

SINGAPORE
Watermark
AWARDS
2024



Recognising outstanding
water contributions

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Managing Singapore's Water Demand

Against the backdrop of climate change, coupled with the increasing demand for water in tandem with economic and population growth, it is crucial that we conserve water as it is a limited and invaluable resource. In Singapore, our water demand is projected to double by 2065, driven largely by the non-domestic sector, which is expected to account for two-thirds of future water needs. Consequently, the non-domestic sector's role in water conservation and sustainable management has become increasingly critical. The call for visionary leadership, innovative solutions and inspiring engagement has never been more urgent.

The Singapore Watermark Awards (SWMA) recognise organisations that demonstrate outstanding leadership and accomplishments in promoting the water sustainability agenda in Singapore. Award winners exemplify the principles of water conservation, stewardship and advocacy, which are essential for ensuring a sustainable water future. As we honour our water champions, we aim to inspire others to pledge their steadfast commitment to water sustainability and join us in safeguarding Singapore's water future.





Singapore Watermark Awards

The SWMA stands as the premier accolade, recognising leading organisations in Singapore that exhibit a profound dedication to effective water management, ongoing efforts in water efficiency, innovative water conservation practices, and active community engagement to inspire action and garner support for the water cause.



Water Efficiency Awards

The Water Efficiency Awards acknowledge the top 10th percentile of water-efficient performers in their respective sectors. They are establishments with the lowest Water Efficiency Index (WEI) or industrial plants with the highest rates of water recycling.



Water Efficiency Awards (Projects)

The Water Efficiency Awards (Projects) recognise innovative projects which demonstrated remarkable improvements in water efficiency and project leadership.





Singapore Watermark Awards Winners 2024

Amazon Web Services Singapore (AWS Singapore)



AWS Singapore is committed to fostering sustainability through employee engagement.

PROFILE



Amazon Web Services (AWS) Singapore offers secure, reliable, scalable, and cost-effective on-demand cloud computing services

PERFORMANCE



Within the top 10% of performers in the data centre sector

AWS Singapore has demonstrated a remarkable commitment to water conservation and sustainability in data centre operations, setting an inspiring standard for water management within their sector and beyond. This is driven by AWS's goal to be water positive by 2030, returning more water to communities than they use in their direct operations. Their efforts have earned them the well-deserved SWMA 2024.

Water Efficiency in Operations

Since the launch of the AWS Asia Pacific (Singapore) Region in 2010, AWS Singapore has implemented a water-efficient cooling tower design for their data centres to reduce water consumption. They have also been upgrading their operational capabilities to optimise water use, positioning AWS Singapore within the top 10% of performers in the data centre sector.



Singapore Watermark Awards Winners 2024

Most recently, AWS Singapore collaborated with a local startup to invest in and co-develop wastewater recycling technologies, allowing them to treat and recycle water on-site to unlock even greater water savings.

Sustainability Through Advocacy

In addition to their operational upgrades, AWS Singapore is deeply committed to raising awareness on water conservation. Through employee education initiatives, such as holding a water forum in conjunction with Singapore World Water Day 2023 and organising a company trip to the NEWater Visitor Centre, they encourage their staff to learn more about water sustainability and contribute in their own ways.

To nurture future generations of water champions, AWS Singapore actively supports youth projects and Science, Technology, Engineering and Mathematics (STEM) programmes on water sustainability. Employees volunteer to guide students in developing their own projects, such as reusing rainwater to generate electricity, further contributing to the advancement of the water sustainability agenda.



AWS volunteers guide students in their sustainability and water-related projects.



AWS Singapore is also a recipient of the Water Efficiency Awards



At Amazon, we set big goals and work backwards to achieve them. The path to achieving some of our goals will be long and complex, but we are not deterred. We thrive on pushing the boundaries of what's possible.



Mr Simon Tan

Amazon Web Services Singapore
AWS Director for Data Center Operations,
Singapore & Indonesia



Singapore Watermark Awards Winners 2024

Mee Toh School



Mee Toh School's culture of environment sustainability raises their young students as responsible eco-stewards.

PROFILE



Mee Toh School is a co-ed primary school in Punggol

PERFORMANCE



Within the top 10% of performers among Singapore's primary schools

Mee Toh School is deeply passionate about water education, advocacy and conservation. With their effective water conservation measures and educational initiatives, they have emerged as a trailblazer in the education sector, winning the prestigious SWMA 2024.

Hands-on Water Conservation

At the core of Mee Toh School's water conservation initiatives are its practical and sustainable solutions aimed at saving and reusing water. One notable example is their rainwater collection system, which harnesses rainwater



Singapore Watermark Awards Winners 2024

for use in the cleaning of common spaces, watering of plants, and even in students' projects. On campus, sensors are installed at taps and water coolers to reduce water wastage. In addition, to ensure that underground water leakage does not go undetected, operations staff monitor water usage by checking water meters daily. Between 2019 and 2022, the school successfully lowered their annual water consumption by an impressive 30%, reflecting their proactive approach to water conservation.

Educating Future Generations

Water sustainability is a part of the school's Environment Education curriculum, instilling a sense of water ownership and responsibility in their young students. For example, Primary 5 students apply what they learn in the various subjects and come up with innovative prototypes in their attempts to address water sustainability issues. A group of them showcased these prototypes at the Singapore World Water Day 2023 celebration event. They also designed posters in their mother tongue languages, and some of these were put up in school to advocate for water conservation.

Other initiatives include water rationing exercises to promote responsible water use and nurture an appreciation for water as a valuable resource among the students. Parent volunteers, together with Environment Champions, are also involved in supporting the exercises and sharing the water conservation messages.



**Mee Toh School is also
a recipient of the Water
Efficiency Awards**



Empowering Water Advocates

The "Environment Champions" are a group of students who organise projects for environmental causes and rally the school community on water sustainability. They reach out to their peers through talks, posters and facilitate the pledging for water conservation by fellow schoolmates. Despite the challenging times of COVID-19, the Environment Champions still reached out to their peers through online platforms using learning packages on water conservation that they designed.

A group of Environment Champions even invented the 'Wishy-Washy' device, a prototype that uses rainwater to clean recyclables without using any additional water. It uses a sensor and Micro:bits (a pocket-sized computer) to detect the recyclables before activating the irrigation of rainwater, ensuring that water is used in the most efficient manner.



Through the school's Applied Learning Programme, students develop projects and prototypes like the "Wishy-Washy", which uses harvested rainwater to clean recyclables.



