SG Green I Issue 18.0

MARCH 2024

SG GREEN

SINGAPORE GREEN BUILDING COUNCIL

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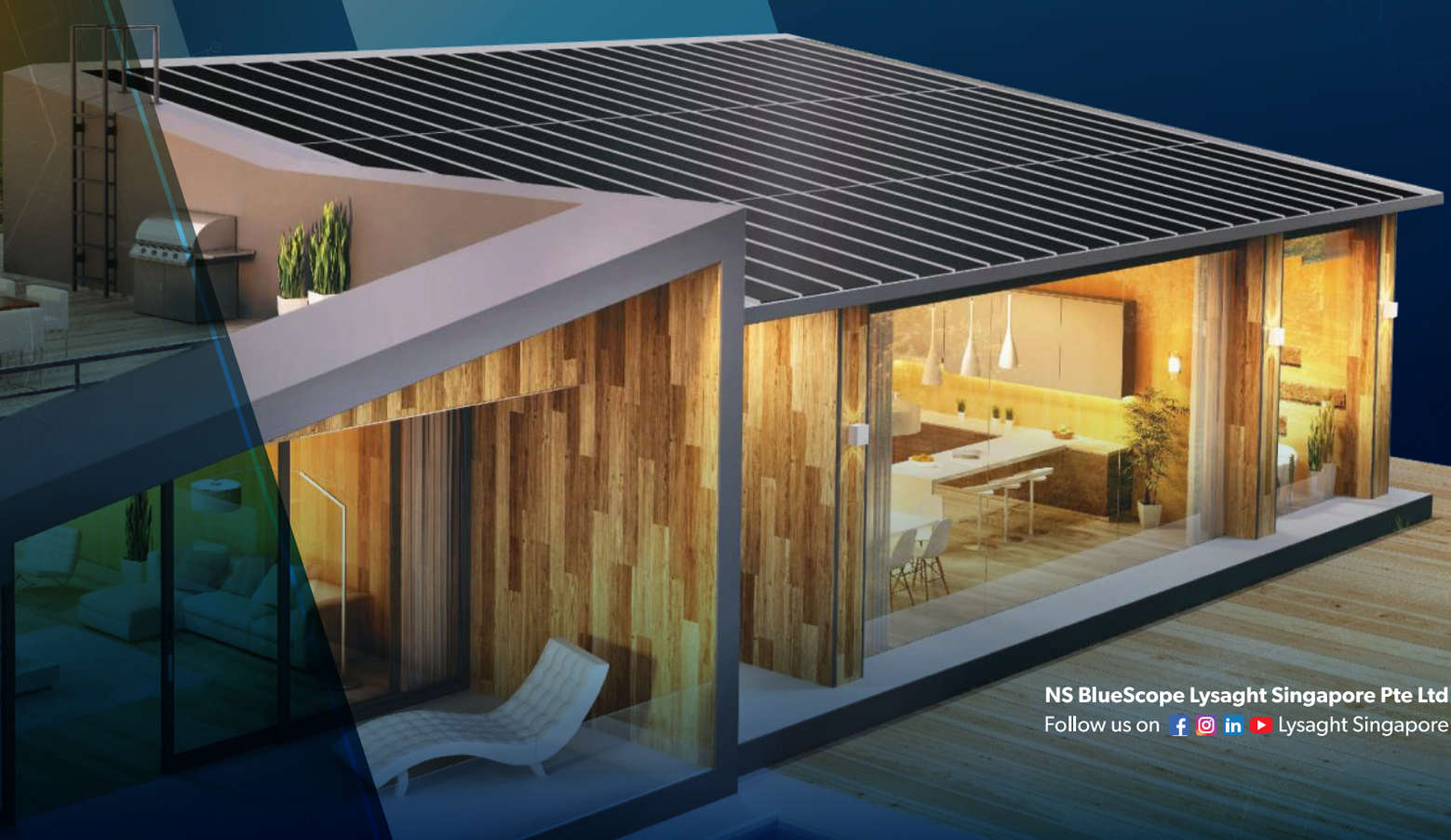

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SGBC EDITORIAL TEAM

Allen Ang
Clifford Chua
Pang Chin Hong
Yvonne Soh
James Tan

CONTRIBUTORS & ADVERTISERS

AkzoNobel
ENGIE
Grobrix Pte Ltd
Singapore Pools Pte Ltd
Sustainable Office Solutions
Pan Pacific Orchard
Univers
UnaBiz Pte Ltd
UOL Group Limited

PUBLISHER

Singapore Green Building Council (SGBC)

DESIGN

SC (Sang Choy) International Pte Ltd

CONTENTS

MESSAGE FROM THE EDITORIAL TEAM

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The ever-evolving global landscape demands a shift in focus from simply discussing sustainability to actively implementing solutions. This edition of SG Green delves into the inspiring stories of individuals and organisations who are putting sustainability into action, translating environmental responsibility into tangible progress, both in Singapore and across the international stage.

Within these pages, readers will encounter a wealth of practical knowledge and inspiring case studies. Focused on Sustainability in Action, the magazine will touch on innovative technologies are revolutionising the way the sector is approaching sustainability, including a feature to help readers better understand district cooling. This issue also showcases cutting-edge advancements in green building practices, resource-efficient technologies and celebrates the ingenuity driving positive change.

Moving beyond theoretical concepts, this edition will also delve into the real-world application of sustainability principles across diverse segments. By examining case studies of successful implementations, such as the beautiful Pan Pacific Orchard hotel, readers will gain valuable insights into replicable strategies and the lessons learned on the path to sustainability.

Finally, achieving a sustainable future necessitates collective action. SG Green Issue 18.0 highlights the power of collaboration between businesses, government agencies, and communities. We will explore how collaborative efforts are accelerating progress and fostering systemic change, like how Univers is helping organisations navigate the decarbonisation imperative.

Singapore serves as a prime example of Sustainability in Action. With its ambitious green building goals and forward-thinking approach, the nation provides a fertile ground for showcasing successful initiatives. By examining these local success stories, we hope to inspire others to embark on their own sustainability journeys, regardless of their location or area of influence.

Whether you are a seasoned sustainability professional, a curious newcomer to the field, or an individual seeking ways to live a more eco-conscious life, SG Green offers valuable knowledge and inspiration. By sharing real-world examples of effective action, this magazine empowers individuals and organisations to become active participants in building a more sustainable future.

Together, through collaboration and sustained action, we can transform Sustainability in Action from a theme to a tangible reality. Let us leverage the collective power of ingenuity, collaboration, and a shared vision for a more sustainable future.

Yours Sincerely,
SG Green Editorial Team


UOL

PAN PACIFIC ORCHARD: AN ICON OF TROPICAL HOSPITALITY WITH THE ENVIRONMENT IN MIND

Pan Pacific Orchard is envisioned to be a new standard for high-rise tropical hospitality and is one of Singapore's only luxury hotels designed with an emphasis on the environment.

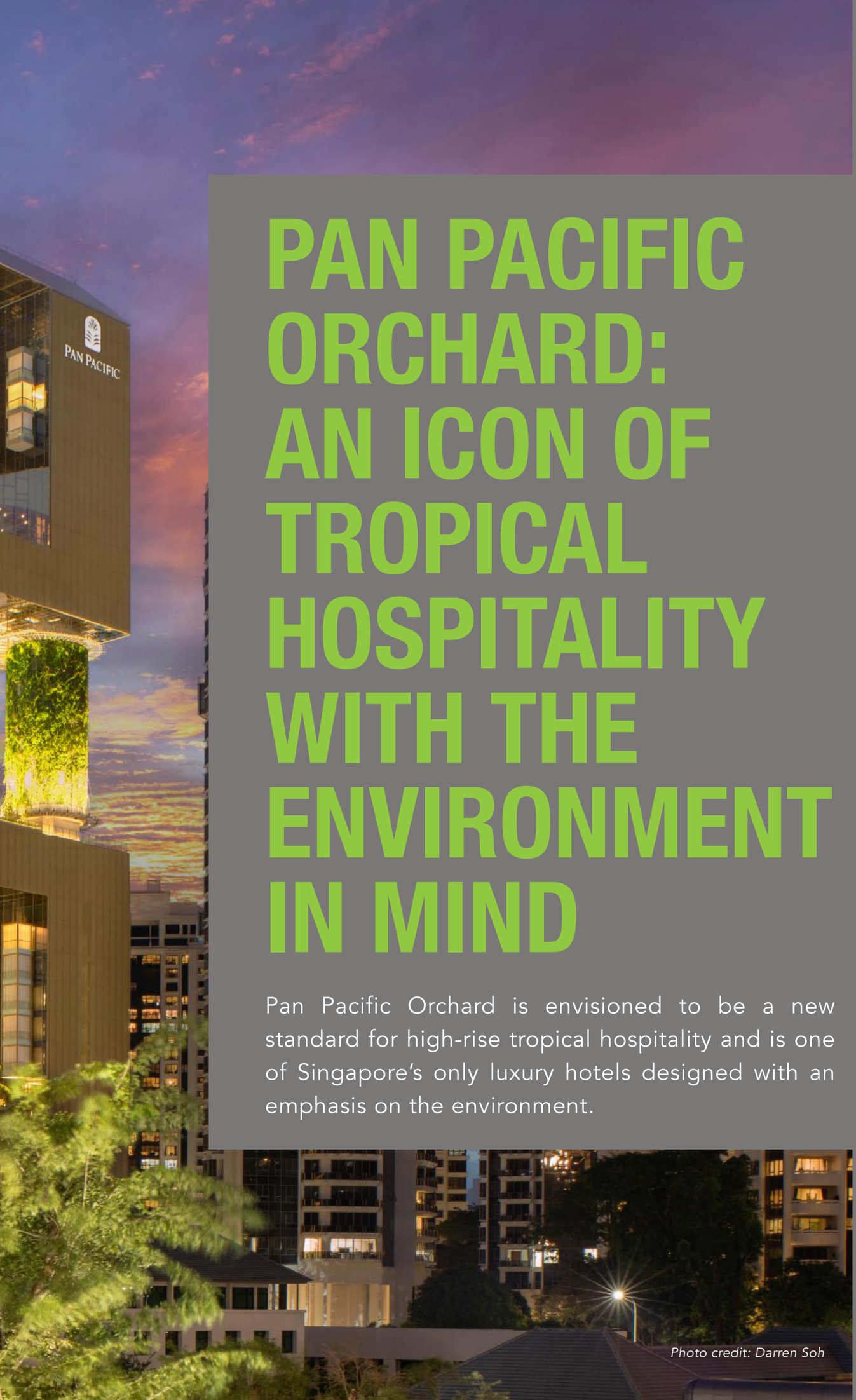


Photo credit: Darren Soh

In a prime area already occupied by multiple iconic buildings, the team at the Pan Pacific Hotels Group, a member of UOL Group (UOL), had their work cut out for them. However, when the 23-storey Pan Pacific Orchard had its soft launch on 1 June 2023, it rose above the vibrancy of Singapore's prime shopping belt and is now an iconic landmark that draws nature inwards with green abundance, marking the latest development in the green rejuvenation of Singapore's famous Orchard Road district.

AN EMPHASIS ON THE ENVIRONMENT

Designed by WOHA as a new prototype for high-rise tropical hospitality, Pan Pacific Orchard is one of Singapore's only luxury hotels designed with the environment in mind, brimming with 14,000 square metres of foliage and water features, a high-ceiling open-air lobby and energy-saving features like rainwater collection, solar panel technology and a bio-digester system.

Pan Pacific Orchard: An Icon of Tropical Hospitality with the Environment in Mind

Pan Pacific Orchard features tropical, breezy open-air architecture and lush greenery throughout its four distinct strata containing a matrix of guestrooms, social spaces and garden terraces. The design provides guests with a true Singapore experience by bringing the island's different environments into one building: the tropical forest, the beach, the botanic gardens, and, at the very top, a skyscraper amongst the clouds.

Centrally located on Orchard Road, the large structure that houses 347 rooms is broken down into boutique-like precinct destinations within a vertical neighbourhood, with the interiors echoing the theme of each terrace.

The sky terraces are connected by a green core on each corner, visually bringing the greenery along Orchard Road upwards and creating a powerful statement of a garden hotel amidst a dense concrete-glass jungle.

Pan Pacific Orchard: An Icon of Tropical Hospitality with the Environment in Mind

A CELEBRATION OF NATURE

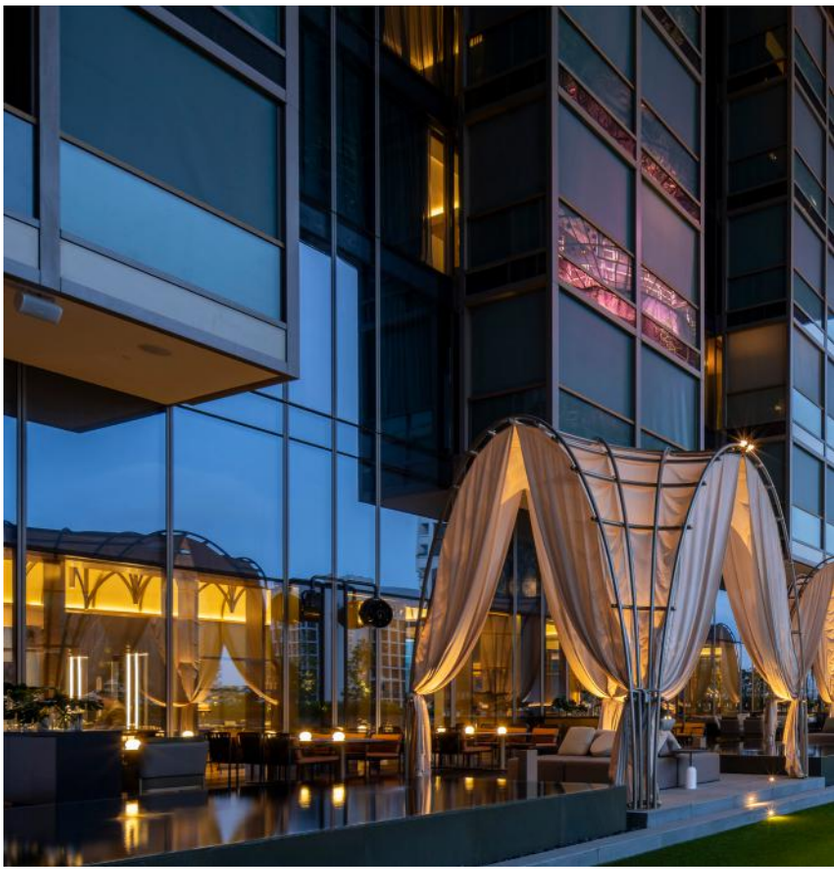
Nature is architecturally celebrated with four high-volume terraced environments: Forest, Beach, Garden and Cloud. The selection of plants amplifies the experience of each environment's theme.

