

# SG GREEN



MCI permit number [MCI (P) 030/06/2022]

## WELLNESS IN THE BUILT ENVIRONMENT

INSIDE:

AN INTRODUCTION TO  
THE WELL BUILDING  
STANDARD

Pg 4

REDEFINING  
SUSTAINABILITY IN  
HOSPITALITY

Pg 24





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### 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:



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- Gain business intelligence on industry and regulatory developments, and connect with the regional and international green building community and WorldGBC

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#### Certification

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#### Learning & Development

- Ten (10) passes for any on-demand courses on SGBC Digital Academy
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# SGG GREEN

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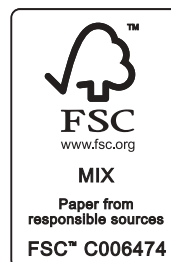
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# CONTENTS



AN INTRODUCTION TO THE WELL BUILDING STANDARD

Pg 4



SUPPORTING WORKPLACE WELLBEING THROUGH DYSON TECHNOLOGY

Pg 10



PHOENIX FROM THE FLAMES

Pg 18



REDEFINING SUSTAINABILITY IN HOSPITALITY

Pg 24



DESIGNING HOLISTIC AND HEALTHY WORKPLACES POWERED BY GREEN TECHNOLOGY

Pg 30



PUTTING SUSTAINABILITY IN THE BANK

Pg 36



CULTIVATING GREEN HEARTS IN THE NEXT GENERATION

Pg 42



CREATING THE SUSTAINABLE WORKPLACE OF CHOICE

Pg 48



REFRIGERANT RECOVERY FOR A GREENER BUILT ENVIRONMENT

Pg 54



BUILDING FROM SUSTAINABLE PRODUCTS

Pg 58



# MESSAGE FROM THE EDITORIAL TEAM

Sustainable development has become a global priority in almost all economies, brought on by increasingly dire weather phenomenon affecting more people than ever before along with a growing emphasis on healthier spaces spurred by the impact of the COVID-19 pandemic. Sustainability and health need not operate on separate tracks, they can be cohesively entwined to produce high performance structures which are both green and healthy. As we spend more than 90 percent of our time within buildings on average, designing for health and wellness is increasingly important.

In fact, health and wellbeing guidelines exist in many green building rating tools, such as Green Mark 2021 (GM:2021), the latest version of Singapore's national green building rating tool. Alongside energy performance, Health & Wellbeing is one of five sustainability outcomes in the GM:2021 standard, allowing green building projects to shape the design, construction, operation and retrofit of buildings that facilitate mental, physical, and social wellbeing of their occupants.

Under the Health & Wellbeing badge, projects that are certified under the WELL Building Standard will receive recognition and some exemption, leveraging the WELL standard's evidence-based roadmap to assess exemplary performance in building health and wellbeing. Since 2014, WELL

has been transforming buildings and organisations in ways that advance health and wellbeing to help people thrive. With the rise in focus on social sustainability as well as health, the WELL standard has been consistently updated to meet industry standards, evolving in its application, scalability and scope.

In this issue of SG Green, read about the latest updates to the WELL building standard, such as on WELL "ratings", programmes that comprise a subset of WELL features but focused on specific areas or strategies. Some of the building project showcases in this issue are also WELL-certified, providing insight into what actually makes a building, well, WELL. Other articles in this issue will also paint a picture on how the different segments of the built environment are approaching sustainability, utilising innovation and technology to drive their own green journeys.

We hope that the content covered in this issue will provide you with some ideas and perhaps even some impetus to incorporate more aspects of health and wellness in the built environment.

Yours Sincerely,  
**SG Green Editorial Team**



# AN INTRODUCTION TO THE WELL BUILDING STANDARD

The role buildings play in human health and well being has never been more evident or important on the back of a global pandemic. Thanks to an evolving evidence base, we now understand more about the relationship between the physical environment and human health. Over time, we have learned to create spaces that enhance – rather than hinder – health and well being. We can now measure – and then improve – the quality of our air, water and light. We can design environments that fuel our bodies, move us, keep us connected, inspire our best work and facilitate a good night’s sleep. We can introduce policies that support people to live their best lives, at work and at home.

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## An Introduction to the WELL Building Standard

With WELL – an evidence-based roadmap for supporting the health and well-being of your people and your organisation – as the vehicle, the International WELL Building Institute (IWBI) helps translate what we know into what we practice. Since 2014, the organisation has been on a mission to transform buildings and organizations in ways that advance health and well-being to help people thrive.

IWBI has channeled what has been learnt into an accessible and adaptable rating system, which continues to be anchored by the latest scientific research and industry best practices and serves as the foundation upon which the entire WELL ecosystem is built. The WELL movement has achieved success because it stands on the shoulders of giants - the green building movement, which over the past three decades has created a market that did not previously exist and has continued to demonstrate the value of green buildings through the likes of Green Mark, LEED and others.

WELL applies the science of how physical and social environments impact human health, well being and performance. The standard consists of a set of policy, operations and design strategies that are focused on how organisations can put health at the centre of decision-making for businesses.

IWBI has been setting the standard for what health leadership looks like for over a decade. Today we're at the centre of a global demand surge for WELL - with 2,000 plus companies, including over 100 of the Fortune 500 adopting the leading global standard as an evidence-based roadmap for scaling health across their organisation.

Like Green Mark, WELL offers an independently verified Certification founded on the following principles:

- **Equitable:** Aims to benefit a variety of people, including and especially disadvantaged or vulnerable populations.
- **Global:** Proposes interventions that are feasible, achievable and relevant across many applications throughout the world.
- **Evidence-based:** Draws upon a diverse and rigorous body of research across varying disciplines, validated by a collaborative body of experts, including IWBI advisors.
- **Technically robust:** Defines industry best practice and validates strategies through performance verification and a rigorous third-party verification process.
- **Customer-focused:** Sponsors the success of WELL users through dedicated coaching services, dynamic resources and an intuitive platform for navigating the journey.
- **Resilient:** Keeps pace with advances in research, science, technology and society, continuously improving by integrating new findings.

### THE EVOLUTION OF WELL

Given the rise in focus on social sustainability and especially health and well-being, IWBI consistently updates the WELL Building Standard (WELL Standard) to meet industry needs. The evolution of WELL has been most evident in three key areas: (1) its application; (2) its scalability; and (3) its scope.

In terms of application, IWBI has introduced WELL "ratings," programs that comprise a subset of WELL features from the WELL Building Standard but are focused on specific areas or strategies. The WELL Health-Safety Rating for Facility Operations and Management, for example, includes 23 features, of which 15 must be achieved for award. The WELL Health-Safety Rating is an evidence-based, third-party verified rating for all new and existing building and facility types focusing on operational policies, maintenance protocols, stakeholder engagement and emergency plans. The Rating can help guide users in preparing their spaces for re-entry in a post-pandemic environment, instilling confidence in places for occupants and the broader community. Other ratings include the WELL Performance Rating (designed for leveraging building performance and occupant experience data to shift business performance and organisational culture) and the forthcoming WELL Equity Rating.

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## An Introduction to the WELL Building Standard

WELL has moved from a single-asset Certification tool to a framework that can be applied to entire portfolios or organisations. “This is a game-changer”, according to Jack Noonan, IWBI’s Vice President in charge of the Asia Pacific market - as “organisations are able to scale their efforts and have a more significant impact on their greatest asset - their people. We’re seeing all types of organisations use WELL as a roadmap, not just property owners and developers, but the likes of Resorts World Sentosa, Standard Chartered Bank, The Executive Centre, and many more”.

By using WELL at scale, an “organisation can achieve a WELL score” which increases over time

as the organisation realises more WELL goals over time, providing constant opportunities to benchmark, track and improve progress over time against industry peers. The Ratings explained above were designed with scalability in mind. These efforts have resulted in significant cost efficiencies for organisations, too.

It is important to note that whilst WELL is being scaled and geared toward entire organistaions or portfolios, individual assets are still able to pursue and achieve WELL Certification, the ultimate demonstration of health leadership in the built environment.

## Apply WELL at scale

### Subscribers gain access to all that WELL has to offer with

- ✓ Unlimited certifications & ratings
- ✓ Enhanced ESG reporting & analytics
- ✓ Co-marketing & occupant engagement
- ✓ Concierge technical support
- ✓ WELL Score to benchmark human & social capital performance



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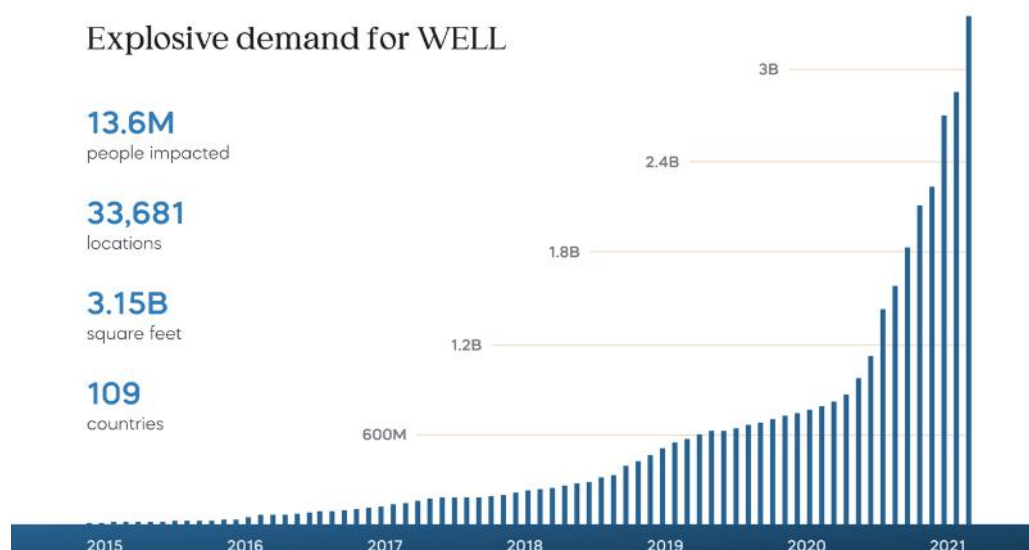
In terms of scope, the framework has expanded to address societal issues facing organisations today, from supporting victims of domestic violence, to mental health education, to providing family or new parent support. Every organisation is unique, which is why WELL offers a flexible and customisable framework to meet the unique needs and goals of every organisation. Whether that is advancing a strategic diversity, equity and inclusion solution or enhancing your climate and sustainability strategy.

### THE METEORIC RISE OF WELL

Over the past decade, IWBI has expanded and scaled its impact over time - applying people-first strategies beyond buildings and into organisations, communities - embedding health into the fabric of how we operate societally - in our companies, homes, and even the neighborhoods or districts where we spend our time. This has resulted in significant growth and adoption.

***“There are many reasons for this growth”, Jack notes. “ESG has enhanced the focus of investors on key social metrics. We’ve experienced a global pandemic that raised the awareness on health and well-being and its impact on businesses. But perhaps most importantly, organisations have realized that their greatest asset - their people - are vulnerable to external factors. Human capital management is the biggest risk facing every organisation, and this is reflected in the rise of WELL as an effective tool to manage it”.***

Another key driver for WELL, particularly relevant for the Singapore market being a financial capital of Asia, is its value in the GRESB assessment. In Oceania, for instance, approximately 80 percent of recognised Sector Leaders are engaged in a WELL programme. This 80 percent is even more notable when compared against the 15 percent of WELL users that aren’t Sector Leaders. In Asia, findings were similar: around 45 percent of Sector Leaders use WELL, whereas only 10 percent of non-Sector Leaders used WELL.



The exponential growth of the global WELL adoption as of August, 2022. The number of people impacted is based on building occupancy. (Source: International WELL Building Institute)

This raises the question: How and why does including WELL in an ESG strategy support, and even enhance, a GRESB score?

Firstly, GRESB recognises the WELL Building Standard as a Tier 1 certification (as is Green Mark), meaning its use warrants a weighting of 1.0 in the GRESB assessment. The use of the Health-Safety Rating, on the other hand, is recognised at Tier 2, which carries 0.6 weighting. In addition, the WELL framework closely aligns with the GRESB survey.

Secondly, a WELL crosswalk against the 2022 GRESB survey showed an alignment of approximately 40 percent between the two frameworks, indicating their complementary nature. The value proposition here is straightforward: WELL includes a series of interventions that, if pursued, can be used as evidence in the GRESB survey. An analysis into the Sector Leaders' WELL strategy / scorecard shows that they are maximising this level of alignment.

Finally, the WELL Building Standard can be used across all components of the assessment (Management, Performance and Development) and thus across both assessments benchmarks: Standing Investments and Development. Funds that include both standing assets and development assets

can apply just the one rating tool, which is not only valuable but efficient. Given WELL's focus on organisations, this contributes too.

### WHAT'S NEXT FOR APAC AND WELL?

***"The future of WELL is exciting", says Jack Noonan, Vice President of Asia Pacific. "Over the past 18 months, we've experienced exceptional growth in our region. We've seen global leadership coming from our region, too, with multinationals such as Standard Chartered Bank and MSD enrolling all their assets in a WELL programme, thus inspiring their counterparts in other continents". Mr Noonan sees the APAC region pursuing ratings as an attempt to meet both internal and external expectations. "Investors and shareholders are looking for independently verified strategies to manage risk. Organisations are increasingly using our ratings such as the WELL Health- Safety Rating to provide confidence to staff, or the WELL Equity Rating to communicate their Diversity, Equity and Inclusion performance and attract talent. Our region is well suited to these ratings and the market is catching on. They are being used to understand and manage key risks in the context of ESG".***

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## An Introduction to the WELL Building Standard

Another exciting development Mr Noonan sees is the crosswalk with Green Mark. "In 2021, Green Mark recognised WELL by offering 15 points for developments that achieved WELL Certification, in addition to the Health and Wellbeing Badge. We're in the process of finalising the crosswalk, so that assets that achieve specific Green Mark criteria will get certain features automatically awarded in WELL. We're aiming for this to be released in Q4 2022".