The award is an affirmation of the efforts of the school community, stakeholders and partners, put together over the years. No effort is too small and we take one step at a time. Our students are in their formative age. By teaching them the values, knowledge and skills to form good habits of water usage from young, we hope to see them grow up with the confidence to influence many more.

Mrs Wang-Tan Sun Sun
Mee Toh School
Principal





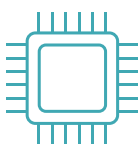
Singapore Watermark Awards Winners 2024

Systems on Silicon Manufacturing Company Pte. Ltd. (SSMC)



SSMC has been recycling at an average level of 67%, as compared to the industry average of 45%.

PROFILE



SSMC is a semiconductor wafer fab that makes integrated-circuit wafers for automotive, Internet of Things (IoT) and mobile communication applications

SSMC has been a forerunner of water sustainability in the semiconductor industry as water is used extensively in wafer manufacturing for the cleaning and cooling of facilities and equipment.

SSMC continues to raise the bar in water sustainability practices, efficient water management and community engagement.

Innovation for Water Sustainability

Since 2015, SSMC has been recycling at an average level of 67%, as compared to the industry average of 45%. They have achieved this through active water recycling strategies, such as using NEWater in 100% of their operations and innovating new wastewater treatment methodologies.

PERFORMANCE



Within top 10% of performers in the wafer fabrication sector



Singapore Watermark Awards Winners 2024

Employee & Community Engagement

SSMC's commitment to water sustainability is evident in their avid community engagement and water advocacy – from participating regularly in Singapore World Water Day, to organising educational tours and sharing sessions for students. They connect with schools by virtually sharing their Water Efficiency Management Journey and offering an educational tour of their facility. This aims to educate students about the process and importance of water recycling.

SSMC is also training staff volunteer docents for the Lorong Halus Wetlands Learning Trail, with plans to educate the community on the importance of keeping our catchment areas and waterways clean.

Over the years, more than 50% of employees participated in SSMC's improvement crowdsourcing platform. In 2023, SSMC invited employees to contribute water conservation ideas to promote engagement in water conservation efforts. More than 35 ideas had been gathered and piped for implementation.



SSMC embraces a culture of water sustainability and innovation, and encourages staff to share conservation ideas for adoption.



**Systems on Silicon
Manufacturing Company
is also a recipient of the
Water Efficiency Awards**



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To all the water champions out there, even the smallest actions make a difference, so stay encouraged and continue your efforts to protect our planet's most precious resource. Together, we can make a significant impact for a better tomorrow.

Mr Lim Soon
Systems on Silicon Manufacturing
Company Pte. Ltd.
CEO

”



Water Efficiency Awards Winners 2024

Biomedical Manufacturing

Alcon Manufacturing & Logistics

Alcon Manufacturing & Logistics (AML) is a contact lenses manufacturing plant, producing contact lenses for distribution and sale worldwide.

AML encourages their team members to brainstorm for solutions and share ideas to reduce the company's water consumption. To date, they have implemented systems such as:

- Reverse osmosis, where treated water can be reused in manufacturing or for cooling tower use
- Continuous electro-deionisation, to deliver high-purity water for reuse
- System optimisations to further reduce potable water consumption



AML's reverse osmosis system diverts reject water back to water tanks for reuse.

JMS Singapore Pte Ltd

JMS Singapore specialises in developing and manufacturing high-quality disposable medical devices such as blood collection bags.

Dedicated to the 3Rs of water conservation, Reduce, Reuse and Recycle, JMS Singapore achieves a significant volume of annual water savings. In the past year, they have saved approximately 40,000m³ of water, or 30% of their usage. Their water management approach includes:

- Operating out of a certified Water Efficient Building
- Recycling and reusing water such as reverse osmosis reject for process cooling



JMS tracks water consumption patterns to identify areas for optimisation.



Water Efficiency Awards Winners 2024

Biomedical Manufacturing

GlaxoSmithKline Biologicals

GlaxoSmithKline (GSK) is a global healthcare company, first established in Singapore in 1959. They have two medicine manufacturing sites and a vaccine manufacturing facility based here in Singapore.

GSK has implemented a robust suite of water treatment and recycling technologies, allowing them to conserve a staggering 27 Olympic swimming pools' worth of water annually. This is equivalent to approximately 68,000m³ of water. Their innovative projects include:

- Softener regeneration system that conserves water
- Wastewater recovery skid, where treated water is reused in cooling towers and for facility cleaning
- Recovery of ultrafiltration rinse water and reverse osmosis reject for cooling tower use
- Recovery of air conditioning and mechanical ventilation condensate for reuse in cooling towers



A GSK technical services manager optimises the softener regeneration system based on usage capacity.

Commercial Laundry

Hotel Laundry Pte Ltd

Hotel Laundry Pte Ltd provides laundry services for the Worldwide Hotels Chain comprising 40 hotels.

Hotel Laundry adopts various water recycling and management measures across their operations to help them optimise their water use. These include:

- Working from a certified Water Efficient Building to facilitate water-efficient operations
- Conducting regular meter readings to monitor water usage
- Generating monthly reports to analyse water consumption patterns and pinpoint opportunities for further water conservation
- Utilising a tunnel washer system equipped with a built-in water recycling feature, allowing it to clean and reuse rinsed water and minimise overall water consumption
- Employing limited use of high-pressure jets for cleaning to reduce water consumption while maintaining cleanliness standards
- Stringent leak and defect monitoring to ensure minimal water loss



Hotel Laundry team performs daily recordings of system readings to identify opportunities for water conservation.





Water Efficiency Awards Winners 2024

Data Centres

Google Asia Pacific Pte Ltd

Google operates data centres in Singapore to ensure that users here have fast and reliable access to all of Google's internet-related services and products.

Google's commitment to water sustainability is evident in their innovative design and technologies, thoughtful water management and vibrant culture of water conservation amongst staff. These include:

- Operating from a certified Water Efficient Building
- Custom-designed cooling system, where each element is designed and built to operate for optimal efficiency of water usage
- Water reuse strategies that significantly reduce water intake, such as relying on recycled water for its cooling system and reusing the water multiple times
- Round-the-clock water management system for continuous monitoring of water consumption and proactive optimisations
- Sensor-controlled water fittings to minimise wastage
- Underwater drones for tank inspections which eliminated the need for tank draining hence conserving water
- Water committee that continuously evaluates water efficiency in the organisation
- Events organised by staff to educate and advocate for water conservation



Google's custom-designed cooling system maximises the company's water-use efficiency.