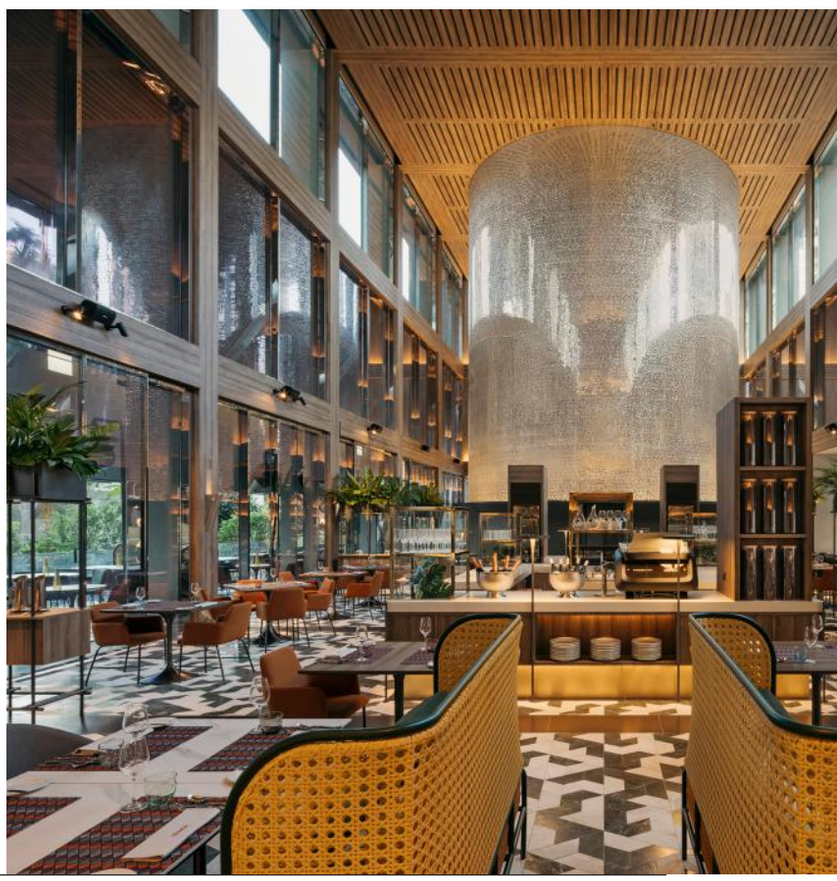
Dramatic 120-metre green columns also tower through the terraces, creating a spectacle of thriving flora comprising Thumbergia with accents of monstera, money plant, cissus and the curtain creeper, also known as the "Lee Kuan Yew" creeper. The Forest Terrace on ground is designed as an immersive 3-dimensional forest with a myriad of tropical native plant species like Cratoxylem Cochinchinense, Dillenia reticulata and Tristaniopsis obovata, around the edges of a stepping waterfall and landscaped pond. Upon arrival, the sights and sounds provide an immediate respite from the hustle and bustle of Orchard Road.

On level 2 sits Mosella, the hotel's restaurant. A play on the word 'morsel', the restaurant brings fun and flavour to a distinctively unique dining experience that combines Mediterranean flavours infused with the vibrant sirit of Peru.

The restaurant is designed to mimic a long house perched over the waterfall and surrounded by myriad foliage. Inside, the sophisticated yet welcoming space is swathed in vibrant hues of burnt orange, jewel-toned greens and jigsaw floor tiling in white-green marble, while timber-lined walls and ceiling add warmth to the space. Lofty floor-to-ceiling glass windows bring in daylight while offering views of the lush greenery beyond.

Mosella serves as a breakfast venue for guests offering an international buffet, while an a la carte menu, available for both lunch and dinner, features an array of thoughtfully curated categories, each highlighting the season's finest ingredients with a focus on sustainably sourced local produce and showcased through bold flavours.





Pan Pacific Orchard: An Icon of Tropical Hospitality with the Environment in Mind

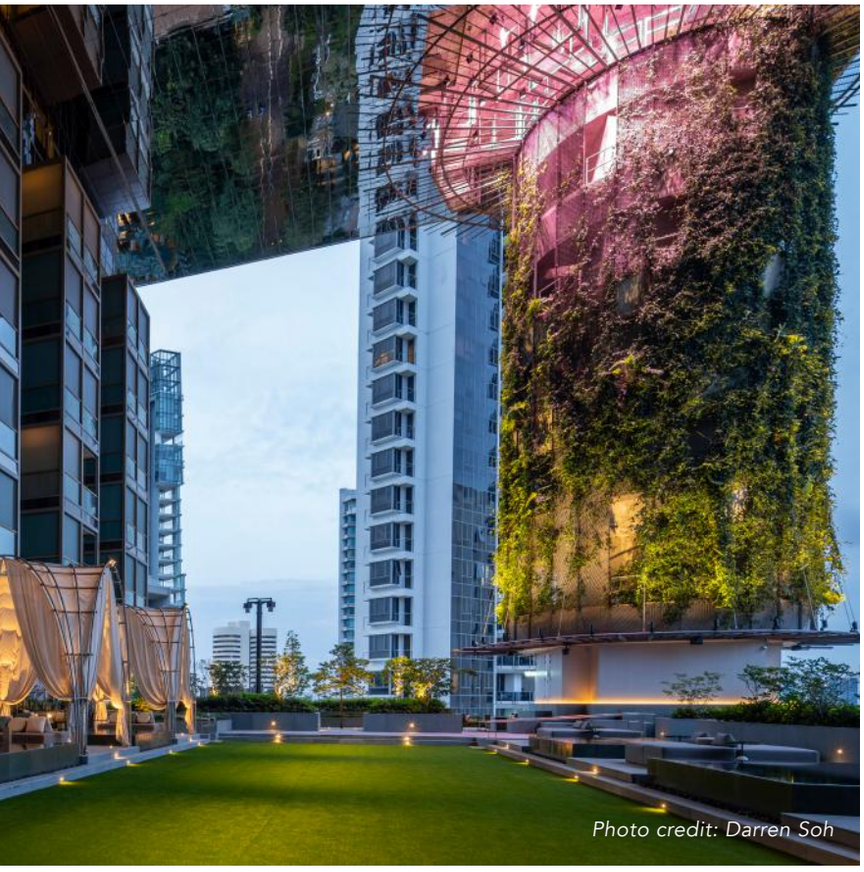
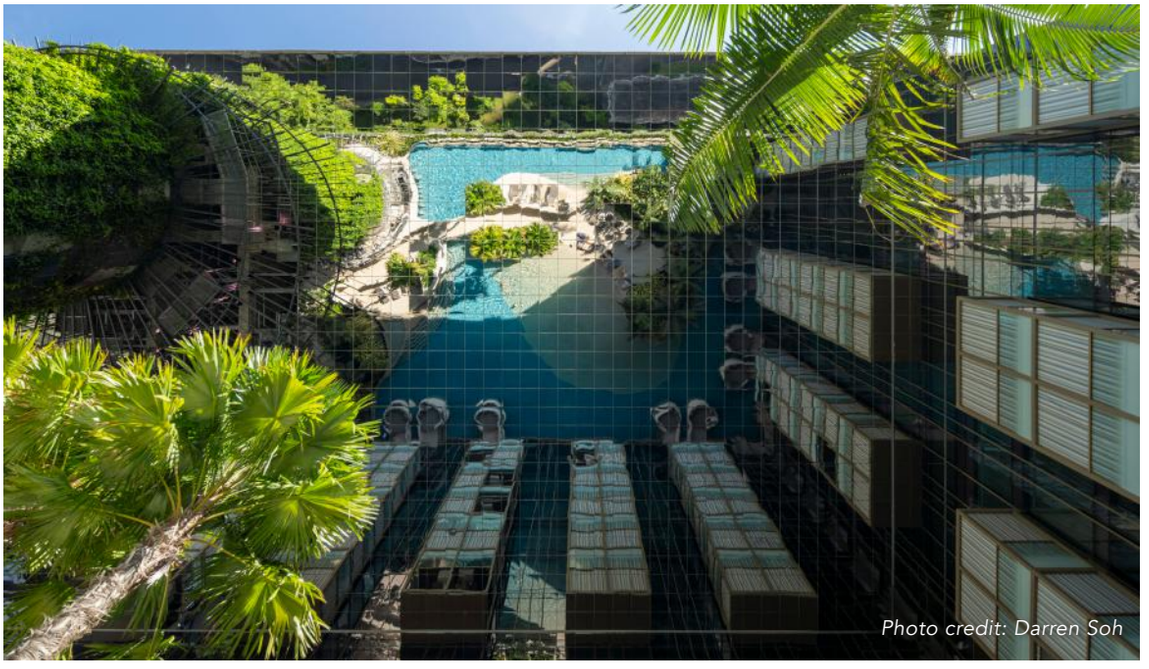


Photo credit: Darren Soh

The Beach Terrace is an urban beach with a meandering waterfont between groves of Pandanus tectorius and Chrysalidocarpus leptocheilos, coastal species commonly found at sea side. The Garden Terrace is a curated garden with paths, seats and reflection ponds framed by planter beds and sculptural tree forms of Tabernaemontana corymbose and Tristaniopsis whiteana. The Cloud Terrace features Araucaria heterophylla and Conocarpus erectus with light, silvery foliage to reiterate the height and views of this event space.

The stainless-steel mirror ceiling at the top of each Sky Terrace reveals the landscaping and activities to the street below like a living artwork. It reflects and bounces daylight internally, to make a comfortable semi-sheltered lushly landscaped space up in the sky.



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Pan Pacific Orchard: An Icon of Tropical Hospitality with the Environment in Mind

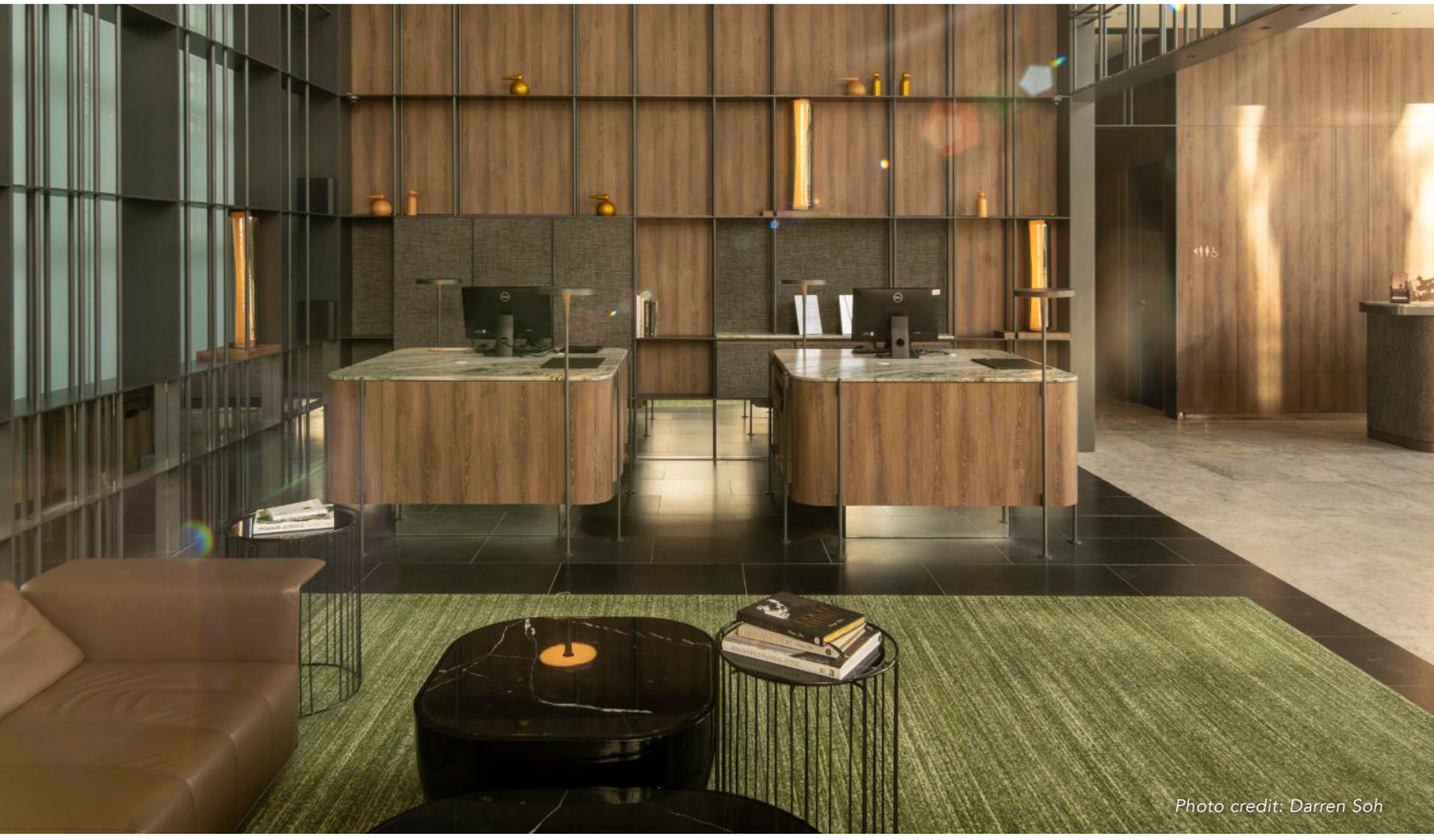


Photo credit: Darren Soh

Two green columns connect the Sky Terraces from Ground to Roof, bringing greenery upwards and anchoring each stratum. It hosts a plethora of climbing species - Thunbergia grandiflora, Cissus nodosa, Philodendron bipinnatifidum and Monstera deliciosa - to give texture, colour and life. The green columns make a powerful green statement, anchoring the corners and framing the cityscape in the background.

These lush spaces where guests are in touch with nature despite being in the middle of a dense city context provide relief from the urban hustle and bustle, and a sense of calm, wellness and even aid healing.

Defined by biophilic design and with over 300 percent of the hotel's land area enveloped in lush foliage, the property's bold architectural approach integrates design with nature seamlessly, underpinned by conscious practices employed throughout the hotel, embodying the vision of sustainable hospitality and graceful luxury by UOL.

A PRIME FOCUS ON SUSTAINABILITY

In July 2020, UOL secured a $120 million three-year term green loan from United Overseas Bank Limited (UOB) to redevelop Pan Pacific Orchard into a lush green 347-room hotel. Pan Pacific Orchard is certified to the highest Green Mark Platinum rating by the Building and Construction Authority (BCA). It achieved this by incorporating active systems and sustainable features that reduce energy and water usage.

Pan Pacific Orchard: An Icon of Tropical Hospitality with the Environment in Mind

In line with the Green Loan Principles published by the Loan Market Association, the proceeds from the green loan facility was to partially finance the redevelopment of Pan Pacific Orchard, an eligible green asset, into a biophilic hotel. Biophilic design is a design concept that seeks to integrate nature with the built environment, thereby creating a positive impact on occupants.

The building's energy, water and waste systems are integrated with each other: 390 photovoltaic panels on the roof generate clean energy that supplements the building's energy usage; rainwater is harvested to irrigate the greenery; and a bio-digester system transforms food waste into liquid, which is recycled for self-cleaning. Energy-efficient LED lighting is also utilised throughout the building where appropriate.

The design of the terraces allows cross ventilation, self-shading and daylighting, reducing overall dependency on energy, and creating a unique urban resort ambience with natural light and fresh air, aided by low-energy dry mist fans in strategic areas that reduce the need for air-conditioning and artificial lighting.

The greenery and water bodies create environmental buffers and surfaces that cool the temperature and help to mitigate the urban heat island effect. The plants provide further valuable ecosystem services like regulating air quality and sequestering carbon dioxide.