Overall, the growth of WELL is just the beginning. The 380-million square metres of WELL spaces speaks volumes for the importance organisations

are placing on managing health and wellbeing of their workforce. With investors shining a microscope on human capital management, and asking pointed questions on rates of burnout, staff turning or strategies for talent attraction, the tailwinds behind WELL adoption are evidently strong. ✔

**By Devan Valenti**  
**Manager, Asia Pacific**  
**International WELL Building Institute (IWBI)**



*Courtesy of School of Design and Environment and Serie Architects.  
Photography by Rory Gardiner*





# SUPPORTING WORKPLACE WELLBEING THROUGH DYSON TECHNOLOGY

Find out how SGBC Member Dyson has incorporated workplace wellness into the Dyson Global Headquarters at St. James Power Station

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## Supporting Workplace Wellbeing through Dyson Technology

Each Dyson space has its own story and character. Buildings matter because they can affect individuals. Architecture and the spaces people inhabit can have a profound impact on their wellbeing, how they feel, and how they work creatively together.

Globally, Dyson strives to build and engineer spaces that are well-designed – places that are enjoyable and exciting. A place of work should be inspiring – a destination to look forward to at the end of the commute and a place that inspires collaboration. The same goes for Dyson Demo stores too, from New York to Paris to Singapore, which are designed to look like art galleries, inspiring people to visit and get hands-on with Dyson technology.

All around the world we gravitate towards buildings with a story and Dyson's move into its new global headquarters at St James Power Station is no different. The restored 110,000 sq ft. national monuments marks an exciting new chapter in Dyson's continued growth in Singapore and will sit at the centre of its ambitions to enter entirely new fields of research and develop a new generation of high-performing technology products with increasing intelligence.

The national monument has been designed to support the wellbeing of its occupants – harnessing Dyson technologies and careful engineering to promote collaboration and personal performance.

***“Ideas need inspiring spaces to grow – surrounded by passionate people who believe in them. The most fragile concepts, if nurtured, possess the potential to change everything.”***

**James Dyson,  
Engineer and Founder.**

### CONSTANT SUPPLY OF PURIFIED AIR BY DYSON PURIFIERS

To ensure a cleaner, more hygienic working environment, Dyson's machines are in use in our office spaces. Built-in ventilation systems may not have adequate filtration systems, meaning that airborne pollutants are simply being blown around the room. Outdoor pollution brought into



the office space may include nitrogen dioxide (NO<sup>2</sup>) and PM2.5 from traffic and vehicle emissions, while indoor pollutant sources can range from particulates released from printing devices to volatile organic compounds (VOCs) from cleaning products.

In a Dyson Washroom and Air Quality Attitudes Survey, 3 in 4 respondents in Singapore who have a workplace away from home said they were concerned about the air quality within their indoor working environment<sup>1</sup>. As people return to the workplace, general awareness and concerns about air quality within an indoor working environment is higher than before. In fact, 85 percent of respondents said that they believed that air purification was important in the working environment<sup>1</sup>.

Placing Dyson purifiers at strategic locations where people gather to collaborate, such as meeting rooms and pantries, is an intentional decision to improve indoor air quality and ensure a constant supply of purified air in the space. Dyson purifiers are engineered to effectively sense, thoroughly filter and powerfully project:

- **Sensing:** Formaldehyde is a common indoor pollutant and one that is notoriously difficult to sense and capture. Dyson wanted to integrate a sensing and filtration system that could effectively counter this pollutant.
- **Capturing:** In Dyson's latest purifiers, it's not just the filter that meets HEPA H13 standard, but the whole machine. It captures H1N1 virus<sup>2</sup> and 99.95% of particles as small as 0.1 microns<sup>3</sup> such

<sup>1</sup> Dyson Survey conducted in Singapore in July 2021 with 1565 respondents answering this question, aged 18 years-old or above. This is part of a global survey done across 20 countries comprising of 9951 total of respondents answering to this question.

<sup>2</sup> Tested on Influenza A (H1N1) under technical conditions resulting in reduction of airborne virus by 99% (in 28.5m<sup>3</sup> area). Results may vary.

<sup>3</sup> Tested for filtration efficiency at 0.1 microns (EN1822, ISO29463).

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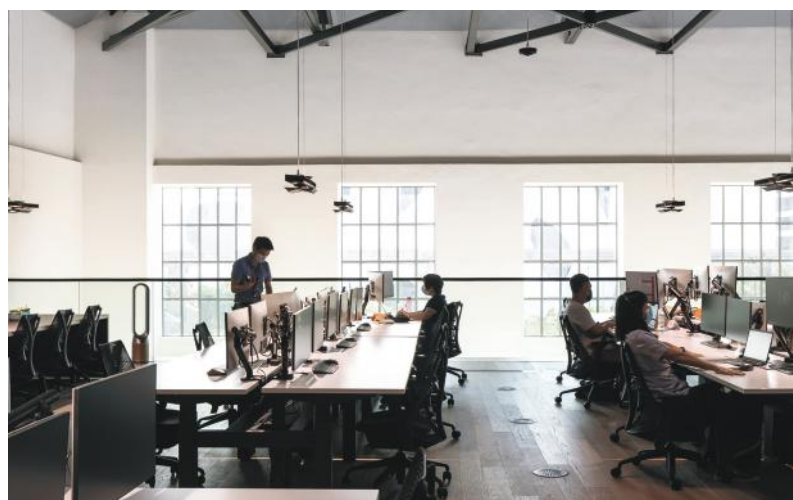
## Supporting Workplace Wellbeing through Dyson Technology

as allergens, bacteria and dust. Dyson engineers took a forensic approach to achieving a fully sealed machine, creating high pressure seals at an additional 24 critical points to prevent dirty air from bypassing the filters and carrying pollutants back into the room.

- **Projecting:** Using Dyson Air Multiplier™ technology, the machine can project purified air to every corner of the room<sup>4</sup>. Auto mode enables the machine to maintain air quality levels, while the machine can be entirely controlled by the Dyson Link App and activated by voice control<sup>5</sup>.
- **Acoustically engineered to be 20% quieter<sup>6</sup>:** Dyson engineers increased efforts to further reduce the sound output of the Dyson Purifier Cool™ Formaldehyde air purifier while maintaining purification performance. Through an iterative design, test, build process managed at the Dyson Malaysia Development Centre's in-house acoustics chamber, the machine was reengineered to be 20% quieter. To achieve this noise reduction, Dyson engineers refined the overall airflow path by widening the aperture (slot in which the air exits the machine) and its geometry was improved. This reduced the amount of friction between the air and surface of the machine, resulting in less sound. Noise was reduced from 64 to 61 decibels at max fan speed.

### IMPROVING WASHROOM HYGIENE WITH HEPA-FILTERED AIR WITH NO SINGLE-USE PAPER WASTE

When creating a hygienic workspace, all shared spaces should be considered, including washrooms. Damp hands can transfer up to 1000 times more bacteria than dry hands<sup>7</sup> and in today's climate, it is vital that hygienic hand washing and drying solutions are available in workspaces to help control the spread of germs.



<sup>4</sup>In maximum setting. Tested for air projection (DTM 801) and purification coverage in a 81m<sup>3</sup> room (TM-003711).

<sup>5</sup>Requires device to run app, Wi-Fi or mobile data, Bluetooth 4.0 support, and iOS version 10 or Android version 5 (or above). Standard data and messaging rates may apply. Voice control requires compatible device.

<sup>6</sup>20% quieter than Dyson's predecessor machine, applies to Dyson Pure Cool and Dyson Pure Cool Formaldehyde only.

<sup>7</sup>Patrick D, Findon G, and Miller T (1997). Residual moisture determines the level of touch-contact-associated bacterial transfer following hand washing. *Epidemiol. Infect.* 119: 319-325

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## Supporting Workplace Wellbeing through Dyson Technology



Office washrooms can be very busy areas with great potential for cross-contamination, particularly where people may not wash their hands thoroughly. Not all hand dryers are touch-free and will require frequent cleaning. Where possible switch to touch-free solutions, such as the Dyson Airblade which dry your hands with HEPA purified air rather than dirty washroom air.

Washrooms in Dyson's global headquarters are equipped with the Dyson Airblade Wash+Dry short hand dryer or the Dyson Airblade 9kJ hand dryer. All Dyson Airblade™ hand dryers are touch-free and have HEPA filters which capture 99.95% of particles<sup>9</sup> as small as 0.1 microns from the washroom air, before it's blown on to hands. This ensures that people are drying their hands with clean air – not dirty air.

A Dyson Global Hygiene Survey<sup>8</sup> revealed that the technologies that continue to drive hygiene concerns with using hand dryers may be more associated with conventional evaporative hand dryers, and could be avoided with an alternative choice of machine. When asked about the biggest concerns when using a hand dryer, 32% globally are still concerned about drying hands with unclean air and 38% worry about having to press physical buttons, just 2 percentage points down compared to last year.

Technology solutions can negate these concerns: the inclusion of air-cleaning filters, a feature that 45% of respondents were reassured by, ensures hands are dried with clean air, and touchless technology, which would reassure 57% of respondents, are both Dyson standards.

***“Door handles, light switches and elevator buttons have become focus points of disinfection, particularly in the current climate,” explains Dr. Salomé Gíao, Senior Scientist at Dyson, “but there are other buttons that can be overlooked.”***



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<sup>8</sup>Global survey conducted in July 2021 across 20 countries worldwide (UK, DE, ES, FR, IT, NL, US, CA, MX, CN, JP, MY, SG, AU, TW, HK, IN, TR, UAE, BE) with 15,100 respondents in total, aged 18 years-old or above.

<sup>9</sup>HEPA filter tested to EN1822-5, by an independent testing laboratory, under prescribed test conditions.

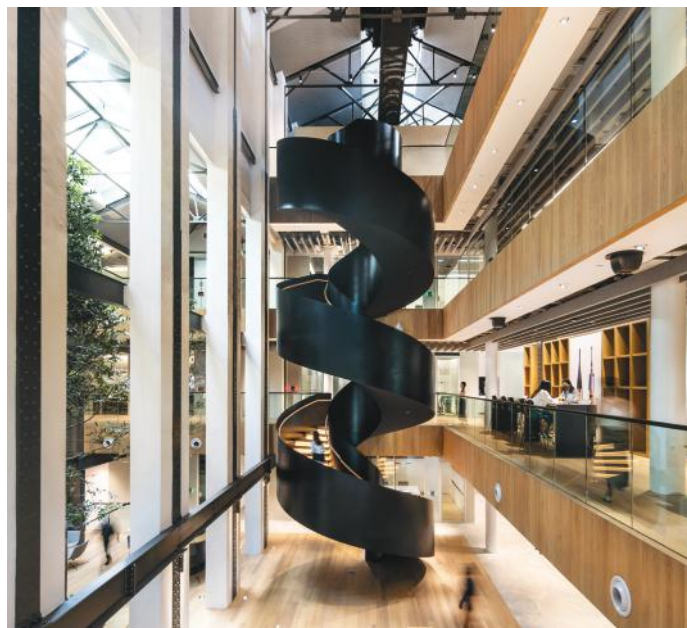


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## Supporting Workplace Wellbeing through Dyson Technology

The Dyson Airblade Wash+Dry hand dryer automatically switches between water and air. With Airblade™ technology in a tap, there is no need for users to move to a separate drying area, so no water is dripped on the floor. The Dyson Airblade Wash+Dry hand dryer also saves space, leaving room for extra toilet cubicles and other facilities.

Powered by a powerful digital motor that spins up to 75,000 times a minute to shift 23 litres of air per second, the Dyson Airblade 9kJ hand dryer helps dry hands quickly in 10 seconds<sup>10</sup>. The Dyson Airblade 9kJ hand dryer is Dyson's fastest and most energy efficient HEPA-filtered hand dryer. It also produces up to 88% less CO<sub>2</sub> than single-use paper towels<sup>11</sup> and costs up to 99% less to run<sup>12</sup>. With a completely unique design and cutting-edge technology, the Dyson Airblade 9kJ hand dryer



enables people to dry their hands quickly and hygienically, while using low energy.

All Dyson Airblade™ hand dryers are awarded 3-tick Excellent, under the Singapore Green Building Product certification scheme. Creating a better environment in washrooms and the world outside.

### MAINTAINING A HYGIENIC, DUST-FREE OFFICE SPACE

In high footfall reception areas and visitor meeting rooms, dust and dirt can build up between scheduled cleans. With cord-free versatility, Dyson V15 detect make it easy to quickly do top-up cleans whenever required.

The Dyson V15 Detect is Dyson's most powerful and intelligent vacuum that has been engineered with 240AW and an illuminated cleaner head to reveal hidden dust on hard floors. Dyson's precisely angled beam integrated into the cleaner head, at 7.2mm off the ground, creates the best contrast between dust and floor and reassures users of a deep clean.



