SG Green I Issue 5.0

SEPTEMBER 2017

SG GREEN

SINGAPORE GREEN BUILDING COUNCIL

MCI permit number (MCI (P) 085/05/2017)

Leading the Way in Sustainability

Pg 04

GREENING THE COMMUNITY

Pg 24

CHOOSING SUSTAINABILITY

Pg 44

Energy savings are in the air.

Retrofit your AHUs with GreenTech EC fans and save up to 40% of energy costs.

SINGAPORE GREEN BUILDING COUNCIL MEMBER

Inefficient fans with belt drive and external control electronics.

Highly efficient Fangrid with GreenTech EC fans.

ebm-papst develops highly efficient fans for building air-conditioning systems. They benefit not only new buildings, but also existing systems because retrofits pay for themselves very quickly. We would be delighted to meet you and explain how we can make Singapore and Southeast Asia a little greener together: **salesdept@sg.ebmpapst.com**

ebmpapst

The engineer's choice

SG GREEN

PUBLISHER

Singapore Green Building Council

DESIGN & PRINTED BY

SC (Sang Choy) International Pte Ltd

CONTENTS

SGBC-BCA Sustainability Leadership AWARDS 2017

LEADING THE WAY IN SUSTAINABILITY

MESSAGE FROM THE EDITORIAL TEAM

SELECTING FOR SUSTAINABILITY

Selection and procurement remains vital in the building and construction industry, with large contract sums of materials, labour and services being procured in order to construct the buildings we live, work and play in. Oftentimes, this process goes unnoticed by the end-users, only reaping the benefits brought about by sound procurement practices. The process itself has evolved with the ever-changing dynamics of the building and construction industry, and with the paradigm slowly but steadily shifting to more sustainable buildings, the procurement and selection process will have to move towards sustainability as well.

Building materials can be vitally important to green buildings as they are responsible for the collective environmental footprint put out by the completed structure. With the growing emphasis on better places for people to work, live and play in, healthier building materials alongside the products that can improve building efficiency are growing in demand. Not only is this evident amongst building developers, homeowners and business owners are increasingly looking to eco-friendly fit-out solutions for their homes and workplaces. A growing body of research, including work done by the World Green Building Council, is also supporting the correlation between healthier buildings and healthier occupants.

Hence, it is important for the industry to further cultivate and nurture a culture of sustainable selection and procurement for all buildings, be it a retrofit or an entirely new construction. Selecting for sustainability would mean greener and more efficient buildings, complemented by healthy indoor air quality produced with building materials that have been tested and certified to be environmentally-friendly and healthy. Buildings also last for a long time, therefore it is important for them to be as sustainable and efficient as long as possible.

In this issue of SG Green, we congratulate the Winners of the SGBC-BCA Sustainability Leadership Awards 2017. When you read through their profiles, you will find that all of them – Individuals, Organisations and Building Projects – place a lot on emphasis on selecting the most sustainable materials for any of their projects. For some of the Winners, sustainability is shown to be in their DNA, thus selecting sustainability has become second nature.

In addition, the fifth issue of SG Green also touches on some of the innovative solutions out there in the market, solutions that can help you on your own green building journey. From organisations producing green building materials to inventive business models that address existing building problems, there is a wealth of resources to give you ideas to procure responsibly and choose sustainability.

Yours sincerely,
SG Green Editorial Team

SGBC-BCA Sustainability Leadership AWARDS 2017

As the global community grows more aware of environmental issues, sustainability can become an organisation's competitive edge. Today's more discerning consumer expects some degree of social good from the organisations they are indirectly funding through the procurement of goods and services. The organisation's corporate social responsibility and sustainability policies are now more relevant than ever before.

To recognise efforts in sustainability, the Singapore Green Building Council (SGBC) and the Building and Construction Authority (BCA) jointly organises the annual SGBC-BCA Sustainability Leadership Awards. Into its second year, the Awards aim to promulgate sustainability efforts and elevate the profile of deserving organisations active in the green building space.

For the 2017 edition, the biennial SGBC-BCA Green Building Individual Awards (GBIA) have come under the banner of the SGBC-BCA Sustainability Leadership Awards. Now covering Individuals, Organisations and Green Building Projects, the Awards is more inclusive, holistic and effervescent of the green building movement. After all, green building is the collective commitment from both individuals and organisations passionate in sustainability.

AWARD CATEGORIES

The SGBC-BCA Sustainability Leadership Awards 2017 recognises Winners across three main categories:

For Individuals

> The Green Building Individual Category accords recognition to passionate individuals from across the building and construction value chain for their consistent contribution and outstanding achievements in this challenging yet fulfilling journey towards greater environmental sustainability in the built environment. This initiative will go a long way in raising the profile and ensuring the retention of capable professionals and practitioners in the industry. There are five subcategories:

Green Advocate of the Year

Green Architect of the Year

Green Facilities Manager of the Year

Green Innovator of the Year

> In addition, the Young Green Building Individual Award Category recognises young professionals/ practitioners from the above four categories for their professional achievements and personal contribution in the green building and development front. Young professionals/ practitioners who are below age 40 in the year 2017 are automatically eligible during the nomination process.

> **Green Visionary Award:** a special Award conferred to an outstanding green building individual with tremendous contribution to the green building movement in Singapore, the accolade this year commends a true forerunner of green building, an individual who had made ground-breaking contributions or revolutionised industry practises, and continue to lead and influence sustainability efforts locally and regionally.

FOR ORGANISATIONS

> The Awards recognises deserving organisations with sound sustainability policies through the following subcategories:

Business Leadership in Sustainability

This is awarded to organisations that are truly integrating sustainability into their business models and contributing to the transition towards a sustainable built environment. These organisations understand that sustainability presents a long-term business opportunity, demonstrate sustainable practices within their internal and external operations, and show sustainability leadership within industry.

Leadership in Green Building Product

> This is awarded to organisations that place key emphasis on developing and offering industry-proven and environmentally-preferred green building products. These companies have developed a growing stable of green building products that are high performance in terms of contribution in a building (e.g. low volatile organic compound content) and yet produced in a manner with consideration to the environment.

FOR GREEN BUILDING PROJECTS

> The final Award category recognises stellar green buildings that deliver a range of benefits through a holistic approach to sustainability. These projects go beyond simply minimising their impact by considering factors that lead to positive outcomes for both the environment and for people.

> There are three sub categories under this award:

Commercial

Institutional

Residential

After an exciting judging process performed by a panel of public and private sector representatives, the Winners for each category have been crowned. A few of the Winners will represent Singapore in the World Green Building Council Asia Pacific Leadership Awards in Green Building 2018, alongside some of the most sustainable companies and projects in the Asia Pacific Region.

Read on to find out more about the Winners of the SGBC-BCA Sustainability Leadership Awards 2017, individuals, organisations and green building projects that are leading the way in sustainability.

GREEN VISIONARY AWARD

DR. JOHN KEUNG
Dean
BCA Academy

As the then-CEO of the Building and Construction Authority (BCA), Dr John Keung played a key role in charting the strategic directions and goals for BCA. He was instrumental in formulating the new mission, vision, strategic thrusts and core values for the organisation. Through his visionary leadership, BCA has aligned its goals and objectives to be more outcomes-based which are key deliverables that Singaporeans are expecting from BCA i.e. to deliver a safe, high quality, sustainable and friendly built environment.

He transformed BCA from an organisation in the past focusing on 'brick and mortar' to one that many stakeholders regard today as forward looking and 'cool'. A case in point is the acknowledgement of BCA's leadership in the green building movement in Singapore and the region, transforming Singapore into a green building hub for the Tropics, discharging the environmental responsibility to save the environment as well as to provide new economic opportunity for the built environment industry for both local and external markets.

MAKING A GREEN MARK

Dr Keung spearheaded the development of a holistic Green Building Rating System tailored to the unique challenges of the tropical built environment. Dr Keung subsequently led the team through scheduled reviews and enhancements to the scheme. The Green Mark Scheme is designed to integrate with other environmental initiatives of various government agencies to create one holistic green building assessment system. Dr Keung advocates that incentive and regulation should work hand-in-hand to bring about significant adoption of green building in Singapore. Singapore is amongst the first in the world to implement legislation for green building and possibly the 1st country in the world to introduce such financially attractive schemes for the private sector.

Since the launch of the first Green Building Masterplan in 2006, it has been progressively enhanced and is now into its 3rd version. Over the years, the focus put forth by Dr Keung for this Masterplan has shifted from the traditional values of Energy Efficiency and the techno-centric approach to look at community level interventions. These include tackling the education sector through strategies to involve teachers and students to groom the next generation to cultivate an acute awareness of the environmental issues and to advocate the sustainability mind-set to enable the future paradigm shifts that will be required.

Dr Keung also played a key role in facilitating and encouraging the private sector to play a bigger role in the green building movement, culminating in the formation of the industry-led Singapore Green Building Council (SGBC). SGBC was set up with the strong support of BCA under Dr Keung's leadership, formed with seed funding from BCA in 2009 to propel the industry towards environment sustainability. From a founding membership base of 129 members, SGBC now has almost 500 corporate members.

As the new Dean of the BCA Academy, Dr Keung will continue his vision to improve the way the buildings are built.

GREEN ADVOCATE OF THE YEAR

MS. ESTHER AN
Chief Sustainability Officer
City Developments Limited

Ms Esther An joined CDL in 1995 to establish its Corporate Communications department and subsequently CDL's Corporate Social Responsibility (CSR) portfolio. She has been instrumental in building up CDL's leadership in sustainability. A forerunner in CSR and a member of the management committee of Global Compact Network Singapore since 2005, she also sits on board the Corporate Advisory Board of World Green Building Council. A founding member of the Singapore Business Council for Sustainable Development, she is a signatory of the UN Caring for Climate initiative and a member of the Urban Land Institute Women's Leadership Initiative Singapore Steering Committee. Her latest appointment includes the UN Environment Programme (UNEP) Finance Initiative Investor Work Group.

AN ENDURING ONUS ON SUSTAINABILITY

Even before BCA launched the Green Mark Scheme to rate buildings for their environmental sustainability, CDL – under the direction of Ms An – has integrated sustainability and conservation into their day-to-day business and operations. As the bridge between senior management and operational staff, Ms An is able to turn CDL's "Conserving as we Construct" ethos into reality, resulting in the first eco-condo launched in 2002, along with the target to build each new development at a minimum Green Mark GoldPLUS level. To date, CDL has the most number of properties with Green Mark certification in Singapore, numbering 87 buildings that cover a variety of uses and types.

Ms An helped CDL launch the first Green Bond in Singapore, linking best green practices with green financing. This green financing taps fast-growing demand for socially responsible investment products and paves the way for more Singapore firms to finance climate-resilient infrastructure projects, with potential market for future issuances. Additionally, Ms An published the first GRI-checked Sustainability Report in 2008, followed up with the first Integrated Report released by a developer in 2015.

Alongside the corporate initiatives, Ms An also spearheaded a great number of sustainability achievements, including trailblazing community engagement initiatives such as Project EcoOffice, One Degree Up, E-Generation Challenge, CSR Young Leaders Award, CDL Sculpture Awards, Singapore Young Photographer Award, Let's Live Green, EcoBank, Create4Good and CoLab4Good. She coordinated the construction and launch of My Tree House in 2013, the world's first green library for children. As a Green Mark Platinum facility, My Tree House is not only refurbished with eco-friendly and recycled materials, it also boasts an eco-centric book collection, interactive green features as well as education programmes for children aged 2-12. In 2016, My Tree House has received a visitorship of over 312,500.

YOUNG GREEN ADVOCATE OF THE YEAR

MS. JOANNE KOH
Course Manager
Temasek Polytechnic

As a certified BCA Green Mark Facility Manager since 2010, Ms Koh joined Temasek Polytechnic (TP) and was tasked to infuse sustainability issues into the diploma curriculum. She has guided TP students on the path of applied learning, incorporating their creativeness and learnt knowledge to become quasi Green Mark Consultants for their alma mater. Further, Ms Koh has honed TP students through real consulting experience; while concurrently allowing schools to benefit from them, and help MOE achieve their Green Mark commitments for the Public Sector Taking the Lead for Environmental Sustainability (PSTLES).

GOING BACK TO SCHOOL

Ms Koh's passion for sustainability goes beyond the classroom. As compared to being a consultant in a project team, the impact made in the classroom is far more visible and impactful. The students come in with limited knowledge on what they can contribute to and are ignorant on the concept of sustainability. Subsequently, as the students were attached out to the industry, Ms Koh had banked on the students to persuade and convince building owners to consider doing more in the area of sustainability. Since 2011, Ms Koh has managed to get at least one group of students to do a paper exercise for a commercial building.

The Back to School Programme is one of the most successful programmes implemented.

As the schools placed their trust in the alumni, the students who were involved in the greening process had to learn enough so that they are able to teach and advise. This makes them good potential green advocates and because they learn, their curiosity in the know-how piqued: indirectly training the next generation of advocators. This knowledge and know-how is also proliferated within the school's faculty and student body, with the potential to spread to their friends, families and loved ones. Under this programme, Ms Koh has mentored 19 students and greened a total of 21 schools (3 GoldPLUS, 7 Gold, 11 to be greened in 2017).

Ms Koh also initiated the Green Our Little Red Dot workshop, a programme implemented with her students. This workshop aims to raise awareness in the younger students about the importance of the environment and the green practices they can adopt in their schools and at home. The participants were taught the meaning of environmental sustainability in a fun and innovative way by playing games and creating recycling posters for their own school. The responses from the students and teachers at the various secondary schools the workshop was conducted at were very positive based on the feedback received. Therefore, the students not only assisted their alma maters but they had also managed to spread more awareness on sustainability.

YOUNG GREEN ADVOCATE OF THE YEAR

MR. QUEK YANG THEE
Assistant Programme Chair (Diploma in Green Building Energy Management)
Republic Polytechnic

As the Assistant Programme Chair, Mr Quek is heavily involved in the curriculum design of the diploma. It is his duty to ensure some of the modules that his students will take are closely related to the green building industry. In addition to the transfer of the knowledge to the students in order to prepare them for work in the green building industry, the modules are also designed and crafted to encourage and inspire them to be green advocates.