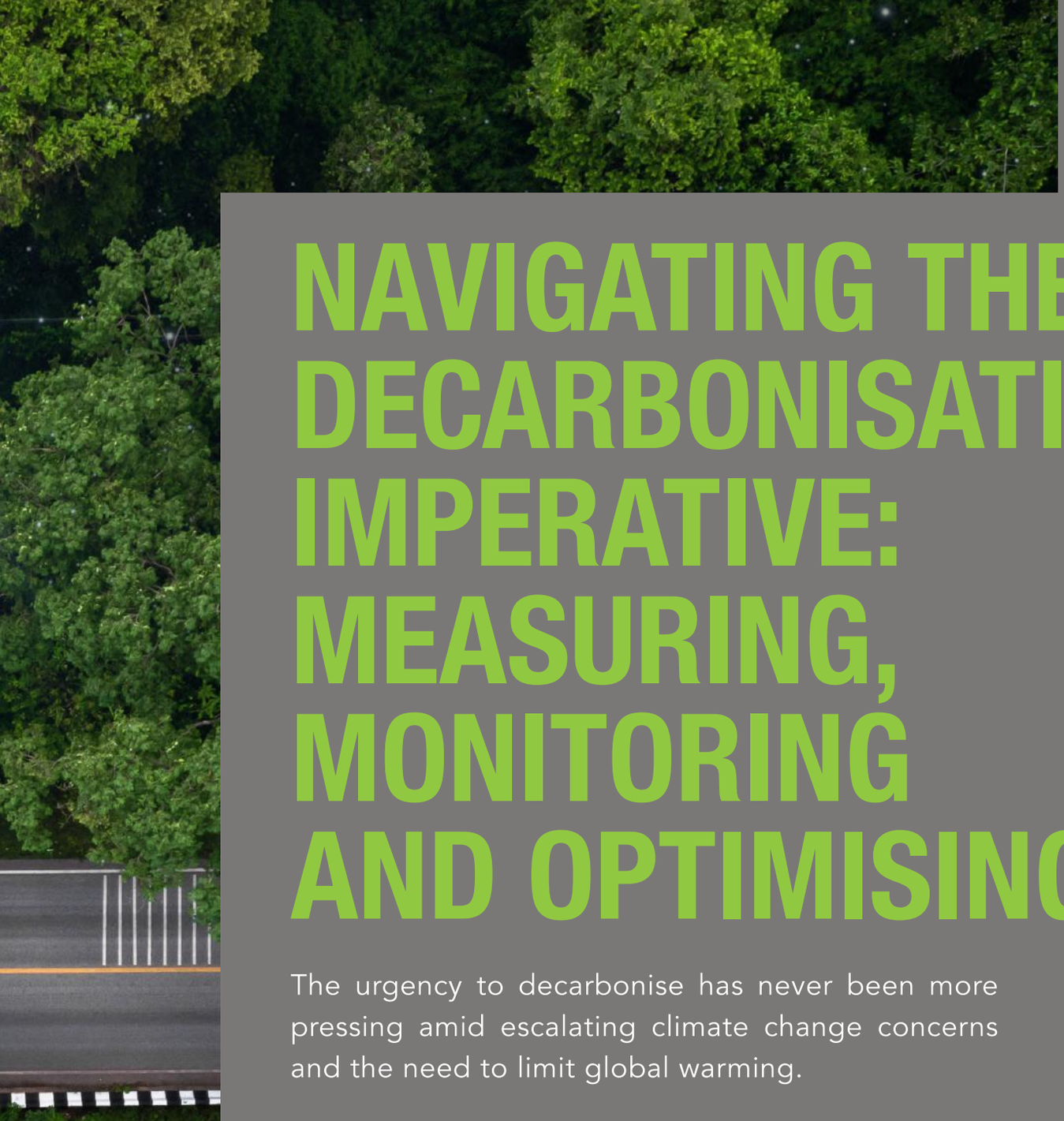
Pan Pacific Orchard: An Icon of Tropical Hospitality with the Environment in Mind

Photo credit: Darren Soh

Low-emissivity glass filters ample natural daylight and together with double-glazed glass, achieve energy saving by keeping the interior ambient temperature cooler by almost two degree Celsius, for the same amount of energy used. Motion sensors have been installed in all guestrooms and public areas that enable intelligent temperature control and efficient use of energy. The motion sensors power down lights and air-conditioning in the guestrooms when no guest presence is detected. Separate recycling bins are also available in all guestrooms.

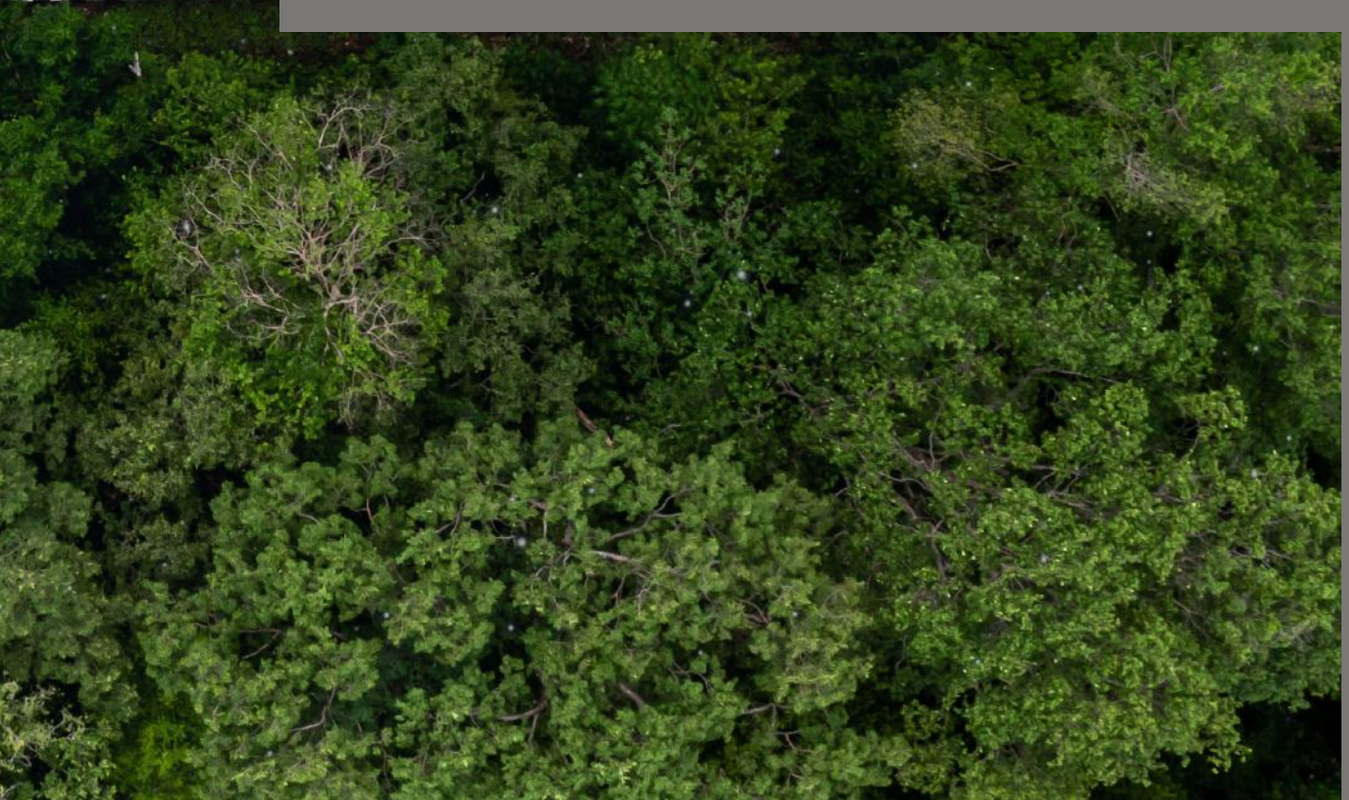
"The purpose of a building is for the people using it, and therefore functionality and practicality are key," said Mr. Liam Wee Sin, UOL Group Chief Executive. ***"We start our routine as a functionalist, then we seek to see design and aesthetic qualities in the architecture, interior, and landscape design. Finally, we endeavour to add value to public spaces, the built environment, and the city. Overall, our buildings must be sustainable and address climate change. Our approach includes responding to the surrounding greenery and parks in the designs and creating new typologies for each project whenever possible."***

Officially opened in October 2023, Pan Pacific Orchard embodies the vision of sustainable hospitality and graceful luxury and stands as an iconic part of the Orchard Road skyline.



NAVIGATING THE DECARBONISATION IMPERATIVE: MEASURING, MONITORING AND OPTIMISING

The urgency to decarbonise has never been more pressing amid escalating climate change concerns and the need to limit global warming.



The built environment, responsible for almost 40 percent of global energy-related CO^2 emissions, plays a pivotal role in achieving the targets laid out in the landmark Paris Agreement.

According to PricewaterhouseCoopers' (PwC) latest Net Zero Economy Index, the Asia Pacific region achieved a decarbonisation rate of 1.2 percent in 2021, more than double the global average. However, a significant gap remains in the 15.2 percent decarbonisation rate required to limit global warming within the Paris target. Moreover, with estimates indicating a doubling of the global building stock by 2060, it is imperative to decarbonise existing structures while planning for net-zero carbon buildings in the future.

CLIMATE REGULATIONS ARE HERE TO STAY

Decarbonisation is not just a moral obligation but a strategic imperative, given the stringent climate regulations being implemented globally.

Proactive measures are crucial to avoid future compliance costs as net-zero building policies evolve. For instance, the Singapore Green Building Masterplan (SGBMP) and New York City's Local Law 97 exemplify the commitment to stringent targets, emphasising the need for sustainable building practices.

UNLOCKING BUSINESS VALUE THROUGH SUSTAINABILITY

Contrary to misconceptions, sustainability is an investment in long-term prosperity rather than a cost burden.

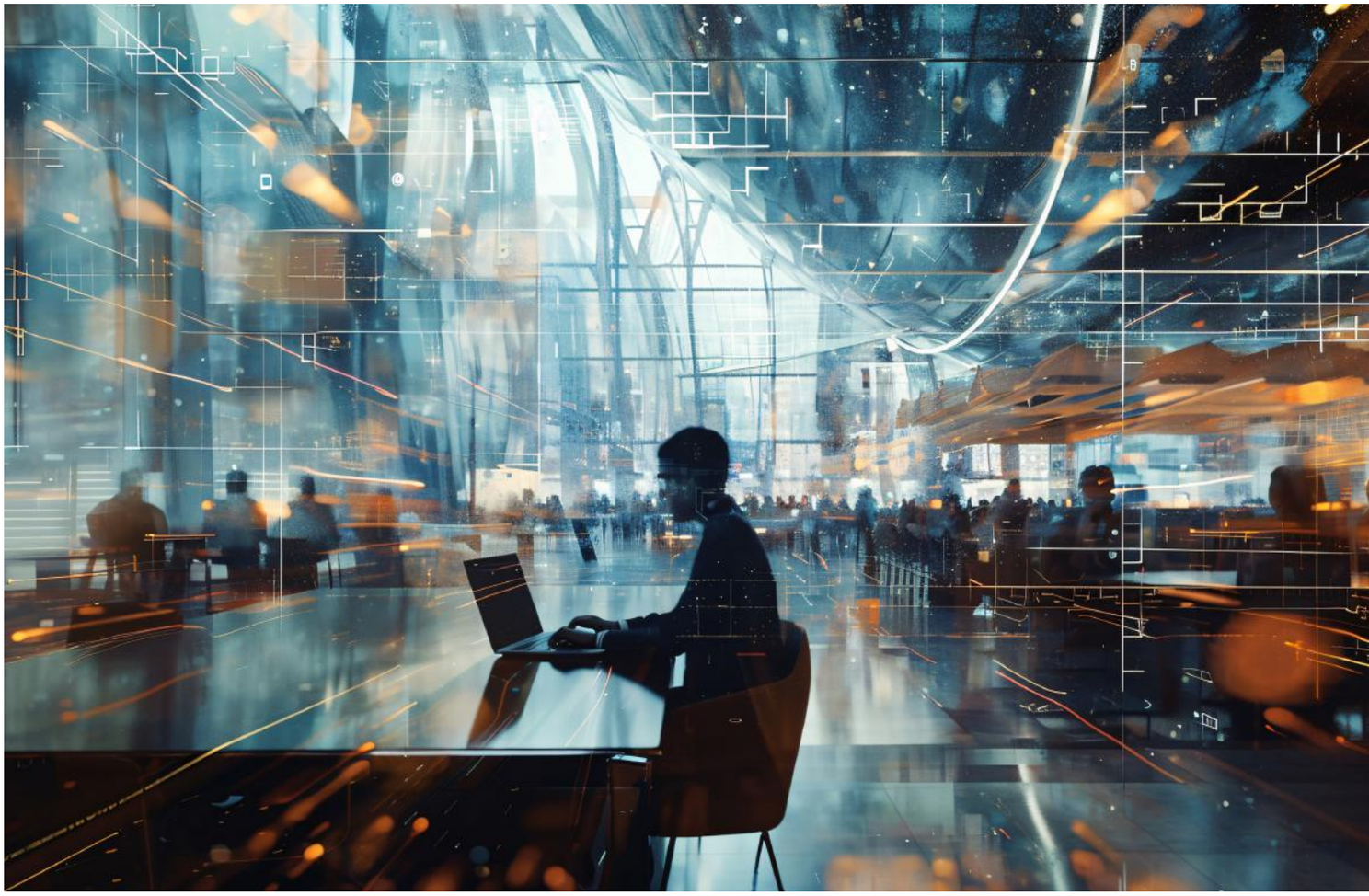
Studies consistently show that the initial costs of decarbonisation are outweighed by long-term savings and competitive advantages. Green buildings, like Green Mark, Green Star or LEED certified ones, can not only command higher rents and resale values but also boast higher occupancy rates.

The business case for sustainability is clear: sustainable practices enhance operational efficiency, making businesses more resilient in the face of evolving environmental norms.

THE DECARBONISATION PATHWAY: MEASURE, PLAN, REDUCE

The journey to net zero can be long, complex, and riddled with challenges. SGBC Member Univers has developed a pioneering solution – the world's first and only complete decarbonisation system.

With a simple yet effective 3-pronged pathway encompassing measuring, planning, and reducing, Univers empowers over 800 organisations globally to take faster and smarter action towards their decarbonisation goals.



1. MEASURE

Effective decarbonisation starts with precise measurement. Leveraging Internet of Things (IoT) technology consisting of sensors, network configurations, and cloud-based analytics can significantly improve the accuracy of emissions measurements, offering unprecedented visibility and business intelligence in real-time.

The Univers system integrates source and activity data, offering a centralised platform to visualise carbon emissions by property. It breaks down emissions into Scope 1, Scope 2, and Scope 3, providing insights into energy consumption and decarbonisation initiatives across portfolios. The platform also benchmarks energy usage for each asset in the organisation's fleet, and can be used for carbon accounting, target setting, abatement initiatives, offsets, and reports management.

These methods are helping organisations avoid the traps of data silos and achieve tangible impacts across their asset portfolios. For instance, Univers partnered with a government agency in Singapore to accelerate efforts towards the Singapore Green Plan 2030. Spanning more than 20 buildings, the strategy focused on energy consumption tracking, HVAC optimisation and the digitalisation of asset monitoring. As a result of the focused three-pronged approach, the agency is on track to achieving significant energy savings and manpower savings, a testament to the power of a comprehensive solution.

2. PLAN

Setting ambitious goals is essential, but delivering them requires a realistic, science-based pathway. Univers facilitates streamlined and data-driven carbon reduction strategies, ensuring organisations can define, strategise, and commit to the standards of the Science-Based Targets Initiative (SBTi) while scaling impacts to the regional, and even global level.

Indeed, Univers' solutions are helping transform entire industries. As Singapore's premier supply chain company committed to sustainability, YCH group came to Univers with the goal of substantially reducing its Scope 1 and 2 emissions by 2030, transitioning its regional warehouses to run on 100 percent renewable energy and start electrifying its transportation fleet.

Since working together, YCH group has got full visibility on where they stand today on their ambitious decarbonisation journey. YCH group is aligning its decarbonisation targets with SBTi and started a slew of initiatives across entire value chain to accelerate their decarbonisation journey. Univers' EnOS system enabled YCH group to quantify the decarbonisation impact of these initiatives in real time and course correct them as and when needed.

3. REDUCE

Why stop at measuring your baseline emissions when you can seamlessly integrate every facet of the decarbonisation journey? Univers' EnOS system stands out for not only measuring emissions but also offering effective ways to reduce them.

Univers leverages cutting-edge AI and machine learning-enriched models through the EnOS decarbonisation system, integrating data from all hardware and software systems into one holistic solution. This enables organisations to lower energy consumption, address underperformance issues, reduce resource waste and cost, and execute targeted decarbonisation strategies.

A compelling example is its partnership with one of Asia's leading rail operators to harness the power of AI-enabled Intelligent Facilities Management. The rail operator achieved an impressive 5-10 percent decrease in energy consumption at two pilot stations. This innovation will be rolled out across 70 underground stations, with anticipated annual savings surpassing 7,000 MWh.

In contributing to the growth of green finance, Univers collaborates with leading financial institutions prioritizing decarbonisation, such as OCBC, Southeast Asia's second-largest financial institution. Univers serves as a key partner, providing IoT-enabled energy management solutions to enhance energy efficiency and ensure compliance with regulatory mandates.

A SHRINKING WINDOW OF OPPORTUNITY

As the carbon clock ticks away, the window of opportunity to make a difference shrinks. It is time to ask ourselves: can we afford to wait any longer?