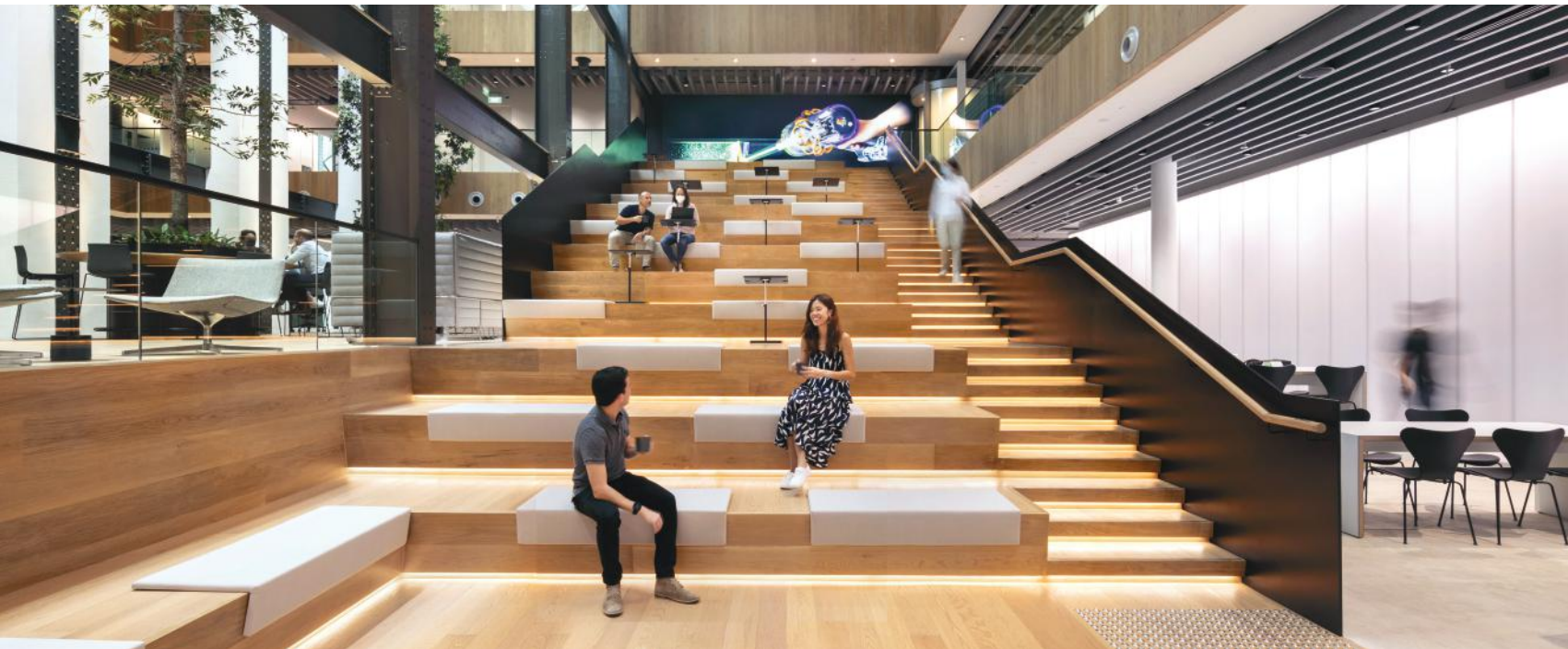
<sup>10</sup>Dry time determined using Dyson test method 769 based on NSF P335 to a measurement of 0.1g residual moisture.

<sup>11</sup>The environmental impact of electrical appliances and paper towels was measured by Carbon Trust. The calculations were produced using the software Footprint Expert Pro, based on product use over 5 years and using weighted averages of individual countries of use. Dry times for product were evaluated using DTM 769.

<sup>12</sup>Average electricity price US\$0.1/kWh as of July 2021. For calculations visit [www.dyson.com.sg/calcs](http://www.dyson.com.sg/calcs)

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## Supporting Workplace Wellbeing through Dyson Technology



An LCD screen shows performance, remaining battery power and maintenance alerts. And with a fully sealed filtration system, 99.99% of particles as small as 0.3 microns are trapped, expelling cleaner air. Dyson's cyclone technology is efficient at separating dust and dirt from floors and surfaces and whole machine sealing means this isn't leaked back into the air.

An acoustic piezo sensor has been integrated into the vacuum. Carbon fibre filaments in the cleaner head pick up microscopic particles which are sized and counted up to 15,000 times a second. The dust enters the vacuum and hits the acoustic piezo sensor within the bin inlet with the tiny vibrations being converted to electrical signals.

The vacuums have been designed so that they automatically increase suction power when they come across a large amount of dust. This happens in auto mode, when the piezo sensor detects high concentrations of dust, and reactive suction power is triggered to automatically increase in power. When dust levels normalise, suction power is reduced to its previous level.

### OPTIMAL ILLUMINATION THROUGHOUT THE DAY TO CREATE A PRODUCTIVE WORKING ENVIRONMENT

We can spend up to 90% of our time indoors<sup>13</sup> and in an office, having adequate levels and the right type of light is critical to creating a productive working environment.

In fact, we have evolved to live and work under daylight's changing brightness and colour temperature, regulated by cycles of day and night. Natural daylight is the gold standard when it comes to providing the right light for your tasks throughout the day. Engineered for versatility and inspired by natural light, the Dyson Dyson Solarcycle™ Morph has unique local daylight tracking and delivers light throughout a room in four different formats – as an indirect, task, feature or ambient light.

Using Dyson's unique Daylight Tracking algorithm and three warm, three cool LEDs, the Dyson Dyson Solarcycle™ Morph continually adjusts its colour temperature and brightness in relation to local daylight, providing the right light for the time of day depending on the user's location.

<sup>13</sup>Klepeis NE, Nelson WC, Ott WR, et al. (2001). The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants. *J Expo Anal Environ Epidemiol*. 11:231-252.

<sup>14</sup>Sheedy JE, Hayes J and Engle J (2003). Is All Asthenopia the Same? *Optometry and Vision Science*. 80 (11): 732-739.

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## Supporting Workplace Wellbeing through Dyson Technology



Whether it is in an office environment or at home, low light, flicker and glare from light sources can cause eye strain<sup>14</sup> and visual fatigue<sup>15</sup>. This can be an uncomfortable sensation for some and the cause of headaches for others. Dyson Solarcycle™ Morph lights are engineered to help reduce eye strain and improve visual performance<sup>3</sup>, placing these at work stations is a deliberate design to support employee eye health.

The Intelligent Optical Head in the Dyson Solarcycle™ Morph produces a uniform distribution of high quality, powerful light, while achieving a low flicker score (<1% at full brightness) thanks to custom drivers and light engines. The Precision mode achieves a colour rendering index of 90 or over (out of 100), displaying colours very close to daylight.

Fluorescent lighting can be inefficient and requires bulb replacements, while LEDs can suffer from overheating, affecting their longevity and brightness. To provide a long-lasting high-quality light, Dyson's heat pipe technology draws heat

away from the LEDs to provide a non-stop, energy-free cooling cycle, maintaining light quality for 60 years<sup>16</sup>.

### SUSTAINABILITY AT ST JAMES POWER STATION

Dyson engineers have always focused on lean engineering: developing long lasting, high performing and efficient products which use fewer resources. This also applies in our spaces; we are committed to reducing waste in our offices and powering as many of our sites as possible with renewable, clean energy.

As far as possible, we choose to restore our office spaces, rather than build new ones. Restoration uses less concrete and, as a result, emits far less CO<sub>2</sub> than building new. 8% of all global CO<sub>2</sub> emissions come from concrete production, with 1 tonne of it being released into the atmosphere for every 1m<sup>3</sup> of concrete. We restored our campus at Hullavington, previously a disused airfield and also restored St James' Power Station into a modern and energy efficient site.

In transforming a former power station into a sustainable global headquarter hub, Dyson has designed St James Power Station to meet the International WELL Building Gold, and Green Mark Platinum standards. St James Power Station was designed to use minimal embodied carbon – harnessing the use of sustainable, recycled and environmentally-friendly materials. This includes features such as carbonneutral flooring and sustainable acoustic engineering.

Bringing this to life in everything from our pioneering technology and the spaces we occupy, sustainability remains at the core of Dyson. Building on our journey so far, we continue to do more with less. ✔

**Article contributed by  
Dyson Singapore**

<sup>15</sup>ISO 8995-1:2002 - Lighting of work places - Part 1: Indoor.

<sup>16</sup>LED-life calculation is based on L70 measurement according to IEC 62717, with an estimation of 8 hours' usage per day. Real-life results may vary.



# PHOENIX FROM THE FLAMES

SGBC Member Pomeroy Studio writes about how a crisis can act as a catalyst for positive change and transform the way our buildings are designed, built and operated.

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## Phoenix From The Flames

Listening to a presentation whilst teaching on a Cambridge Institute for Sustainability Leadership course a while ago jogged my memory of how crisis can act as a catalyst for positive change and greater, broader systems thinking.

A few years ago I researched and presented a TV series called 'Smart Cities' - a series that sent me on a quest to reveal what makes 8 particular global cities 'smart'. My visit to Higashimatsushima in Japan was an eye-opening episode, not least due to the cataclysmic effects of the March 2011 earthquake which triggered a Tsunami and the consequent Fukushima nuclear reactor melt-down. Nothing sharpens the mind than such a crisis, where lives are lost and complete districts decimated.

Out of the flames of Higashimatsushima rose a phoenix in the form of positive environmental and socio-cultural change. The heavy reliance on nuclear energy and the monopoly of large energy corporations was challenged through a people-driven need for greater control of their own lifestyles and choices for how they were able to (quite literally) power them.

This was the catalyst for a re-evaluation of the country's energy generation and the 'power' of those energy corporations: a shift from nuclear predominance to more equitable sources of energy generation that started to promote renewable energy and could be generated / used by the communities as a means of energy self-sustenance in whole or in part.

A bottom-up, people driven 'culture of resilience', born out of the cataclysms of a natural and nuclear disaster, would affect positive environmental and socio-cultural change and influence the broader system: from the creation of micro-grid zero-carbon communities to their eventual influence of greater clean energy use and energy deregulation.

Let's take another crisis as an example. We are all too aware of the cataclysmic effects of the pandemic (and arguably the 'plastic pandemic' of

cartons and disposal utensils that followed from the app-induced deliveries!) and so we partnered with Salad Stop! the first and largest healthy sustainable food chain in Asia to give a new life to those discarded plastics (amongst other things) to create a zero carbon 'SaladStop!' store that also sought to promote healthier eating options. The store will act as a 'living lab' as we monitor carbon performance to thus inform a broader network of stores across Asia and beyond. It will be for public consumption so as to further help influence the broader hospitality system and hopefully become a case study for a well-known hospitality school.

As our zero carbon design guidelines take effect, the intention is to influence the hospitality, food and beverage supply system further through not only SaladStop!'s roll-out of stores across Asia but a very broad collaborative platform across the broader system: from turning the plastics into further structural / non-structural building components; bamboo and coconut husks into plates and cups; through to partnerships with localised super low-energy urban farms and smart delivery companies signing up to more stringent green guides.

It's remarkable to imagine how a conversation around the amount of waste generated by plastic would inspire a group of like-minded individuals to seek to make a difference. The waste plastics have been turned into building tiles, and you will see them in their finished glory here! We can't predict what the future holds but we have a plan; we have the courage of our convictions; an evidence-based approach and, equally importantly, a broad network of 'green-apostolic' collaborators across different sectors and disciplines that will collectively influence the system.

It has been inspiring to observe the people of Higashimatsushima and the SaladStop! zero carbon project team pulling together around a common (green) cause or innovation: an edict not unknown to many of those who pass through the hallowed grounds of Cambridge University or embark on a

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## Phoenix From The Flames

journey at the Cambridge Institute of Sustainability Leadership. I am a graduate of the Cambridge IDBE programme many moons ago and, coming from the built environment industry that is historically adversarial across the design and construction value chains, it was refreshing to be able to get to the root of the word 'contractor': not from a construction sense per se, but from its Latin meaning of 'pulling together' across the value chain to influence the broader (built environment) system and thus help reduce its negative impacts.

Ultimately, a sustainable process, catalysed and accelerated sometimes by crisis, can rise like a phoenix from the flames to deliver more sustainable products and can initiate positive change for the greater good of the human and natural environment.

**By Prof. Jason Pomeroy  
Founding Principal, Pomeroy Studio;  
Pomeroy Academy  
CISL Ambassador (Singapore)**



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## Asia's 1st Net Zero F&B Outlet



### ASIA'S 1ST NET ZERO F&B OUTLET

On 30 June 2022, SaladStop! Group launched Asia's first food & beverage (F&B) outlet to be certified net zero by Unravel Carbon, is part of the Group's commitment to achieving net zero emissions across all new and existing outlets by 2030, directly supporting the Singapore Green Plan 2030.

The net zero SaladStop! outlet is located in CapitaSpring, a Green Mark Platinum building with a host of green building features and innovations that further support the outlet's green credentials. From water-efficient fittings, rainwater harvesting systems, verdant greenery to an energy-efficient air-conditioning system, CapitaSpring is a suitably green building for SaladStop!'s net zero outlet to operate out of.

### SUSTAINABLE STORE DESIGN

SaladStop! worked closely with SGBC Member and certified Environmental Sustainability Design (ESD) Consultant, Pomeroy Studio, to not only design the store's interior and exterior, but also developed a set of net zero guidelines which will serve as a playbook to anchor SaladStop!'s retrofits of all of their outlets towards net zero. These guidelines, which will be tracked and updated regularly, include pointers for selecting construction material, guidance for operating footprint as well as considerations for a sustainable brand identity. Pomeroy Studio is also assisting SaladStop! with the Green Mark certification for the net zero outlet.

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## Asia's 1st Net Zero F&B Outlet



Adding to the sustainable design, SaladStop! used upcycled logs that were turned into furniture, creating tables, shelves, and décor at the store. Recycled plastics were used to make the wall tiles, and a statement green wall was produced with plants that are treated with a plant-based and biodegradable liquid that allows it to go months without watering.