Microsoft Operations Pte Ltd

Microsoft (Nasdaq "MSFT" @microsoft) enables digital transformation for the era of an intelligent cloud and an intelligent edge. Their mission is to empower every person and every organisation on the planet to achieve more.

Microsoft demonstrates a strong commitment to water sustainability through various measures implemented across their facilities:

- Certified Water Efficient Building facilitates water sustainable practices from the ground up
- Daily water meter monitoring with automatic alerts to trigger investigation and rectification when water consumption exceeds predefined threshold values
- Incident reporting system to swiftly report and resolve water leakages
- Installation of 3-tick rating flush valves in all water taps and toilets to maximise water efficiency
- Preventive Maintenance Program to ensure that all water pumps, pipes, tanks and fittings meet certified water efficiency standards



With strategically sited posters, Microsoft encourages employees to report water leakages promptly.



Water Efficiency Awards Winners 2024

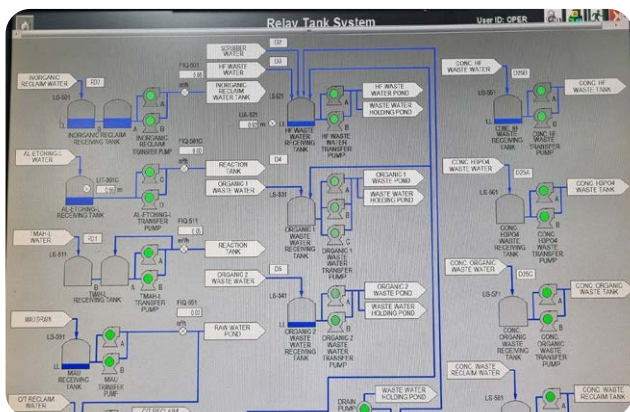
Electronics

AFPD Pte Ltd

AFPD is a manufacturer of electronic display devices. They also conduct research and experimental development on electronics to develop cutting-edge products.

AFPD showcases dedication to water sustainability with their implementation of various water conservation and recycling systems:

- Meticulous daily and monthly monitoring of water usage allows the company to ensure judicious use of water resources
- Integration of an effective faulty report system serves as a preventive measure against water wastage by ensuring that irregularities are swiftly identified and resolved
- Wastewater treatment solutions minimise the discharge of pollutants and allow water recycling for operational needs



AFPD's relay tank system diverts water from production and cooling towers for treatment.

Refinery

Singapore Refining Company Pte Ltd

Singapore Refining Company (SRC) operates a crude oil refinery to produce fuel products and chemical feedstocks for domestic and overseas export markets.

SRC shows a firm commitment to water sustainability, from implementing new water recycling projects, to continuously improving on their existing capabilities to further enhance their water conservation efficacies.

- Water Task Force dedicated to increase sustainable water usage across different process areas
- Projects to reuse treated foul water as process wash water
- Routine water loss audits to identify and address water loss areas
- Continuous improvement and optimisation of water treatment plant, water recovery plant and condensate recovery system performance
- Maximising seawater for cooling in future projects to further reduce overall water consumption



A clarifier removes solids from wastewater at SRC.



Water Efficiency Awards Winners 2024

Semiconductor

HOYA Electronics Singapore Pte Ltd

HOYA Electronics develops photomask blanks, which are critical components in the manufacturing process of the chips used in various applications such as artificial intelligence, high-performance computing, 5G, as well as memory, logic and power devices.

Recognising the inherent water-intensive nature of their operations, HOYA Electronics has implemented a series of proactive water recycling technologies to enhance their water efficiency and reduce the need for freshwater intake. These initiatives include:

- Electro-deionisation system reject water recycling
- Reverse osmosis system reject water recycling
- Makeup air unit drain water reuse for cooling tower operations
- Wastewater recycling



Technical specialist (facility) conducts a check on cooling tower make-up water at HOYA Electronics.

Wafer Fabrication

United Microelectronics Corporation

United Microelectronics Corporation (UMC) is a global semiconductor foundry company. Its Singapore branch is the company's specialty technology development centre providing 12-inch manufacturing services.

UMC is dedicated to maximising water efficiency in their operations. In addition to mainly using NEWater for their manufacturing processes, they have also invested in comprehensive water reclamation, treatment and recycling systems, such as:

- DIR30% treatment system to reclaim partial chemical contaminated ultrapure water
- DIR50% treatment system to recover lightly contaminated water
- Local scrubber treatment system to treat and recycle wastewater
- Diluted hydrofluoric acid (HF) treatment system to treat HF contaminated wastewater for reuse
- Continuous electro-deionisation water treatment system to reduce chemical and water consumption
- ROR recycling system to reuse reverse osmosis reject water and other recycled water for cooling tower operations



UMC's diluted HF system recycles process wastewater for secondary facility system usage.



Water Efficiency Awards Winners 2024

Hotels

Andaz Singapore

Andaz Singapore is a modern and luxurious gateway to Singapore's vibrant neighbourhoods, celebrating local cultures and fostering connections. Situated at the crossroads of the Kampong Glam, Little India and Bras Basah Bugis cultural districts, the hotel is an excellent launch pad to many attractions in Singapore, including Gardens by the Bay and Marina Bay.

As part of their sustainability efforts, Andaz Singapore ensures that their property adheres to PUB's water efficiency guidelines while going the extra mile to enhance water conservation efforts. Some of their water sustainable practices include:

- Ensuring that all water taps meet PUB's water efficiency standards, minimising wastage without compromising the comfort level of guests
- Implementing constant flow regulators in all 347 guest rooms to further optimise water usage
- Conducting training for hotel associates, encouraging them to actively conserve water in their daily duties
- Displaying posters to encourage staff to report water leakages immediately, ensuring rapid rectification of any issues
- Purchasing equipment with the Singapore Water Efficiency label to ensure optimal water use



A senior technician explains the importance of reporting water leakages to a hotel associate.

Conrad Singapore Orchard

Conrad Singapore Orchard is a hotel located at the top of Orchard Road, with 12 floors of contemporary guestrooms, meeting spaces, restaurants and bars.

The hotel embraces responsible water use in their operations, with measures that help them to boost water efficiency and lower overall water consumption. These include:

- Daily meter readings to monitor water usage and flag any areas that require optimisation
- Encouraging staff to report water leakages and faulty water fittings in a timely manner, fostering a culture of awareness and responsibility for prompt rectification of issues
- Installing rain sensors for landscape irrigation, avoiding unnecessary water usage during periods of rainfall
- Upgrading dishwashers to more water-efficient versions that consume less water per cycle



Water-efficient dishwashers help Conrad Singapore Orchard to reduce water consumption.