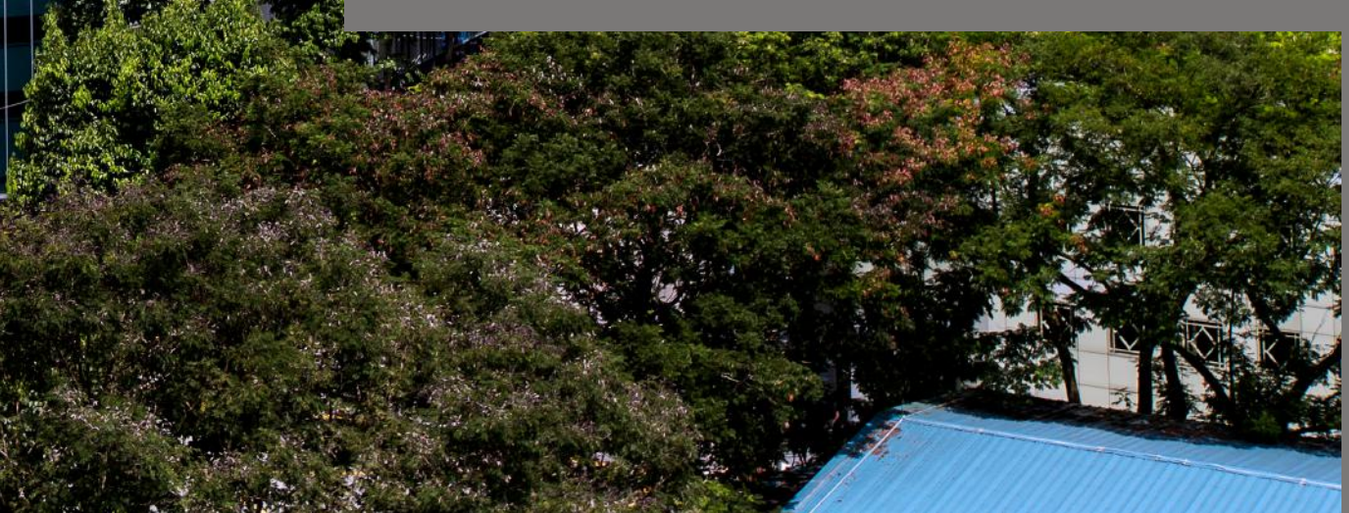
Navigating the decarbonisation imperative is not just about meeting regulatory requirements but unlocking long-term value for businesses and contributing meaningfully to a sustainable future.

Article contributed by:
Univers


SINGAPORE
POOLS
TMC

CHARTING A SUSTAINABLE FUTURE: SINGAPORE POOLS' GREEN JOURNEY

Recognising the impact of operations on the environment, Singapore Pools has embarked on a green journey to address sustainability challenges throughout its value chain, aiming to seamlessly integrate efficient resource utilisation practices into its operations.



In alignment with key sustainable development goals, Singapore Pools will navigate its green journey centred around core environmental priorities – "Affordable & Clean Energy," "Industry, Innovation & Infrastructure," "Sustainable Cities & Communities," and "Responsible Consumption & Production." Through the adoption of eco-friendly practices, the organisation is committed to diminishing resource consumption, enhancing energy efficiency, and minimising waste over an extended period. This approach not only fosters long-term cost savings but also makes a substantial positive impact on environmental sustainability. By actively contributing to the reduction of environmental risks, Singapore Pools is proactively reinforcing its resilience against the dynamic challenges posed by the ever-evolving global climate.

Singapore Pools' first move towards environmental sustainability was by initiating a retrofitting project on its main office building. Retrofitting an existing structure, especially one originally constructed in 1998 and repurposed for Singapore Pools in 2013, presented a distinctive set of challenges. The endeavour required careful consideration of various factors, including the balance between functionality, aesthetics, and energy efficiency.

In overcoming these challenges, the organisation and its facilities management team focused on leveraging innovative technologies and sustainable design principles, roping in and consulting industry experts.

ELEVATING ENERGY EFFICIENCY AND HARNESSING RENEWABLE ENERGY

In 2020, Singapore Pools embarked on its 5-year sustainability journey to improve energy efficiency. Recognising the significant contribution of lighting to overall energy consumption,to mitigate emissions, Singapore Pools initiated a comprehensive overhaul of its current lighting system in the financial year 2023. All traditional incandescent bulbs are on track to be replaced with energy-efficient LED fittings, resulting in a significant decrease in energy consumption throughout the head office. This was followed with the installation of high-efficiency air conditioning systems with a minimum NEA energy label tick rating of 5 in cooling.

Photovoltaics installed on Singapore Pool's rooftop harnesses solar energy to power the building's passenger lifts and an entire office floor.

In August 2022, over 361 square meters of photovoltaics were also installed on the rooftop, which yield approximately 76,490.52 kWh/year and powers the buildings' passenger lifts and an entire office floor. The energy output from these panels is meticulously monitored and tracked in real-time through a mobile app, providing live insights for the facilities management team. To date, about - 121.91 MWh has been generated – boasting a carbon sequestration capacity of 80 new trees planted.

Aiming for higher energy performance standards, the nearly three-decade old building also underwent a series of retrofitting works including the Chiller and Building Management system.

Engineers monitoring the refreshed chiller system to ensure optimal performance energy standards.

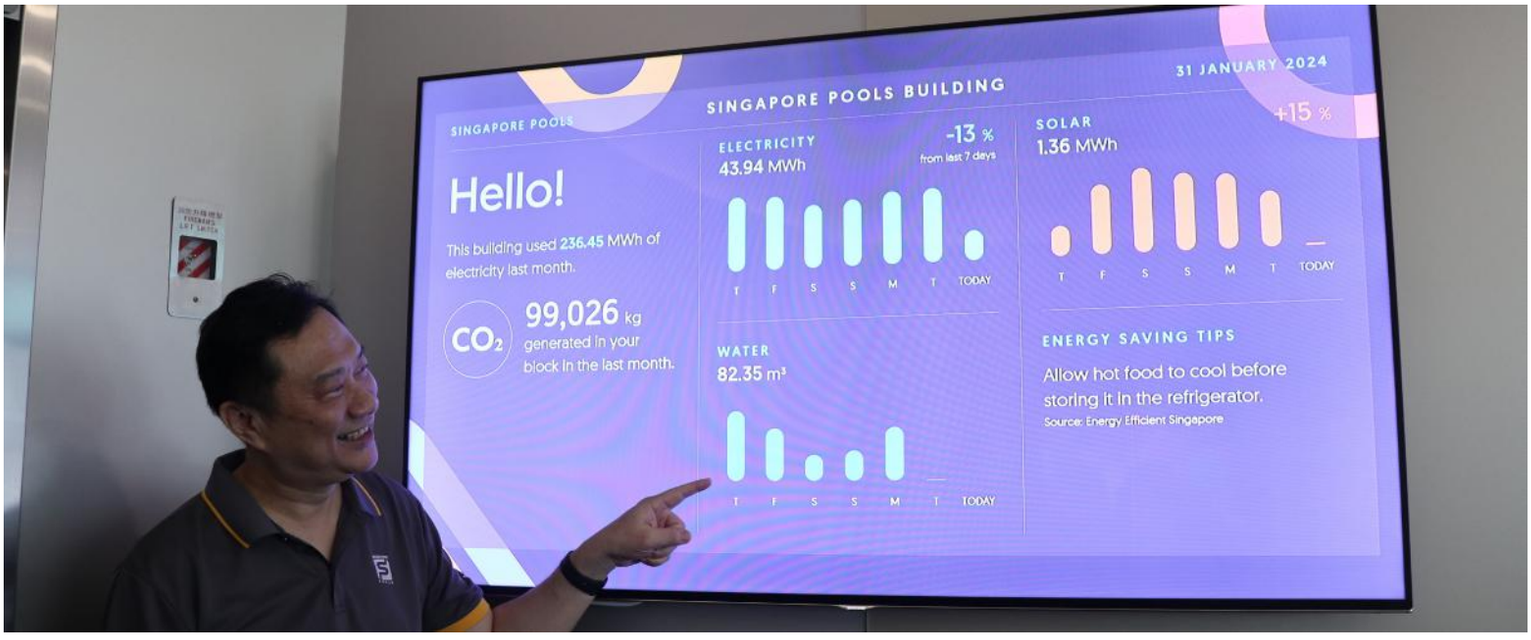
Mr Mohd Norhelmy, Deputy Director of Facilities Management at Singapore Pools, said, *"Our head office retrofitting project was more than an upgrade. It was a vision to transform our workplace and set a higher bar for environmental responsibility. Our green journey exemplifies Singapore Pools' belief that responsible corporate practices contribute significantly to a more sustainable future for everyone."*

SUSTAINABLE OPERATIONS AND MINIMISING WASTE

In its ongoing commitment to sustainability, Singapore Pools also explored integrating environmentally conscious practices into various facets of its business operations.

Recognising the environmental impact associated with paper betslips, a recycling program for used betslips is in place at retail outlets and onboarded several authorised retailers who have not established their own recycling programs. Further exploring ways to reduce one-time paper waste in its operations, the organisation launched eBetslip in 2018 – a paperless mobile app for customers to mark out online bet slips for 4D and Toto bets.

Technicians employ the use of electric vehicles to transport items and service Singapore Pools' network of branches.



The Smart Green Dashboard is displayed at the building's lobby and operations centre, empowering Singapore Pools employees to monitor their energy consumption and stay conscious of the environmental impact.

Extending to the transportation fleet, Singapore Pools replaced two internal combustion engines vans with electric vans and installed EV chargers. These vans are currently used by technicians to transport items and materials to various outlets and branches.

More recently, a feasibility study is being conducted for the Smart Green dashboard installed at the head office. In collaboration with several vendors, the dashboard will link up with smart meters, enabling users to monitor water & electricity usage and temperature conditions of the working environment.

INCULCATING A GO-GREEN CULTURE

Believing that embracing sustainable practices and a go-green culture is a collective responsibility that extends to every employee, Singapore Pools launched the Green Up! Committee in 2016 to champion green issues. Comprising a team of staff from various business functions, the committee actively organises educational workshops, activities and excursions to empower employees with the knowledge and awareness needed to make environmentally conscious choices.

Examples of such initiatives include an Angbao collection and Textile recycling drive. In June 2023, over 20 kg of red packets were dropped off by staff at the collection point in Singapore Pools' main office. Collaborating with Reborn Recycle services, the red packets were given a second lease of life and repurposed into innovative products such as card boxes and toilet rolls, contributing to a circular economy.

In November 2023, a retail uniform and corporate tee update saw a surplus of textiles with potential to be repurposed or recycled. Responding to this, two collection bins were placed at level 8 for staff to drop off generic textiles including curtains, bags, shoes, and clothes alongside Singapore Pools' branded tees. In collaboration with Cloop, 557 kg of textiles were collected during the recycling drive, saving about 3,343 T-shirts from landfills.

Singapore Pools was conferred the Eco-office Plus (Champion) in 2017 and 2022 and achieved the Green Mark Gold^{PLUS} certification by the Building and Construction Authority (BCA) in 2013 and was subsequently recertified in 2016 and 2022. These awards underscore our unwavering dedication to sustainable practices.

The committee will also continue supporting Non-Governmental Organisations (NGOs) championing the environmental cause, such as Green SG Collab and the East Coast Green Space +, to promote education and awareness of sustainability issues amongst the public.

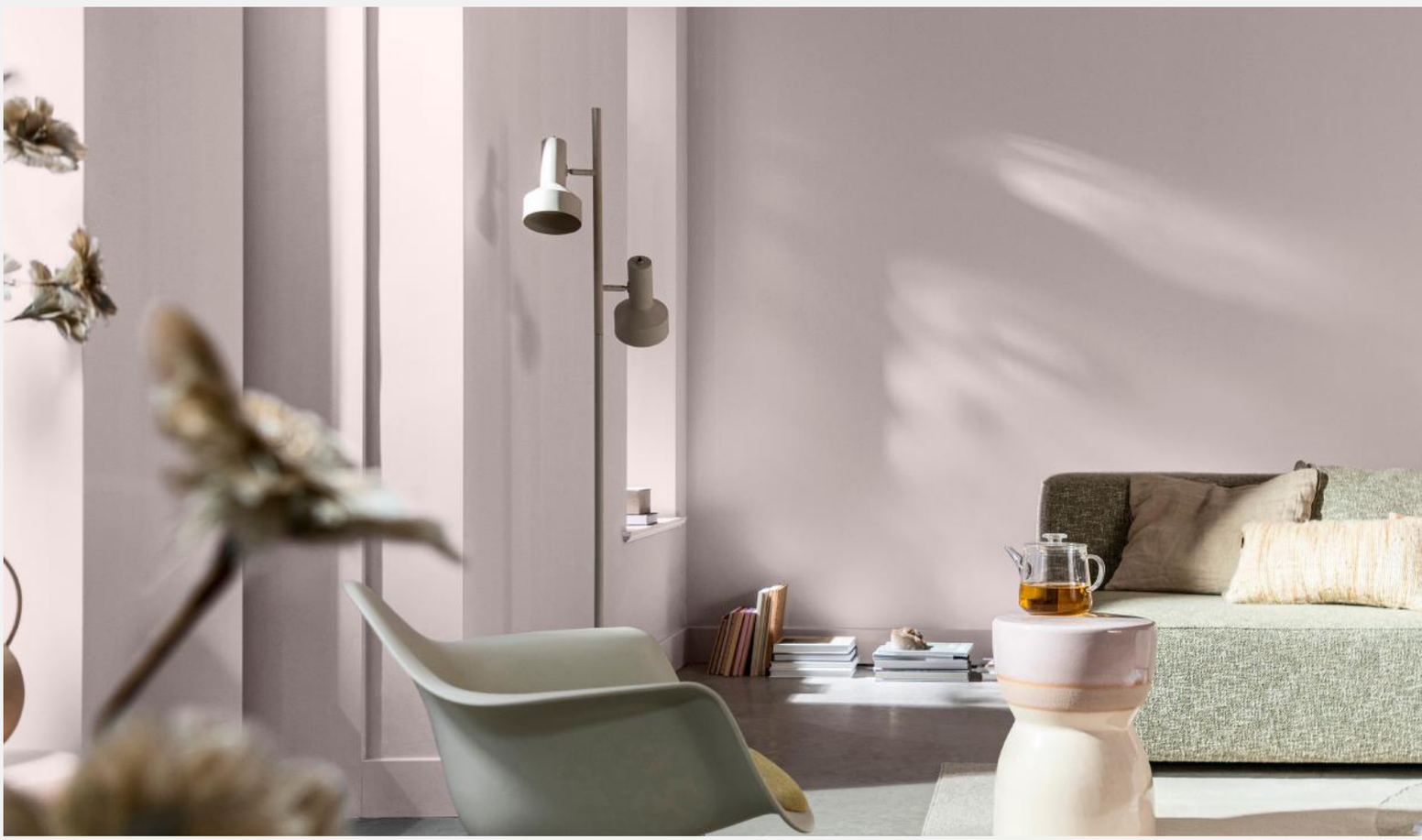
Article contributed by Singapore Pools

PAINTING A SUSTAINABLE FUTURE FOR SINGAPORE

Paints play an important role in the sustainability of the built environment. Find out how paints and coatings are innovating to help address climate challenges.

Painting a sustainable future for Singapore

As a low-lying island nation, Singapore is vulnerable to the impact of climate change. Since 1950, Singapore's average temperatures have been rising by 0.25 degrees Celsius per decade. This is approximately double the rate at which global temperatures have been rising. Singapore's annual mean temperature has increased by 1.1 degrees Celsius in just three decades (1980 to 2020). The key challenge is how to mitigate the urban heat island effect (with increasing urbanisation and human activities making the urban environment warmer than its surroundings) whilst keeping Singapore cool in a warming world?



According to the World Green Building Council (WorldGBC), 28 percent of our buildings' total carbon footprint comes from embodied carbon (emissions released during the manufacturing, transportation, application or construction of building materials and their end-of-life disposal) while the bulk 72 percent is due to operational carbon emissions (typically from energy needed to heat, cool and power buildings). In Singapore's case, building lifespans tend to be shorter due to faster urban renewal. Hence, the embodied carbon emissions of buildings can go up to 40 percent over the building's lifespan.

