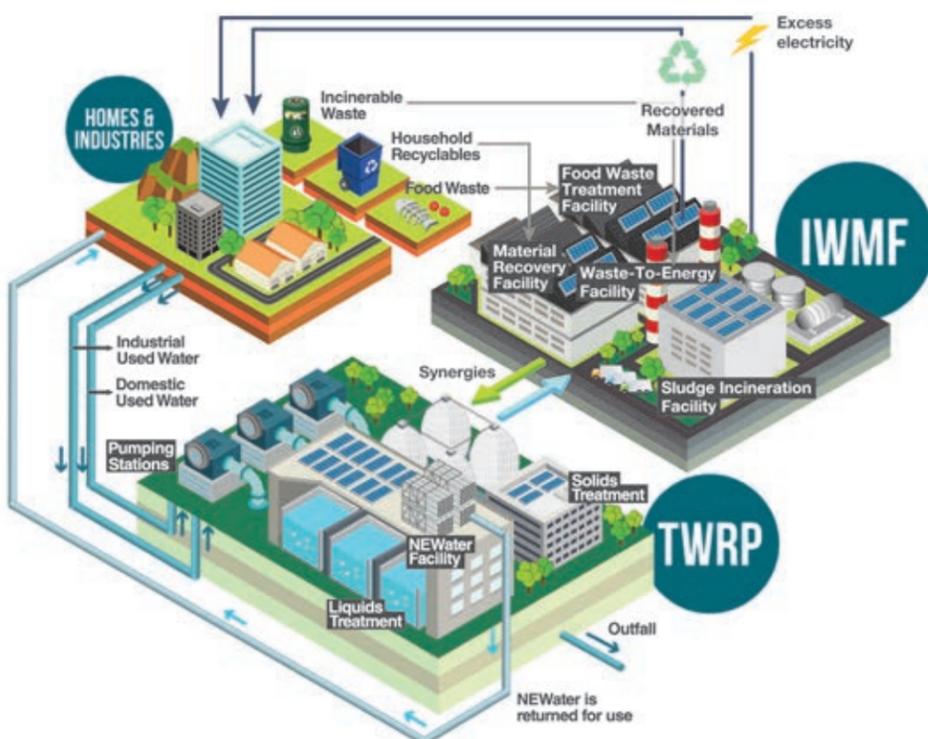
Food waste from IWMF will be sent to Tuas WRP to be combined with used water sludge for co-digestion, which is aimed at

augmenting the production of biogas. This biogas will in turn be sent back to IWMF as a source of fuel for power generation. The facilities are expected to be energy self-sufficient, as electricity generated in IWMF’s waste-to-energy facility will be used to power the IWMF and Tuas WRP, with excess electricity to be exported to the grid.

Fully equipped with state-of-the-art technologies and estimated to cost around S\$3 billion (US\$2.2 billion) to build, IWMF will be able to effectively process various waste streams, including incinerable waste, household recyclables collected under the National Recycling Programme, source-segregated food waste and dewatered sludge from Tuas WRP.

Black & Veatch, which, with its joint-venture partner AECOM, is providing engineering services for DTSS Phase 2, explains that this confluence of used-water and solid-waste treatments can “maximise both energy and resource recovery”.

If you wish to learn more about DTSS Phase 2 and IWMF, visit the project booth at Basement 2, from 11–13 July 2016 at the Sands Expo and Convention Centre. There will also be a forum on 13 July 2016 from 9.30–12.00 at Basement 2 of the Convention Centre.



SEEN@ WCS

SEEN@ SIWW



I want to meet other mayors, to interact, to network. And I want to share our ideas of Gross National Happiness with them too



Mr Kinlay Dorjee
Mayor of Thimpu, Bhutan



Above: Sino-Singapore Tianjin Eco-City's booth showcases the milestones that the flagship bilateral project has achieved over the years



A sustainable city is one where you manage the whole water cycle, and you do not just use water once. You use water as many times as possible

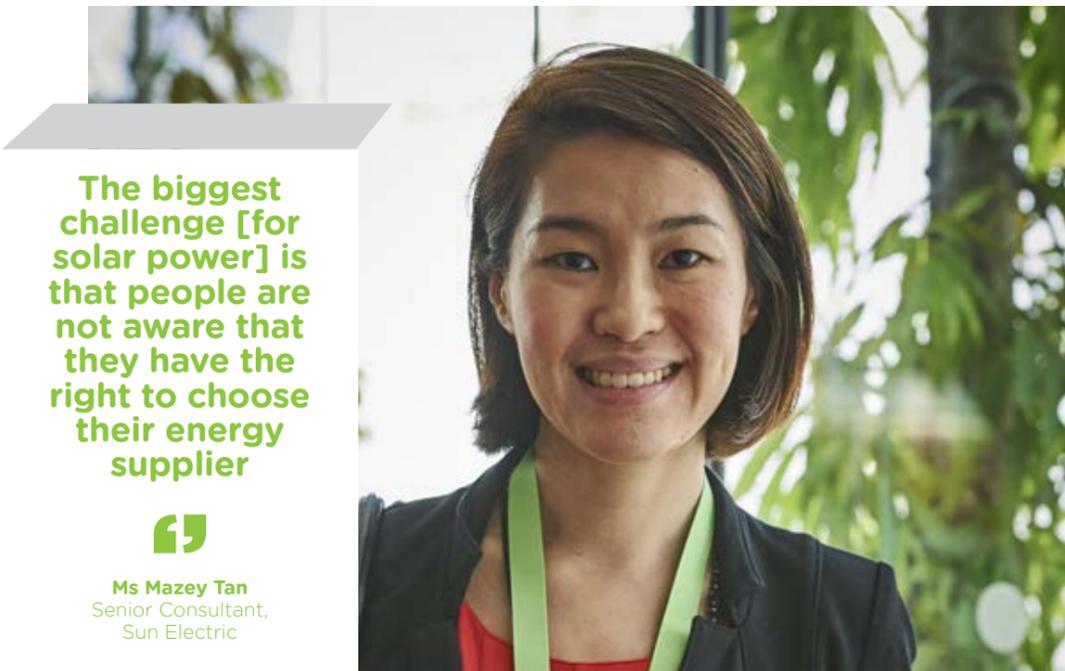


Ms Sue Murphy
CEO, Water Corporation



Above: Lyon, Nanyang Technological University's mascot, posing at the NEWRI Ecosystem booth

SEEN@ CESS



The biggest challenge [for solar power] is that people are not aware that they have the right to choose their energy supplier



Ms Mazey Tan
Senior Consultant,
Sun Electric



Above: ISS has a vast array of eco-friendly cleaning services on show at the City Solutions Singapore expo hall

SOLUTIONS

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