### TOWARDS NET ZERO

A full carbon assessment, done in partnership with Singapore-based firm Unravel Carbon, was undertaken for the outlet to achieve net zero. The objective of the Net Zero store is to achieve maximum reduction in embodied and operational carbon emissions by identifying and employing emission reduction opportunities, from the design and build to the waste, and then compensate for any remaining emissions via high quality offsetting.

According to Unravel Carbon's report, the CapitaSpring store is estimated to have operational emissions of 117 tonnes of CO<sub>2</sub>-e per year, compared to a 126 tonnes of CO<sub>2</sub>-e per year in an older SaladStop! store and 558 tonnes CO<sub>2</sub>-e per year as an average across the F&B industry for a similar sized quick service restaurant. These emissions estimates include all emissions associated with operating the store as well as emissions associated with ingredients, consumables and packaging. Unravel Carbon also calculated the emissions associated with the fitout of the CapitaSpring branch, determining that 6.4 tonnes of CO<sub>2</sub>-e were emitted. Total emissions to construct the branch and for the first year of operations (June 2022 – June 2023) are estimated to be 124 tonnes of CO<sub>2</sub>-e.



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## Asia's 1st Net Zero F&B Outlet



Once all reduction efforts have been exhausted at the store, the emissions are negated through the use of high quality, offsets representing real, permanent emissions reductions. With ongoing emission reports and monitoring processes, SaladStop! will be able to keep track of and improve its net zero efficiency. From its construction to its daily operations, the first Net Zero SaladStop! outlet has been designed to have the least negative impact on the environment as possible.

### EASING INTO SUSTAINABILITY

The SaladStop! outlet also helps consumers to ease into a more sustainable lifestyle. For example, customers can opt in to donate a small amount of all meal proceeds (20 cents) which go towards a mangrove reforestation project in Indonesia. Customers receive one free standard topping if they order a vegan meal or bring their own container. In

partnership with the Muuse lifestyle app, the store also offers a waste-free option for consumers to use eco-friendly reusable containers for takeaway orders. These can be dropped off at any partner café on the Muuse platform.

Similarly, customers get a small discount on beverages for bringing their own containers and pay 10 cents for an FSC-certified paper bag if they require one, with all paper bag fee collections going to the World Wildlife Foundation (WWF).

Further, all food deliveries from the CapitaSpring outlet will be done only on foot or by bicycle through an exclusive partnership with delivery company Deliveroo, ensuring that no carbon is emitted during the delivery process. Food waste is also minimised with an innovative biodigester onsite, which turns leftovers safely into fertiliser and diverts food waste from the landfill.

The net zero store is the first step in SaladStop!'s net zero vision. The company is committed to becoming the first Asian F&B chain to achieve Net Zero capability across all new and existing outlets under its direct management by 2030, beginning with SaladStop! shops aiming for zero emissions by 2025. Any new store or existing stores must be built or renovated to achieve Net Zero, starting with outlets in Singapore.

Adrien Desbaillets, CEO and Co-Founder of SaladStop! Group said, "Opening the first Net Zero store in Southeast Asia is a momentous achievement and I am extremely proud of our team. By evolving our business strategy to include Net Zero, we are transforming our governance and processes, making sure we have the right structures in place to not only monitor progress but make long-term decisions about our future. This new strategy is changing how we allocate capital and build a long-term sustainable brand that consumers love, further propelling our vision to become the first Asian F&B chain to achieve Net Zero across all new and existing outlets." 🍀

**Article contributed by  
SaladStop! Group**



**PARKROYAL COLLECTION**

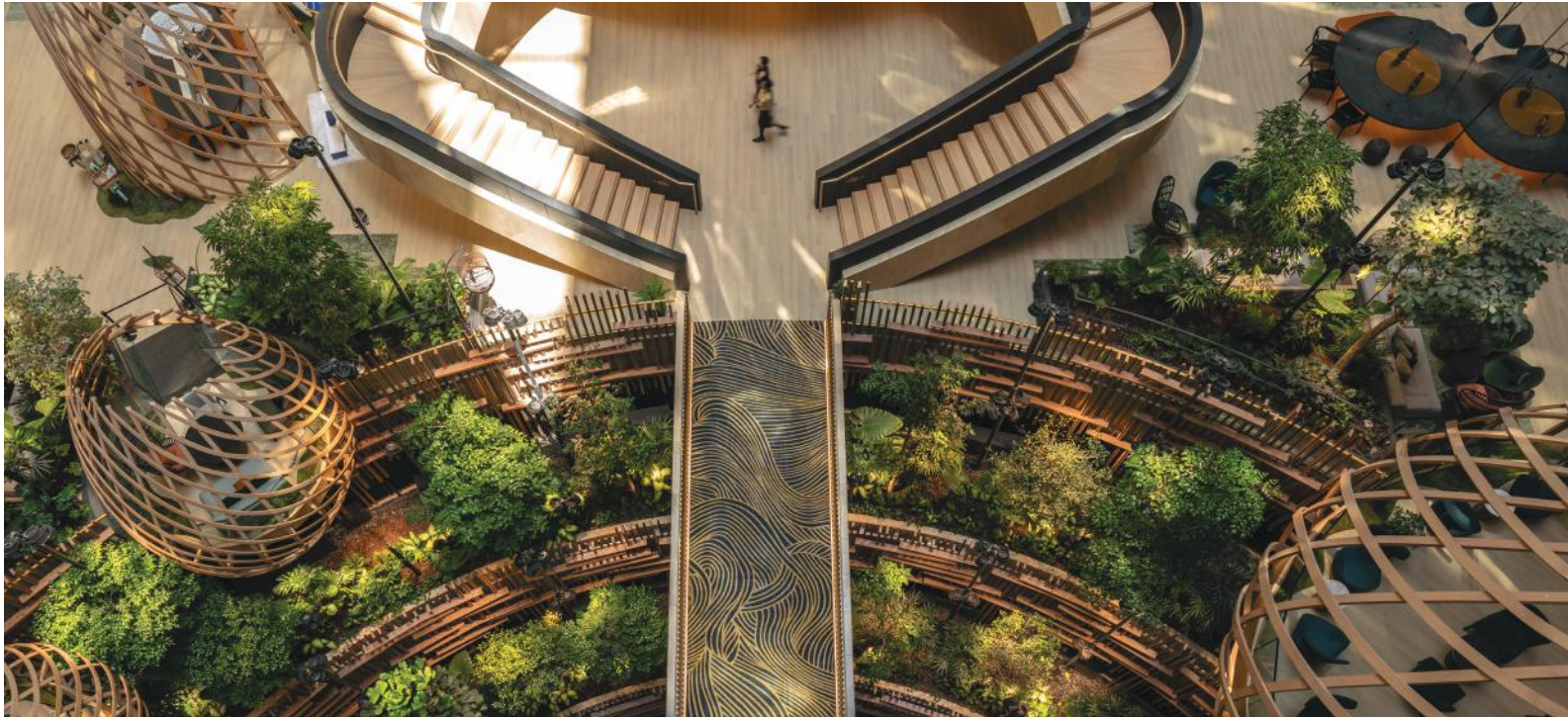
**PARKROYAL COLLECTION**

MARINA COAST



# REDEFINING SUSTAINABILITY IN HOSPITALITY

SGBC Member UOL Group Limited successfully blends hospitality with sustainability through the green building innovations and initiatives at PARKROYAL COLLECTION Marina Bay, Singapore.



Situated in Singapore's downtown core, PARKROYAL COLLECTION Marina Bay, Singapore seamlessly intertwines and weaves together hospitality with innovative and pioneering sustainability initiatives to curate unforgettable guest experiences, while providing sustainable accommodation. As Singapore's "Garden-in-a-Hotel", the building appears nondescript from the exterior, but is actually a timeless architectural masterpiece and a beacon of sustainability and innovation.

Over the past few years, a growing awareness and concerns on climate change have brought about the rise of the socially conscious and sustainability sensible traveller. Consumer surveys have also found that 71 percent of global respondents want to travel more sustainably, in terms of what they do and where they stay. This recognition fuelled and empowered the hotel's commitment to help clients and guests by curating travel journeys with a positive impact, even in their choices of accommodation.

Completed in 1987, PARKROYAL COLLECTION Marina Bay, Singapore chose to undergo rejuvenation in 2020 instead of reconstruction, which resulted in avoidance of 51,300 metric tonnes

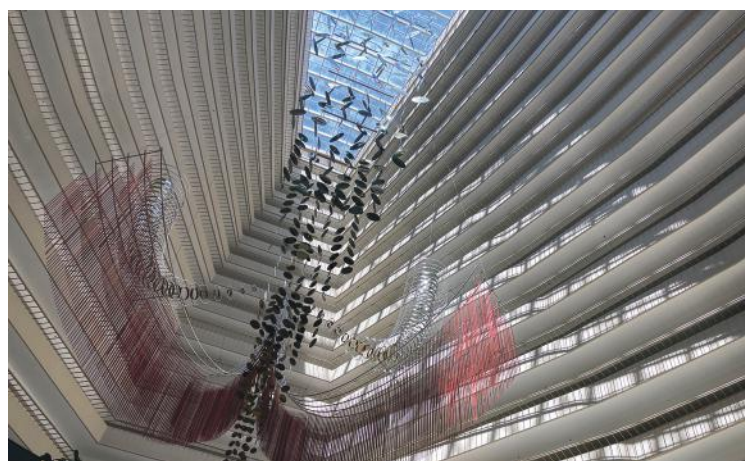
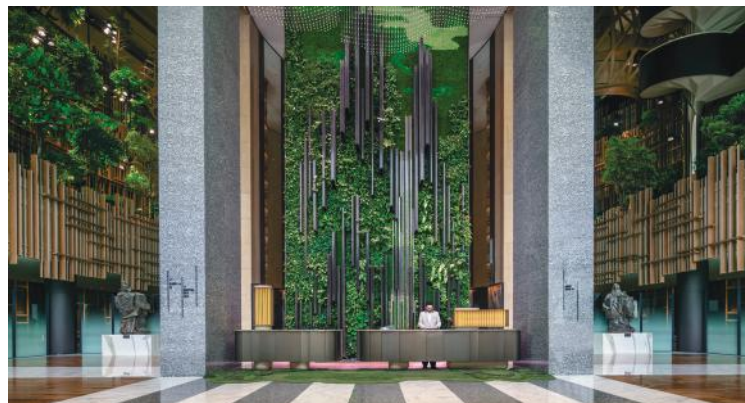
of carbon dioxide – which would have required the planting of 8.7 million trees or 10,000 hectares of forest to offset, an area larger than all of Singapore's nature reserves combined.

Spearheading the hotel's commitment to sustainability is the installation of 210 rooftop solar panels, which generate over 350 kWh of electricity per day. This output is enough to power 540 typical households in Singapore in a month, and the electricity generated supports the hotel's 13 lifts and emergency lightings, reducing the overall electrical consumption by about 1.4 percent. The hotel, itself a building certified to the Building and Construction Authority's Green Mark Gold standard, saves up to S\$21,900 per year on energy consumption and expects to recoup this investment within four and a half years. With the solar panels having an anticipated useful lifespan of 25 to 30 years, the savings generated could be directed to implementing other green innovations, or to benefit the community in future.

The double-glazed glass and the low emissivity of the hotel's iconic Atrium skylight filter natural daylight into the indoor spaces, while reducing ambient temperature by 2°C - equivalent to 2

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## Redefining Sustainability in Hospitality



percent reduction of energy use, as this enables the air-conditioning and chillers to run at a lower fan speed, yet still maintain the same ambient temperature. The hotel has installed motion sensors in all guestrooms and public areas that enable intelligent temperature control and efficient use of energy. These motion sensors power down lights and air conditioning when guests are not present.

Within the building, greenery features prominently, with a 13-metre-tall green wall greeting visitors as they enter the hotel lobby. The wall contains an inbuilt auto-irrigator that brings the wall to life, which teems abundantly with carpet mosses and a variety of plants, interspersed by vertical metal slabs, and crowned by a “floating” cloud of lights. Behind the green wall cladding the rear of the main lift core, visitors ascend in the guest lifts to the Skybridge on level four, where they are greeted by the soaring indoor atrium, one of the biggest in South-East Asia. Flanking the sides are raised stepped planters with lightweight screens bringing the gardens up into the main atrium, where over 2,400 plants, trees, shrubs, and groundcovers drawn from more than 60 varieties of flora are spread across 15,000 square feet of space throughout the hotel, and handpicked for their resilience to indoor

growth and light requirements. This creates the distinct impression of a daytime forest that is both attractive and beneficial, with the plants acting as natural air purifiers and sinks for carbon dioxide as part of the biological carbon cycle, thereby helping to improve air quality and reduce the concentration of carbon dioxide within the hotel building.

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## Redefining Sustainability in Hospitality

In the swimming pool, 1,380 glowing fiber optic lights are used to provide illumination after dusk. These lights consume 13,140Kwh of energy per year, more efficient than standard swimming pool lights which consume approximately 18,000Kwh of energy per year.