Water Efficiency Awards Winners 2024

Hotels

Holiday Inn Singapore Atrium

Holiday Inn Singapore Atrium is a four-star hotel located in the heart of the city.

Holiday Inn Singapore Atrium has implemented a range of commendable measures to minimise water usage and promote responsible stewardship. These include strategic initiatives and innovative technologies such as:

- Using NEWater for cooling towers, fountain and irrigation, reducing the consumption of fresh water
- Installing sub private meters for guest rooms, kitchens, outlets, cooling towers and pools, to enable precise monitoring of water consumption across various areas of the property
- Installing high-efficiency water fittings in guest rooms, public toilets, kitchens and staff areas to reduce water wastage
- Upgrading of chiller plant and cooling towers with high water efficiency to further optimise water usage
- Conducting daily meter monitoring and monthly utilities reports for evaluation of water consumption patterns and to identify areas for improvement



By utilising NEWater in several areas, the hotel minimises the use of fresh water.

Vibe Hotel Singapore Orchard

Vibe Hotel Singapore Orchard is managed by Far East Hospitality, a home-grown leading operator with a diverse portfolio of 10 brands of hotels, serviced residences and apartment hotels.

Vibe Hotel's commitment to water sustainability runs deep, as seen in the thorough integration of water sustainable practices in their operations. These include:

- Installing 3-tick Water Efficiency Labelling Scheme (WELS) rated water taps in its washrooms, to reduce water consumption
- Partnering with an external laundry vendor as an alternative to in-house washing to optimise efficiency and reduce water wastage
- Displaying sustainability messages in guest rooms to encourage guests to participate in water conservation by reusing towels and bed linen, and in turn minimising water usage
- Actively monitoring bulk meter for irregularities in water consumption and swiftly addressing leaks to minimise water wastage



Through the use of sustainability labels, the hotel aims to shift guest behaviour to reduce water consumption.



Water Efficiency Awards Winners 2024

Offices

Ocean Financial Centre

Ocean Financial Centre is a 43-storey office tower located in the heart of Singapore's Central Business District.

Ocean Financial Centre blends water-saving technologies with contemporary design to cultivate an eco-friendly work environment. The building's commitment to water conservation is evident through various features:

- Building management system, which facilitates monitoring of water consumption and early fault detection by alerting technicians to investigate spikes in water usage
- Drip irrigation system for green wall, which reduces the volume of water needed for watering by 30%
- Rain sensor for green wall, which cuts off irrigation during rainy periods, further reducing water usage
- Rainwater harvesting system, which collects rainwater for use in landscape irrigation, thereby reducing fresh water intake

They also undertake several tenant engagement measures to further reduce the building's total water consumption, which include:

- Water conservation posters, which are displayed in tenants' office toilets to encourage the reporting of water leaks
- Green Fit-Out Guides for tenants, which outline sustainable water practices and recommend water saving fixtures
- Regular circulars and exhibitions on water conservation



Ocean Financial Centre holds regular water conservation exhibitions to educate and engage tenants.

The Metropolis

The Metropolis comprises two Green Mark Platinum certified office towers, home to many leading multinational corporations. It is the largest Grade A commercial development outside the Central Business District, with a suite of future-ready, sustainable features.

The Metropolis is committed to water sustainability and has integrated a series of water reduction and conservation initiatives in their infrastructure and operations, such as:

- Installation of digital water meters, which allows continuous monitoring of water usage via its Building Management System (BMS)
- Harvesting of rainwater for landscape irrigation and implementation of sensors that stop irrigation during rainfall
- Recycling of condensate water from air conditioning and tracking via the BMS to optimise water recycling
- Use of water-efficient fittings such as sensor taps, urinals and WCs to lower water consumption
- Certification by PUB as a Water Efficient Building, which underscores a commitment to water sustainability and stewardship



The Metropolis uses meters to track the amount of air conditioning condensate water recycled.



Water Efficiency Awards Winners 2024

Retail

IMM

IMM is Singapore's Largest Outlet Mall with more than 100 outlet stores.

IMM contributes to water sustainability through various water conservation measures integrated into their operations:

- Installation of 3-tick Water Efficiency Labelling Scheme (WELS) rated water taps throughout the mall to reduce unnecessary water consumption
- Display of water conservation messages in public toilets, fostering awareness and promoting water-saving practices among visitors and staff
- Monitoring of monthly water consumption, allowing them to track usage trends and identify areas to further reduce water wastage



IMM promotes water conservation messages in public toilets to advocate for the adoption of water-saving habits.

Northpoint City

Fraser's Property Singapore's Northpoint City in Yishun is the largest mall in the north region of Singapore, with two retail wings.

Northpoint City takes a proactive stance towards water sustainability in their operations, while also inspiring a culture of responsibility and stewardship among their shoppers and tenants. Its efforts include:

- Recycling condensate water for reuse in operations
- Closely monitoring water usage with regular meter readings to help minimise water wastage and promptly address any faults
- Installing 3-tick Water Efficiency Labelling Scheme (WELS) rated water taps, urinals and toilets to optimise water consumption
- Displaying educational water conservation messages in toilets and participating in events like Singapore World Water Day
- Implementing an effective fault reporting system to ensure timely resolution of water-related issues
- Extending sustainability efforts beyond their own operations through the Green Mark Initiative, encouraging tenants to embrace water-efficient fittings during their shop renovations



As part of Singapore World Water Day, Northpoint City ran various initiatives to raise awareness on water conservation.



Water Efficiency Awards Winners 2024

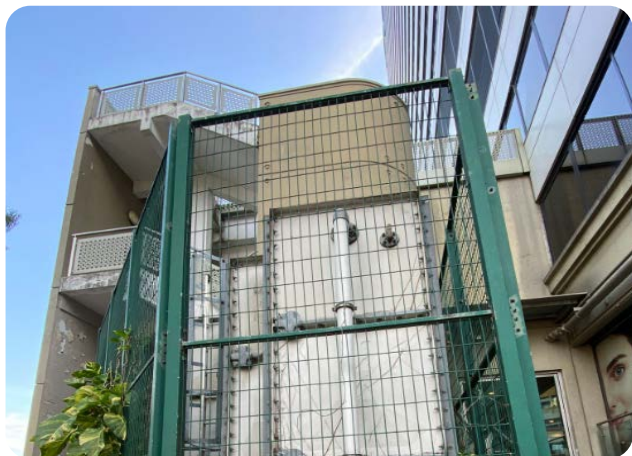
Retail

Parkway Parade

Parkway Parade is one of Singapore's first major and biggest suburban malls, offering the largest range of stores on the East Coast. It is a mixed-use development with an adjoining office tower.