In the course of his work, Mr Quek has driven his team to be actively involved in green building projects. Under his leadership, his team has worked on green building related projects covering a wide scope from building and energy audits to feasibility studies of wind turbine to prototyping of indoor vertical greenery. In his years with RP, Mr Quek has managed the installation of three photovoltaic systems on the campus.

Preparing for the Green Collar

Mr Quek passionately ensures that his students will be equipped with the necessary skills to pursue green professions when they graduate. One key project pioneered by Mr Quek is the Greenovate programme, a collaboration between Republic Polytechnic, the Building and Construction Authority (BCA), the Singapore Green Building Council (SGBC) as well as Johnson Controls Pte Ltd. Through this programme, students returned to their secondary schools to help them with their Green Mark certification. Performing a suite of services that include a Green Mark gap analysis, students are tasked to research, collect data and do analysis before putting up a recommendation with a presentation. The students will also mentor the secondary school students so that the secondary school students will be able to perform a basic level of green building audit while exposing them to green building measurement technology. Since its launch in 2016, the programme has benefitted 18 schools.

Recognising the lack of green building knowledge in the student body, Mr Quek made use of Republic Polytechnic's campus and formulated a Green Campus Tour. Covering the entire property, Mr Quek and his team bring secondary school students across the "living learning lab", educating them on several green building features in place while elaborating on the importance of orientation, façade, natural lighting, indoor air quality, greenery and smart technology. The students will also get a chance to experiment with industry-grade green building measurement tools commonly used in Green Mark audits. One of the highlights of this campus tour is the visitation of a rooftop photovoltaic system, especially set-up by Mr Quek for his students' education. The secondary school students can get to see and feel a real, operating solar array, deepening their appreciation of green building. More than 700 students have participated in the Green Campus Tour.

GREEN ARCHITECT OF THE YEAR

AR. KHOO POH BIN
Deputy Managing Director
DCA Architects

Ar. Khoo Poh Bin is the Deputy Managing Director at DCA Architects. He a Registered Architect in Singapore, a Registered APEC Architect, and a Registered ASEAN Architect. After his studies, he worked in the London before settling down in Singapore in 1994. He joined DCA Architects in 1996 and was made Director in 2002. He is a registered Architect with the Board of Architects in Singapore since 2000 and also a member of the Singapore Institute of Architects with over 15 years' experience in design, design development and overseeing a diversity of projects in Commercial, High-rise Residential, Institutional, Retail and Master Planning both locally and abroad.

Ar. Khoo's design projects brought him to UK, France, Spain, UAE, Sri Lanka, India, Myanmar, Thailand, Malaysia and Singapore. He has led a great number of Green Mark projects and is a key driver for BIM and various simulation software to validate architecture design.

MINIMISING ENVIRONMENTAL IMPACT THROUGH DESIGN EFFICACY

Ar. Khoo firmly believes in sustainable architecture, designing buildings using a conscious approach to energy and ecological conservation.

Working with BCA to establish the Green Mark criteria in 2005, Ar. Khoo adopted a practical design concept for the One George Street commercial development. The 1st storey was conceived as one fluid environment with the green from Hong Lim Park opposite flows into the public plaza and in turn into the lobbies. This gesture facilitated natural ventilation in between the free standing lobbies and with the introduction of reflective pools and planting helped to cool the surface area. The project was one of the early office buildings to have sky gardens punctuating the building at certain storeys as green lungs in the cityscape. Auto irrigation was introduced to optimise water usage together with water retention gel in the soil mix to improve water holding capacity reducing the need for frequent watering. The other prominent feature of the building was the louvered façades. It was one of the first office buildings to use aluminium sun shading louvers. Sustainable materials such as ceiling boards, carpets, waterproofing, drywalls, MDF boards used had recyclable content, energy efficient features introduced such as motion detectors, T5 lighting, water efficient fittings, infrastructure to receive NEWater and so on.

The building was one of the pioneer buildings to obtain Green Mark Gold certification in 2005 for the features it adopted and results of energy savings which was beyond expectations during operation of the building from readings taken. This eventually led to its recognition in the ASEAN Energy Awards Best Practice for Energy Efficient Building category in 2006.

As an advocate of BIM, Ar. Khoo also speaks regularly at seminars and conferences sharing on the use of BIM and sustainability tools on how parameters like climate analysis, sun and shadow studies, solar load analysis, wind analysis, lighting and life cycle are studied using BIM in the projects.

GREEN ARCHITECT OF THE YEAR

AR. KUAN CHEE YUNG
Senior Vice President
CPG Consultants Pte Ltd

Ar. Kuan Chee Yung is Senior Vice President at CPG Consultants Pte Ltd. He is an Architect, Planner, Educator, Nature Champion, Integrated Landscape and Garden Designer with extensive work in Singapore & the Region ranging from Complex Integrated Projects like Knowledge Campuses, Healthcare; to Lifestyle Oriented Designs like Residential Townships, Urban & Waterfront Mixed Commercial Developments; to Institutions like Museums, Botanic Gardens and Iconic Themed Parks. He is a multiple GreenMark Platinum Award Winner, won the SIA-NParks Skyrise Greenery Award 2009, LEAF Awards 2014 (Outstanding), CTBUH & RIBA International Design Award for Solaris@ one-north and Futurearc Awards for Bay East Gardens.

His writings on Social Capital & Sustainable Design have been featured in SA Journal and he continues to be active in SIA as Council Member, Chairman of Practice Convention 2016, Co-Chair of Education Thrust, and member of GreenMark 2015 work groups. He also serves in the Construction Productivity and SkillsFuture Tripartite Committee (CPSTC), Productivity Gateway Advisory Panel, INPQS (BIM) Co-Chair and Design for Maintainability Workgroup in BCA.

AN EYE FOR GREEN

Ar. Kuan has been involved with many Green Mark projects in Singapore, many of which have distinctive sustainability features. For example, Solaris@One-North - a Green Mark Platinum project – features a 1.5km spiral garden that winds around the building and links a series of stepped roof gardens that allow for practical vertical greening from One-North's green spine to the rooftop. This garden is cost-effective as it reduces glazing by 30 percent yet still retains the multi-function of an easily maintainable green façade, attractive sky terraces for users, native trees planted in a bio-swale/ water filter and rainwater collector. This green façade was found to be more efficient in ETTV (envelope thermal transfer value), allowing the project to clinch the ASEAN Energy Award in 2013 as well as the NParks LEAF Outstanding Award for landscape with biodiversity.

Another notable project Ar. Kuan led is the Wet Science Building at the National University of Singapore (NUS). Apart from being a very energy-efficient building through the usage of higher efficiency chiller systems, Ar. Kuan also added a new social-creative dimension of "Maker Space & Floor to Floor connected Collaboration Spaces", innovated with passive and mixed mode thermal comfort systems with the use of cool condensate water for cooling and landscape irrigation. The laboratory's efficiency was also raised by two percent with a larger combined "flexi-lab" floor plate, allowing in more daylight without higher solar heat gain.

Ar. Kuan is also co-chair and advisor for the Singapore Institute of Architects (SIA), representing SIA and the Malaysia Institute of Planners to promote promote various green and wellness initiatives in Singapore and Malaysia.

GREEN FACILITIES MANAGER OF THE YEAR

ER. TONG KOK KWANG
Project Director and Principal Mechanical Engineer
Office of Development and Facilities Management,
Nanyang Technological University

Er. Tong Kok Kwang is a practising mechanical professional engineer with more than 20 years of experience in the design, construction supervision and maintenance of mechanical and electrical engineering systems. He has completed a vast number of projects across many different fields.

Er. Tong served as a Council Member of ACES and Technical Committee member in IES. He is a Technical Committee Member which reviews and makes changes to local Codes of Practice. Er. Tong is also a Technical Committee member for two BCA Green Mark taskforces to review the new Green Mark assessment criteria for existing buildings.

Possessing a strong passion for mechanical engineering, Er. Tong is always on the lookout for and testing new designs that can improve energy efficiency and cost effectiveness.

PUSHING THE GREEN ENVELOPE

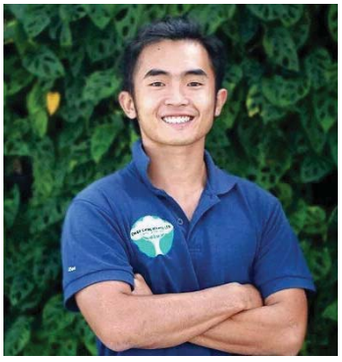
Er. Tong joined Nanyang Technological University (NTU) in 2012, back when NTU only had one Green Mark Platinum building on its sprawling campus. Today, NTU has 53 Green Mark Platinum Buildings. As project director, Er. Tong is responsible for most of the buildings in NTU.

Driving part of NTU's Eco Campus Initiative to save 35 percent of energy, water and waste, Er. Tong is instrumental in guiding the direction of NTU's green initiatives. Actively searching for innovative solutions to address green building issues, Er. Tong testbeds promising technology before implementing them in NTU's new and existing buildings. For example, a Passive Displacement Ventilation (PDV) system can reduce a building's total electrical load by about 14 percent. After test-bedding the technology in a number of buildings on-campus, NTU will begin to convert their conventional air-conditioning system to this PDV system for the rest of their existing buildings.

Er. Tong also led a feasibility study for a Photovoltaic Cell Farm in NTU, which produced positive and economically viable results. Today, the PV Cell Farm is completed and offsets about four percent of NTU's total consumption for its academic buildings. Er. Tong also worked with his consultants to upgrade all chiller plants to higher efficiency ones, complemented with variable speed drives added to all pumps and cooling towers. He also explored high temperature phase shift district cooling systems (DCS) to improve the overall chiller plant efficiency for the current DCS plant. When all the chiller plants are upgraded, up to 10 percent of the total building electrical load can be saved.

Apart from his contributions on campus, Er. Tong also speaks at conferences and shares his experiences with other universities and institutes of higher learning.

YOUNG GREEN INNOVATOR OF THE YEAR



MR. ZAC TOH
Director
GWS Living Art Pte Ltd

Zac Toh serves as the head of GWS (Green Wall System) Living Art, a part of family business Chop Ching Hin Pte Ltd that specialises in urban green technology. He deals closely with green technologies, bringing landscaping into modern world buildings and skyscrapers.

Growing up, he spent his school holidays in his father's plant nurseries plucking weeds, propagating plants and driving forklifts and automated farming machinery. Instead of going to university where he had a placing, he chose to take on the role as Chop Ching Hin's GWS Team head. He continues to improve and push the limits of urban greenery and has designed and engineered many green walls in residential and commercial project – the most recent being Country Garden at Danga Bay, Iskandar Malaysia.

THE MODERN FARMER

Seeing himself as a modern farmer, Zac strives to sustainably integrate greenery into modern structures. He firmly believes in developing sustainable systems and that the cost of the system and its upkeep should not exceed the real benefits of going green.

One key innovation perpetuated by Zac is a sustainable, pre-situ mat for green roofs, the first pre-grown mat green roof system in system. Having used conventional systems prior to this new innovation, Zac found these older systems to be lacking in certain aspects. After spending two years working with greenery specialists in Europe, Zac developed the revolutionary product that is able to cut installation time by five times owing to its pre-fabricated nature. This mat system also ensures project success as the room for error becomes very minimal, and the system is safer for workers as they are much lighter than conventional methods of greening roofs. Most importantly, the green roof pre-situ mat system is sustainable, reducing the frequency of maintenance visits from monthly to quarterly. This system has since been installed on many different projects ranging from public housing to a childcare centre.

A recent project undertaken by Zac and his team is the internal green wall at Changi Airport Terminal 3, whereby internal addition and alteration works to the green wall was done. For this green wall to survive, special lighting had to be integrated into the installation. The plants also required a special combination of colour rendition index, plant growth and creation of the right atmosphere to thrive. Zac worked with specialists from Japan and Germany to create the best suitable light for the indoor space that not only works but is also sustainable due to its low energy usage.

Zac regularly shares his expertise and experience with the industry through speaking engagements. He is also very passionate about greening the next generation, devoting time and effort to educate students on the true benefits of greenery.

COMMENDATION: GREEN ADVOCATE

AR. QUEK SER BOCK
Deputy Director (Design Implementation)
Housing and Development Board

Aligned with HDB's vision to create vibrant and sustainable towns, Ar. Quek's work has always been the advocating for sustainable buildings and public housing precincts. Through establishing clear design guides and having sustainable eco-features that are implemented in Singapore's public housing developments, there is a significant environmental contribution towards the nation's vision of creating a Sustainable Singapore.

As the Deputy Director of Design Implementation in HDB, Ar. Quek has led projects to achieve Green Mark Gold, GoldPLUS and Platinum levels of certification, along with implementation of standard features and initiatives that encourage sustainable living in public housing. On the national level, Ar. Quek has led the implementation of eco-features to be provided for in all new public housing developments since January 2014.

GREENING PUBLIC HOUSING

In the process of his work with HDB, Ar. Quek is committed to delivering sustainability outcomes for the residents who will inevitably live in the buildings he helps to create. He has pioneered a number of public housing projects with keen sustainability features, such as Waterway Terraces I & II, a Green Mark Platinum housing project that has also won the International Public Housing Competition.

Besides having green building features, the project also encourages social sustainability through community living.

Ar. Quek spearheaded the implementation of a number of eco-features in HDB projects. The implementation of centralised chutes for recyclables has actively encouraged recycling amongst the residents, and improved productivity for waste collection. Similarly, the provision of eco-pedestals in every household contributes to the national water saving efforts, while bicycle rack provisions encourages cycling as a cleaner mode of transport.

The significance of such implementations is that the result of the efforts is compounded over time. For example, as of Feb 2017, the centralised chutes for recyclables has been incorporated into 100 new public housing projects comprising close to 572 apartment blocks island-wide. As the number will continue to increase, this implementation has already helped to save cost through the omission of recycling bins and improve waste collection. To further reduce the need for manpower resources, HDB has since 2016 started to provide Pneumatic Waste Conveyance System (PWCS) to new public housing developments, with Ar. Quek overseeing the smooth implementation of the PWCS across projects island-wide.

CITY DEVELOPMENTS LIMITED

SGBC-BCA Sustainability Leadership AWARDS 2017

Business Leadership in Sustainability

Driven by a passion and purpose to 'Build Value', CDL has built a strong track record as Singapore's trusted property pioneer and one of the most sustainable companies in the world.