The hotel's green features also extend to the guestrooms, but in a way that is seamless and convenient for guests. The in-room IPTV system helps minimise paper use, while creating a more refreshed and clutter-free interior. Guestrooms are designed to minimise resource usage without compromising on the guest experience. For instance, the replacement of all plastic bottles in the guestrooms with glass bottles, and installation of a filtered water system in all guestrooms, which eliminates cradle-to-cradle Greenhouse Gas (GHG) emissions associated with the manufacture, transport and disposal of more than 360,000 single-use plastic bottles per year. In the bathrooms, the installation of low-flow shower heads reduces water flow from 27 litres to nine litres per minute, while disposable miniature bath amenities have been replaced with refillable pump bottles. The

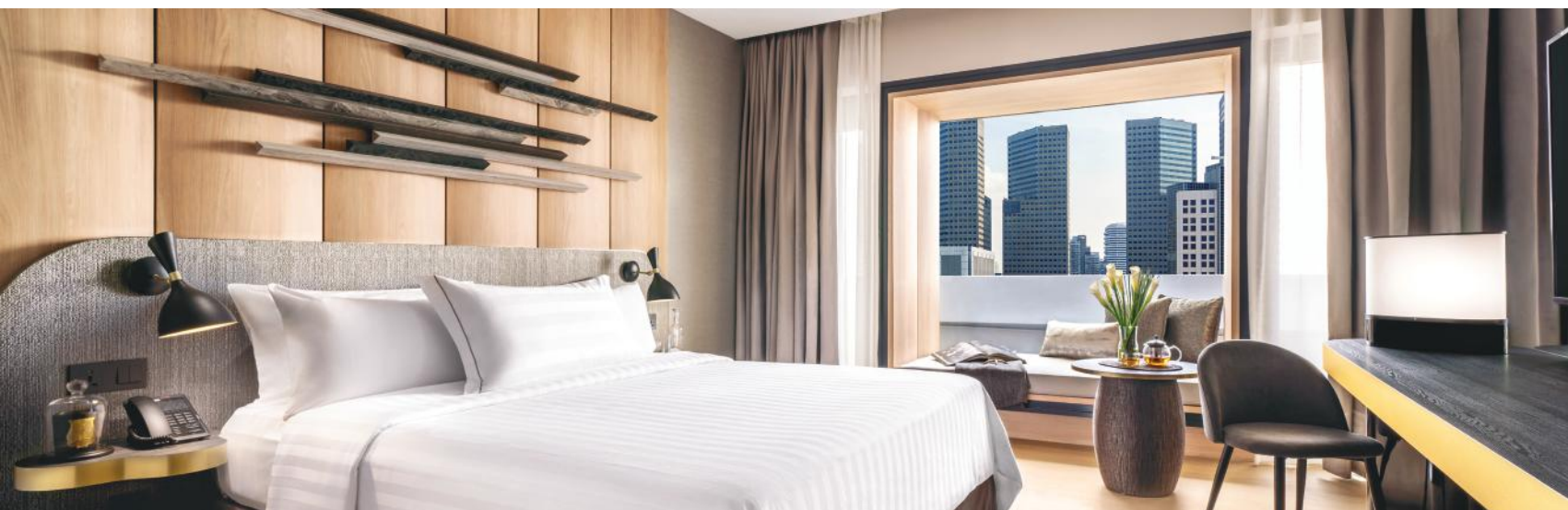
vinyl flooring installed in the guestrooms resemble timber flooring that do not actually contain natural timber elements. This vinyl flooring holds several environmental certifications, including the Singapore Green Building Product (SGBP) certification, Environmental Product Certification and Green Guard Certificate of Compliance.

Singapore imports 90 percent of its food supply, but this is set to change: the country aims to build up local food production to 30 percent by 2030. Among hotels, PARKROYAL COLLECTION Marina Bay, Singapore is one of the pioneers: it is increasing its food resilience and cutting food miles with its 150-square-metre - Urban Farm, one of the largest in the Central Business District. Today, the Urban Farm supplies 20 percent of the hotel's requirements. With over 60 varieties of fruits, vegetables, herbs and edible flowers, the Urban Farm exemplifies the hotel's farm-to-table, farm-to-bar and farm-to-spa concepts, with produce harvested daily for use in the hotel-owned restaurants, bar and spa. The Urban Farm has become a favourite for the chefs and mixologists at the hotel since fruit and vegetables harvested



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## Redefining Sustainability in Hospitality



at peak ripeness are fresher and do not require preservatives, unlike air-flown imports. The Urban Farm is also open to visitors during their stay, adding to their experience. Dishes at the hotel are also planned months in advance, which has helped to reduce food waste by close to 72 percent. The hotel's two energy-efficient food waste digesters use active enzymes to break down food waste in a safe and environmentally-friendly manner into liquid, which is safe for disposal into the waste pipe, while eliminating environmental pollution of groundwater. This year, the hotel is exploring the feasibility of implementing vertical farming using hydroponics to further increase in-house food production.

With its emphasis on sustainability, PARKROYAL COLLECTION Marina Bay, Singapore was accredited in early 2022 with the UNESCO Sustainable Travel Pledge badge by Expedia Group and the Travel Sustainable Badge on Booking.com as a provider of sustainable accommodation. The hotel is committed to not only delivering a memorable accommodation experience that not only cares for the environment but also eases guests into more sustainable practices for their holidays. 🌱

**Article contributed by  
PARKROYAL COLLECTION Marina Bay, Singapore**



**C&W  
SERVICES**

**EXIT** →

Orchard



A modern office interior featuring a staircase with a black metal railing in the foreground. In the background, there is a lounge area with a wooden table, grey chairs, and a large potted plant. The ceiling has a grid of recessed lighting. The overall atmosphere is bright and professional.

# DESIGNING HOLISTIC AND HEALTHY WORKPLACES POWERED BY GREEN TECHNOLOGY

SGBC Founding Member C&W Services' new office employs a rounded approach to employee wellbeing – embodying the firm's sustainable and inclusive ethos for the future of work



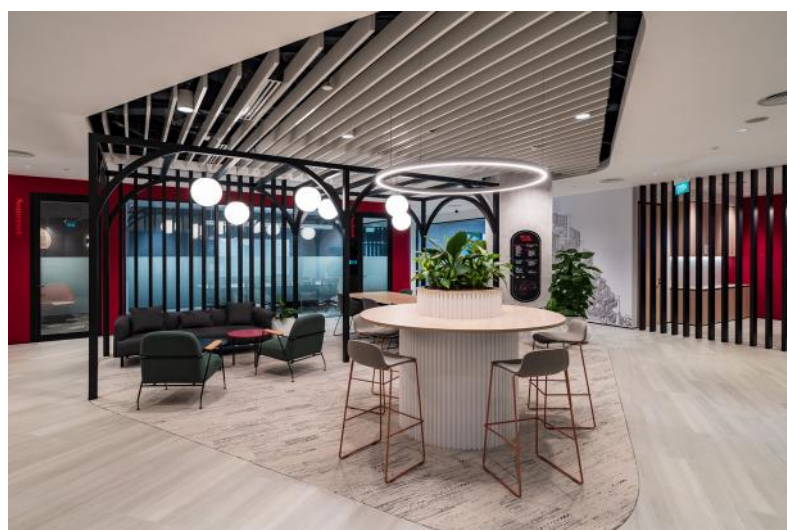
The world is undergoing significant change, and now workplaces – not just the workforce – are racing to adapt to ever-evolving needs and trends. As societies are working towards realising a better and more sustainable future of work, one such trend gaining strong and rightful momentum is employees prioritising their health and wellbeing, even over financial considerations, both at home and at the workplace.

This trend is taking life in Singapore as employers broaden their views on workplace wellbeing, and one such company is C&W Services. Distilling its ethos around workplace sustainability in its new 36,000-square-foot premises in Chai Chee, the integrated facilities services provider recognises that long-term workplace sustainability requires a holistic approach to wellness, impacting both people as well as the environment they work in, powered by green technology and intuitive design.

### LEVERAGING TECHNOLOGY FOR ENVIRONMENTAL SUSTAINABILITY AND EMPLOYEE COMFORT

With climate change entering a critical juncture, organisations have been looking to leverage green technology to reduce their energy footprint. C&W Services, which is currently in the process of securing its Green Mark Platinum accreditation, has already enhanced its energy-saving efforts through maximising natural light with further green building state-of-the-art features:

- Over 270 motion and photocell sensors with machine learning capabilities detect and pick up atmospheric recordings and adjust accordingly. These are 100 percent configurable for each zone, with data analytics monitoring intensity and consumption to optimise usage, and maintaining standards at Singapore code of practice levels.



- The office transforms provided air-conditioning systems over to Variable Air Volume (VAV) systems with air filtering (MERV14). This is to control environmental airflow, temperature, and pressure for better thermal comfort and improved energy saving.
- 11 uHoo Aura air quality monitors ensure air quality is maintained to WELL building standards, emitting minute-by-minute analysis that enables stakeholders to make accurate decisions on addressing ventilation upon trigger notifications (for instance, if there is a high carbon-dioxide level, which impedes cognitive functioning and encourages the spread of viruses).
- A smart toilet system. Based on the Internet of Things (IoT), this comprises sensors and cloud-based applications that monitor cleanliness in real-time through people counting, and an ammonia sensor together with a feedback panel. Cleaners are notified via mobile phone applications if these levels are exceeded, or if feedback is provided.

Through these thoughtful efforts, C&W Services shows it is heeding the environmental call strategically – not only to reduce energy waste and create smart, green and healthy buildings, but also to enable safe and healthy workspaces for employee comfort and wellbeing.



### INNOVATING DIGITALLY TO OPTIMISE EFFICIENCY AND RESOURCES

C&W Services is also driving the adoption of Smart Facilities Management practices and tools, and central to this is remote and real-time monitoring for critical services including energy management, maintenance of M&E equipment and security.

Through the use of IoT sensors and cameras around the office, effectively acting as C&W Services' on-site eyes and ears alerts and other triggers will notify the team of any abnormalities which occur, informing specialists of the need to mobilise engineers and technicians on the ground to conduct inspections.

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## Designing Holistic and Healthy Workplaces Powered by Green Technology

Remote access and ease of use are important features of the employee experience as well. For example, facilities may be booked seamlessly via the Jumpree 3.5 application. This enables the easy reservation of desks and meeting rooms through mobile devices, email, or physical 'walk-up' booking screens. The application also allows employees to raise service requests (such as cleaning after spilling coffee), hence contributing to greater efficiency in housekeeping deployment. There are also video conferencing facilities to connect off-site employees and clients to the office – reducing the need to travel and leaving carbon footprints, whilst still providing workplace connectedness.

To optimise the office's physical space, occupancy sensors have been installed throughout the office, leveraging data analytics to help inform the workplace team and leadership about reallocating resources if, for instance, a specific office area is not being occupied. This improves employee workplace experiences in reducing overcrowding and allows the better identification of spatial needs.

C&W Services has also integrated advanced biometrics, such as facial recognition entry which allows for convenient, keyless office access whilst enhancing security. The office also employs a waste management system that conducts the physical weighing of waste with real-time data. This system encourages and incentivises employees to use alternate sustainable solutions and reduce waste (such as recycling coffee waste via a composting scheme sent daily to a low-carbon, urban vertical farm for organic vegetables).

### PROMOTING HOLISTIC WELLNESS THROUGH DESIGN

C&W Services provides employees with a dynamic, safe and healthy environment to encourage them to perform at their best. This includes having a designated social hub that encourages team interactions and allows the hosting of townhalls, events and celebrations. There is also a 'Chill Room', catering to staff breaks, and employees are given the agency to think of other features to include to contribute to their own workplace wellness.

In further using design to promote sustainability and wellbeing, C&W Services also has two office



pantries stocked with zero-waste and recyclable products, with one including a table tennis table for relaxation and physical activity. A vending machine dispensing subsidised healthy snacks further encourages employees to make healthier lifestyle choices.

With the company committed to transitioning to a hybrid workforce, C&W Services has determined that office time must be spent conscientiously with relationship building, collective idea sharing, training, collaboration and brainstorming. Conducive spaces were thus created, featuring modular furniture, to enable easy reconfiguration to form varying spaces – helping to invoke creative thinking whilst also reducing barriers to interaction and communication.

Together with the social hub, the office recognises office interactions are no longer stereotypically limited to desk or meeting room settings but can take on more social and informal settings.

### EMBRACING DIVERSITY AND INCLUSIVITY

C&W Services recognises that employees work in different ways to perform at their best. Hence, in addition to collaborative areas, the company provides designated 'quiet zones' for more focused work whilst sound-absorbent phone booths provide privacy for confidential calls.

This commitment to employee diversity is further embodied by the provision of a nursing room with a standalone refrigerator for milk storage, a multi-person prayer room with ablution facilities, a first-aid room, as well as separate refrigerators

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## Designing Holistic and Healthy Workplaces Powered by Green Technology



and microwaves for halal and non-halal food. As it is in the process of obtaining the Enabling Mark accreditation, the office has included barrier-free accessibility features such as a ramp for wheelchair users, automatic doors, and 60 power-assisted height-adjustable workstations.

In aesthetically representing diversity efforts, the office also features murals contributed by social enterprise The Art Faculty (a social enterprise by The Autism Society of Singapore) and multi-disciplinary creative platform-studio Mural Lingo. The office also set up a community wall featuring a 6x2-meter artwork of masks decorated by over 600 employees, reflecting personal pandemic experiences and staff mugs as well as lanyards created in collaboration with SG Enable's 'I'm Able' Programme.

The company's belief in inclusion is further reflected in its hosting of the Singapore Chapter of the global employee resource group 'Leading with Education and Awareness of Disabilities' (LEAD). With a mission to support colleagues affected by disability and bolster a more inclusive workplace, the group is headed by Human Resources Executive Mr Maximillian Tan, a three-time Paralympian.

### A BEACON FOR EXPANDING WORKPLACE NOTIONS OF SUSTAINABILITY

With employee wellness now becoming an inalienable component of a healthy society, the future of work must be driven by organisations, especially in actively providing a healthy and positive workplace experience.