Recognising the importance of water conservation, Parkway Parade has undertaken several initiatives to minimise water usage while maximising efficiency across their operations:

- Rainwater harvesting for toilet flushing to reduce consumption of fresh water
- Installation of waterless urinals and certified water-efficient fittings with 3 ticks under the Water Efficiency Labelling Scheme (WELS) to maximise water savings
- Endorsement of water efficiency management policy, outlining proactive measures to optimise water-efficient performance
- Regular communications with stakeholders to raise awareness and make water efficiency a priority



Parkway Parade's rainwater harvesting tank allows them to utilise rainwater in place of fresh water for select areas of their operations.

The Atrium@Orchard

The Atrium@Orchard is an integrated development that comprises a retail podium and two office towers.

Through adopting innovative technologies and undertaking proactive initiatives, The Atrium@Orchard prioritises water efficiency at every turn. Some of their water efficiency measures include:

- Operating from a certified Water Efficient Building
- Performing automated meter readings, which facilitates meticulous tracking and monitoring of water usage and identifying areas for improvement
- Implementing an effective fault reporting system, with information strategically placed in toilets to encourage timely reporting of leaks or defects
- Installation of 3-tick Water Efficiency Labelling Scheme (WELS) rated water taps and urinals to maximise water efficiency
- Advanced water treatment process for the condenser water system, which achieves a minimum of seven cycles of concentration for optimal water savings



Technician monitors water usage at The Atrium@Orchard.



Water Efficiency Awards Winners 2024

Primary Schools

CHIJ (Katong) Primary

CHIJ (Katong) is an ardent supporter of the water sustainability agenda, from educating young students about the importance of water conservation, to applying the same sustainable practices in the school's operations. In addition to having a certified Water Efficient Building, the school has also implemented other water sustainability measures, such as:

- School-wide programmes, such as World Water Day Celebration, to raise awareness on water conservation
- Display of water conservation messages in common school areas, like the canteen and toilets
- Save-The-Earth Ambassadors, who remind and encourage their peers to save water
- Assembly talks to educate students about water conservation
- Monitoring of water and utilities consumption, and sharing the findings during school meetings and assemblies, to encourage accountability, responsibility and the active conservation of water
- Installation of water-saving fittings and devices – like auto-release taps in canteens and toilets, and drip irrigation for plants – to help reduce water consumption
- Implementing fault reporting to ensure the swift reporting of water leakages and faulty water fittings, and the speedy rectification of such issues



Save The Earth ambassadors attended a water saving symposium and later shared what they learned with their schoolmates.

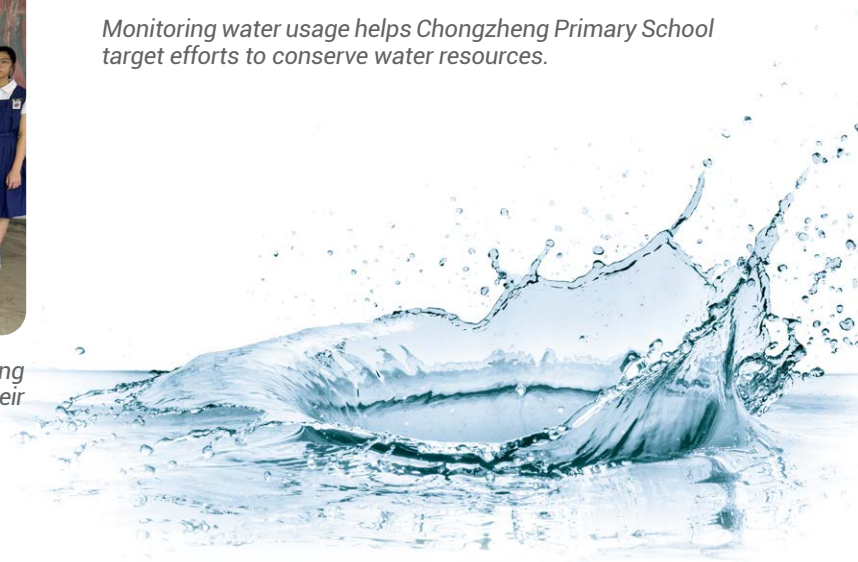
Chongzheng Primary School

Chongzheng Primary School takes a proactive approach to water stewardship, from having a certified Water Efficient Building to using water-efficient tools and systems, to nurturing water-conscious students. These include:

- Regular monitoring of water usage to ensure responsible water use and identify possible areas for improvement
- Fault reporting via QR codes which are placed strategically around the school to facilitate swift reporting of water leakages or similar issues, streamlining the rectification process
- Upgrading 50 taps with new Water Efficiency Labelling Scheme (WELS) fittings, to enhance water efficiency
- Eco-stewardship co-curricular activity, to foster a deeper understanding and appreciation of water conservation amongst student members



Monitoring water usage helps Chongzheng Primary School target efforts to conserve water resources.





Water Efficiency Awards Winners 2024

Primary Schools

Greenwood Primary School

Greenwood Primary School strives to develop their students into environmental changemakers who are committed to building a sustainable water future. Their myriad initiatives and education programmes include:

- Thimbles on water taps, to reduce water flow and promote water conservation
- Irrigation rainwater harvesting system, to collect rainwater to water plants on the school's green wall
- Integrating the irrigation system into the school's Science curriculum, to educate students about the importance of water conservation
- Eco-ambassadors who help raise awareness about water conservation and inspire their peers to actively conserve water
- Use of the Student Learning Space (SLS) platform, to conduct lessons on the significance of water conservation
- Pledges to reduce water usage, to reinforce the ethos of water conservation among students
- Organising educational talks, such as the Waterways Clean-up Talk by Waterways Watch Society, which share about the importance of protecting and conserving our waterways
- Monthly monitoring of rainwater collection and usage, as well as sharing with students to promote a culture of responsibility and sustainability



At Greenwood Primary School, students are inspired by their schoolmates' pledges to conserve water.

Punggol Green Primary School

Punggol Green Primary School takes a comprehensive approach to water sustainability by educating their young students about the importance of water conservation and reducing their water consumption for estate management and daily operational needs.