As urbanisation is expected to increase further, climate emergency demands a swift transition to green buildings which reduce carbon emissions from the built environment, preserve precious natural resources and improve the quality of life for people who live and work in them. Addressing this concern, the Singapore Green Plan 2030 calls for 80 percent of new buildings to be Super Low Energy buildings and 80 percent more efficient; reducing consumption and waste; moving towards circular economy; moderating the rise in urban heat with cool paint; increasing greenery with the One Million Trees movement and more.

APPROACHING SUSTAINABLE BUSINESS

Paints and coatings can play an important role in helping Singapore achieve its carbon neutrality ambitions. From the interiors to exteriors of buildings, these are reducing embodied and operational carbon emissions of Singapore's urban landscape. While operational carbon emissions can be reduced during the lifespan of buildings through increased energy efficiency and renewable energy adoption; embodied carbon emissions are locked-in once the building is constructed.

As an organisation actively involved in the greening of the built environment, AkzoNobel looks at sustainability through a holistic lens. The organisation actively works to reduce waste, increase recycling, create products that are more durable, lasting longer, and innovate solutions that bring sustainability benefits and contribute to the health and well-being of its stakeholders. These include decreasing energy consumption, increasing efficiency, lowering waste levels and improving safety, while being more cost-effective.

AkzoNobel places particular emphasis and investment into developing sustainable solutions, ensuring that its game-changing portfolio of innovative products and technologies is always expanding. This emphasis on sustainability is guided by five key drivers: lower energy and carbon; less waste; reduce, reuse and renew; health and well-being; longer lasting. It means the development of products and solutions is increasingly focused on the use of renewable and recycled materials, improving material and production efficiency, making surfaces more durable and enhancing systems and processes.

To reduce embodied carbon emissions in the built environment, paints are now doing more with less. AkzoNobel has specially formulated 2-coat paints that use less materials but give the same results as the usual 3-coat system, without compromising on the final performance experienced by end-users. This 2-coat system represents a disruptive and groundbreaking innovation that delivers uncompromising performance while significantly reducing resource consumption.

Other innovations like heat reflective paints are counteracting the urban heat island effect that impacts Singapore. For instance, AkzoNobel's Cool Chemistry range of paints and coatings are designed to reflect invisible infrared energy - which is virtually half of the sun's energy and is responsible for the increased temperatures in urban areas compared to its surroundings. When these cool paints and coatings are used on roofs and facades, the result is a sustainable building material that reduces exterior surface temperatures by up to 5°C and results in up to 15 percent energy savings annually as less air-conditioning is required for cooling. These green innovations move in tandem with national sustainability masterplans which are also looking into incorporating and supporting innovations to keep Singapore cool.

At the same time, for Singapore's sustainable ambitions to materialise, it's equally important that businesses also commit to reimagining the future from the lens of sustainability. One such example is AkzoNobel's approach to business, by setting clear 2030 sustainability ambitions to halve its carbon emissions across the entire value chain (pioneering the way as the first in industry to get SBTi certification on this science-based sustainability target) and to achieve 50 percent of revenue from sustainable solutions.

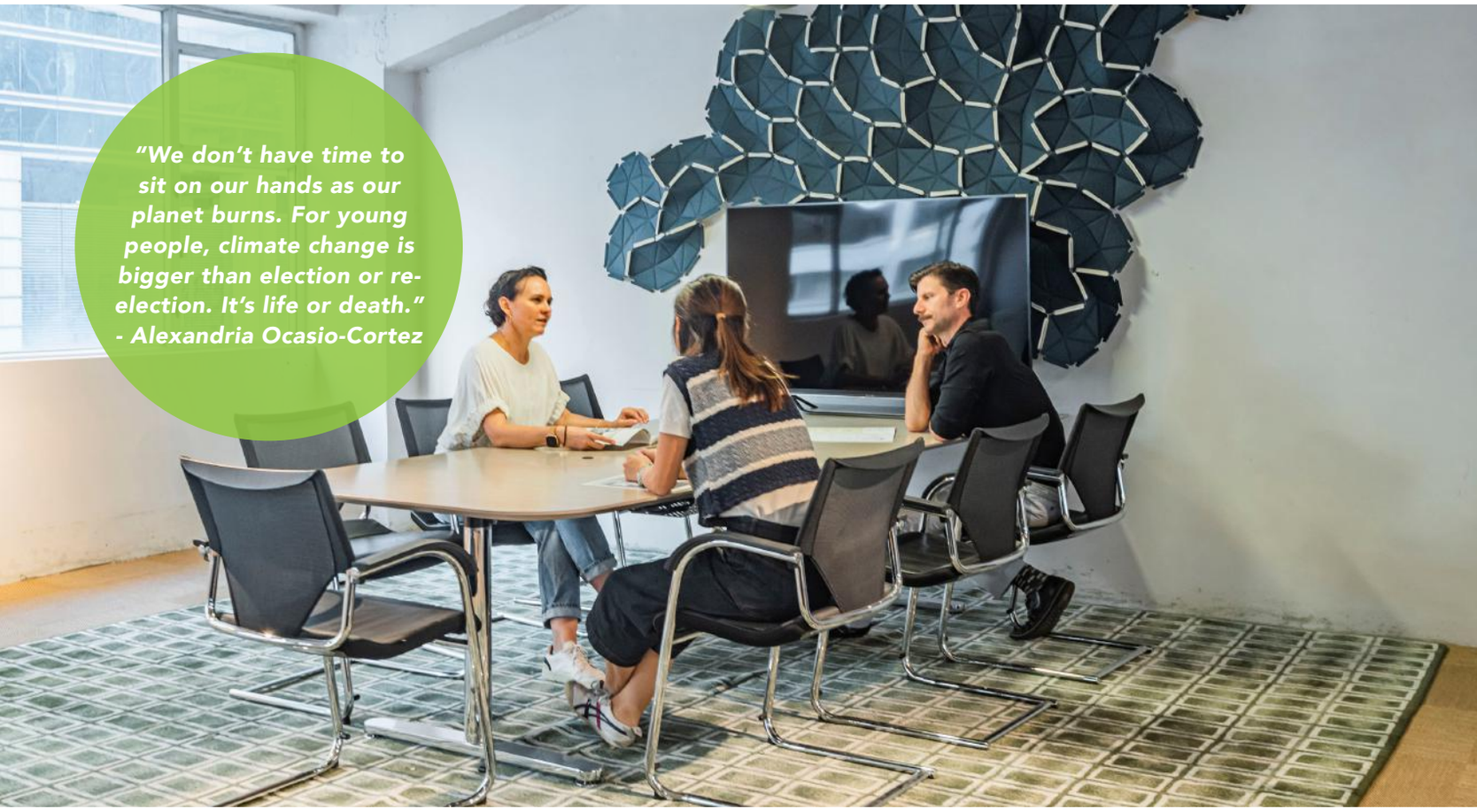
AkzoNobel measures the sustainability benefits of its products using the holistic Sustainable Product Portfolio Assessment (SPPA), a methodology framework developed with the WBCSD (World Business Council for Sustainable Development) and setting the standard for sustainable product portfolio management. Currently, 39 percent of AkzoNobel's revenue is already coming from products with a sustainability benefit. The ambition is to grow this to more than 50 percent by 2030, driving actors in the built environment to adopt more sustainable solutions.

As a Dutch-headquartered multinational company with roots dating back to 1792, AkzoNobel has long prioritised sustainability. Its ongoing contribution to sustainability in the Singapore ecosystem, through the transfer of knowledge and technological breakthroughs, aligns with the Singapore Green Plan 2030's focus on sustainable living, a city in nature, and collective actions against climate change. These shared interests have facilitated the integration of Dutch sustainability principles into Singapore's built environment, benefiting from AkzoNobel's expertise and innovative solutions.

Article contributed by
Gordon Lee
Commercial Head, MSU Singapore & Export Markets
AkzoNobel

NAVIGATING THE GREEN REVOLUTION

Find out how sustainable asset management trends and circular office furniture factor into the journey to net zero.



Climate change deserves to be a huge priority. According to research from the World Wildlife Fund, humans currently use the equivalent of 1.75 Earths to provide the resources we use and absorb our waste. This stark reality means organisations must make sustainability a key part of their strategy to secure long-term success.

Sustainable furniture management is one way to strategically manage resources to maximise value, minimise environmental impact and benefit both current and future generations. Research shows that sustainability reduces costs and can affect operating profits by up to 60 percent. McKinsey & Company further substantiated this point by reporting that products with claims related to environmental, social and governance (ESG) metrics boasted a 1.7 percentage-point advantage over products without them.

Although the market is evolving rapidly, the concept of secondhand and preloved furniture remains taboo and a hurdle to achieving circularity in Asia. To challenge, change and re-educate on the misconceived status quo is no easy feat. However, the awareness of the benefits of sustainable furniture management is gradually becoming more recognised and appreciated. It goes beyond regulatory pressure or cost savings but rather reputation enhancement, supply chain stability, data management, and reporting.

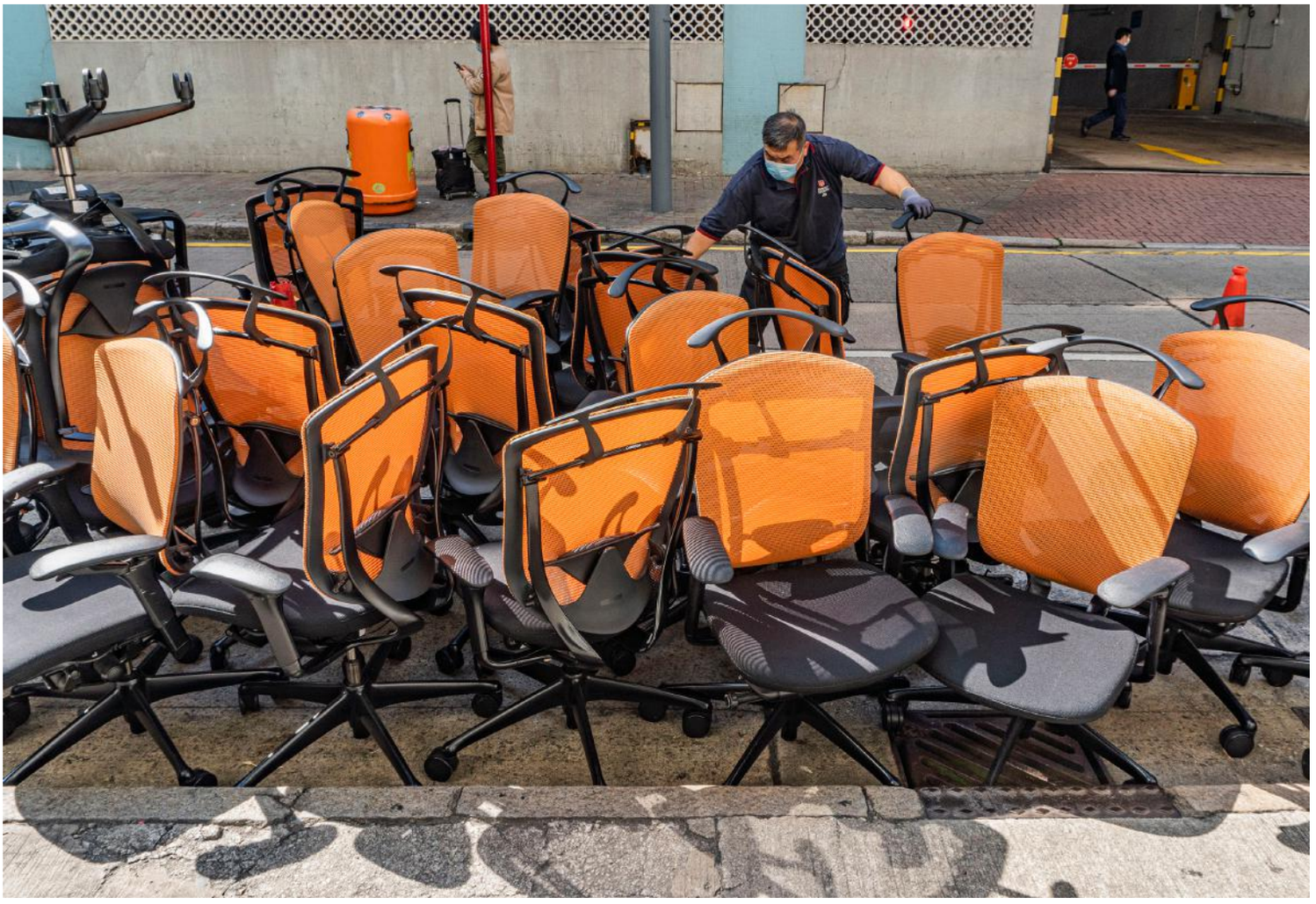
As we stand on the brink of a pivotal era in the fight against climate change, opportunities to enable greener choices in products and services at a reasonable price point that do not force a trade-off between saving money and the planet are bound to keep rising.

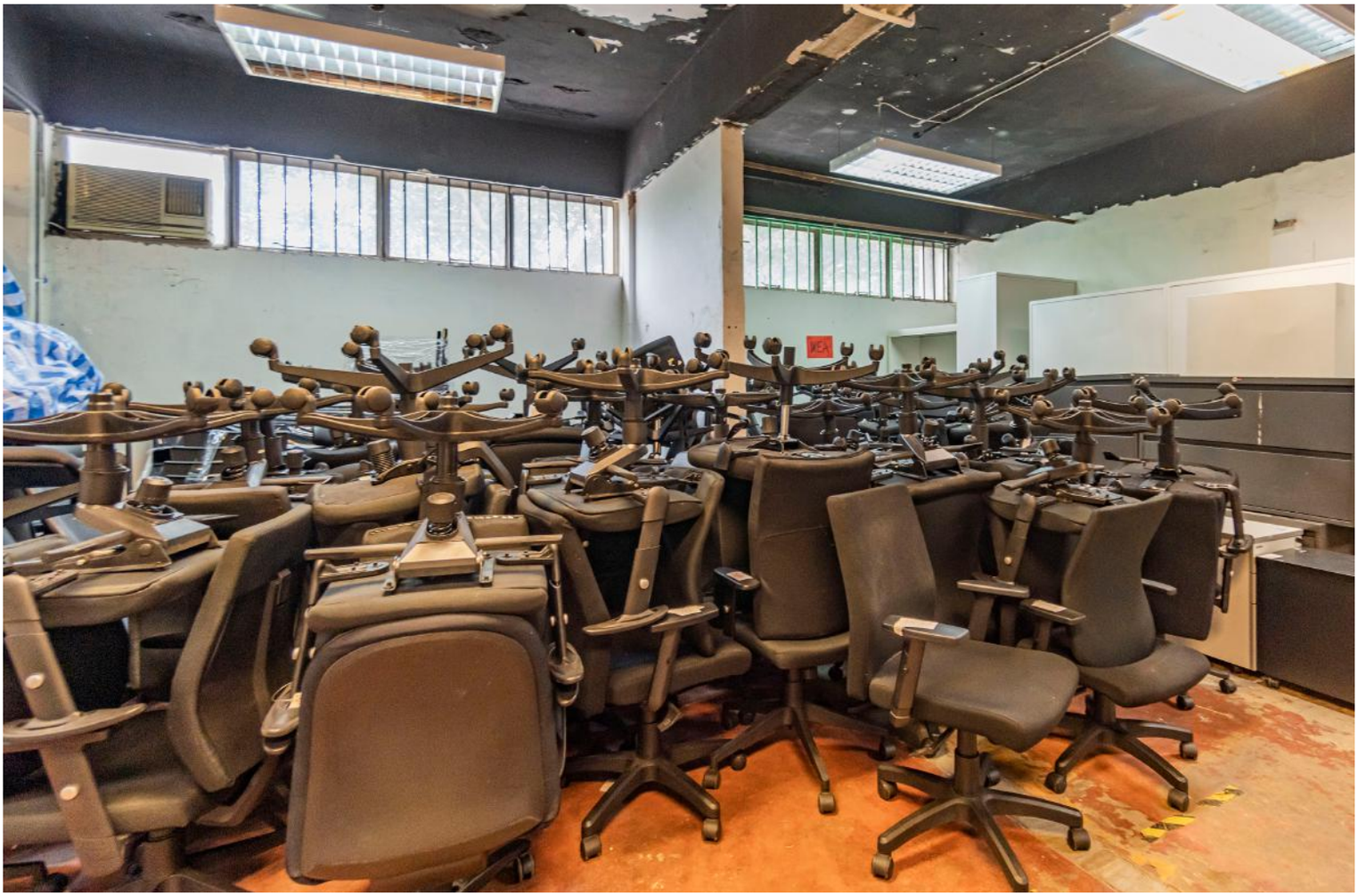
THE CIRCULARITY IN OFFICE FURNITURE GAP

To curb global warming, many nations and organisations have set "net zero" targets – but the majority have come under fire as insufficient, where actions are not matching up to the talk. While it is naturally difficult to navigate new, unchartered waters, however, walking the talk and demonstrating tangible, transparent results is undoubtedly a must. So, how will organisations address these targets and meet climate goals? This will vary by industry, but circularity in office furniture is a crucial aspect, for it is responsible for around 10 percent of the building's overall environmental impacts.