A Singapore-listed international real estate operating company with a global presence spanning 97 locations in 26 countries, CDL is one of Singapore's largest companies by market capitalisation. Its income stable and geographically-diversified portfolio comprises residences, offices, hotels, serviced apartments, integrated developments and shopping malls, totalling over 18 million square feet of floor area globally.

Over the past five decades, CDL has developed over 40,000 homes globally and is one of Singapore's largest commercial landlords, with one of the biggest landbanks amongst Singapore private-sector developers.

Beyond shaping skylines with architectural icons, CDL has played a key role in transforming the built environment with numerous award-winning green buildings.

For over two decades, CDL has embraced its ethos of 'Conserving as we Construct', and led the industry with green building innovation from first-of-its-kind sustainable developments that inspire eco-friendly lifestyles to industry-changing methods that promote recycling, reduce waste and raise productivity.

Since 1995, CDL has also integrated sustainability across its business, operations and entire value chain. The Group adopts a holistic three-pronged approach which includes designing and developing sustainable and green buildings, managing buildings in an energy- and resource-efficient way, and engaging and influencing stakeholders to support CDL's commitment towards sustainable development.

In line with its sustainability strategy, the CDL Future Value 2030 blueprint was introduced to future proof the organisation to meet challenges in the evolving business and natural landscape.

With a focus on sustained growth and value creation for the business, stakeholders, community and the environment, the blueprint reflects CDL's commitment to its Environmental, Social and Governance (ESG) goals and policies to mitigate risks, enhance resource-efficiency, drive productivity and innovation – and to create enduring value.

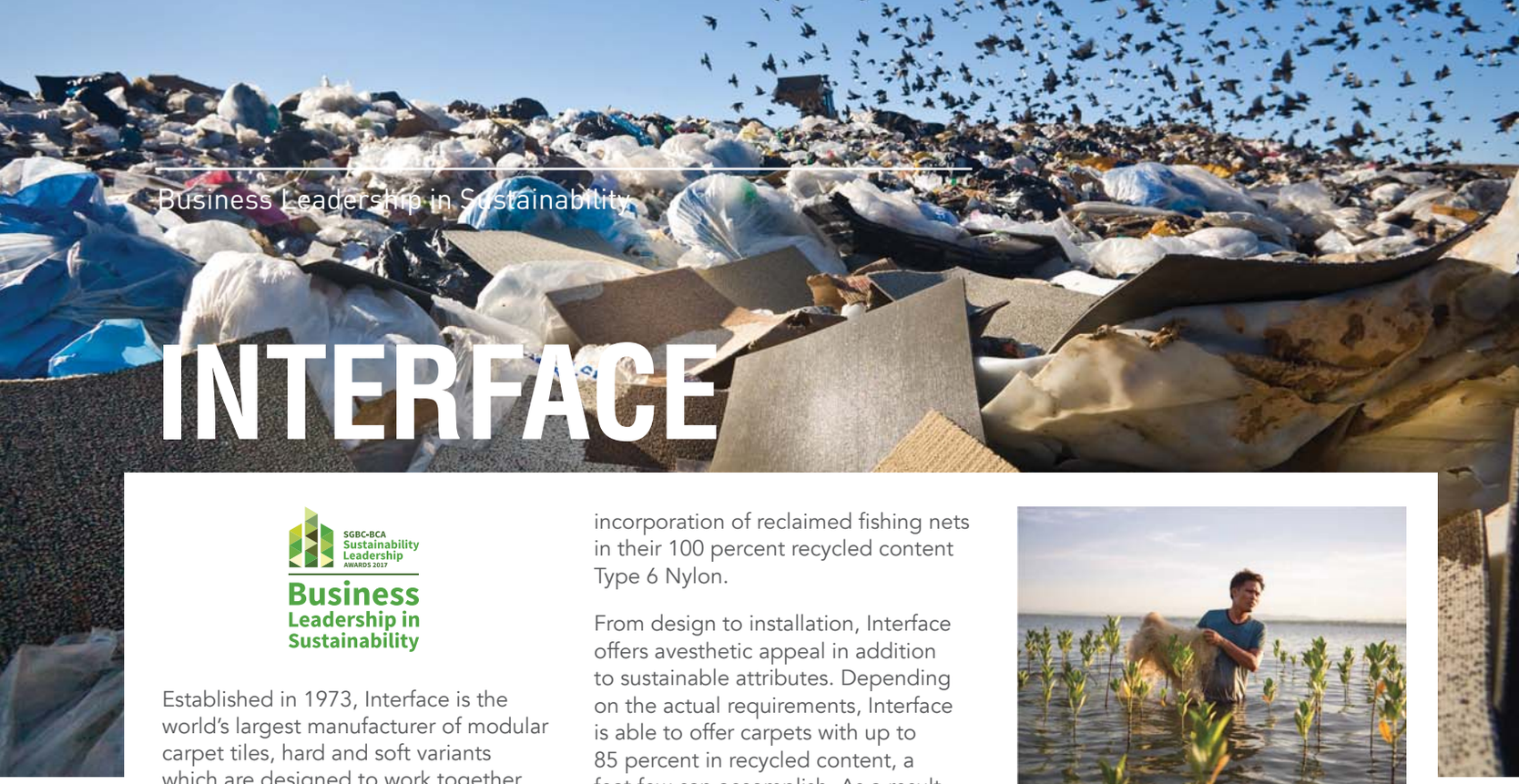
The CDL Future Value 2030 blueprint is aligned with the United Nations Sustainable Development Goals which came into force in 2016, and reflects CDL's voluntary commitment to raise its carbon emissions intensity target from 25% to 38% by 2030, against baseline year 2007.

Globally, CDL is ranked Top Singapore Company and the Most Sustainable Corporation in Real Estate Management & Development in the eminent Global 100 Most Sustainable Corporations in the World in 2017, and is the only Singapore company listed in the ranking for eight consecutive years.

CDL is also the first Singapore company to be listed on four of the world's leading sustainability benchmarks – FTSE4Good Index Series (since 2002), MSCI Global Sustainability Indexes (since 2009), Global 100 Most Sustainable Corporations (since 2010) and Dow Jones Sustainability Indices (since 2011). Since 2014, CDL has also been Asia's Top Property Developer, Top Singapore Company and Top 10 Companies in the Channel NewsAsia Sustainability Ranking.

For its contributions in shaping a sustainable built environment, CDL has been recognised by the Building and Construction Authority (BCA) with numerous pinnacle accolades. It was the inaugural recipient of the Built Environment Leadership Platinum Award in 2009 and Green Mark Platinum Champion Award in 2011. More recently, it was the first developer to receive the Quality Champion Star Award in 2017.

All images courtesy of City Developments Limited.



INTERFACE

SGBC-BCA Sustainability Leadership AWARDS 2017
Business Leadership in Sustainability

Established in 1973, Interface is the world's largest manufacturer of modular carpet tiles, hard and soft variants which are designed to work together in an integrated flooring system. A global company with a reputation for high quality, reliability and premium positioning, Interface has manufacturing locations on four continents and sales in 110 countries.

Recognised internationally as one of the most environmentally responsible manufacturers on the planet, Interface is dedicated to "Mission Zero". This commitment to sustainability equates to the complete elimination of any negative impact Interface has on the environment by the year 2020. Launched in 1994 to find an alternative to the traditional take-make-waste manufacturing model, Mission Zero is deeply entrenched and embedded into Interface's philosophy and business strategy. When it comes to closed loop manufacturing, Interface sets the bar, recycling thousands of tons of old carpets and transforming them into beautiful new ones.

Right from the design stage, Interface carefully considers their ultimate destination and does what it can to reclaim used carpets. Since 1995, more than 118 million kilograms of have been diverted from landfills globally. Interface also works closely with its fibre suppliers to continually reduce the virgin content in the nylons purchased by supplying them with post-consumer carpet fibre from all over North America. This has resulted in new and innovative technologies that significantly increase the recycled content of Interface products, and now includes incorporation of reclaimed fishing nets in their 100 percent recycled content Type 6 Nylon.

From design to installation, Interface offers avesthetic appeal in addition to sustainable attributes. Depending on the actual requirements, Interface is able to offer carpets with up to 85 percent in recycled content, a feat few can accomplish. As a result of this emphasis on total life cycle sustainability, Interface is the first carpet manufacturer in Singapore to achieve the maximum 4-tick Leader rating in SGBC's Singapore Green Building Product labelling scheme.

The focus on sustainability permeates every aspect of Interface, from the products it offers right down to the people who make, market and deliver the product. Both management and rank-and-file employees are onboard Interface's sustainability vision through a number of initiatives that include a sustainable internal purchasing policy, a program that puts employee suggestions into action as well as internal transportation programmes. Indeed, Interface tracks and neutralises carbon emissions from employee business air travel, having planted more than 200,000 trees to negate the carbon emissions from business-related air travel since starting in 1997.

With a business model focused on sustainability, Interface is well-poised to achieving Mission Zero by 2020. In fact, the company is getting very close to this goal and proving that a sustainability-based business model is possible. Interface is now preparing to take the next powerful step in its journey: Climate Take Back, an audacious new mission to go beyond mitigating harm to the environment to running the business in a way that helps to reverse global warming.

LOCAL AND REGIONAL PRESENCE

Interface's regional hub is in Singapore with 35 staff, including its Sustainability Lead for Asia. Interface's regional location in Singapore allows it to reach countries across South East Asia including Thailand, Indonesia, Malaysia, Vietnam, South Korea and Japan.

Interface drives a number of sustainability initiatives from the regional office in Singapore, one of which is an open source collaborative platform designed (HumanSpaces.com) to aggregate and publish content related to biophilic design to advance the sustainability of buildings in Singapore and beyond. Through this site, Interface has featured case studies from WOHA and CPG including the ParkRoyal on Pickering property and Khoo Teck Huat Hospital. Their role has also always been quite focused on contributing global resources and findings to push the boundaries of green and sustainable approaches in Singapore.

Interface works closely with the local industry, such as with the Singapore Green Building Council. Regularly supporting SGBC's Pavilion at the annual BEX Asia exhibition, Interface has also organised a number of events with SGBC, primarily seminars cum networking events centred on sustainability in design and architecture as well as on biomimicry.

All images courtesy of Interface Asia.

Leadership in Green Building Product

AGC ASIA PACIFIC PTE LTD

SGBC-BCA Sustainability Leadership AWARDS 2017
Green Building Product

Established in 1907, Asahi Glass Co. Ltd (AGC) draws on more than a century of research and technical innovation to develop world-class expertise in various fields related to glass, chemicals, electronics, ceramics as well as other high-tech materials and components.

Leveraging on the breadth and depth of its know-how, AGC is in the three business domains of:

- Safe, Sound and Comfortable Living Spaces and Materials
- Higher Quality Display Devices and Communications
- Clean and Green Energy

Today, it is a truly global company contributing to a high quality of life around the world by providing a stable supply of not only high quality glass, but also a wide range of excellent products across its three business domains.

Building upon its rich history, AGC has acquired the world's leading market share for various glass products, including architectural glass, processed automotive glass, and glass substrates for liquid crystal displays.

AN ONUS ON GREEN BUILDINGS

AGC regards green buildings as an important concept as far as the built environment is concerned, taking it one step further by developing an award-winning green building of its own. In Europe, the AGC Glass Europe Headquarters is a shining example of a company walking the talk, with the building certified "Excellent" by the Building Research Establishment Environmental Assessment Methodology (BREEAM), the second best certification rating a building can obtain. BREEAM

is the world's leading sustainability assessment method for master-planning projects, infrastructure and buildings.

Achieving this rating was no mean feat; only glass was capable of meeting the challenge of admitting maximum natural daylight while protecting the occupants from the sun's heat and glare. The building's designers achieved this feat using double glazing with enhanced thermal insulation in combination with louvres made of screen-printed glass.

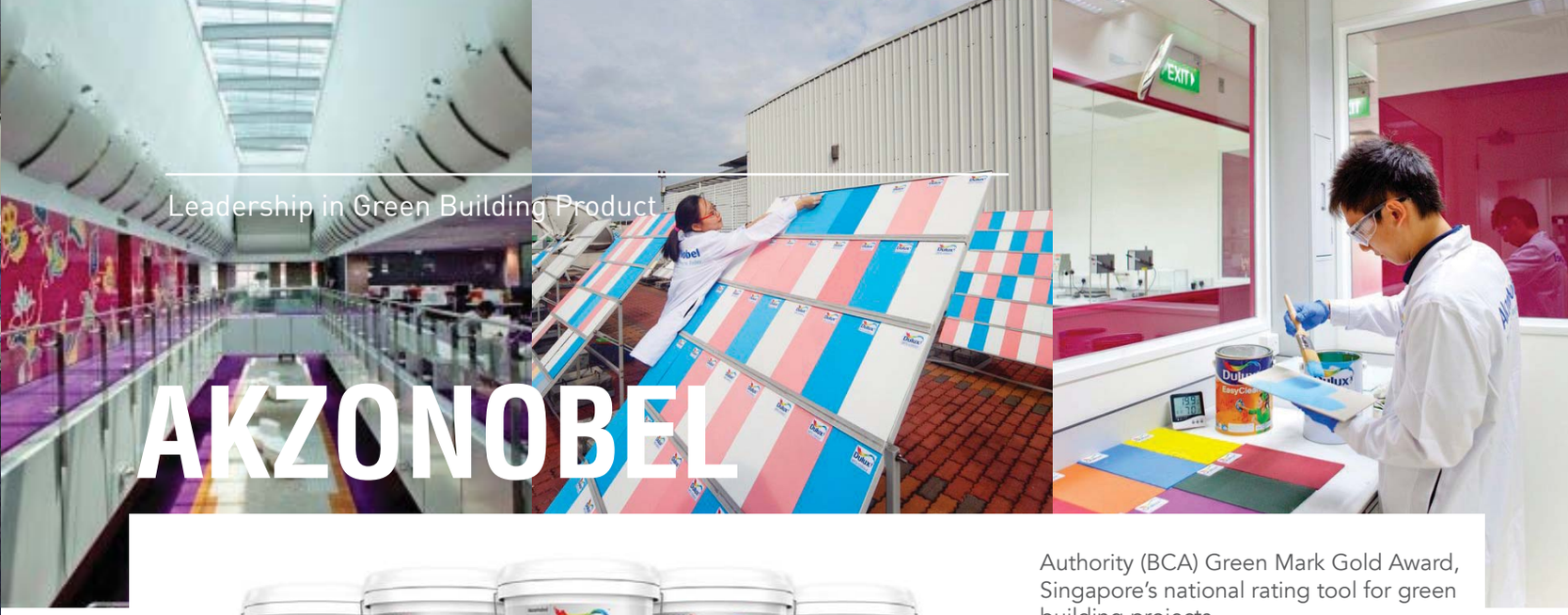
AGC's Asia Pacific arm also repeated this emphasis on green buildings when it occupied a new office in Singapore, consolidating all its staff spread across different sites. Fitted out according to green design principles, the office is sited in a Green Mark GoldPLUS certified building and has itself achieved a Green Mark certification of GoldPLUS for Office Interior as well.