Embodying its commitment to its 'people at the core' philosophy, C&W Services' new premises serve as a forerunner and example of a future sustainable workplace. It also expands the notion that sustainability encompasses more than just a green building, thereby demonstrating that long-term workplace sustainability is closely intertwined with the well being of the people working in an environment.

While C&W Services has laid the foundations, the company aspires for its people to multiply their own diversity and inclusion efforts and hopes its new office will serve as an exemplar of a workplace of the future. ✓

**Article contributed by  
C&W Services (S) Pte Ltd**





# PUTTING SUSTAINABILITY IN THE BANK

SGBC Member DBS Bank has opened the nation's first net zero building by a bank, setting the pace for Singapore's corporate sustainability efforts





Building on its commitment to achieve net zero operational carbon emissions by the end of 2022, SGBC Member DBS Bank officially opened its refurbished DBS Newton Green building on 18 July 2022.

A 30-year-old retrofitted building located a stone's throw from Newton MRT station, DBS extended the lifespan of the building and avoided squandering the embodied carbon in the existing structure or generating additional embodied carbon with a new structure. According to the World Green Building Council, embodied carbon accounts for 11 percent of global carbon emissions, and is estimated to constitute up to 40 percent of Singapore's carbon emissions due to shorter building lifespans as a result of urban renewal.

DBS began retrofitting works in the middle of 2021, investing over S\$5 million in the process. A portion of the cost was covered by a grant awarded by the Building and Construction Authority (BCA) under the national Green Buildings Innovation Cluster (GBIC) Programme to support the integration of green innovations throughout the development. DBS Newton Green has since been certified as a Green Mark Platinum (Zero Energy) development in affirmation of the building's net zero credentials and will house over 400 employees from various functions across the bank's Consumer Banking Group.

Before retrofitting works began, the old building consumed about 845,000 kWh each year, equivalent to the annual energy consumption of about 200 four-room Housing & Development Board (HDB)



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## Putting Sustainability in the Bank



flats in Singapore. To achieve net zero outcomes for DBS Newton Green, DBS deployed new technologies and creative design strategies to reduce energy consumption as much as possible while maximising the building's capacity to generate its own renewable energy, reducing its energy consumption by 70 percent.

One innovative design feature is a newly created overhang to expand the amount of rooftop space for solar panels. With this extension, the building is able to house over 1,000 square metres of solar panels. Cavity spaces are incorporated into the overhang's structure to allow for the building's air handling units to be housed externally, allowing previous mechanical space to be covered with solar panels. The overhanging roof also provides



additional shade cover to shield the building from the heat of direct sunlight.

To further enhance the energy generation capability of the rooftop solar panels, bi-facial modules are deployed to harvest sunlight reflecting off the roof surface. This is expected to boost energy production by about 5 percent. Collectively, the rooftop solar panel array could yield around 250,000 kWh annually. Additionally, close to 10 percent of the floor area that was previously air-conditioned have been converted to naturally ventilated spaces that do not need air-conditioning.

DBS Newton Green also possesses a host of innovations and features that contribute to its net zero performance, including:

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## Putting Sustainability in the Bank

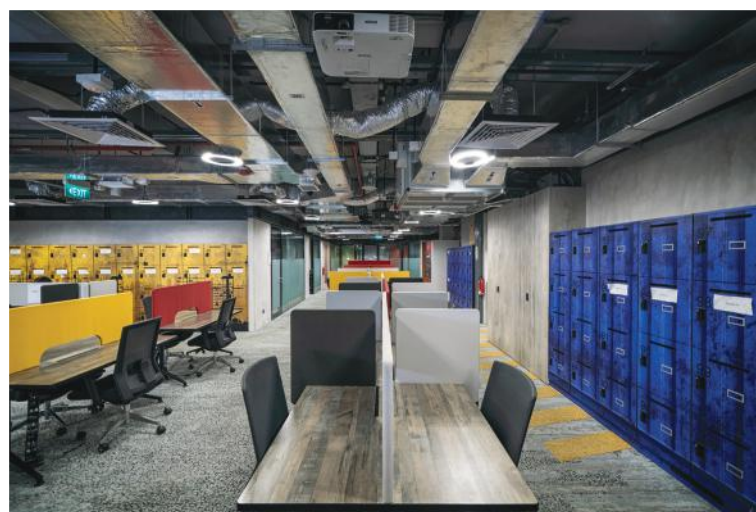


- A slatted façade made from bamboo that serves the dual duty of shading the building while encouraging natural ventilation. Bamboo is a sustainable building material with a carbon footprint lower than that of concrete or steel.
- Intelligent occupancy-based lighting and air-conditioning systems to minimise energy consumption.
- A biophilic exterior with living plants covering more than half of the DBS Newton's perimeter façade to reduce heat gain and to lower the mean radiant temperature through transpiration. DBS selected the plants in collaboration with the Nature Society of Singapore to provide suitable refuge for native butterfly and bird species such as the magpie robin, bulbul and flowerpecker. Additionally, the planted wall is expected to enhance indoor air quality by phytoremediation.
- Low energy appliances such as heat pump water heaters, solar-powered appliances and energy efficient ceiling fans in the lobbies and corridors reduce the building's energy needs.
- Energy recovery ventilators which pre-cool incoming fresh air with previously cooled air, all controlled by carbon dioxide sensors. This ventilation system also features air purging options for fresh air flush outs when necessary.

DBS developed the DBS Newton Green design together with SGBC Member GreenA Consultants – who acted as sustainability consultant – along with architecture house KAIA Architects and mechanical and electrical engineering firm CCA & Partners, all homegrown firms actively involved in Singapore's net zero space.

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## Putting Sustainability in the Bank



Officiating the official opening of DBS Newton Green on 18 July 2022, Mr. Desmond Lee, Minister for National Development and Minister-in-charge of Social Services Development, said, "We need to retrofit many more of our older buildings to improve their sustainability standards. This is more challenging than designing a new green building from scratch. The original development may not have been designed with sustainability in mind, making retrofitting more complex and potentially costly. I congratulate DBS and its partners on transforming this building into Singapore's first net zero building by a bank. Such teamwork between the private, public and people sectors is critical, as we strive to grow a more sustainable City in Nature."

With all the effort, ingenuity and innovation poured into the project, DBS Newton Green will definitely generate much interest in the industry and the greater community for the months and years to come. ✓

**Article contributed by  
DBS Bank**



# CULTIVATING GREEN HEARTS IN THE NEXT GENERATION

SGBC Member ebm-papst SEA Pte. Ltd. is using its innovative technology to help advance Singapore's food security goals



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## Cultivating green hearts in the next generation



As recent global events and supply chain disruptions have shown, reducing our reliance on food imports in Singapore is critical to our food security. Hence, the government aims to build up our Agri-food industry's capability and capacity to produce 30 percent of our nutritional needs locally and sustainably by 2030. To reach this '30 by 30' food security goal, the government recognised the need to equip new local talents with relevant knowledge and skills.



### FARMZSTORY

In tandem with this vision, Farmzstory is spearheading a movement to promote urban farming to schools, the community and beyond. Farmzstory is led by Mr Ng Ah Ban (Team Lead & Strategy Planning), and his team consists of Ms Germaine Tan (Sales & Marketing), Mr Ernest Chew (Business Partner & Finance) and Mr Ng Kok Keong (Operations). Incidentally, Mr Ng and his team were among the first batch of graduates of the 'Digital AgriTech Operation Manager' program held by NTUC Learning Hub.

In the span of less than a year, the team at Farmzstory completed the set-up of 18 greenhouses across 13 primary schools, secondary schools and junior colleges. Concurrently, the Farmzstory team looks out for new technology that could further optimise their farming activities. To test their theories, the team sets up a model greenhouse located in Lim Chu Kang.

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## Cultivating green hearts in the next generation



### REFINING THE TECHNOLOGY

A greenhouse is 2.5 metres wide, 6 metres long, and 2.3 metres tall. A mixture of crops, such as Chinese broccoli (kai lan), choy sum (cai xin), milk cabbage (nai bai) and ipomoea aquatica (kang kong) can be grown in these greenhouses. However, growing conditions in greenhouses were not optimal, especially given the warm climate in Singapore. This triggered the idea to improve the ventilation system within these greenhouses.

Through a collaboration with SGBC Member ebm-papst SEA Pte. Ltd., two electronically commutated (EC) axial fans were installed in the model greenhouse. These fans help to remove the stale and hot air from the interior and bring in fresh, cooler air from the exterior. The gentle air draft generated by the fans create air change at the tip of the leaves to encourage photosynthesis and thus healthy growth of the crops. In addition, the cooler air will also improve the comfort levels of the people who are hard at work with the crops.

Unlike conventional alternating current (AC) fans, these EC axial fans are also equipped with infinite variable speed control. This enables fan speed to be changed in accordance with the needs of the plants and farmers. In the day, fan speed will be higher as



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## Cultivating green hearts in the next generation



the plants are more active. At night, fan speed will be lower to allow for minimal fresh air change and to conserve energy.

The Farmzstory team installed a standalone solar PV system to power these fans, making it friendlier to the environment. As the EC axial fans are energy-efficient than their AC counterparts, it enables easy integration with the solar panels. With this set-up, the team are several steps closer to net-zero emissions.

In recent months, the team has been exploring Internet-of-Things (IoT) technology for their greenhouses. By using sensors, critical parameters

such as the nutrient and moisture level of the medium and temperature and humidity levels inside the mini greenhouse can be measured and tracked.

ebm-papst EC axial fans can also be controlled through such sensors. For example, when the temperature in the greenhouse increases, the fan speed will also increase in order to cool the greenhouse more quickly.

Through further refinement of the above technologies, the team hopes to develop more conducive growing conditions for other types of crops.



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## Cultivating green hearts in the next generation



Students can get their hands dirty and learn about the entire farming process, from sowing to harvesting. It enhances the students' learning of STEM with practical applications such as the pH level of soils (chemistry), plant life cycles and symbiotic relationships (biology) and pressure gauges (physics). They also begin to understand and appreciate the hard work that goes into growing vegetables for their own consumption.

These activities also help to foster a sense of community and belonging among the students as they work together to ensure their crops are healthy and growing well. It has also been well documented that green spaces like these help to improve mental and psychological wellbeing, which is important for a competitive society like Singapore.



### THE FARMZSTORY FOR SCHOOLS

On top of building greenhouses for schools, Farmzstory organises workshops for the students in these schools so that they can pick up the necessary skills to care for their vegetables. They also conduct experiential learning sessions in the farm located at Lim Chu Kang so that students can learn more about agriculture and get a closer look at the latest technologies.

Although it has not been long since Farmzstory started these initiatives, it is clear that the students are benefitting immensely from the activities.

### THE NEXT CHAPTER FOR FARMZSTORY

Once the technology in the model greenhouse has been further refined, the team aims to roll out these additional value-added systems to greenhouses in schools. Students will then be able to get a closer look at how these high-tech and sustainable systems can help the crops' growth.

In addition, the Farmzstory team is looking into building greenhouses for preschools, which will unlock further learning opportunities for the next generation of Singapore. 🌱

**Article contributed by  
ebm-papst SEA Pte. Ltd.**





# CREATING THE SUSTAINABLE WORKPLACE OF CHOICE

SGBC Member WSP Consultancy Pte Ltd blended green and smart solutions to create a premium, sustainable workplace experience at Csuites.



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## Creating the Sustainable Workplace of Choice

Csuites is envisaged to be a next generation flexible co-working space that are redefining the work culture - delivering a quality workplace that prioritise the health and wellbeing of people and society. Developed by Lendlease, this innovative concept brings together the privacy of conventional offices, with the accessibility of modern co-working options to offer large corporations the opportunity to collaborate.

Situated within the Paya Lebar Precinct, the 72,000 square feet multi tenant space features 10 office suites fitted with multiple shared facilities built into a complete workplace ecosystem for a seamless experience to enhance productivity and the wellbeing of its occupants.

The two-storey dynamic workspace located in Paya Lebar Quarter Tower 3, is the first to be awarded

the Green Mark Platinum award under Green Mark for Non-Residential Buildings 2015 in recognition of its sustainable and resource-efficient solutions.

All three office towers at PLQ were recently awarded the WELL Core & Shell Certification Gold level, the first building in Singapore to be accredited by International WELL Building Institute's (IWBI) for nearly one million square feet of Grade A workspaces across its three office towers to recognise its leadership standing in advancing health and well-being in buildings, and communities backed by evidence-based research.

Appointed as the Mechanical & Electrical and Green Mark Consultant, WSP partnered with Csuites to contribute to a sustainable workplace of choice through three key attributes.





### ADVANCING SMART AND GREEN SOLUTIONS FOR A SUSTAINABLE WORKPLACE

With energy and water conservation as key priorities, the highest quality energy and water efficient systems are procured to boost significant energy savings.

Added enhancements were incorporated resulting in:

- An ultra low power lighting system of only 4.3 W/m<sup>2</sup>, which yields over 50% efficiency than the existing code requirements

- The deployment of water efficient fittings which are rated 3 ticks under the PUB Water Efficiency Labeling Scheme

### DESIGNED WITH A PEOPLE-CENTRIC APPROACH FOR HEALTH AND WELLNESS

Located close to the Paya Lebar airbase where exposure to aircraft noise is a key concern, the building façade is constructed to deliver a conducive indoor environment. Additional improvements to the acoustical characteristics of the workspace encompass the implementation of sound absorbing interior panels to effectively minimise unwanted noise and sound.

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## Creating the Sustainable Workplace of Choice



To further improve the quality of the interior space and support the use of locally certified building products, materials certified by the Singapore Green Building Council's Singapore Green Building Product (SGBP) certification scheme are used extensively during the construction stage. By applying these materials which comply with stringent emissions standards, this helps to reduce volatile organic compound (VOC) emissions, ensuring healthier and better air quality in a well-ventilated space.