By embracing circularity, organisations can stand to benefit by reducing their carbon footprint, and waste reduction, and contribute to a more sustainable future. Firstly, circular practices in office furniture minimise the need for new production and resource extraction by extending the lifespan of office furniture through refurbishment, repair, and reuse. Organisations can significantly reduce their carbon footprint associated with furniture production, minimise demand for these finite resources and prevent unnecessary waste generation. All in all, it reduces the overall environmental impact of office furniture and supports the goal of a zero-waste economy.

Embracing circular practices in office furniture is not only environmentally responsible but also offers economic and social opportunities and benefits for businesses and society as a whole. Let us not lose focus on the bigger picture: driving positive impact must be everyone's priorities, in this critical moment for our planet and human nature.





FROM IDEA TO ACTION

In just 2.5 years, Sustainable Office Solutions (SOS) has implemented over 150 projects – both locally and regionally, ranging from large multinationals to local SME's and start-ups, below are some highlights:

SOS worked closely with a fellow SGBC Member to sustainably clear out their office furniture across Singapore. As a strong supporter from the very beginning, our beliefs were closely aligned in that the environmental and social benefits of the programme made it an easy decision for them to move forward with. In 2023 alone, SOS helped this organisation sustainably manage 4,868 items, which resulted in 179,415 kgCO2e of emissions avoided and diverted 129.22 tonnes of materials from the incineration plant.

Additionally, the charitable and community donation arm of the SOS business is a unique, meaningful focus for both businesses. For this particular project, 396 furniture items and/or appliances were redistributed, delivered and donated to seven different charitable organisations in need. As recipients of 'good-as-new' furniture and equipment, these organisations effectively saved budget that could then be used and put to better use.

Overall, these case studies demonstrate that Sustainable Office Solutions' initiatives have delivered meaningful outcomes. Furthermore, the adoption of these sustainable practices has led to cost savings, reduced energy consumption, and minimised environmental impacts, aligning with the organisation's commitment to sustainability and creating a positive impact on both the users and the wider community.

Article contributed by
Lim Shu Xin
Sustainable Office Solutions (SOS)


LEVELED
PUZZLES


ADINE

CULTIVATING CHANGE: HOW VERTICAL FARMING IS ELEVATING SUSTAINABILITY IN URBAN SINGAPORE

In a time of heightened environmental consciousness, shifting regulatory policies and urban complexities, the importance of sustainable practices within the built environment has never been more real.

Cultivating Change: How Vertical Farming is Elevating Sustainability in Urban Singapore

Grobrix farms @ C&W Services
Photo: C&W Services

Urban farming, and more specifically vertical farming, is an innovative approach to agriculture which is increasingly relevant to Singapore. The city-state, with limited land for traditional agriculture (less than 1 percent), has embraced the concept of growing crops vertically within controlled environments, which plays a crucial role not only in improving food security, but also paves the way towards environmental resilience. Vertical farming has the potential to address critical concerns like food transportation, freshness, and waste, helping to enhance sustainability within Singapore's urban setting.

REDUCING FOOD MILES: A TRANSITION TOWARDS LOCALISED AGRICULTURE

Traditional agricultural models often involve long-distance transportation, which result in increased carbon emissions. Vertical farming minimises these transportation costs and emissions by localising food production. According to a benchmarking study conducted by Grobrix, up to 2,500 KG CO2e of emissions can be avoided in a year just by using a low maintenance vertical farming system, instead of flying the same produce all the way to Singapore from Australia.

In Singapore, where over 90 percent of food is imported, the potential for reducing food miles becomes a critical consideration in reshaping urban agricultural practices. The country's commitment to achieve net-zero emissions by 2050, as per the goals of the Paris Agreement, aligns with the inherent advantages of vertical farming in mitigating the environmental impact associated with traditional food supply chains.

The integration of vertical farming into urban spaces also addresses the challenges posed by limited agricultural land. Singapore's land constraints make traditional farming impractical on a large scale. Vertical farming, by utilising vertical space, allows for increased food production without the need for vast expanses of land. This not only helps to address the growing demand for fresh produce, but also optimises land use in densely populated urban areas.

Beyond Singapore, vertical farming is also gaining traction as an industry trend globally. Businesses are recognising that vertical farming not only brings positive carbon benefits, they are also supporting a more resilient and adaptable food supply system. These attributes combined make it easier for corporations to meet green building certification criteria, which evaluate workplaces on their environmental impact and performance.

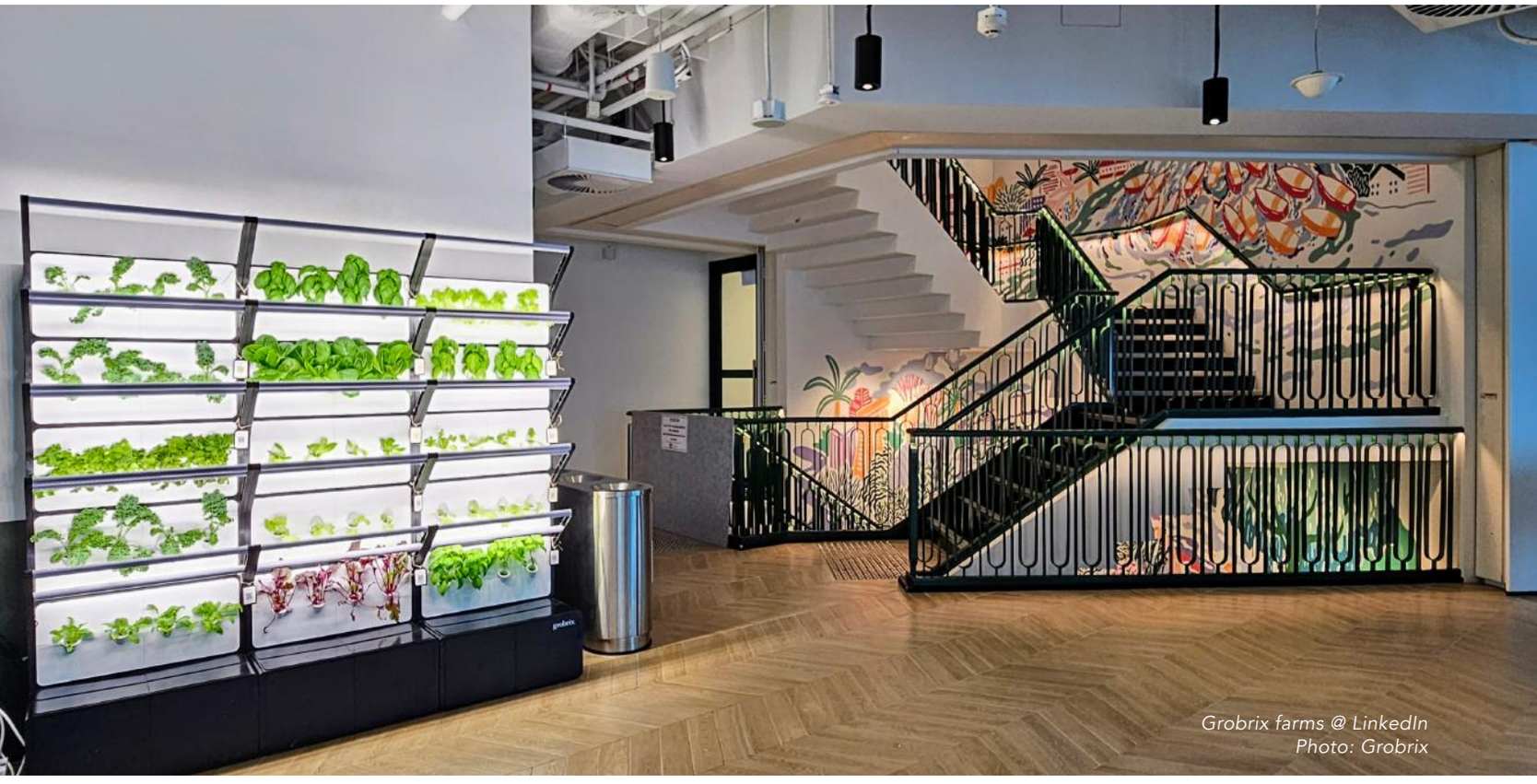
Overall, the shift towards shorter supply chains is becoming a hallmark of sustainability in the agricultural sector, and Singapore's focus on adopting such practices positions it at the forefront of this global trend. The adoption of advanced technologies in vertical farming can also further enhance its sustainability impact. Machine learning, automated systems, precision agriculture, and controlled environments all contribute to optimising resource utilisation, further helping to reduce the environmental footprint of food production.

LESSONS FROM THE URBAN FARM FOR THE CONCRETE JUNGLE

For a growing number of businesses in Singapore and across the world, the focus on social and environmental accountability has driven them to explore innovative sustainability practices. Urban farming, previously overlooked, is bringing back agriculture into the city through corporations, offering fresh produce and valuable lessons for corporate sustainability.

Urban farming has the potential to spark active employee participation, providing a model for businesses to elevate their CSR efforts and foster a socially responsible corporate culture. Initiatives like cultivation and harvesting days, together with co-workers, can improve team bonding and sustainability education.

Companies like City Developments Limited (CDL), C&W Services, LinkedIn, Standard Chartered and Maxeon Solar Technologies, for instance, have worked with Grobrix to incorporate edible vertical gardens in their offices.



Grobrix farms @ LinkedIn
Photo: Grobrix

Cultivating Change: How Vertical Farming is Elevating Sustainability in Urban Singapore

Grobrix farms @ M Moser Associates
Photo: Grobrix

"Since its first introduction as an innovation showcase at Singapore Sustainability Academy in 2021, we have witnessed Grobrix's growth and its positive impact across our properties. Grobrix has evolved into a powerful community engagement enabler at our corporate office at Republic Plaza, fostering meaningful social interaction among our employees. Beyond the office space, we've integrated Grobrix into Studio M Hotel to bring about farm-to-table concepts in our hospitality space, enrich guest experiences and align with our sustainability goals," shared Mr. Lim Ke-Vin, Head of Group Innovation at CDL.

Award-winning international workplace designers, M Moser Associates who make architecture centred around people is another great example, partnering Grobrix in its journey to shape the new world of hybrid working.

Simon Paddison, Design Director, International at M Moser Associates, shared "We're in the business of transforming workspaces. We have been integrating Grobrix's urban farming concept into our designs to foster wellness and collaboration. Understanding the psychology of biophilia within our spaces, the addition of edible urban farms adds a new twist, connecting in diverse ways - educationally, nutritionally, and environmentally. This collaboration empowers us to create innovative workplaces that inspire creativity, innovation, and employee well-being, redefining the future of work".

Employees can enjoy the convenience of harvesting fresh herbs and nutritious greens directly from the office walls, while appreciating the aesthetics of a beautiful green space. Recognising the potential in design engineering, Grobrix in particular has developed a patented modular edible green wall - enabling its corporate partners to blend ornamental greenery with the functionalities of modern controlled environment agriculture.

"At Maxeon Solar Technologies, we believe in not just talking about wellness, but actively enabling it. By providing access to nutritious food through Grobrix's farms, we're empowering our employees to prioritise their well-being and push the boundaries of what's possible. We've always been early adopters, whether it's in solar technology or in fostering a healthy workplace culture. After just over 6 months, we have noticed increased employee connection during office harvest days, opportunities to interact and meet different team members, and fostering discussions about recipe ideas using the produce we grow," shared Rachael Fitzpatrick, Senior Human Resources Business Partner at Maxeon Solar Technologies.

Rachael Fitzpatrick, Senior Human Resources Business Partner, Maxeon Solar Technologies with fresh produce from the Grobrix farm
Photo: Maxeon Solar Technologies

Beyond embedding more sustainable practices within their own operations, food and retail businesses are also starting to incorporate vertical farming into their business models. Wholefoods store Little Farms, for instance, features Grobrix's vertical farm produce in their selection, as they continue to expand and seek innovative ways to deliver fresh produce for customers. Bringing its farm-to-table commitment to life, W Sentosa hotel and Marina Bay Sands are also working with Grobrix to grow and cultivate their own ingredients right within their premises.

THE ROLE OF PROXIMITY IN ENABLING FRESH PRODUCE AND REDUCING WASTE

Vertical farming is playing an important role in enhancing the quality and diversity of food available to consumers, especially as urban dwellers increasingly seek healthier, locally-sourced food options. This shift towards fresher and more nutrient-rich options is not only a trend but a fundamental change in consumer behaviour, driven by a growing awareness of the benefits associated with freshly harvested food. Bringing farms closer to urban spaces ensures better-tasting and more nutritious produce.

Cultivating Change: How Vertical Farming is Elevating Sustainability in Urban Singapore

Grobrix wall @ Little Farms
Photo: Grobrix

The spatial proximity of urban farms, especially in vertical farming setups, also plays a pivotal role in minimising food waste. In traditional agriculture, a significant portion of food can get lost during transportation and processing. According to a study by the Singapore Environment Council, it found that an estimated 342 thousand tonnes of food is lost from farm to market within Singapore. For the locally-produced food within Singapore, more than five thousand tonnes of food are lost at production, and close to two thousand tonnes of food are lost during post-harvest handling and storage. Vertical farming models may directly connect producers with consumers, reducing waste by providing a more direct and efficient distribution channel.

Singapore's emphasis on reducing food waste, as highlighted by the National Environment Agency's estimation that 40 percent of food waste is generated in the commercial and industrial sectors, underscores the potential impact of localised farming in reshaping waste reduction strategies. Vertical farming aligns with the country's efforts to address food waste at its source, promoting a more sustainable and circular approach to food production and consumption.

Addressing food waste is a global challenge, and Singapore's initiatives in this regard contribute to a broader movement aimed at creating more sustainable and efficient food systems. The role of vertical farming in this context is not only a local solution but also a blueprint for other urban centres grappling with similar issues.

EMBRACING VERTICAL FARMING FOR SUSTAINABLE URBAN ECOSYSTEMS

The adoption of vertical farming continues to emerge as a transformative trend shaping Singapore's built environment. As the country continues to champion sustainability initiatives, such as the Singapore Green Plan 2030, the relevance of vertical farming will only become more apparent.

Understanding and embracing these trends can pave the way for a greener, healthier, and more sustainable future — one that prioritises environmental responsibility in the face of evolving global challenges. The convergence of technology, sustainability, and urban planning in vertical farming positions it as a cornerstone in the construction of a resilient and ecologically responsible urban ecosystem.

As we witness the impact of vertical farming on urban sustainability, it prompts us to redefine the relationship between urban environments and agriculture. Vertical farming is not just a solution; it is a manifestation of a collective desire for a more sustainable and harmonious coexistence between urban spaces and the natural world.