Although AGC ensures that its manufacturing processes are truly sustainable while producing sustainable products, these materials would have to meet global standards and benchmarks in order to stay relevant in a dynamic and ever-changing market. Industry certification is an important benchmarking tool, ensuring that performance of AGC products is commensurate with both local and global standards. Over the years, the AGC group has amassed many forms of certification for its products and manufacturing standards, both mandatory and voluntary for its products. Examples of such recognitions include REACH, ROHS and Cradle to Cradle. The AGC group is also the first glass manufacturer to receive certification under the Singapore Green Building Product (SGBP) labelling scheme, administered by the Singapore Green Building Council (SGBC).

AGC has four certificates issued under the SGBP labelling scheme that cover many different product models, and two of these certificates bear the maximum Leader rating. These certified products enjoy better standing when specified for use in local building projects as the SGBP scheme directly complements the Green Mark Scheme which is Singapore's national green building rating tool administered by the Building and Construction Authority (BCA).

The AGC group is poised to offer its expertise and assistance, banking on its decades-long experience in creating innovative, eco-friendly building materials. AGC's various technologies and commitment to sustainability can help the world achieve a greener, more sustainable environment, one that is real and palpable for future generations to enjoy.

All images courtesy of AGC Asia Pacific Pte Ltd.



Leadership in Green Building Product

AKZONOBEL

SGBC-BCA Sustainability Leadership AWARDS 2017
Green Building
Product

Sustainability is at the heart of everything at AkzoNobel. AkzoNobel is committed to making all their products, services and partnerships as sustainable as possible. The organisation takes pride as a one-stop solutions provider of paints and coatings – offering a full range of sustainable innovations across Decorative Paints, Protective Coatings, Powder Coatings and Wood Adhesives for the building and construction industry. AkzoNobel's trusted brands and products have been around for over three centuries to help build better places for people to live, work and play in.

SUSTAINABLE INNOVATIONS

AkzoNobel is focused on paint and coating innovations that improve air quality, save on maintenance and improve durability – all while looking good while they do it.

This result in class leading products such as the Dulux Professional Weathershield™ E1000 formulated with heat reflective feature to keep exterior surface temperature cooler by up to five degrees Celsius – resulting in savings of up to 15 percent on energy used to cool their homes and thus mitigating the effects of global warming.

Similarly, interior paints containing Lumitec technology such as Dulux Professional Smartlight in Singapore have been developed specifically to meet growing concerns about the environment. Being more reflective and less absorbent of light, it can result in up to 22 percent lower energy consumption for lighting. Lights can be set to a lower level or switched on for shorter periods.

AkzoNobel's industry leading Interpon®powder coatings are VOC (volatile organic compound) free, recyclable during application and is the only powder coating that comes with Environmental Product Declaration (EPD) certification based on life cycle assessment and independent verification. AkzoNobel also produces passive fire proofing coatings which replace concrete for fireproofing, and allows better use of space, lower VOC and improved recyclability.

AkzoNobel has multiple product lines certified at the maximum 4-tick Leader rating under the Singapore Green Building Product certification scheme.

AKZONOBEL HOUSE IS A GREEN MARK BUILDING

As a leading company in sustainable practices, sustainability is at the top of the organisation's agenda when selecting a new site in Singapore. AkzoNobel House has been awarded the Building and Construction Authority (BCA) Green Mark Gold Award, Singapore's national rating tool for green building projects.

Besides using eco-certified decorative paints, the building has a consolidated recycling system, as well as procedures such as the Water and Energy Efficiency Improvement Plans which monitor resource consumption every month and encourage pro-active moves to ever more sustainable behaviour.

SUSTAINABILITY TARGETS

Products that offer a sustainability advantage will become increasingly significant to the business. AkzoNobel's goal is for sustainable products which bring a customer benefit to form 20 percent of revenue by 2020. AkzoNobel is also committed to reducing its carbon dioxide footprint across the whole value chain. The aim is to reduce carbon emissions by 25-30 percent by 2020 (against a 2012 base). The business in Singapore is well positioned to advance the sustainability agenda and contributes directly to the sustainability targets.

Planet Possible, AkzoNobel's commitment to doing more with less has been successfully built on the three strategic pillars: sustainable business; resource efficiency and capable, engaged people. The organisation is committed to developing a more sustainable business and creating more value from fewer resources. Customers, partners and society in general also expect AkzoNobel's products and services to be as sustainable as possible. The organisations believe that each and every one of us together has a role to play in making the environment more sustainable. By working together with all its customers and partners, AkzoNobel can make life more liveable, healthy and inspiring.

All images courtesy of AkzoNobel.

RAISING THE BAR ON SUSTAINABILITY

SGBC-BCA Sustainability Leadership AWARDS 2016

Design & Performance COMMERCIAL

Alexandra Point, a 24-storey office building located along Alexandra Road, has come a long way in its sustainability journey since it was completed in 1992.

In recent years, the building had undertaken a series of green retrofits to upgrade its chilled water system, air handling units (AHU) and lifts algorithm. and the whole lifecycle of the equipment in optimising the resource efficiency of the building. This resulted in higher energy and water savings of more than 1,162,000kWh/year and 30,000m3/year respectively.

Besides receiving the BCA Green Mark Platinum certification, Alexandra Point was also listed as one of the top 10 best performing private office buildings in BCA's Building Energy Benchmarking Report in 2015 and 2016.

SUSTAINABLE FEATURES

Various initiatives have been introduced and monitoring systems have also been put in place to reduce and track energy consumption at Alexandra Point. To conserve energy, the building uses LED lights in common areas, motion sensors at the carpark, toilets and stairways, and adopts a lighting schedule.

Smart meters provide real-time continuous remote monitoring of the chiller plant's performance. This facilitates maintenance and ensures optimum efficiency of the chiller plant system. Smart monitoring of the water quality in the cooling tower also improves water efficiency, reduces maintenance cost and extends the lifespan of the cooling tower.

Alexandra Point uses NEWater for its cooling tower and irrigation to reduce the usage of potable water. Water-efficient fittings that are rated "Excellent" under PUB's Water Efficient Labelling Scheme (WELs) and waterless urinals are also installed in all toilets.

To enhance the health and well-being of building occupants, carbon dioxide (CO^2) sensors are installed and integrated with the building management system to maintain the level of fresh air. Singapore Green Label certified (SGLS) product Gelair is also used in all AHUs to improve indoor air quality and energy efficiency.

To walk the green talk, Frasers Centrepoint Limited's offices at Level 15, 16 and 21 of Alexandra Point

have been certified with the BCA Green Mark Office Interior GoldPLUS from 2017 to 2021. The office uses energy-efficient lighting and air-conditioning systems, water-efficient fittings, recycling facilities and 'Energy Star'-labelled office equipment.

ENGAGING TENANTS

In addition to its sustainable features, the building management team collaborates with Alexandra Point's office tenants to adopt environmentally-friendly practices where possible.

Educational green talks, guides and posters promote resource conservation and recycling among staff and tenants. Recycling and e-waste bins are also conveniently placed at the lift lobbies to encourage recycling.

Lastly, customer satisfaction surveys are conducted yearly as part of ongoing efforts to foster partnership with stakeholders to drive greater environmental sustainability for the building.

Architect: RSP Architects Planners & Engineers
M&E Engineer: Squire Mech Pte Ltd
Structural Engineer: RSP Architects Planners & Engineers
Quantity Surveyor: Davis Langdon and Seah
Main Contractor: Reliance Contractors Pte Ltd
Landscape Consultant: Garden & Landscape Centre Pte Ltd
ESD Consultant: Kaer Pte Ltd

OUR TAMPINES HUB

SGBC-BCA Sustainability Leadership AWARDS 2016

Design & Performance INSTITUTIONAL

Our Tampines Hub is the first-ever integrated community and lifestyle hub in Singapore. Led by the People's Association, the project brings together many different agencies and stakeholders to offer a comprehensive suite of services and facilities that include ancillary services, a sports stadium, medical and childcare facilities. It is a veritable Hub for the residents of the Tampines district.

Constructed with energy efficiency and sustainability in mind, Our Tampines Hub is built with a vision to foster a caring, learning, active and green building development. The 7-storey establishment occupies the land area of the former Tampines Stadium and Sports Hall, occupying a gross area of 121,600 square metres. However, concrete waste from the demolished buildings were reused in the construction of Our Tampines Hub, reducing the development's carbon footprint.

The building has facade types including a curtain wall system, pre-cast concrete walls, vertical fins and metal composite panels as cladding on the MPSH. The design team selected energy efficient / high performance glazing which achieved 38.43 W/m2 for the overall envelope thermal transfer value (ETTV). This ETTV figure meets the Green Mark Platinum standard (i.e. below 40 W/m2). The façade systems are designed to be durable and permeable, effectively optimising natural ventilation and daylight in campus areas. The architectural elements were designed in synergy with the existing compound and built with the flexibility for future expansion.

Staying true to its design intent, the building forms and materiality will provide a recognised architectural expression, demonstrating a commitment to environmentally sustainable design, sound buildability principles combined with select material innovation. The new campus incorporated low energy and smart systems for environmental control into its architecture. A well-integrated building management system, the team employed extensive conservation strategies to manage energy and water consumptions.

The building has implemented several approaches to improve energy efficiency, with the chiller plant system achieving an overall efficiency of 0.588 kW/ton. Carbon dioxide (CO2) sensors are also installed in associated rooms to maintain adequate air quality

throughout occupied hours, they regulate outdoor air flow rate to maintain the concentration of carbon dioxide. In the common areas, large diameter fans help to move large volumes to air to improve ventilation and thermal comfort.

The building circulation areas also have motion sensors installed in the staircases and toilets. Additionally, photocell sensors are installed in these associated areas as well: when lighting level is adequate within a space the system will switch the electric lights off and utilise natural daylight. These sensors will help save significant amount of lighting energy annually. High frequency ballasts are also used throughout the development. Energy efficient lifts and escalators are installed to optimise energy savings, with AC variable voltage and variable frequency (VVVF) motor drive and sleep mode features.

In terms of water conservation, Our Tampines Hub makes use of water efficient fittings with an Excellent Rating under the WELS labelling system. Sub-meters are also installed throughout the development to monitor usage and leaks for the domestic water, irrigation system, cooling tower and swimming pool via the BMS. In addition, the provision of a rainwater harvesting and auto-irrigation system equipped with rain sensors and drip irrigation for the greenery and landscape architecture. Further, drought resistant plants help to further reduce water demand a nd use.

Indeed, a striking visual of the development is the extensive provision of landscape and vertical green walls layered all over the façade. Aside from the visual appeal and comfort that is provided, the greenery also serves to reduce the urban heat island effect.

Going beyond the façade, Our Tampines Hub implements and maintains a number of sustainability initiatives from the construction stage. The development saw extensive use of building products and materials certified by the Singapore Green Building Product labelling scheme, as well as the use of green concrete, RCA and WCS to maintain low concrete usage index. All of the parties involved in the development are also firms certified by the Singapore Green Building Services certified scheme.

Building tenants are encouraged to partake in their own recycling and sustainability initiatives through the Tenant Guide Book, assisted by the provision of recycling bins found in common areas. The development is also adopting green leases to increase tenant awareness and buy-in to utilise the building facilities optimally and to their true energy saving potential. An Energy Information System is also installed as an education tool to educate the public on the building's energy usage in real-time in terms of units of power and also financial spending. Occupant response patterns derived from this system can go towards helping the building perform better further into its lifespan.

Developer: People's Association
Project Manager: ARCADIS Project Management Pte Ltd
Architect: DP Architects Pte Ltd
M&E Engineer: AECOM Singapore Pte Ltd
Structural Engineer: T.Y. Lin International Pte Ltd
Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor: Hexacon Construction Pte Ltd
Landscape Consultant: DP Architects Pte Ltd
ESD Consultant: Meinhardt (Singapore) Pte Ltd

BLOSSOMING SUSTAINABILITY

SGBC-BCA Sustainability Leadership AWARDS 2016

Design & Performance RESIDENTIAL

Blossom Residences, a 602-unit executive condominium development situated in mid-western Singapore, boasts a host of passive green building design features that work in tandem with sustainable implementation to give its residents a pleasant and healthy place to live in.

The residential development is designed with a passive and active ecological approach. Residential towers are orientated in the North-South direction with good cross ventilation and natural ventilation to all units. The design of the façade using fins act as sun shading feature for the units. In addition, an extensive lush landscape deck, sky garden, green wall of multi-storey carpark and green roof of clubhouse further enhance the ecological design of the development.

The planning strategy was to maximize the use of Gross Floor Area (GFA) while minimizing the building footprint in order to optimize the greenery provision (green plot ratio or GPR) for the site. The resulting GPR achieved is approximately 4.47, improving environmental thermal comfort levels through reduction of the urban heat island effect. Environmental management practice was also performed by the main contractor during construction of the project, and a preliminary study was carried out to calculate estimated cost for waste disposal, consumption of water, electricity and fuel for the whole project with the objective of controlling resources within target and save as much as possible.

A number of energy saving features are implemented within Blossom Residences. The lighting in common areas and external areas is controlled by a suitable number of time switches such that approximately half of these lighting shall be switched off after predetermined time during the night to conserve energy. Internal staircases lighting are controlled by motion sensors at every light fitting. All apartment units are also provided with gas operated water heaters instead of electric heater. This results in an estimated 505,854kWh of energy savings per year. The basement car park with Mechanical Ventilation system with CO sensor and Multi-storey Car Park with fume extractor system with CO sensors, generating estimated energy savings of 272,760kWh per year. All residential units are also provided with energy efficient air conditioners certified under the Singapore Energy Labelling Scheme (4-ticks).