### ECO-FRIENDLY FEATURES FOR A HOLISTIC ENVIRONMENT

Beyond the high-quality work environment, Csuites aims to meet the increasing demand of enterprises that seek to achieve sustainability in their workplace.

Adjustable partitions within the townhall area are designed to enable flexibility and optimisation of space usage to accommodate the different events



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## Creating the Sustainable Workplace of Choice



such as a townhall meeting, fitness classes and product launches etc.

The use of fabric ducts in air conditioning ducting instead of the commonly used metal ducts helps ensure the highest standard of hygiene as these can be taken down and washed periodically to allow the air quality to be maintained for optimal efficiency without compromising on air quality.

Water sub-meters were fitted to track water consumption patterns to benchmark against industry standards and avoid potential leaks and inefficiencies thus enjoying cost savings. Building Management Systems (BMS) were also installed to measure electricity consumption to cater for future reduction program.

Timer control for lightings were introduced to monitor energy consumption during after office hours. As a result of the reduced operation hours, the lifespan of light tubes is lengthened to minimise the frequency of maintenance.

The design and structure of the space is fit-for purpose, complemented by the use of colours, biophilic design and multi-functional spaces for a comprehensive user experience. The introduction of biophilic design enhanced the space through natural wood elements and air purifying indoor plants. These distinct features come together to form an inclusive co-working environment to reduce distractions and foster closer collaboration, while being positioned as a comfortable haven for those in need for a mental or energy recharge.

Csuites was awarded the Singapore Green Mark for Healthier Workplaces Platinum certification in 2020 by Building and Construction Authority and Health Promotion Board (BCA-HPB) to recognise workplaces that emphasize on both the quality of indoor environments as well as the health and well-being of its occupants. 🌱

**Article contributed by  
WSP Consultancy Pte. Ltd.  
Photo credits: Csuites**



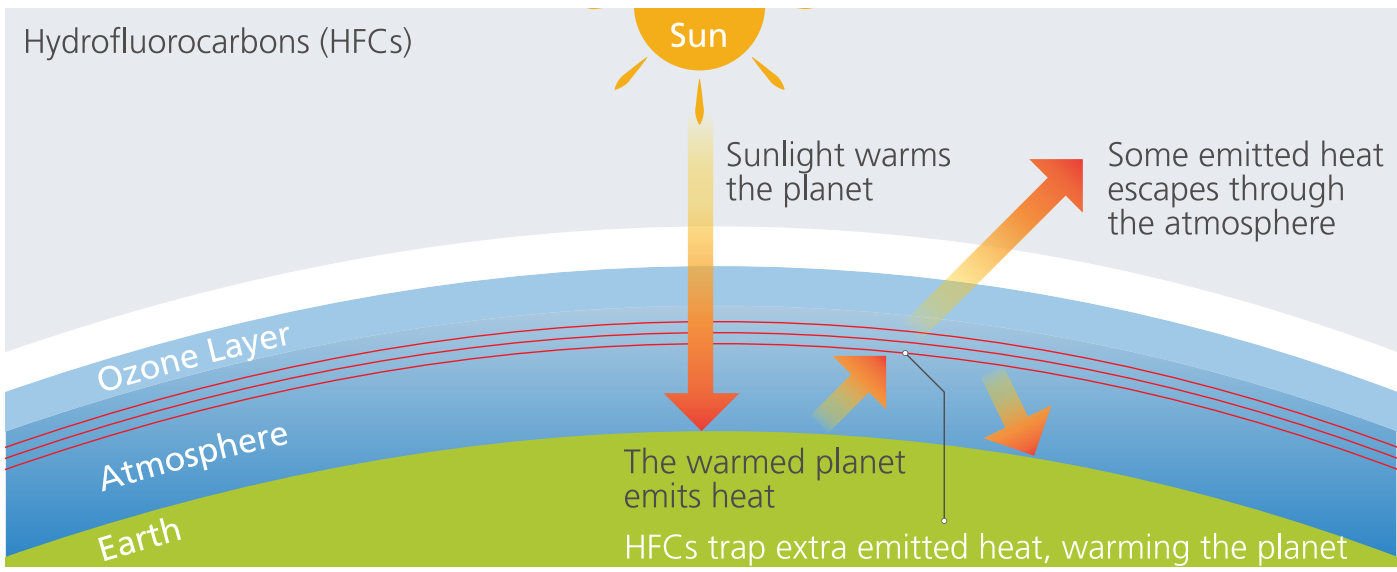




# REFRIGERANT RECOVERY FOR A GREENER BUILT ENVIRONMENT

SGBC Founding Member Daikin outlines an alternative solution to replacing air conditioning systems

## Refrigerant Recovery for a Greener Built Environment



In sunny Singapore, air conditioning is ubiquitous. Our homes, workplaces, shopping centres, schools and recreational areas all have varying degrees of air conditioning installed. In fact, it is more uncommon to find places or spaces without any form of air conditioning. As the globe is subjected to more erratic weather patterns in recent months, such as the scorching heatwave across Europe, the demand for air conditioning will likely not be letting up in the near future.

While air conditioning provides respite from the hot weather and helps to regulate temperatures, it is the top energy guzzler in any building. A typical building will see air conditioning (and other HVAC-related services) being responsible for nearly 40 percent of its total energy use, followed by lighting at around 11 percent. Ensuring the efficiency of the air conditioning system therefore brings about multi-pronged benefits: no electricity bill shocks, assurance of healthy indoor air as well as doing a small part to advance environmental sustainability.

The energy efficiency of an air conditioning system is tied to the type of refrigerant it uses. A

refrigerant is basically the working compound in an air conditioning system that absorbs heat from the environment, cools the air and distributes cooled air into the indoor environment. However, many refrigerants release harmful substances such as chlorofluorocarbons (CFCs) and greenhouse gases when the system is faulty, poorly-serviced or improperly disposed of. While the newer R32 refrigerant with a lower global warming potential is able to offer better cooling and smoother operation while reducing electricity consumption, there is a solution to essentially close the loop in greening air conditioning: refrigerant recovery.

As its name suggests, refrigerant recovery refers to the transfer of an air conditioning system's refrigerant into a refillable refrigerant cylinder during repairs or replacement. Not only does refrigerant recovery eliminate the need to manufacture new refrigerants, the process also prevents spent refrigerants from leaking into the atmosphere, which removes the possibility of releasing harmful greenhouse gases and other ozone-depleting substances.



Recover refrigerant on site during repair, service and equipment replacement



Installer/contractor transport recovered refrigerants to Daikin ECO Corner at Daikin main office



Daikin will send the recovered refrigerants for reclamation and disposal to reclamation facilities

## Refrigerant Recovery for a Greener Built Environment



Daikin Singapore provides a range of refrigerants to cater to various types of air-conditioning products. Currently, the R32 refrigerant has now been categorised as a climate-friendly refrigerant by NEA.

SGBC Founding Member Daikin Airconditioning (Singapore) Pte Ltd has in place an environmentally-conscious process for the recovery, reclamation and recycling of refrigerants as a viable, sustainable alternative to simply replacing entire air conditioning systems. To put it simply, used refrigerants are recovered from air conditioning systems during, repairs, servicing and maintenance. Refrigerants can also be collected from sub-contractors and installers of air conditioning systems, which will then be sent for storage and handling at Daikin's eco-corner before being sent for reclamation.

During the reclamation process, these used refrigerants will be subjected to an intensive filtration process to rid it of all impurities and to restore the refrigerants' purity levels to meet AHRI 700 international standards, which is the equivalent to new refrigerants. The reclaimed refrigerant can then be reused on any air conditioning system as though its brand new. Reclaimed refrigerants

promise optimal energy efficiency, equipment operation and a prolonged lifespan while reducing equipment downtime.

A point to note is that reclaimed refrigerant is not the same as recycled refrigerant: while recycled refrigerants may have contaminants reduced or removed, they have not been processed to meet any purity standard, unlike reclaimed refrigerants which have been processed to meet or exceed the AHRI-700 standard (International Virgin Refrigerant Standard).

Daikin Singapore is phasing in the use of reclaimed refrigerants as part of its Sustainable Green initiative, and is actively pushing for the recovery, reuse and reclaiming of used refrigerants. When your air conditioning system is due for repair or maintenance, refrigerant recovery may be a better, greener solution to replacement. ✓

**Article contributed by  
Daikin Airconditioning (Singapore) Pte Ltd**

# BUILDING FROM SUSTAINABLE PRODUCTS

Sustainable development continues to be a global priority and green buildings are in a prime position to facilitate this transition. But how do we know if the literal building blocks of our places and spaces are indeed green?





In order to achieve the vision of a low-carbon and energy-efficient future, the environmental performance of each and every building product cannot be left to chance since buildings are permanent structures in place for decades at a time. As such, the materials used in its construction play important roles in ensuring that the building's footprint and impact on its surrounding environment is as small as possible. Green building materials certified for their environmental performance, coupled with sound green building design and technology along with an emphasis on sustainability, will definitely go towards creating buildings which are greener and healthier for both occupants and the environment.

According to the latest 2021 edition of the triennial World Green Building Trends Study published by Dodge Construction network in collaboration with research partners such as the World Green Building Council (WorldGBC), green building continues to remain a global priority, likely driven by increasing extreme weather events and despite other rising concerns like the global pandemic. The study, published in end-2021, also mentions that the use of green building products is expected to grow, with the top classes of products for anticipated use being electrical, mechanical, building automation systems, and products for thermal and moisture protection. Built environment organisations who do the majority of their projects green report high levels of green product usage, particularly in mechanical, electrical and building automation

products and systems.

In terms of identifying what makes a product green, energy efficiency ranks highly as a key criterion among built environment stakeholders including architects, engineers, contractors, owners or investors. Two other criteria were also high on priority lists: having recycled content as well as being non-toxic, especially within the architect's circle. Other green building product criteria taken into consideration include lifecycle data, durability and environmental product declarations (EPDs), with the latter seen as important across all built environment stakeholder groups. With these standards in demand from the people who design, build and operate our buildings, certification of green building products is becoming ever more important.

The Singapore Green Building Product (SGBP) scheme, managed by the Singapore Green Building Council (SGBC), is a certification for green building products and materials. It is based on scientific and engineering principles and built upon the collective knowledge and expertise of the building and construction industry. The SGBP certification scheme advances the built environment to one that is greener and more carbon-efficient while facilitating sustainable procurement. The certification ensures that sustainability is integrated throughout the design and manufacturing process of green building products.

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## Building from Sustainable Products

Aligned with the WorldGBC's vision of green buildings for everyone, everywhere, SGBC aims to make the spaces we live, work and play in healthier, more sustainable, and more resource-efficient. SGBC recognises the need for green building products, materials and solutions to support this vision. With the SGBP certification scheme, a high benchmark is set for sustainable building products and materials. This ensures sustainability targets are met while providing transparency and credibility to the products chosen for use when building green into our spaces and places.

### METHODOLOGY & ASSESSMENT CRITERIA

The SGBP covers a wide range of products and assesses them based on their sustainability performance. Environmental and health impacts can occur across a product's lifecycle, from raw material extraction or cultivation, through manufacturing, use and end-of-use management. The scheme looks at the whole lifecycle of products to account for the full impact and assesses products and materials on their sustainability performance.

The SGBP's assessment criteria is categorised into common criteria which apply to most products and specific criteria which apply only to relevant products. The SGBC Certification team will identify for each applicant which assessment criteria are most suitable for their products. For some products, the assessment against criteria covers the whole product lifecycle, while for other products, the assessment criteria focus on a select few lifecycle stages across raw material extraction or cultivation, manufacturing, distribution, use, and end-of-use. This grounded methodology enables building products to be impartially evaluated for their relevant, noteworthy qualities, benchmarked against similar products in its category.

SGBC will assess the degree to which the certifying product meets the assessment criteria. For some products, the applicant will need to show proof of laboratory test results or other documentation to verify the product's alignment with some criteria. SGBC works with a selection of lab partners to assist applicants on any third-party tests required for certification. After the assessment, the certified product will be awarded a rating between 1 and 4 ticks, based on its performance. 1 tick indicates good attributes, while 4 ticks indicate leading industry performance.

The SGBP assessment criteria are designed to assess products on performance over their lifecycle. There are 12 common criteria which apply to most products, covering low environmental impact and quality manufacturing, avoidance of hazardous materials, carbon footprint reporting and reduction pathways, and innovation. In addition to common criteria, specific criteria apply only to relevant products. For example, the specific criteria which applies to interior products are different from the specialised criteria used by outdoor products due to the different functionality and usage of these products. Some of the specific criteria for Architectural products include volatile organic compounds (VOC) content and air emissions performance for instance, while an example of the specific criteria for mechanical engineering products would be energy efficiency.

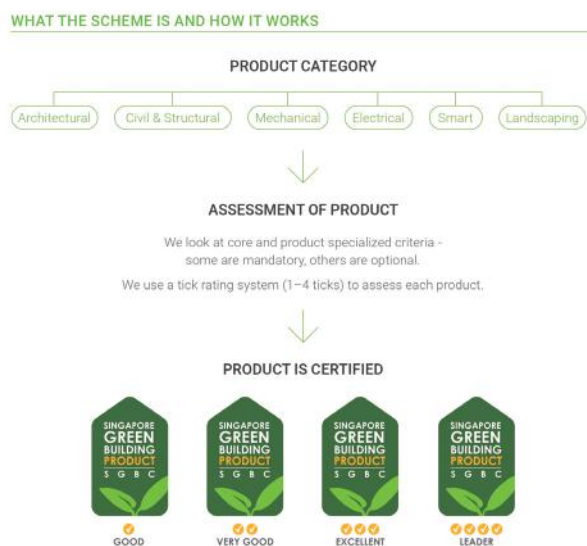
For both the common and specific assessment criteria, some are mandatory, and others are optional. The assessment criteria have been drawn up by SGBC in close collaboration with industry professionals and experts. SGBC continually reviews the criteria to ensure they reflect the current science, engineering and best practice.