- Environmental Education Programme fosters awareness about water conservation and promotes design thinking so that students can understand and develop alternative water recycling tools (like aquaponics)
- Students are active water advocates as they encourage their families to practice water conservation at home
- Student leaders also engage kindergarten children, spreading awareness about the importance of saving water to their juniors
- Parents Support Group and teachers guide and support students in water conservation activities, on occasions like World Water Day
- Water conservation posters are prominently displayed in school common areas, reinforcing the message to save water
- Implementing water-efficient fixtures such as self-closing basin taps with faucet aerators to minimise water wastage
- QR-code based fault reporting system simplifies and expedites the reporting process for water leakage issues, ensuring timely resolution
- Monthly water consumption monitoring enables the school to identify and address issues promptly, contributing to overall water efficiency



Student Leaders spread the message of water conservation to kindergarten children through fun and games.



Water Efficiency Awards Winners 2024

Secondary Schools

Sembawang Secondary School

Sembawang Secondary School employs a range of measures to reduce water consumption and promote water sustainability within their premises:

- Certified Water Efficient Building incorporates water-saving features to reduce overall water consumption
- Installation of 3-tick Water Efficiency Labelling Scheme (WELS) rated water taps, urinals and WCs, which are designed to minimise water wastage
- Display of water conservation messages in common areas to raise awareness and encourage water-saving behaviour among students and staff
- Effective fault reporting system to facilitate prompt response to reported water leakages and faulty fittings
- Limited use of high-pressure jets for cleaning, favouring robots for large floor areas to reduce water usage
- Conducting annual briefs for estate management staff such as contract cleaners and canteen stall operators to align everyone on water conservation best practices
- Close monitoring of monthly water consumption to optimise water efficiency

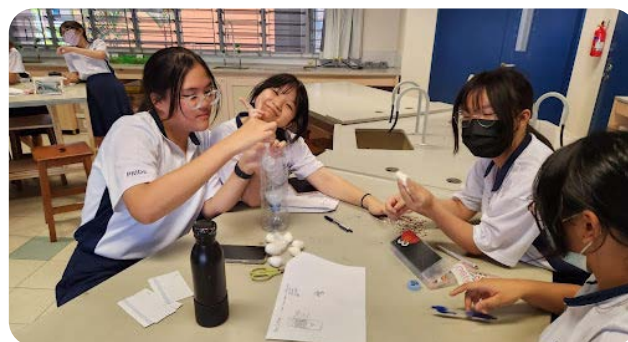


School staff conduct weekly water meter readings, which helps to detect potential leaks or inefficiencies.

Serangoon Garden Secondary School

Serangoon Garden Secondary School has applied a wide array of water efficiency initiatives aimed at promoting sustainability among students and reducing overall water consumption:

- Applied Learning Programme emphasising sustainability education
- Environment Education Programme raising students' awareness about water conservation
- Collaboration with Saint Pedro Poveda College in Manila to facilitate discussions about common water issues faced in Singapore and Manila, and encourage collaborative problem-solving
- Awareness campaigns in the school's common areas to highlight and remind about the importance of water conservation
- Implementation of a smart, automatic watering system in the spice garden, where watering volumes can be tailored to the needs of plants to optimise water usage
- Effective fault reporting system to facilitate timely reporting and rectification of water leaks



Students design a water filtration system, and learn how to produce a clean and sustainable source of water.



Water Efficiency Awards Winners 2024

Secondary Schools

St. Hilda's Secondary School

At St. Hilda's Secondary School, water efficiency is ingrained in its core educational ethos and daily operations. They champion water conservation through initiatives such as:

- Advocating care for the environment, including water conservation and sustainable water use as part of Character and Citizenship Education
- Encouraging student-led ground-up initiatives, such as 'Fighting Climate Change through Sustainable Use of Toilets', which cultivate good water saving habits
- Standard operating procedures designed to conserve water, such as allocating fixed times for washing and immediate maintenance in case of water leakages
- Fault reporting systems for students and staff to report faulty fittings in a timely manner, reducing water wastage
- Annual briefings and regular reminders on the importance of water conservation
- Monitoring of monthly water consumption for accountability and optimisation



Educational posters depict tips on sustainable water use in toilets.

Tampines Secondary School

Tampines Secondary School's efficient water management practices allow them to reduce water use and wastage, while promoting water conservation amongst the school community.

- Certified Water Efficient Building allows the school to optimise water consumption throughout their premises
- Installation of water-efficient fittings, such as self-closing taps and flow regulators, help to reduce water consumption
- Restriction of high-pressure water jet usage to conserve water
- Monthly monitoring of water usage to detect consumption highs for timely intervention
- Implementation of an effective fault reporting system for prompt rectification of water leakages
- Posters to educate and remind the school community, including students and staff, on the importance of water conservation



A QR-code based fault reporting system facilitates timely reporting and rectification.



Water Efficiency Awards Winners 2024

Secondary Schools

Yuying Secondary School

Yuying Secondary School adopts a multi-faceted approach to water conservation, with initiatives to engage and raise awareness, as well as to proactively reduce water consumption in their operations:

- Comprehensive school-wide survey and focus group discussions to assess student perceptions of water conservation
- Production of an educational video on water-saving practices to engage and interest young students
- Placement of posters around the school to remind users to use water wisely
- Installation of water-saving fittings such as self-closing taps in school toilets to minimise water wastage
- Adoption of less water-intensive cleaning methods, reducing reliance on high-pressure water jets for cleaning
- Implementation of an effective fault reporting system for staff and students to report water leakages and faulty fittings promptly, ensuring timely intervention
- Installation of a vertical farm enables the recycling and reusing of water through an innovative flooding method



Eco initiatives remind Yuying Secondary School students to use water wisely.

Junior Colleges

Millennia Institute

Millennia Institute prioritises water efficiency, conservation and responsible water use within their school community through sustainable water management practices. These practices include:

- Conducting daily monitoring of pressure pumps to detect anomalies in water pressure and enable prompt identification and rectification of potential leaks
- Simplifying fault reporting process by pasting QR codes around the school, allowing all members of the school community to easily report water leaks or other issues for immediate rectification
- Assessing the need for high-pressure water jet usage with visual inspections to determine if moss is present before initiating any water-intensive cleaning
- Regular monitoring of their water bill to promote accountability and awareness of water consumption



Millennia Institute conducts daily monitoring of pressure pumps for quick detection of leaks or faults.



Water Efficiency Awards Winners 2024

Estates (Town Councils)

East Coast Town Council

East Coast Town Council manages, maintains and improves the common property of HDB residential flats and commercial property within East Coast.