Blossom Residences has in place an automatic irrigation system equipped with rain sensors to water the generous amount of greenery present using water harvested from natural rainfall. As rainfall in the region is extensive, it is being harvested and stored in a tank for irrigation purposes during days with no rain. Rain sensors are also in place to detect rainy days.

A vegetated swale located next to a footpath and community gardens with seating areas slows down rainwater runoff and allows suspended solids to settle, resulting in improvements to water quality. There is also a viewing deck that overlooks the vegetated swales exposing residents to the swale and educating them on this bit of green infrastructure.

All residential units are also equipped with water-efficient fittings which can generate up to 98,328 m3 of water savings a year. Sub-meters are installed to monitor water usage in common facilities such as the clubhouse, swimming pool and the development's plentiful water features. A solar heater is installed at the clubhouse to make use of the solar energy.

Native plants species are carefully selected and planted within development. A large part of the environmental deck and roof gardens on clubhouse and multi-storey car park is covered with lush greenery. An "infinity forest" is incorporated into the environmental deck with facilities such as children's playground and spa pools nested within.

Sustainable products were extensively used during the construction of Blossom Residences. At the construction stage, the project adopted system formwork for greater productivity. Additionally, the Concrete Usage Index (CUI) is maintained at a low level by optimizing the slab's span vs thickness, minimizing transfer structures as well as a low floor-to-floor height of 2.95m. All internal walls withi the residential units are using a drywall system for ease of installation. 460 bathroom units are also prefabricated minimizing in-situ works and improving efficiency and quality.

Where possible, the development makes use of building materials manufactured from sustainable sources and certified by the Singapore Green Building Product labelling scheme. These include the residential drywall systems using gypsum board, doors, drainage cells using recycled materials, EPDM rubber flooring, floor screed & skimcoat, laminated flooring as well as flexible cementitious membrane waterproofing. Low-E glass is also sourced and used for windows reduce the need for active cooling of space within the units, conserving energy.

A pneumatic waste collection limits exposure to refuse and pests. Common refuse chutes are located in openly ventilated common corridors, and recycling bins are provided at each block to help residents with their recycling initiatives.

Apart from simply providing the green amenities to residents, Blossom Residences has in place several initiatives design to educate and raise awareness of

the property's green features. Informative signages on "Clean Waterway" and "Green Infrastructure" are installed to educate residents and visitors on sustainable ecological design for this development, and Resident Handbooks are given to the homeowners and it comprises all the essential information on the use of the property's green facilities. Blossom Residence's green features are also included in the handbook to educate residents on green living. Residents are then advised to follow the rules strictly, particularly on the aspects of safety and communal living. All the green features were also briefed to the residents during an introductory TOP fair for the development. These Handbooks are given to residents in CD-ROM format instead of hard copy in a bid to be environmentally friendly.

With plenty of green features in place, Blossom Residences helps its residents go towards greener living.

Developer: Grand Isle Holdings Pte Ltd (City Developments Limited)

Architect: ADDP Architects LLP

Main Contractor: Dragages Singapore Pte Ltd

C&S: LSW Consulting Engineers

M&E: United Project Consultants Pte Ltd

Landscape: ONG & ONG Pte Ltd

Interior Designer: Axis ID Pte Ltd

GREENING THE COMMUNITY

SUSTAINABILITY REQUIRES THE SUPPORT FROM ALL STAKEHOLDERS TO FLOURISH

Going green is a collective effort: it requires the commitment from everyone in the value chain in order to blossom and flourish. From the people who build our buildings to the people using the buildings, all stakeholders must be on the same page when it comes to going green.

In some modern offices and workplaces, it is not difficult to spot some of the sustainability initiatives already put in place for tenants and occupiers. The provisioning of recycling receptacles, individual climate controls and zoned lighting systems are some of the more prominent measures in place to help building tenants go green. All these features are designed specifically to ease tenants into embracing green practices for the benefit of their own welfare and also for the entire building. After all, who would say no to lower utility bills through energy and resource savings?

SPREADING THE MESSAGE

But what about the greater community? The regular man-on-the-street would undoubtedly possess only fleeting knowledge of sustainability at best, let alone the know-how to start on his or her own green living practices. Therefore, it is heartening to see that the North West Community Development Council (NWCDC) is taking the lead to help the residents in the entire North West District lead more sustainable and green lifestyles.

Speaking at the second annual SGBC Leadership Conversations 2017 forum at The South Beach on 7 July 2017, Dr Teo Ho Pin, Mayor of the North West District, said that "The North West CDC hopes to encourage greater environmental ownership in the community and inspire more residents to embrace green living. Among the variety of sustainable programmes, the Eco CC @ North West initiative was launched on 31 October 2016 to transform CCs into green educational centres, installed with energy and water efficient "hardware" while simultaneously developing green "software" to drive green living messages to residents through regular activities."

Indeed, going green has become a key message in NWCDC's activities. As part of the Eco CC @ North West initiative, the Bukit Panjang Community Club was awarded with the BCA Green Mark GoldPLUS rating early this year. With green building features such as a green wall, photovoltaic system, energy efficient air-conditioning and lighting systems, the Community Club is able to have estimated energy savings of 6000 kWh/year along with estimated water savings of 1000 cubic metres. In addition to being greener shared venues for resident activities, the Community Club is also a physical example of what constitutes a green building, providing for a more relatable sustainability story closer to the hearts of the residents.

COMMUNICATING SUSTAINABILITY

During the Leadership Conversations 2017 forum, Dr Teo emphasised the importance of collective effort by a committed government, forward-looking industry partners and an active civic society in order to drive sustainability initiatives forward. As such, the NWCDC published the inaugural Green Living @ North West Sustainability Report (SR) in March this year to communicate sustainability efforts in the North West District more effectively and inspire more partners to strengthen collaboration in promoting green. A sustainability report is usually produced and published by organisations to give information on their performance in the areas of economic, environmental, social as well as governance, and this is usually done in alignment of one of several international reporting standards, such as the Global Reporting Initiative (GRI) standards used by NWCDC.

As the first-of-its-kind, the Green Living @ North West Sustainability Report details community green efforts in the North West District, summarising the progress of the North West CDC's Green Living @ North West initiatives since the inception of the 10-Year Eco Plan from 2009 – 2016, measures its impact on the community and assesses the North West CDC's future sustainability plans in the coming years, to stay on-track with the goals set out in the Eco Plan. Although available in physical hard copies, the Report is also available in electronic format on NWCDC's website in support of efforts to go green.

Subsequently, NWCDC will publish Sustainability Reports annually to better monitor the green initiatives undertaken as well as to help the CDC measure the effectiveness of their programmes, many of which would not have been possible without the assistance from like-minded organisations and partners.

In fact, an impressive 80 sustainable programmes were rolled out in the North West District in 2016, reaching out to about 745,000 residents and over 8,000 volunteers, with the help of 117 corporate and community partners. This is definitely a big leap in terms of sustainability for the residents.

GREEN LIVING

In an effort to get residents onboard more sustainable lifestyles, one of the green programmes undertaken by

NWCDC is Green Homes @ North West. Essentially an outreach initiative to make residents more conscious of sustainable options in their choice of home appliances and eco-friendly practices, Green Homes @ North West recognises homeowners for their efforts through a simple home audit and certification by volunteers. The volunteers will look at the electrical appliances installed within the home, whether they have been certified by a recognised energy efficiency rating system, as well as at areas like natural ventilation in the common living areas and established recycling corners.

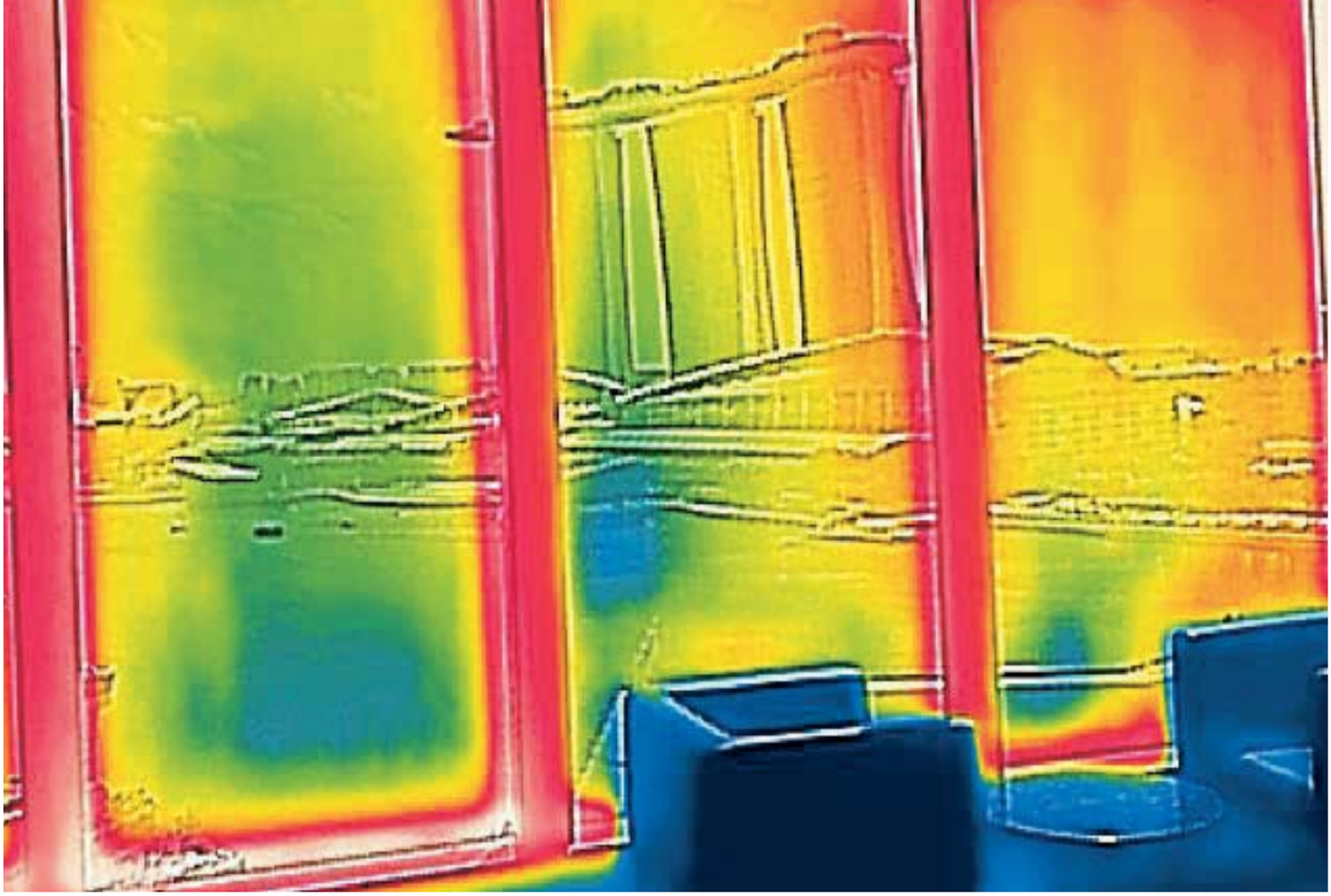
Another initiative undertaken is Recycle @ North West, a programme to encourage active recycling in the District's residents. Slightly different from the usual recycling programmes, green volunteers from NWCDC will share with residents on the importance of reducing and reusing; and how to recycle and what to recycle. This allows the residents to learn a little more about resource conservation and how to actually sort recyclables through hands-on experiential learning. Again, this is to inculcate sustainability themes in the residents, which may help them lead greener, more sustainable lifestyles in the near future.

BEYOND THE FAÇADE

As Singapore progresses along its national goal of greening 80 percent of the built environment by 2030, the need for community engagement is more important than ever. It is only through engagement with the community that green building problems can be heard and subsequently addressed.

As articulated by Mr Tai Lee Siang, Honorary Advisor for SGBC and the Chair of the World Green Building Council who engaged Dr Teo in dialogue during the SGBC Leadership Conversations forum, "It is only with the commitment and expertise of passionate organisations structured in a sound public-private partnership, can green building truly reach beyond the façade."

Images courtesy of North West Community Development Council.



Ever wondered how building facades in Singapore look like under a thermal imaging camera?

Today, curtain wall facades in the tropics are typically using advanced double glazed units (DGU) with multiple layers of low-emissivity coating. However, the curtain wall framing and DGU spacers, which are commonly made of aluminum, are not thermally insulated and transmit large amount of heat indoors.

Technologies for insulation of aluminum frame and edge of glass have been available since the 1970s. Founded in 1969 in Germany, Technoform is a global leader in thermal insulation solutions for building façades, with 13 production sites and more than 45 sales offices worldwide.

Are you designing an energy efficient façade in the tropics? Why not talk to us?

Your Asia Pacific Partner Onsite
Technoform Bautec Asia Pacific Pte Ltd - A member of Technoform Group
6 Temasek Boulevard, #28-06, Suntec Tower Four, Singapore 038986
Tel: +65 62739595
enquiry@technoform.sg
www.technoform.sg

SINGAPORE GREEN BUILDING COUNCIL MEMBER

TECHNOFORM®

SOUTH BEACH
A NEW WAVE OF GREEN INNOVATION, DEVELOPED WITH THE FUTURE IN MIND

Strategically located along Beach Road, South Beach is a mega mixed-use development which marries top design and environmental sustainability, as well as heritage and modernity. An iconic landmark in Singapore's cityscape, South Beach's environmentally friendly architecture incorporates sustainable design and green technology to create a distinctive, high-quality development that fits well with Singapore's tropical climate and urban context.

A City Developments Limited joint venture project, the mixed development seamlessly blends four historic buildings on site with two new 45- and 34-storey towers. The integrated development comprises approximately 510,000 square feet (sq ft) of Grade A office space, 190 luxury residences, a 634-room designer hotel and around 30,000 sq ft of retail space.

COMBINING HERITAGE WITH MODERNITY

An integral aspect of South Beach's development plans was the conservation and integration of four heritage buildings on the site – the former Beach Road military camp and the Singapore Armed Forces Non-Commissioned Officers' Club. Through careful restoration, the four heritage buildings were preserved and turned into usable spaces, with much of the old Beach Road camp's original façade retained to form part of the new development. The heritage buildings now house a mix of F&B options, a grand ballroom and several meeting rooms, blending in with the contemporary office, retail, entertainment, hotel and residential complex built around it.