### INDUSTRY RECOGNITION

The SGBP is one of the key standards and benchmarks for green building products in the built environment sector. Products and materials certified by the SGBP are highly recognised under the Green Mark Scheme, Singapore's national green building rating tool administered by the Building and Construction Authority (BCA), which allows certified products to accrue points that count towards a project's Green Mark rating. The more highly rated



## Building from Sustainable Products



a product is under the SGBP Scheme (i.e., the more ticks it has achieved), the more points are awarded towards the Green Mark rating.

The SGBP is also widely accepted by regional green building rating tools for its coverage of a building product's sustainability performance. Key examples include GreenRE, a rating tool set up by the Real Estate & Housing Developments' Association (REHDA) of Malaysia, and the LOTUS programme administered by the Vietnam Green Building Council. The SGBP complies with many of the requirements in ISO 14024 Environmental labels and declarations — Type I environmental labelling.

SGBC is always working to improve the SGBP's quality and usability. The SGBP Certification Scheme is similar to internationally leading eco-labels, such as Cradle2Cradle, DECLARE, Global Green Tag, Good Environmental Choice Australia, Korea Environmental Industry and Technology Institute. Future versions of the SGBP may provide additional recognition for products that excel in addressing social issues, circular economy, and low embodied carbon, and reorganise the scheme's governance to allow for products certified under the SGBP to be recognised under other eco-labels.

### HOW CAN THE SGBP HELP?

With the SGBP certification, a building product is assured of its superior environmental performance benchmarked against current industrial standards, serving as a credible sustainability credential. Some other benefits include:

#### ■ FOR PRODUCT SUPPLIERS

- Gain deep analysis of a product's sustainability performance by experts and certification by a credible source
- Receive opportunity and insight into how to further develop the product to be more sustainable
- Raise greater awareness of the product for use in current and future building projects

#### ■ FOR DESIGNERS/ SPECIFIERS

- Gain an overview of products that are certified sustainable
- Obtain an understanding of how a product stacks up against others in terms of their sustainability performance
- Easier decision-making when choosing more sustainable products

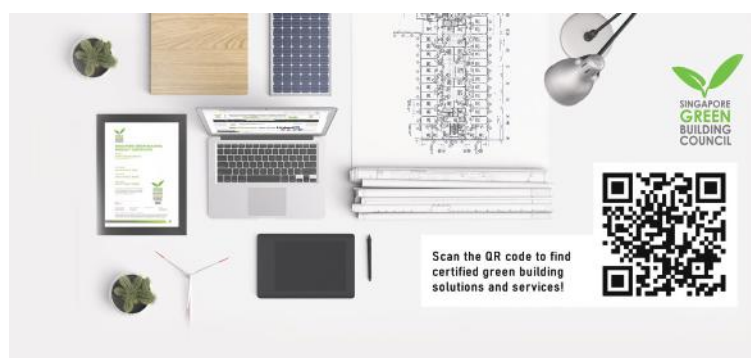
#### ■ FOR BUILDERS/ OWNERS

- Gain an overview of products that are certified sustainable
- Obtain data around the environmental properties of the products used
- Provide a unique selling point for building projects

#### ■ FOR TENANTS/ OCCUPANTS

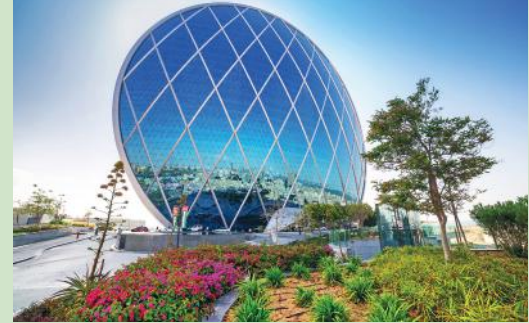
- Gain an understanding of how sustainable the spaces you live and work in are
- Know about the health benefits of living, working and playing in a greener building

In the next few pages, read about a specially-curated selection of green building solutions by SGBC Members. With innovations covering architectural products to mechanical & engineering solutions as well as smart technology, there will definitely be something that can help in your next green building project. ✓



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## Building from Sustainable Products



### AGC Asia Pacific Pte Ltd

The AGC Group is a world-leading material manufacturer of glass, chemicals and other high-tech materials and components. Drawing on more than a century of technical innovation and in the pursuit of sustainability, the AGC Group has developed world-class solutions and products for the ever-changing built environment and infrastructure segment.

In 2021, the AGC Group set forth its long-term goals for 2050 of aiming to achieve net zero GHG emissions resulting from its business activities and contributing to the realization of net zero carbon emissions globally by leveraging its product and technologies. Sustainable products include the latest range of building integrated photovoltaic SunEwat, high performance fluoropolymer ETFE Film, and low volatile organic compound Lumiflon.

AGC Asia Pacific is the regional partner of World Green Building Council's Asia Pacific Network, supporting various green building initiatives such as the formulation of the Embodied Carbon Primer Report and Net Zero Readiness Framework.

Find out more: <https://agc-asiapacific.com/>

### Armstrong Fluid Technology

Armstrong Fluid Technology leads the industry on integration of fluid-flow systems, by approaching energy optimization as a whole-building challenge and advancing the practice of full lifecycle management of mechanical systems. Focusing on HVAC, plumbing, gas transmission and fire safety applications, Armstrong provides energy-efficient and cost-effective solutions to building and facilities around the world.

The core of its innovation is Design Envelope technology, a demand-based intelligent control solution that models equipment and system behaviour, monitors system conditions and adjust equipment operation to match system demand. Together with in-built parallel sensorless features, the technology provides seamless integration to BMS and cloud computing for real-time data analytics for optimum performance.

With over 1200 employees worldwide, Armstrong established and operates eight manufacturing operations in four continents. Over the past 80 years, Armstrong has embarked on a journey of carrying over our expertise in producing fluid flow products to the engineering and support of intelligent building energy technologies, with products such as DE4300 intelligent pump, 4380 vertical inline pump, 4700 fire pump, FTV multi-purpose valves, including IPC 115500 and IPC 9521 water-cooled chiller control system.

Find out more: <https://armstrongfluidtechnology.com/>





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## Building from Sustainable Products



### bbp

bbp was founded in 2012 to revolutionise the business of energy efficiency. Its holistic business model and patented technologies supersedes the complex alternative of individual services. bbp's technologies is employed by mission critical assets that run 24/7 operations across Asia, with clients including the world's top semiconductor manufacturers, leading commercial real estate firms in Asia, Fortune 500 and blue-chip companies in the industrial, data centers, district cooling plants and infrastructure space.

bbp's proven and patented solutions is available at minimum or zero upfront cost, with no fees charged if no savings are delivered. Actual savings are annually verified by independent 3rd parties.

bbp's innovative energy savings technologies are patented across multiple countries and partners businesses to deliver more innovation solutions and impactful decarbonisation goals.

Find out more: <https://bbp.sg/>



### Infogrid

Infogrid is changing the world through building intelligence. Its AI-powered platform empowers the real estate industry to revolutionise the way the built environment is run and managed.

Infogrid partners impartially with best-in-class IoT tech providers to retrofit existing buildings with smart technologies to collect, combine and analyse data for a complete visibility of a building's performance.

Headquartered in the UK and operating globally, Infogrid solves real world problems in real-time, from anywhere, in support of its mission to make every building healthy, efficient and sustainable.

Find out more: <https://www.infogrid.io/>

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## Building from Sustainable Products

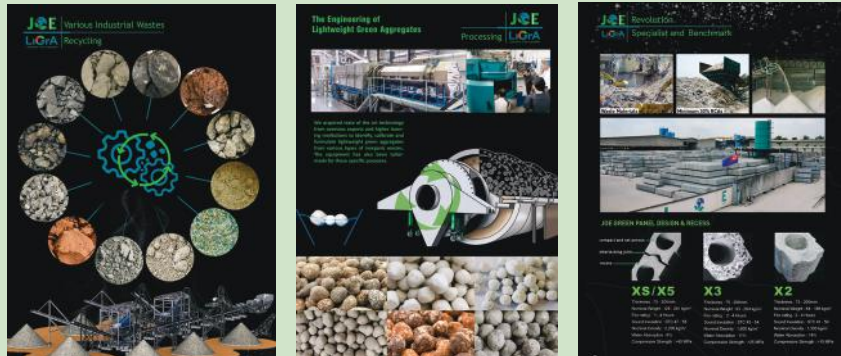
### JOE Green Pte Ltd

JOE Green specialises in the production and distribution of lightweight precast solutions for the building and construction industry. As a Zero Waste Manufacturer, all products that do not pass the stringent quality control are crushed and recycled.

JOE Green is an ISO 9001:2015 Quality Management System certified company that contributes to a sustainable development and to preserving the environment. It is also ISO 14001:2015 certified in improving the efficiency of manufacturing, usage of resources, waste reduction and to its designs of safe, quality wall panels. The ISO 45001:2018 system helps to govern its stringent safety and health concerns, develop and implement policies that foster good occupational health and safety practices, thus reducing injuries and diseases. It is acclimated to local standards with the BizSAFE Star counterpart.

Today, JOE Green is known for its environmental-friendly and highly efficient products, using the proven recycled concrete aggregates (RCA) of minimum 30 percent that have been tested by accredited and authorised institutions. It is widely used by local and international reputed developers, professional architects, top consultants and established main contractors for their projects in Singapore, Malaysia, Cambodia and Indonesia.

Find out more: <https://www.joegreenpanel.com/>



### KONE Singapore

As a global leader in the elevator and escalator industry, KONE provides elevators, escalators and automatic building doors, as well as solutions for maintenance and modernization to add value to buildings throughout their life cycle. Through more effective People Flow®, KONE makes people's journeys safe, convenient and reliable, in taller and smarter buildings.

For over a decade, KONE has been advancing its sustainability agenda, aiming to offer its customers innovative and eco-efficient solutions and reduce the environmental impacts of its operations. Buildings account for a large part of the world's energy consumption and greenhouse gas emissions. KONE wants to be the most trusted partner for their customers throughout the entire building life cycle by helping them achieve their sustainability objectives and creating better urban environments. KONE supports its customers in building sustainable and climate resilient communities.

Find out more: <https://www.kone.sg/>

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## Building from Sustainable Products



### Signify (formerly Philips Lighting)

Signify is the world leader in lighting for professionals, consumers and lighting for the Internet of Things. Signify's energy efficient lighting products, systems and services enable customers to enjoy a superior quality of light, and make people's lives safer and more comfortable, businesses more productive and cities more livable.

Sustainability is at the heart of Signify's purpose: to unlock the extraordinary potential of light for brighter lives and a better world. By changing the way we create and use light, we can improve lives and have a positive impact on the planet.

As a company, Signify strives for the highest sustainability standards and has implemented several energy efficiency and carbon reduction programs to achieve carbon neutrality in 2020. Additionally, Signify actively works with suppliers to implement measures to reduce their environmental footprint. Its portfolio of connected and energy efficient products, systems, and services and solar products offer low carbon alternatives that are fit for sustainable consumption patterns.

Find out more: <https://www.signify.com/global>



### Wieland Electric Singapore Pte Ltd

Wieland Electric is a medium-sized family business operating in the electrical and electronics industry, with its headquarters in Bamberg. As an experienced and reliable partner, Wieland Electric helps to meet building requirements with safety, efficiency, and pluggability.

For over 40 years, Wieland Electric has been offering smart solutions with its connector systems, whether for lighting installation and automation, room automation, power supplies, and more. Wieland Electric also supports customers in the fields of mechanical engineering, wind power, and lighting technology in over 70 countries around the globe.

Wieland Electric's solutions embody pluggability with smart installation. Its high-quality and durable components boast up to 70 percent time savings and up to 30 percent cost savings while eliminating the need for time-consuming unshoothing, stripping and wiring by using individually prefabricated components. With the tight seal and high mechanical strength of the connectors, any application can be installed quickly safely.

Find out more: <https://www.wieland-electric.com/en/>

# green means



# comfortable

## What's a Green Home?

It goes beyond living in a certified green building, it's about reframing your lifestyle and how you live at home to create a more comfortable and healthier home that's **good for the environment and you.**

Here are some small changes you can do for your home that could make a big difference:

## GO natural

Maximise the natural resources around you.

Use a fan in the day

save up to **10-30%** energy consumption

Get some potted plants

increase productivity by **up to 15%**

Open your windows

improve indoor air quality for **better sleep and health**

## GO healthy

Make decisions that optimise the home for your body.

Choose light colour temperature

set the right **mood** in each room

Choose Low-VOC materials

**1000x** reduction in indoor air pollutant levels

Clean AC filters every month

improve **air quality** & save electric bills

## GO smart

Use smart technology and energy-efficient appliances.

Use smart window tinting

**84%** drop in symptoms like eyestrain, headaches

Get an energy efficient fridge

save as much as **10%** on electricity bills

Use smart home control systems

save up to **20%** energy consumption for your home

## Build Green Into Your Home

There are a number of things you can do in your home to build green into your home, and often times **small actions can create a big difference.** And when you're ready to renovate your home to make bigger changes, be sure to check out the various green home renovation loans offered by local banks.

Visit [greenbuildings.sg](http://greenbuildings.sg) to learn more about what you can do for your home.