Article contributed by
Mathew Howe
Founder
Grobrix

Grobrix walls @ W Sentosa
Photo: Grobrix

DATA-DRIVEN DIGITAL TRANSFORMATION FOR GREEN AND SUSTAINABLE BUILDINGS

Find out how UnaBiz partnered with StorHub to achieve green certification for the largest portfolio of self-storage facilities in Singapore

StorHub's Headquarters at 615 Toa Payoh - Credit: StorHub

THE DEMAND FOR GREEN BUILDING IS ON THE RISE

In recent years, there has been an increase in demand for green buildings due to growing awareness of environmental issues, regulations promoting sustainability, cost savings from energy efficiency, and the desire for healthier indoor environments. This surge in demand underscores a global shift towards the integration of Internet of Things (IoT) technologies for enhanced efficiency and sustainability practices.

Embracing the global trend, StorHub began its journey to certify the company's portfolio of properties throughout the region, including Australia, Greater China, Japan, South Korea, and Malaysia. As Singapore's premier and largest self-storage operator managing 18 facilities that operate around the clock throughout the year, partnered with GreenA Consultants and UnaBiz to achieve green certification for its portfolio in Singapore.

Relying on UnaBiz's expertise in digitalisation and IoT, a connected ecosystem was created to collects precise electrical and water consumption data and indoor air quality (IAQ) metrics through several connected products in all StorHub's 18 properties in Singapore. These include Milesight's LoRaWAN Certified 9-in-1 indoor indoor air quality (IAQ) sensors, Socomec's B10 Diris B electrical meter, and Norika's Multi Jet Dry Dial Smart Water Meter with Modbus RTU Output (Class B).

AN INCREASED ATTENTION TO INDOOR AIR QUALITY

The pandemic has raised consumer awareness of indoor air quality to one of the highest levels today. Today, having instantaneous and accurate air quality data is crucial, due to the amount of time people spend indoors. Substandard indoor air quality can have adverse effects on the health, comfort and productivity of building occupants. Consequently, investing in indoor air monitoring system has become essential for ensuring a safe and pleasant environment in commercial settings.

StorHub deployed a Milesight IAQ 9-in-1 sensor at the reception area of each of their 18 facilities. The reception area, with one of the highest human traffic flows, contributes to inconsistent air quality. The sensor is a comprehensive IAQ monitoring solution that integrates nine types of sensors to measure various ambience conditions including CO2 concentration, temperature, humidity, light, HCHO/o3 level, TVOC, barometric pressure, PM2.5, PM10 and motion. This energy-efficient sensor is designed for real-time monitoring and collecting reliable IAQ data 24/7.

The sensor is equipped with a Smart Screen Mode designed for energy conservation. When the Passive Infrared (PIR) value indicates vacancy (0) for a continuous duration of 20 minutes, the screen intelligently ceases updating to conserve power, ensuring an efficient and eco-friendly operation. To ensure reliable communication, the sensor supports data retransmission, even in situations where the network experiences occasional downtimes.

Built on the LoRaWAN® technology, the sensor offers a remarkable data transmission range. With penetrating signals, it achieves up to two kilometres in range in urban areas and 15 kilometres in rural areas, ensuring connectivity even in challenging environments. Furthermore, it is also highly compatible, adhering to standard LoRaWAN® gateways and network servers. This compatibility enhances its adaptability to diverse network infrastructures, providing seamless integration into existing systems and futureproofing deployments of similar nature in other countries as Storhub scales up its sustainability efforts in other regions.

With these sensors in place, Storhub receives data of its premises' indoor air quality throughout the day and is able to regulate the air ventilation systems accordingly to ensure optimal indoor air quality.

ENERGY AND WATER-EFFICIENCY EFFORTS ARE NECESSARY TO MITIGATE UTILITY PRICE HIKES

With the recent utility price hike, the operating cost of businesses has increased and profit margins squeezed. Businesses are motivated to accelerate their adoption of sustainable practices to mitigate the impact and enhance their environmental credentials.

StorHub installed electrical and water meters across their facilities to assess their utility usage. The data collected enables StorHub to analyse their consumption pattern and hence facilitating informed measures to more effectively manage usage.

The DIRIS B model is a multi-function power monitoring device that monitors the remote measuring points. It has four RJ12 independent current inputs and they provide a quick, easy and reliable connection and avoid wiring errors. The automatic product addressing and set-up (communication address, load type, sensor type and ratio) simplify implementation and saves time.

The four RJ12 independent current inputs of the device allow it to manage different types and number of circuits too. The versatile DIRIS B is connected to current sensors that are suitable for all types of installation.

For water metering, StorHub made use of a smart water meter with the MODBUS RTU (Remote Terminal Unit) communication protocol, allowing precise water meter readings to be collected remotely. The device is easy to install and use.

Installation of Socomec electrical meter at StorHub

Installation of Norika water meter at StorHub

THE FUTURE OF SUSTAINABILITY REPORTING

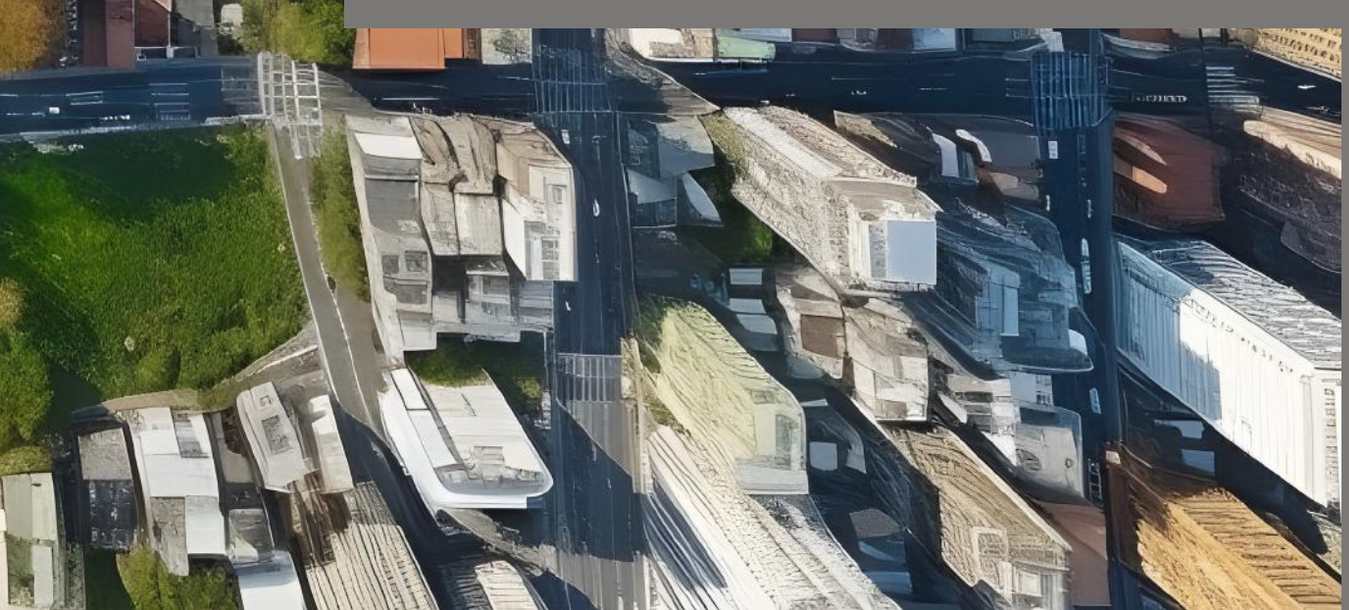
To-date, StorHub has successfully fulfilled the stringent certification criteria of the Arc Skoru sustainability performance platform, through the implementation of diverse sustainable practices with the expert advice of SGBC Member GreenA Consultants who brought in expertise on the various green building certification programmes.

Executing the project in two phases through a wireless retrofit solution, StorHub achieved swift installation turnaround times without the need for a costly infrastructure overhaul. The utility consumption data and environmental data is then seamlessly fed into Arc Skoru performance platform, a sustainability reporting tool. With meticulous planning, StorHub has managed to reduce their energy consumption by 10 percent off the baseline numbers.

The success of this project has set the benchmark for Storhub's green certification in Singapore and is paving the way for other StorHub's facilities in the region.

UNDERSTANDING DISTRICT COOLING SYSTEMS

Find out how district cooling networks can be the backbone of better and more sustainable cities.



Understanding District Cooling Systems

As global warming and urbanisation continue, the demand for air conditioning is expected to increase three-fold by 2050, when 70 percent of the global population is anticipated to be living in cities. Cities will have a crucial role to play in the much-needed energy revolution with 50 percent of carbon dioxide (CO^2) emissions expected to be produced in urban areas alone. Renewable energy and modern district cooling networks are among the most efficient and cost-effective ways to reduce the carbon footprint of densely-populated areas like city centres and industrial parks.

SGBC Member ENGIE aims to help cities address their urgent decarbonisation challenges. As the world's leader in cooling networks, ENGIE operates more than 400 district heating and cooling systems globally. These systems currently have close to 1.3 million refrigeration tons (RT) of installed capacity. In Southeast Asia alone, ENGIE operates two district cooling systems (DCS) with a combined installed capacity of 46,000 RT in Malaysia and Philippines, with two new DCS plants under development in Singapore (in collaboration with JTC and the Singapore Institute of Technology (SIT) that will together have an installed capacity of 30,000 RT. These two new DCS will be commissioned in 2024, bringing ENGIE's total installed capacity in Southeast Asia to 76,000 RT with many more similar developments planned within the region. Over the past 30 years, the company has honed its technological expertise in energy efficiency, renewables, and waste-to-energy solutions, and takes pride in designing, financing, building and operating highly efficient district cooling networks.

As part of its strong commitment towards the development of district cooling networks in the region, ENGIE inked a Memorandum of Understanding (MoU) with the Singapore Institute of Technology (SIT), to jointly develop a district cooling centre of excellence in Singapore in 2022. The ENGIE-SIT District Cooling Centre of Excellence will catalyse innovation in cooling solutions in Singapore and create a test-bed for the development and pilot deployment of advanced district cooling solutions.

Cultivating a district cooling ecosystem

KEY METRICS

30 year
contract duration

22,000 RT
Target capacity

3,700 tonnes
CO2 avoided annually

30%
energy consumption reduction

4km
chilled water network

jtc

KEY METRICS

30 year
contract duration

7,800 RT
Target capacity

1,960 tonnes
CO2 avoided annually

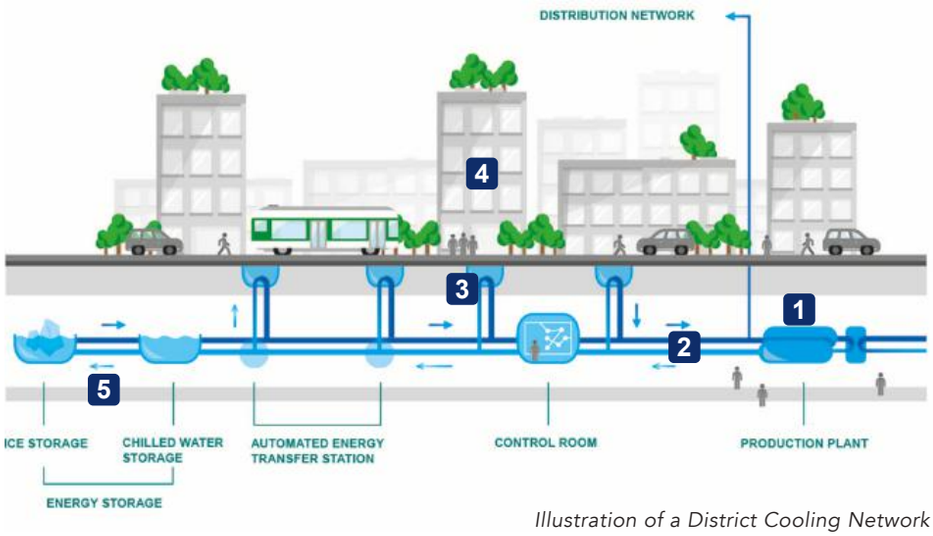
30%
energy consumption reduction

1km network
covering 253,000 sqm

SIT Singapore Institute of Technology

While DCS are poised to play a critical role in sustainably cooling Singapore and the broader region, they are not the only method for reducing the energy consumption and CO2 emissions of escalating cooling needs. In addition to district level cooling networks like DCS, there are also decentralised onsite cooling networks. While a DCS is a centralised system that provides chilled water to supply an air conditioning system, a decentralised system has multiple cooling plants, all located in dispersed facilities that feed into it to enable efficient, environmentally-friendly cooling.

In practice, a DCS includes chilled water production and distribution facilities that provide cooling services to all connected buildings as depicted in the figure below. Operating as a closed circuit, the cooling network always includes two pipelines: one supplying chilled water to users, and the other returning the "warmer" water to the production plants. Reflecting a perfect balance between industrial and operational performance, DCS integrate advanced digital technologies and solutions to manage their networks to ensure both demand side and supply side are running optimally. Further adjustments can be made to improve system efficiencies by deploying technologies such as thermal energy storage and free cooling.



1. **Central chilled water plant produces chilled water**
2. **Which is supplied to the building via pipeline**
3. **Connecting to the building at a transfer station**
4. **Chilled water will be circulated in the buildings, business as usual**
5. **ENGIE can deploy the latest technologies such as storage or free cooling to further improve efficiency**

Illustration of a District Cooling Network

DCS have the following benefits as compared to a traditional, standalone, decentralised onsite cooling system:

- **Lower total cost of ownership:** from savings in operational and maintenance costs resulting from a reduction in the installed base, due to consolidation of cooling capacities.
- **Space savings:** achieved through the consolidation of cooling capacities and eliminating the need of buildings to install their own chillers. Rooftop space savings could be used to deploy onsite rooftop solar solutions to increase the onsite production of renewable energy, which helps meet cities' growing electricity demands in a sustainable manner.
- **Space monetisation:** opportunities arising from the freeing up of space that can now be leased out.
- **Higher system efficiencies:** achieved through economies of scale.
- **High supply availability and improved reliability:** of centralised cooling plant can be achieved though thermal energy storage systems.
- **Reduced CO_2 footprint:** achieved through better energy efficiencies and refrigerant usage reduction.
- **Environmental benefits:** gained through reduced usage of chemicals and water.

It is important to note that ENGIE has been focusing efforts on digitalising production assets and have created an in-house tool, Network Energy Modelling and Optimization (NEMO), with the aim to help operators continually adapt and adjust cooling production in line with distribution to minimise thermal losses based on local factors, weather conditions, equipment availability, price signals and green ambitions. Even with this proprietary technology and domain expertise in the sustainable cooling space, ENGIE continuously invests in innovation to keep improving with a focus on energy efficiency and CO2 abatement.