SUSTAINABLE ARCHITECTURE AND DESIGN

Testament to CDL's ethos to "Conserving as We Construct", a key feature of South Beach is its emphasis on ecological design and an extensive use of green innovations and technology.

MICROCLIMATIC WAVE-LIKE CANOPY

On first sight, South Beach's most striking feature is its undulating microclimatic canopy that extends throughout the development, rising and dipping in waves over the heritage buildings and linking them with two soaring towers.

Located at the heart of Singapore's civic district, South Beach is a new defining sustainable development in Singapore's skyline.

The wave-like canopy extends across the development, providing shade from the sun and rain.

Engineered to provide a naturally-ventilated shelter against the harsh tropical climate, the microclimatic canopy draws in natural light and acts as an environmental shield, providing shade against the sun and rain. Its dynamic form and structure also filters out heat and converts solar glare into electricity through photovoltaic cells while encouraging airflow within the spaces beneath.

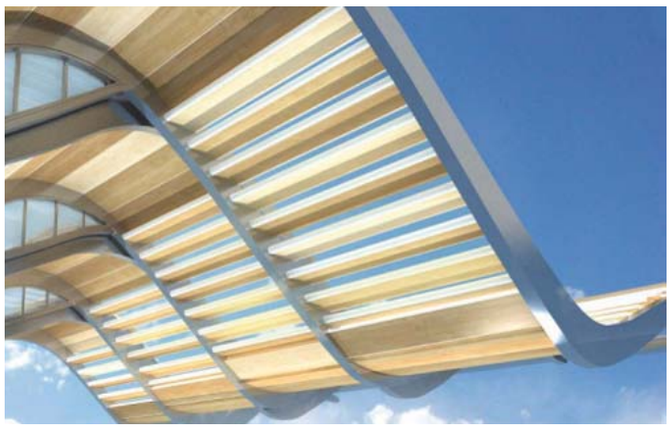
The unique shape of the canopy further serves as a channel for rainwater harvesting and irrigation purposes. Rainwater is harvested from the canopy roof via the 'gutters' in the valleys of the canopy and are transferred to an underground irrigation tank before being used for the irrigation needs of the external landscape and the sky gardens in the towers. This is targeted to save approximately 26,971m3 of water, which is equivalent to 10 Olympic-sized swimming pools.

HIGH PERFORMANCE FACADE

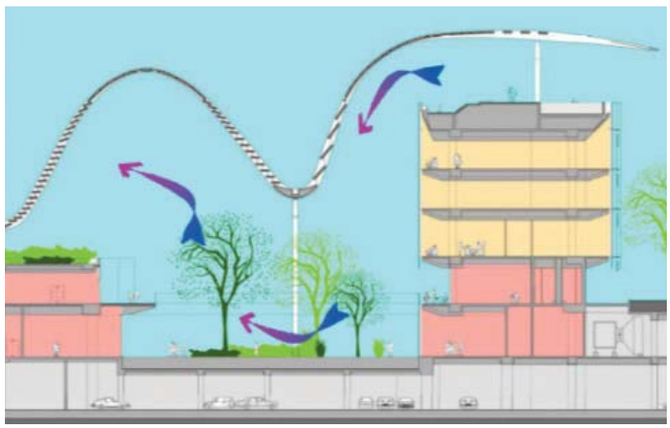
The glass façade is shingled on the North and South facing sides of both towers as a visual statement to create interesting framed views and to mitigate the sun's glare. The upward facing surfaces of the shingled façade consist of double glazed glass of low shading coefficient to reflect harmful ultraviolet rays while the downward facing surfaces consist of higher shading coefficient glass to provide clearer views out. The shingled façade captures the sun's reflections at different times of the day and adds a unique aesthetic feature to the towers.

In contrast, the East-West facing façade treatments have a second layer of sun-shading louvres and the building profile is set back to shield against the more direct sunlight. Planting terraces on certain levels also help to provide shade from the sun's glare for

The heritage buildings from the original site have been preserved and integrated with the new office, retail, hotel and residential complex around it.



The louvres on the canopy allow light and air to filter in, creating bright and airy spaces.



The undulating canopy promotes air circulation and creates a breezy sheltered space for pedestrians.

the levels below. The canopy soars upwards on the east-facing façade of one tower and the west-facing façade of the other tower to shield them from the sun. The slanting facades of the two towers also help to catch winds and direct air flow to the ground-level spaces.

SUSTAINABILITY IMPACT

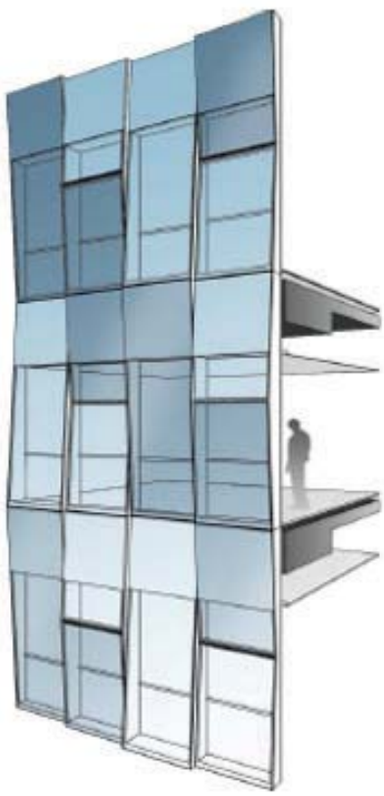
Each year, South Beach saves 30% of energy, or the equivalent of 4,457 units of typical 3-room apartments, through using energy efficient cooling and ventilation systems, lifts, escalators, lighting systems and presence sensors.

In addition, its combination of good orientation, high performance facades, extensive sky terraces and gardens and demand-controlled cooling and ventilation aid the development to achieve 35% lower heat gain than most conventional buildings. A 40% reduction in annual water consumption, or the equivalent of up to 98 Olympic-sized swimming pools, is also expected to be achieved by using water efficient fittings, NEWater top-ups, irrigation systems and rainwater harvesting.

There is close to 10,000m^2 of greenery throughout South Beach, including those in the lush sky gardens and terraces. Providing a living lung for the development, these fresh green spaces not only absorb carbon dioxide and produce oxygen but also act as tranquil, refreshing escapes from the hustle and bustle of busy city life. Moreover, the spaces also act as natural cooling agents which help to reduce temperatures.

Where feasible, South Beach development has adopted the procurement and use of eco-friendly materials certified under the Singapore Green Building Product labelling scheme and products with recycled content. For example, these materials are used for the development's internal partitions and ceilings, flooring in selected areas, waterproofing materials, subsoil drainage and plumbing. This helps promote responsible sourcing along its supply chain and also reduces the overall environmental impact of the development across its life-cycle.

The shingled façade of South Beach's towers reflects the sun's glare and is a unique aesthetic feature of the development.



The upward facing double glazed glass panels reflect the harsh sun rays, while the downward facing clear glass panels provide clearer views out.

INSPIRING SUSTAINABLE LIVING

With its convenient location and excellent connectivity, South Beach helps its visitors and occupants reduce their carbon footprint by offering a multitude of eco-friendly transport alternatives. Easily accessible by public transport, it is directly linked to Esplanade MRT station in the basement plaza and is close to several bus stops. Sheltered bicycle parking lots can also be found within the basement carpark. Furthermore, the carpark provides charging points for green vehicles and an intelligent carpark guidance system.

FOR RESIDENTS

Residents at South Beach Residences will enjoy units that have been carefully laid-out to offer stunning views while maximising natural light and ventilation. The units are all finished and fitted with environmentally friendly and technologically advanced equipment and materials. For instance, units come installed with an inverter split unit air-conditioning system certified "4 ticks" under the Singapore Energy Labelling Scheme, which uses zero ozone depleting refrigerants. All water fittings selected for use are also certified under the Public Utilities Board (PUB)'s Water Efficient Labelling Scheme, and is designed to consume less water and save more on utility bills.

For those looking for a more intimate experience with nature, the lush sky gardens provide a tranquil and refreshing nature escape without having to leave the building.

FOR OFFICE TENANTS

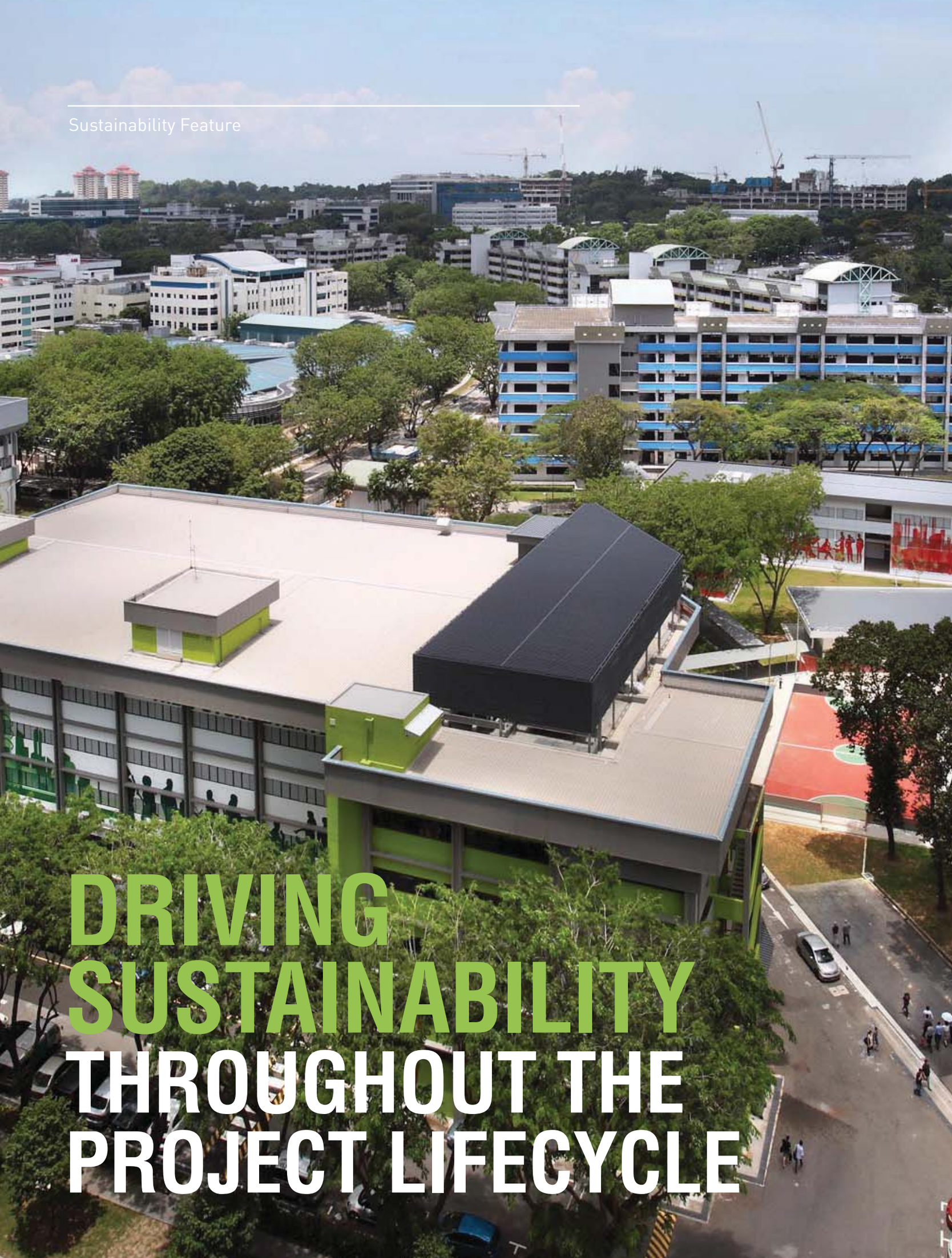
To improve air quality in offices, low emission paints and adhesives were used, while additional features such as an advanced air quality monitoring system, demand regulated air supply and zoned thermostat controls all ensure that an optimal working environment is provided for maximum comfort and productivity.

All staircases and toilets are fitted with motion sensors for 'use when needed' activation to reduce the overall energy consumption. To encourage recycling and reduction of waste, recycling bins are provided at South Beach Tower.

To further create awareness of the importance of protecting the environment and encourage greener living, the development employs both physical and interactive Green Corner displays. A physical display with easy to understand infographics showcasing the overall development, its environmental design, and key green features, is located on the major pedestrian corridor intersection linking the carpark escalators and the overhead bridges towards Nicoll Highway and Middle Road. There are also interactive LCD display panels prominently located along the main pedestrian walkways on Level 1 and basement plaza area leading to Esplanade MRT station entrance where users can find out more about the environmental design and features of the development, including energy consumption data.

One of Singapore's most sustainable developments, South Beach has earned not one, but two Building and Construction Authority Green Mark Platinum Awards.

Images courtesy of South Beach Consortium Pte Ltd.



DRIVING SUSTAINABILITY THROUGHOUT THE PROJECT LIFECYCLE

JTC CleanTech One

JTC CleanTech Three

JTC Furniture Hub @ Sungei Kadut

JTC Space @ Tuas

To maintain and elevate Singapore's edge in the increasingly competitive regional and international markets, industrial development can be seen as a key driver and tool to accomplish this aspiration. Since the country's founding days, industrial development has been a cornerstone for Singapore's progress and growth, attracting investors, creating meaningful jobs and putting the tiny red dot on the global map. Evidently, the industrial landscape is essential to Singapore's continued success.

As society grows more sophisticated and varied, there is more demand for more of Singapore's limited land area. More land will now have to be demarcated for residential developments to house a growing population, with yet more land allocated for ancillary services such as shops and schools for the population. Further, as more foreign companies choose Singapore as their springboard into the Asian market, more commercial and office spaces would have to be constructed to support this economic growth. Therefore, the industrial landscape must also evolve.

As Singapore's lead government agency responsible for the development of industrial infrastructure, JTC pushes boundaries in sustainability to respond quickly to evolving industry needs and overcome challenges such as manpower and resource constraints in today's fast-changing built environment.