East Coast Town Council champions water efficiency in the community, fostering collaboration with contractors and residents alike to achieve water conservation goals. Their responsible water management solutions include:

- Operational monitoring of water consumption with their Operations Command Centre
- Contractor engagement, with regular reminders to prioritise water conservation in their activities
- Installation of water-efficient fittings like sensor faucets in new markets and hawker centres, which reduce water wastage
- Fault reporting system, which allows for prompt identification and rectification of leaks or burst pipes to prevent and reduce water loss
- Timely shut-off of supply valves to water tanks before scheduled cleaning, flushing and sterilisation, to reduce water wastage



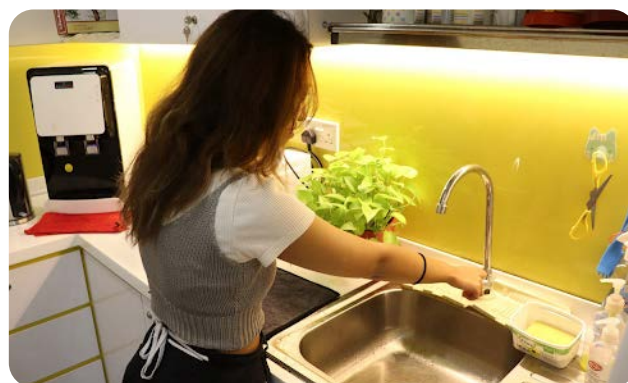
Property officers monitor water meters regularly to identify instances of high water consumption.

Jalan Besar Town Council

Jalan Besar Town Council manages, maintains and improves the common property of HDB residential flats and commercial property in Jalan Besar.

Jalan Besar Town Council has implemented a range of proactive water conservation measures to help both staff and community save water. These include:

- Procuring 3-tick Water Efficiency Labelling Scheme (WELS) rated water fittings and appliances to minimise water consumption throughout the estate
- Replacing taps and introducing a faucet aerator to improve water stream and optimise water usage
- Adjusting the water pressure in pantry taps to reduce flow rates and minimise water consumption
- Conducting regular surveillance checks for underground leaks, faulty taps and unlocked fixtures to swiftly address issues and reduce water wastage
- Launching a digital campaign on social media and estate Digital Display Panels to raise community awareness and share tips on water conservation
- Displaying water conservation posters to remind staff to actively reduce water wastage in their daily activities



Water fittings are adjusted to lower water pressure settings to minimise water usage.



Water Efficiency Awards (Projects) Winners 2024

Low Hydrofluoric Acid (HF) Reclaim Water for Cooling Tower Make-Up

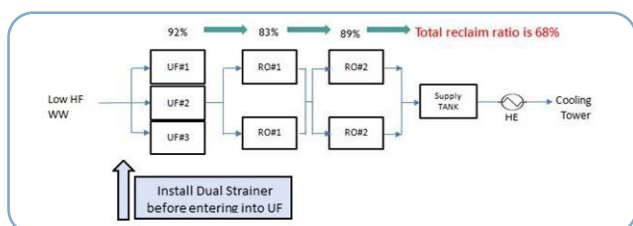
By AFPD Pte Ltd

AFPD is a manufacturer of electronic display devices. They also conduct research and experimental development on electronics to develop cutting-edge products.

Sustainable water supply is essential for AFPD's business operations as water is used for the flushing and diluting of chemicals. Hence, the company developed a water recycling project that allows them to treat dilute hydrofluoric acid wastewater for reuse in its cooling tower.

They implemented innovative water treatment technologies, such as ultrafiltration (UF) to remove high molecular-weight substances, as well as two-pass reverse osmosis to effectively eliminate heavy metals and fluoride from the wastewater stream. Additionally, they included dual strainers to filter out broken packings, reducing the frequency of auto chemical washes and maintaining the high UF design reclaim ratio.

Initially achieving a water recovery rate of 68%, AFPD underwent meticulous process optimisation to boost the recovery rate to an impressive 80%. The project now has the potential to achieve up to 820m³ of water savings per day.



Dual strainers help to reduce blockages caused by broken packings from the scrubber drain.

Wastewater Treatment Plant

By Amgen Singapore Manufacturing

One of the world's leading biotech companies, Amgen fights the world's toughest diseases by harnessing the best of biology and technology to make millions of people's lives easier, fuller and longer.

Integrating sustainability designs into their facilities to treat and recover wastewater, Amgen's wastewater treatment plant achieves a high 80% water recovery rate for reuse in their cooling tower and other operational needs.

Featuring an advanced automation system control with an optimised multi-step process, the plant harnesses various technologies including ultrafiltration, reverse osmosis and biological treatment to reduce their water consumption and environment footprint. They also implement advanced odor and air quality management solutions, evaporators for residual processing and volume reduction for offsite disposal.

This project has helped Amgen to achieve substantial water savings, conserving 26,000m³ of water annually, while propelling them closer towards their ambitious 2027 water reduction goal, which includes a 40% decrease in water use. To date, the Singapore plant has achieved 70% of its targeted reduction.



Amgen's advanced wastewater treatment plant paves the way towards improved operational efficiency and overall water resiliency.



Water Efficiency Awards (Projects) Winners 2024

Water Reclamation Plant Project

By MGC Pure Chemicals Singapore Pte Ltd

MGC Pure Chemicals Singapore (MPCS) is a chemical company that specialises in manufacturing ultrapure electronic chemicals such as super-pure hydrogen peroxide, super-pure ammonium hydroxide and chemical polisher etchants.

Focused on reclaiming reject water from the company's ultrapure water plants, the project incorporates a mix of water recycling technologies, such as a feed cartridge system, ultrafiltration and reverse osmosis, strategically integrated to optimise the water recovery process.

Despite facing space constraints for new facilities, MPCS remained committed to water recycling and found an ingenious solution by repurposing existing resources. They converted an unused water tank and strategically installed equipment in proximity to the tank to minimise space requirements for the water reclamation infrastructure.

As a result of their efforts, MPCS successfully achieved an approximate recovery rate of 75% of their reject water, translating to significant monthly savings of up to 1744m³ of water.



An engineer explains the various water recycling technologies deployed in MPCS's water reclamation plant.

Fab10X Local Scrubber Reclaim Reject Recovery (LSRRR) & Fab10X Local Scrubber Reclaim Expansion (LSR)

By Micron Technology

Micron designs, develops and manufactures memory and storage products for AI and 5G across data centres, the intelligent edge and consumer devices, for industries including healthcare, automotive and communications.

Micron's water reclamation projects epitomise innovation and productivity in sustainable water management.