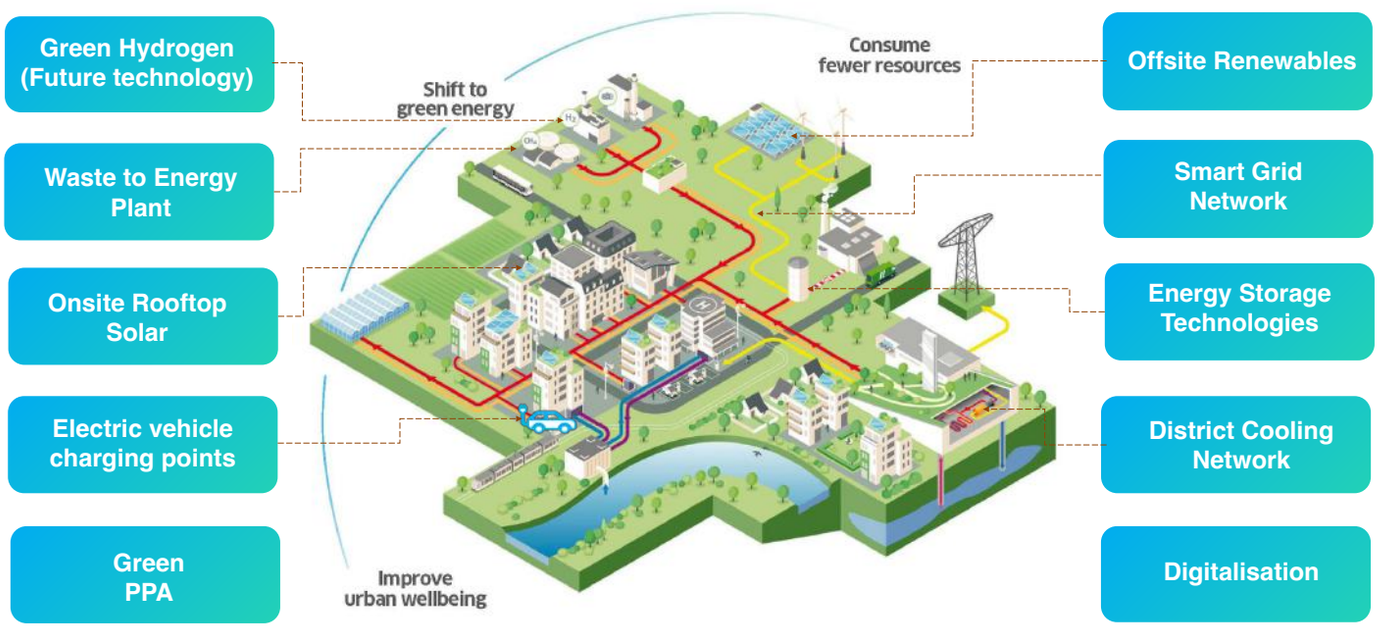
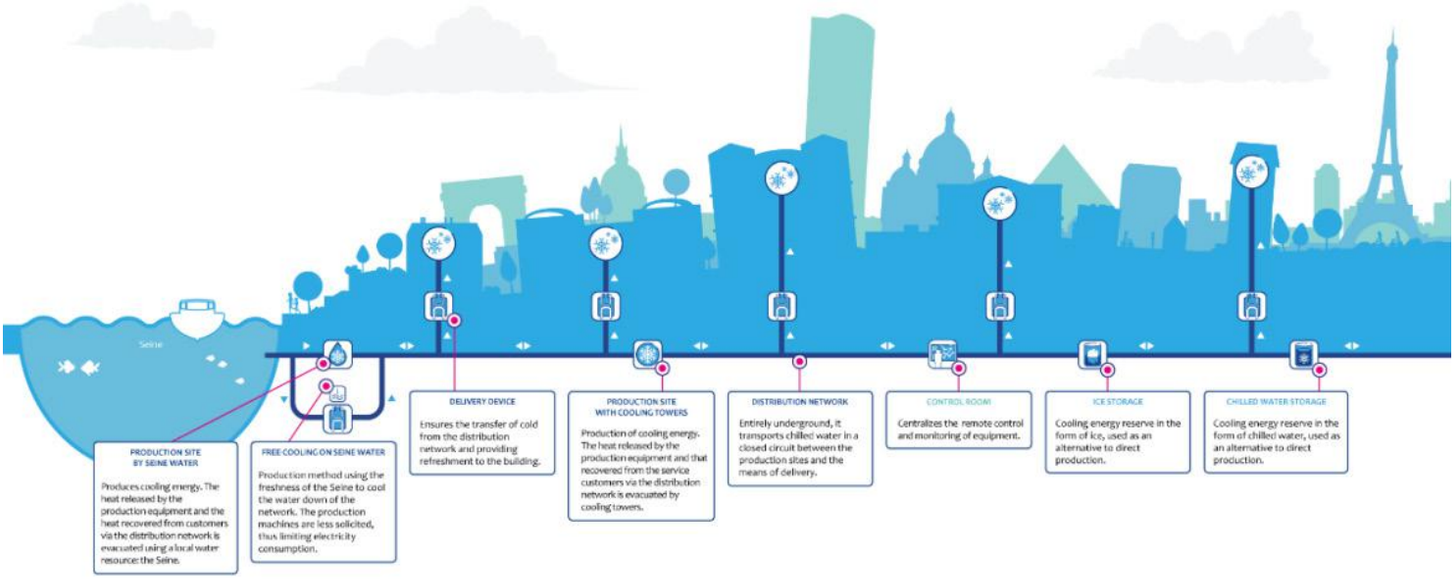


Illustration of ENGIE's District Level Integrated Energy Solutions



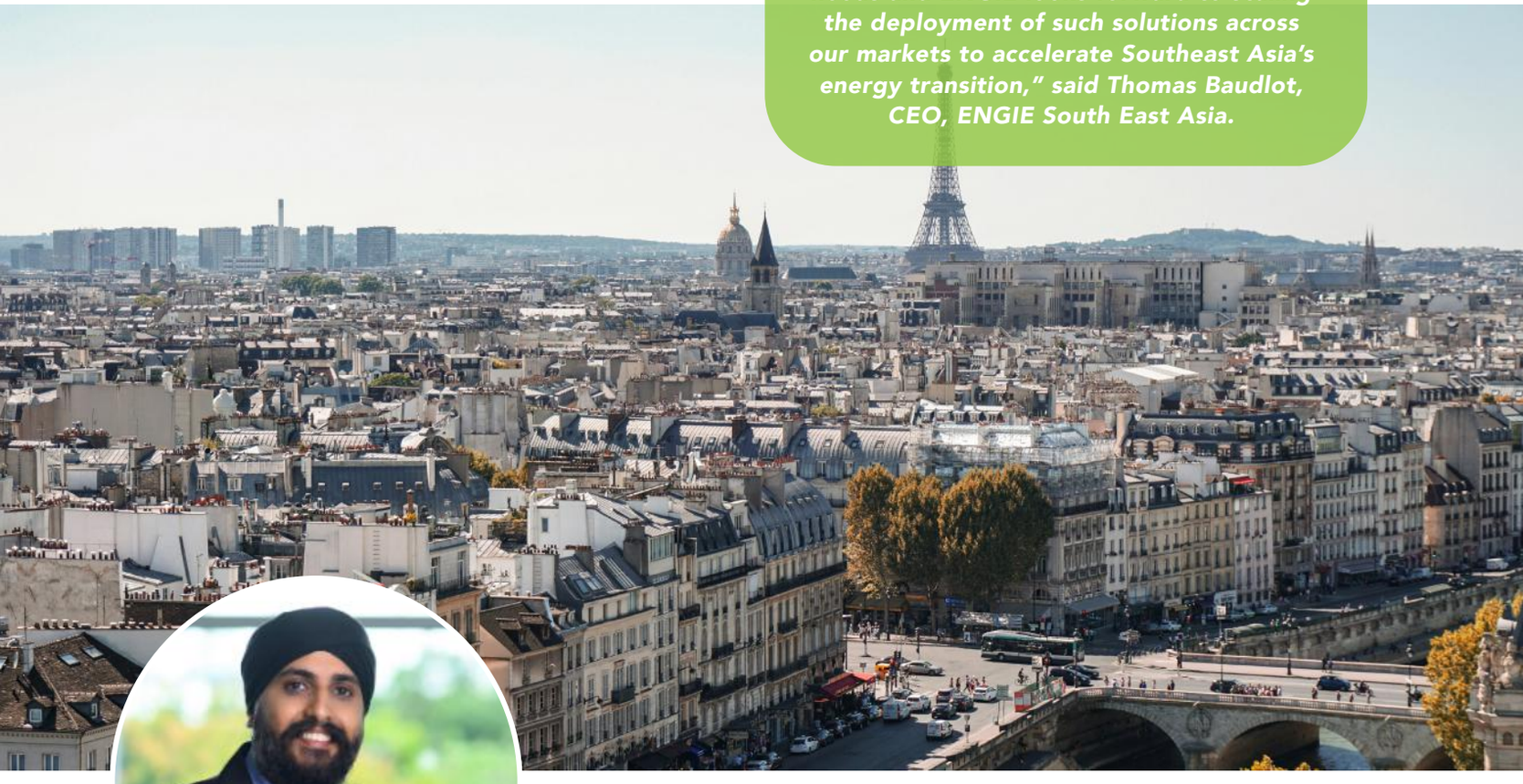
The Case Study of Fraîcheur de Paris – A Carbon Neutral District Cooling Plant and Europe's Largest Cooling Network

Fraîcheur de Paris is a jointly owned company by ENGIE and RATP and was newly appointed as the district cooling operator for Paris in 2022. This concession will cover the production, storage, transport and distribution of Paris' cooling energy for a period of 20 years and superseded the previous contract, which had been in effect since 1991 with CLIMESPACE (a wholly-owned ENGIE subsidiary). Being the largest cooling network in Europe, Fraîcheur de Paris meets the cooling needs of hotels, department stores, offices and museums in the capital, which encompasses 10 production and four storage sites, supplying nearly 400 GWh/year of cooling to more than 730 buildings via 90 kilometres of networks. It is expected to triple in size over the next 20 years with the addition of 20 new production plants and 10 storage facilities bringing the total installed capacity from 269 MW to 553 MW.

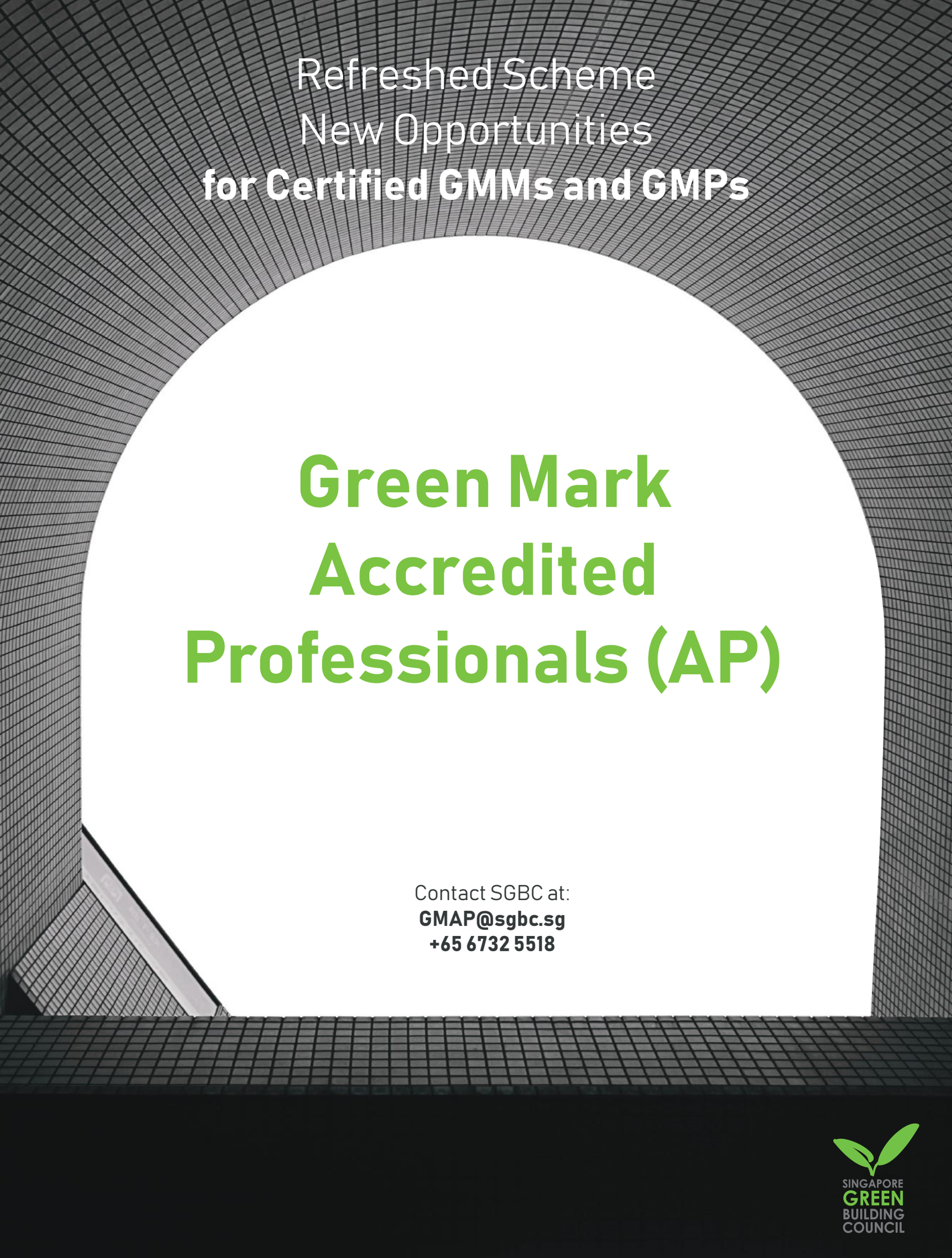
This cooling network has been running on 100 percent renewable electricity since 2013 and has been carbon-neutral since 2018, and with the expansion, will contribute heavily towards Paris' 2050 carbon neutrality targets. Over the 20-year operating contract period, this plant is expected to abate 300,000 tonnes of CO_2 through:

- 100 percent renewable electricity use, where 70 percent will be supplied from four new dedicated solar farms
- A reduction in users' energy consumption of more than 20 percent (compared with a traditional air conditioning solution)
- An improvement in the efficiency of production tools of more than 15 percent through innovative processes that consume less (increased use of water from the river Seine in winter via free cooling) and the use of artificial intelligence
- Use of materials, technologies and coolants that are more environmentally friendly
- Greening of an urban area of 5,000 m^2 (production plants and streets during major construction work)
- 130,000 m3 of water saved each year through reclaiming of seepage water, which will be used in the cooling process

"ENGIE, a global leader in cooling networks with over 400 district energy schemes worldwide, is proud to be supporting Southeast Asia's journey towards carbon neutrality with our district cooling systems (DCS). DCS will play an increasingly critical role in meeting the region's growing cooling needs and ENGIE looks forward to scaling the deployment of such solutions across our markets to accelerate Southeast Asia's energy transition," said Thomas Baudlot, CEO, ENGIE South East Asia.



Article contributed by
Kemal Singh
Head of Business Development,
ENGIE Services Singapore



Refreshed Scheme
New Opportunities
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Green Mark Accredited Professionals (AP)

Contact SGBC at:
GMAP@sgbc.sg
+65 6732 5518

SINGAPORE GREEN BUILDING COUNCIL

SGBC Corporate Membership

For more information, please contact Grace Chua at **grace_chua@sgbc.sg** or **(65) 6797 0898**.

Be part of the Singapore Green Building Council Network

The Singapore Green Building Council (SGBC) enables sustainability across the building and construction value chain, championing capability development and innovative solutions that support industry transformation through Membership, Certification and Outreach. Together with a growing network of Member organisations united by a commitment to green building and sustainability, SGBC drives impactful change to the built environment.

Membership Benefits

SGBC Membership is meaningful, rewarding and aligns organisations with national and international sustainability standards and goals. Being a Member of SGBC positions your organisation on the forefront of green building and sustainability, paving the way for further collaborations with like-minded organisations. Membership also comes with a host of exclusive privileges and benefits:

Marketing Support

- Enjoy exclusive use of SGBC Member logo on corporate collateral and assets
- Boost visibility with organisational listing on the SGBC Members Directory
- Profile solutions and expertise by contributing content to SGBC communication channels such as SGBC Members Bulletin, SG Green Magazine, SGBC Blog and our various social media platforms

Preferential Rates

- Enjoy bulk discount on renewal fees for Green Mark Accredited Professionals
- Gain exclusive access and preferential rates to a wide range of learning & development activities as well as invitations to exclusive networking events

Impactful Partnership

- Collaborate with SGBC to deliver impactful events for the green building community
- Demonstrate leadership and showcase capabilities through SGBC events such as seminars, webinars, courses, conferences and learning journeys
- Gain business intelligence on industry and regulatory developments, and connect with the regional and international green building community and WorldGBC

SGBC Members may select one of the following complimentary **Bespoke Benefits** for each year of Membership:

Marketing

- Quarter (¼) page Sustainability Listing on SG Green Digital Magazine
- One (1) spotlight technical article/ interview feature on SGBC LinkedIn

Learning & Development

- Ten (10) passes for any on-demand courses on SGBC Digital Academy
- One (1) pass for an instructor-led SGBC Course (live)
- Speaking opportunity at one (1) SGBC Webinar