By pioneering the use of sustainable technologies, materials and processes in its existing projects, JTC hopes to positively influence and transform industry practices and standards.

As a master planner and a master developer for industrial buildings and estates, JTC has in place a structured framework to enhance sustainability throughout the entire industrial infrastructure lifecycle. This sustainability framework also helps to improve productivity, and allows for the provision of sustainable procurement at almost every stage.

PHASE 1:
Planning for Sustainability, Productivity, Constructability & Safety

Before anything is constructed, the development will go through the Planning phase. Essentially the blueprints for the project, JTC considers a number of factors that go towards its sustainability, productivity, constructability as well as safety:

Air Quality

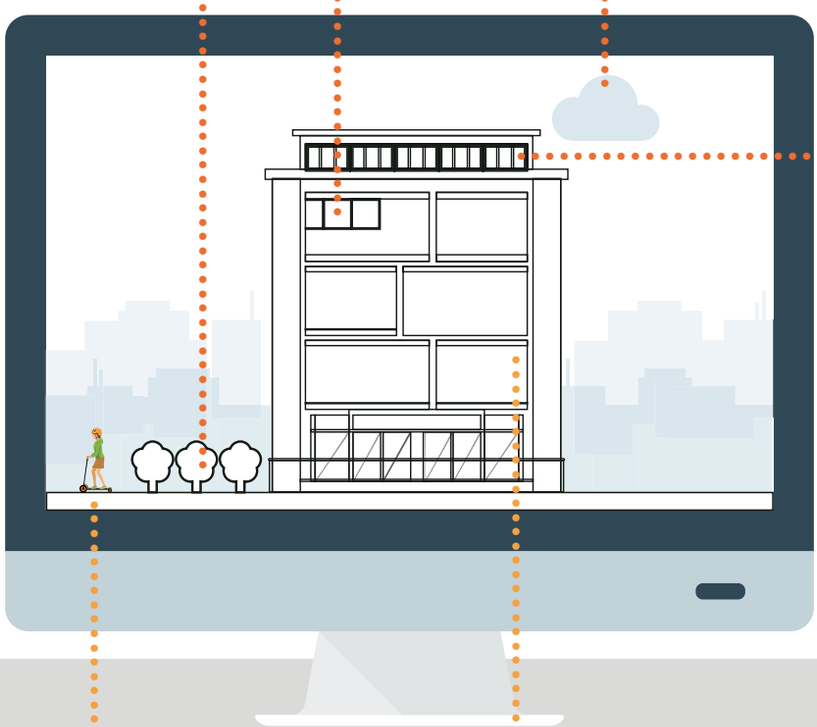
Natural elements are considered from the passive design stage, and are used to optimise airflow in each building. Notable installations include JTC CleanTech One's atrium wind wall, and JTC CleanTech Three's natural wind corridors; both enhance natural ventilation and reduce the need for mechanical ventilation and air-conditioning.

Water

Systems that facilitate the recycling, reusing and conservation of water are adopted. Examples include harvesting and recycling of grey/rainwater at CleanTech Park, and the water - cooled chilled water system at JTC Space @ Tuas.

Green & Blue Masterplans

These are employed to balance environmental sustainability and existing biodiversity with the commercial needs of each development.



Energy

Smart systems and renewable energy sources are implemented to reduce energy consumption levels. Furniture Hub @ Sungei Kadut, for instance, possesses a solar panel-ready roof design to enable sustainable energy generation.

Transport

By planning for estate-wide connectivity, JTC enables greener, car-lite environments. Initiatives include multi-route shuttle bus services on high-capacity buses; and Personal Mobility Device sharing services to enhance last-mile connectivity; and self-driving taxis.

Shared Services

Technologies that can be deployed on larger scales are considered – such as District Cooling Systems and Pneumatic Waste Conveyance Systems – to achieve greater energy and operational efficiencies.

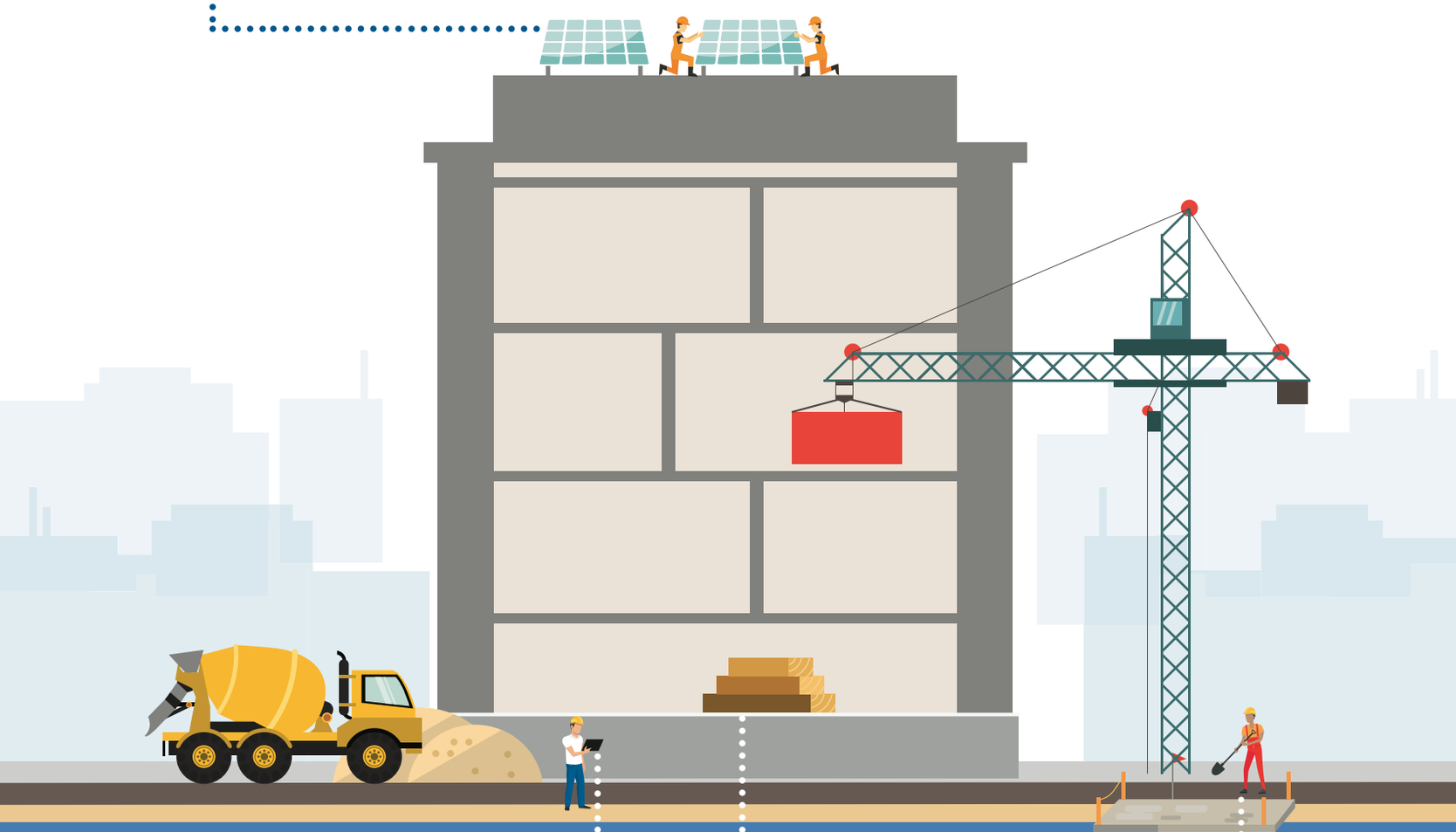
PHASE 2:
Design & Construction

Once the planning has been finalised, the development will then move into the Design & Construction phase. JTC ensures that its buildings are constructed sustainably, productively and safely through a number of factors:

Green Mark Features

International best practices of sustainable, green designs are incorporated into JTC's buildings and estates. An example is the installation of solar panels at Jurong Town Hall, and provision for future solar panel installations at newer developments like TimMac@Kranji. Provisions are incorporated into JTC's building design requirements for consultants to include the following into their designs:

- Adoption of energy saving air-conditioning / chiller system
- Adoption of energy saving LED lights for general lighting of common areas such as staircases, corridors, plant rooms, car parks, and circulation areas
- Usage of motion sensors to control staircase and toilet lighting



Buildability Practices

Project buildability and constructability are assessed through Virtual Design and Construction (VDC). This helps to reduce resource wastage and speeds up design and construction work dramatically.

Green Materials

To lead the adoption of productive and sustainable construction methods, JTC pioneered the use of environmentally friendly materials. These include the use of Green Concrete, Structural Steel and Mass Engineered Timber, all of which boost construction productivity and contribute to a cleaner and safer construction environment. Additionally, JTC encourages the use of materials with high recycled content (e.g. recycled concrete aggregate).

PHASE 3: Operations

Constructing a building is one thing but maintaining one is a whole new ballgame all together. JTC operates its buildings and estates by streamlining resource use and optimising long-term sustainability through the following key features:

Smart Building Management Systems

J-Ops is JTC's integrated building and estate operations system that allows JTC to centrally and remotely monitor, analyse and optimise estate and building systems, such as lighting and air-conditioning systems. Instead of just one particular building, J-Ops links multiple developments and properties into one comprehensive system.

Green Living Labs & Test-Beds

Through Open Innovation Calls, JTC supports start-ups, enterprises and academic institutions in the development, fine-tuning and test-bedding of new sustainable solutions. This accelerates their time-to-market so that industries can benefit from the boost to efficiency and sustainability.

Green Bonus Scheme

Facility management partners are incentivised with contract bonuses for successful implementation of new energy-efficient initiatives. This encourages more proactive, innovative approaches for energy management. One of the requirements for this scheme is for the facility management partner to use environmental friendly and energy efficient equipment (e.g. environmental friendly cleaning agent / equipment with at least 3-5 ticks) and include recycling in all specifications. Since its implementation in 2016, the scheme has seen a 2 percent reduction in energy consumption.

Green Leases & Policies

Through Green Leases, JTC is introducing tenants to sustainable technologies, and sharing how going green can benefit them in the long run. TC also encourages the use of environmental friendly and energy efficient equipment, and these can be found on the Singapore Green Building Council's Directory of Certified Products. JTC Tenants are also encouraged to partake in their own recycling activities.

BIM 6D for Facilities Management

Beyond using Building Information Modelling (BIM) for design and construction, JTC is piloting the information-rich system for effective facilities management and building maintenance.

PHASE 4: Rejuvenation

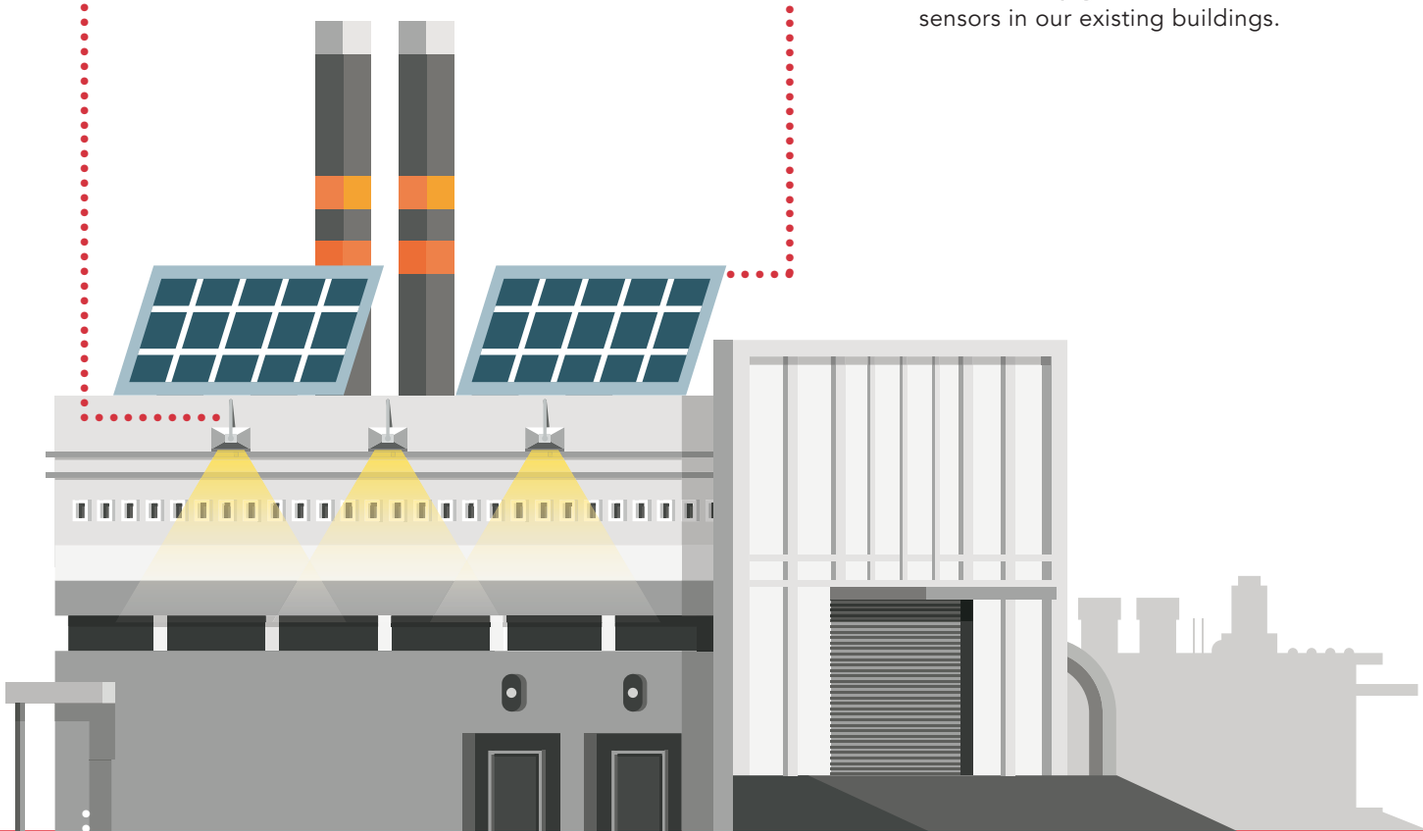
Essentially retrofitting existing projects for greater performance and sustainability, JTC considers the following when making rejuvenation plans for its buildings and estates:

Retrofitting to Meet Sustainability Guidelines

Existing developments are updated with new green features to meet sustainability goals and guidelines. Some of these updates include energy-efficient lighting and water-saving toilet fittings.