Their LSR system employs Electrodialysis Reversal (EDR) technology to automatically reverse electrical polarity and facilitate a self-cleaning "electrical flushing" effect. This reduces fouling or scaling on the membrane surface, eliminating the need for extensive pre-treatment. Compared to conventional treatment methods, EDR technologies reduce the total space required by 2.5 times for the same capacity for remarkable efficiency and space-saving benefits.

The reject stream from LSR undergoes further treatment in the LSRRR system, which employs ultrafiltration and reverse osmosis technologies, enhancing the overall water recovery rate from 70% to 85%.

The LSRRR system is fully automated to maintain the company's high levels of productivity while supporting their water reuse and recycle efforts. It includes features such as early detection of process anomalies and automated membrane cleaning in place.

With these projects, Micron has achieved a 23% reduction in water consumption, equivalent to 151,000m³ of water per month.



Micron's EDR technology utilises less space than conventional treatment processes.



Water Efficiency Awards (Projects) Winners 2024

Local Scrubber Drain (LSRD) Reclaim Project

By RF360 Singapore Pte Ltd

RF360 Singapore Pte Ltd, a subsidiary of Qualcomm Technologies, Inc, develops and manufactures innovative Radio Frequency Front End (RFFE) filtering solutions for mobile devices and fast growing business segments, such as IoT, drones, robotics, automotive applications and more.

RF360 leveraged Electrodialysis Reversal (EDR) technology to treat and recover wastewater from local scrubbers with greater efficiency.

Compared to conventional water treatment methods, their EDR-based project features a simpler configuration, more compact footprint, enhanced tolerance to feed water, economical biofouling through chlorination, lower operating expenses and a high system recovery rate of 80%. With this project, RF360 can reclaim and reuse up to 630m³ of water per day.

Despite challenges posed by the COVID-19 pandemic, RF360 remained steadfast in their commitment to project execution, devising extensive sourcing strategies and other innovative solutions to ensure successful implementation. Through their perseverance and dedication to sustainability, they set a commendable example for responsible management even in challenging times.



RF360 conducts a learning tour of their LSRD Reclaim Project.

Fully Enclosed Water Saving Cooling Towers

By Samwoh Corporation Pte Ltd

Samwoh is an integrated civil and infrastructure company that offers a full suite of engineering services and supply of construction materials, to build and maintain civil infrastructure such as roads, viaducts, underpasses and airport runways.

Samwoh commissioned an innovative, fully enclosed cooling tower design which effectively mitigates water loss by minimising evaporation, drift, splash out and windage. This new design significantly reduces water wastage, ensuring a more sustainable approach to water.

Thanks to their unique layout and construction, the cooling towers cut off nutrient mediums and prevent direct exposure to sunlight, creating an inhospitable environment that deters the growth of algae and biofilms.

Despite the global disruptions caused by COVID-19, Samwoh remained undeterred in their delivery and installation of the cooling towers. Commissioned in November 2021, their fully enclosed system has achieved potential water savings of 4,356m³ annually when compared to conventional cooling water systems.



Samwoh's Facility Manager briefs team on cooling tower maintenance.



Water Efficiency Awards (Projects) Winners 2024

Improving the Efficiency of Bus Washing

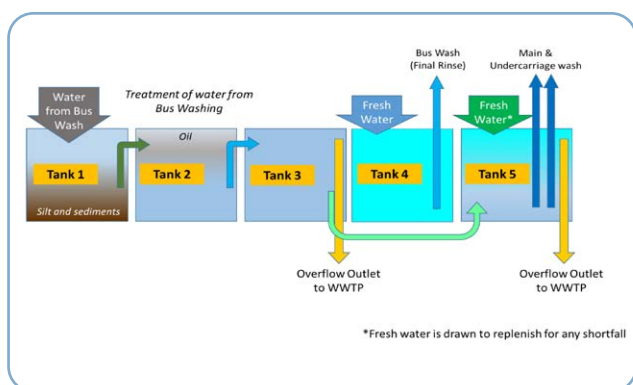
By SBS Transit Ltd

SBS Transit is the largest public bus operator in Singapore, operating over 200 bus routes with a fleet of more than 3,500 buses.

SBS Transit's bus washing machines were equipped with systems capable of collecting, filtering and recycling approximately 80% of the water utilised in the bus washing process.

In their quest for continuous improvement, they installed additional pumps which helped to transfer a greater volume of filtered recycled water back to the water tank. This significantly reduced the need for fresh water, leading to a more water-efficient washing process.

They took innovation another step further in their final wash process by reducing the size of the spray nozzles to 1/8 inch. This effectively decreased flow rates while boosting water pressure to facilitate optimal cleanliness while reducing water consumption. By simply switching the nozzles, they save about 25% of water used per bus wash, showing that strategic enhancements and innovative adaptations can go a long way in optimising resource utilisation and conserving precious water.



The auto bus wash process uses recycled water for washing and fresh water for the final rinse process, minimising overall water consumption.

Water Recycle System

By Vitasoy International Singapore (VIS)

VIS is a wholly own subsidiary of Vitasoy International Holdings, a leading international manufacturer and distributor of plant-based food and beverages.

VIS developed an innovative Water Recycle System that uses collection tanks to intercept overflow water from their machines used to manufacture tofu, then channels this water through a filtration bag system to remove large impurities from the water. The water that has passed through the system can then be reused in multiple in-house activities, such as general cleaning and equipment washing.

In the initial stages, the project encountered roadblocks, such as frequent choking of the filtration bags, which compromised the flow and quality of the recycled water, placing undue stress on the system. Undeterred, VIS persevered in its vision and came up with effective solutions. They collaborated with project stakeholders to develop a cleaning plan that included redundant filter bags as backups to reduce downtimes. They also involved engineering control to implement alarm sensors that would alert operators of system abnormalities for timely intervention and rectification.

Through diligent implementation and optimisation, VIS's Water Recycling System has now achieved the potential to save up to 30m³ of water every day.



A VIS employee washes the filter bags that help to remove large impurities from overflow water.

Acknowledgements

We would like to express our appreciation to the members of the Singapore Watermark Awards Selection Committee for contributing their valuable time, expertise and insights throughout the process of identifying our deserving SWMA winners.

This booklet was also made possible with the support of all our 2024 Singapore Watermark Awards, Water Efficiency Awards, and Water Efficiency Awards (Projects) winners. Congratulations to all winners!

Finally, to all the remarkable water champions who have made their own strides towards water conservation and sustainability, you are nothing short of inspiring and your efforts are instrumental in shaping a sustainable water future for Singapore.

Thank you all for being a driving force behind our collective journey towards a sustainable water future.

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Singapore Watermark Awards 2024
PUB

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