Introducing New Sustainability Features

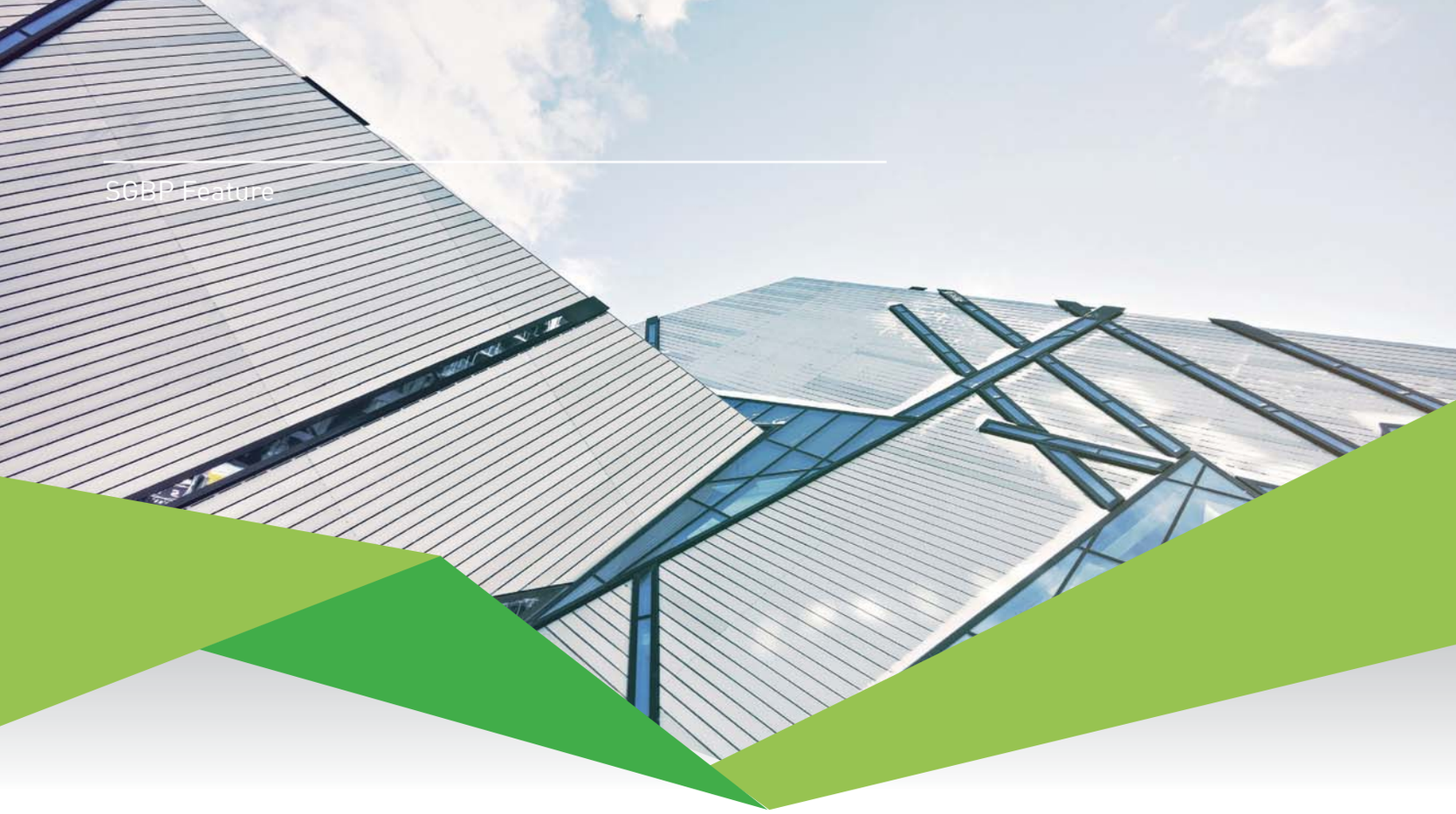
Installation of new sustainable elements, such as solar panels, low-emissivity glass and smart sensors in our existing buildings.



Repurposing Land for Optimal Land Use

JTC maximises and optimises land use by redeveloping matured buildings and estates into more productive and flexible future-ready spaces. One example is the conversion of standard factories at Ayer Rajah Estate into start-up space, and the redevelopment of the Tanjong Kling industrial estate.

All infographics and images courtesy of JTC.



CHOOSING SUSTAINABILITY

As people grow more cognizant of environmental issues and are able to better grasp the concept of built environment sustainability, demand for greener and healthier buildings will definitely increase. In fact, according to the World Green Building Trends 2016 report published by the World Green Building Council and Dodge Data & Analytics in partnership with United Technologies, global green building is expected to more than double by 2018. This trend is largely driven by countries with developing green building markets, as they push forward with their national agendas to certify projects as green buildings.

SINGAPORE'S GREEN BUILDING AMBITION

On the local front, green building has established a firm foothold in the building and construction industry, driven by the Building and Construction Authority (BCA) through the national Green Mark Scheme. With the target to green 80 percent of the existing building stock by 2030, the BCA is working fervently with like-minded organisations to proliferate the adoption of green building design and technology to create a more sustainable built environment. Currently, the percentage stands at 33 percent, but construction demand is expected to grow in the next few years.

Hence, there is still great potential for green building growth in Singapore. With an estimated $28-$35 billion worth of public and private sector projects projected for 2017, a commensurate quantity of green building materials and services is needed to fulfil the projects' sustainability objectives. This trend is corroborated by the World Green Building Trends report, which highlighted that the demand for green building products across almost every conceivable category is expected to grow by about 10 percent on average in the next few years. These include electrical products, mechanical products, finishes, flooring as well as furnishings.

With the growing green building industry, there is a huge pool of green building products and materials for building designers, owners and consultants to select from. However, the environmental performance of the particular building product cannot be left to chance, as 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 greener, healthier buildings.

After all, the whole is greater than the sum of its parts.

ASSESSING SUSTAINABILITY

So how does one determine if this particular green building product is indeed green? As the only dedicated certification scheme for green building products in the country, the Singapore Green Building Product (SGBP) labelling scheme – administered by the Singapore Green Building Council (SGBC) - provides a one-stop solution for the selection of sustainable building materials. While the BCA Green Mark Scheme certifies the complete building for its environmental performance, the SGBP does the same for the building materials that go into a building, guaranteeing that the final structure will be healthy and sustainable from inside-out.

Embracing a holistic assessment philosophy that closely mirrors the requirements outlined in the national Green Mark Scheme, products and materials certified by the SGBP can help green building projects obtain higher Green Mark ratings while also ensuring that the building is sustainable and healthy throughout its lifespan and beyond.

Certified green building products and materials are also good news for building occupants. No one would want to live, work or play in buildings that are "sick", since it would have detrimental effects on human health and productivity. For employers, this essentially translates to higher absenteeism rates, greater medical costs and needless hours lost, which ultimately go towards diminishing the company's bottom line. Therefore, it stands to reason that green and healthy buildings make business sense as well.

A FRAMEWORK OF SUSTAINABILITY

The SGBP is structured on a holistic framework that covers energy efficiency, water efficiency, resource efficiency, health & environment protection as well as any other green features present in the product. In addition, the SGBP assesses products across the entire life cycle: from manufacturing to installation/ operation and all the way to its end of life. Based on assessment of the product's documentation and testing reports, it will be awarded a rating ranging from 1-tick to 4-ticks (Good to Leader), depending on the environmental qualities of the product.

SGBP certification covers a broad range of building products and materials, stratified into seven main

categories. Individual product types are further classified into more than 80 sub-categories within these main categories, ensuring that any conceivable building product can be certified for environmental performance.

All certified products are contained in an easily-accessible online directory, where designers and consultants can easily source for and identify required green building products. For example, a consultant looking for certified paints can either type in a keyword or browse through all certified products of that particular category to locate a suitable choice.

MAKING A SUSTAINABLE CHOICE

Since 2010, the SGBP has certified more than more than 2200 products across more than 270 companies and suppliers. SGBC also regularly engages with building owners, designers and consultants to spread awareness of SGBP-certified products, through purpose-organised seminars, sharing at partner events or during green building conferences and related exhibitions.

SGBC participates in relevant green building exhibitions, most regularly at the annual Build Eco Xpo Asia exhibition during Singapore Green Building Week, where a selection of certified green building product and service providers come together to put forth a compelling sustainability story for the industry. Providing practical ideas and workable solutions through their proven products, these companies embody the essence of green building and sustainability, an endeavour that begins from the inside.

Read on to have a glimpse of green building solutions certified by the SGBP.

ANACLE SYSTEMS LIMITED

It was nearly a decade ago when Alex Lau and Charles Ong casually discussed the possibility of developing green technology for energy management when their eyes were captured by the thick foliage during their in-camp jungle training. Years of being colleagues in a property management firm afterwards fuelled their interests further as they realised utility costs accounted for the bulk of a building's operational expenses. Yet, addressing that issue required structural renovation that could cost corporates a fortune, leaving the problem unresolved - and an opportunity opened!

In 2006, Anacle Systems was incorporated to pioneer groundbreaking yet pragmatic technologies for asset and energy management industries. Anacle delivers end-to-end hardware and software integrated solutions for energy management with Starlight™, and for enterprise resource planning with Simplicity™. Arming customers with powerful and accessible tools to monitor carbon footprint, perform analysis and take actions using a simple, down-to-earth approach, Anacle is proudly described by Alex to be a smart and sexy one-stop solution for businesses.

Anacle's global clientele includes Singapore Airlines, CapitaMalls, Taipei 101, Qatar Cultural Village and Keppel. In 2013, it received the prestigious Red Herring's Top 100 Asia Award, a clear testimony of the team's sheer focus on excellence and ambition to transform the energy management landscape regionally.

A REVOLUTION IN ENERGY MANAGEMENT

Anacle Systems' expertise is encapsulated in two key products: Tessaract and Starlight.

As the next generation platform for smart energy management, the Tessaract is the first industrial sensor to have 64-bit computing power with a vast amount of onboard memory, allowing it to perform better than many sensors in the market. Tessaract is also installed with the Android operating system, giving you access to a growing ecosystem of smart energy applications. Equipped with the latest interface technologies, the Tesseract can adapt to a wide range of IoT environments. The Android operating system allows it to be upgraded in-situ, thus future-proofing any smart energy investments.

Starlight is a one stop cloud-based smart energy management solution that gives real-time access to the energy profile of the building, including information such as energy consumption, power quality, energy analytics and carbon footprint profiles.

Using Wireless Mesh Concept, Starlight® is easy to deploy, efficient and cost effective. It does not require additional data cabling, local WiFi, nor cellular services to support the automated meter reading in the building.

DANFOSS INDUSTRIES PTE LTD

Danfoss is a leading producer of precision mechanical and electronic components and of intelligent mechatronic devices. The company has modern factories on four continents, sales companies and representatives all over the world and more than 21,000 employees worldwide.

The company's strength in production and quality control are matched by equally outstanding capabilities in research and development. Danfoss has pioneered techniques like load-sensing hydraulics, intelligent refrigeration controls, radiator thermostats, frequency converters, CFC-free compressors and thermostats for household appliances.

As a result, Danfoss today defines the state of the art in many areas of components technology.

ENGINEERING TOMORROW

The company employs the very latest in quality control equipment. All Danfoss manufacturing plants have to apply and adhere to the ISO 9000 and 14001 certifications - international standards that require companies to develop and maintain a quality and environmental management system.

Danfoss products are sold and serviced worldwide by an international network of sales companies and distributors. These companies provide reliable deliveries from convenient local stocks. More important, however, is their total commitment to customer satisfaction.

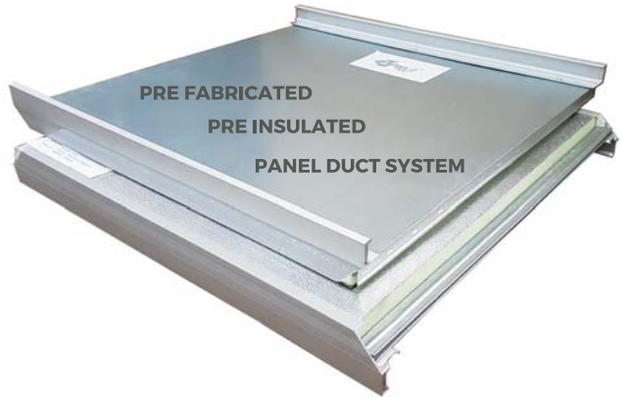
Danfoss sales companies are managed by local professionals who understand their market's needs, and they are staffed by skilled sales engineers and factory-trained technicians who can provide the product training, application support and maintenance services so essential to equipment manufacturers. On six continents, there are authorised service centres equipped with tools and testing instruments specially designed to keep Danfoss products up and running.

INSTAD PRE FABRICATION PTE LTD

E3Panel DUCT™

ECO-FRIENDLY EFFICIENT EASY

PRE FABRICATED
PRE INSULATED
PANEL DUCT SYSTEM



INSTAD Pre Fabrication Pte Ltd is a subsidiary of R Glazen Group, leader in manufacturing and supplying of HVAC applications in the construction sector. INSTAD Pre Fabrication Pte Ltd is specialised in research, design, development, manufacture and delivery of innovative building services solutions transforming engineering projects into fast track, sustainable, high performing environments.

TRANSFORMING THE FACE OF DUCTING

INSTAD's E3PANEL DUCT™ is an innovative ductwork system design that will revolutionise the HVAC applications in the construction sector. It comprises premium performance E3PANEL DUCT™ panels, fabrication methods, coupling systems and a complete line of accessories to produce ductwork in sections.

Consisting of a polyisocyanurate (PIR) insulation core, faced on the external with a protective and durable zero spangle thin galvanised sheet metal and on the internal with a 100 micron embossed aluminium foil, the panel is pre-fabricated and pre-insulated (PFPI) reducing on-site human resources, installation time, cost and space, transportation space and material wastage.

For HVAC systems designed to withstand a maximum static pressure of 1500 Pa, ductwork fabricated from this system can achieve air-leakage rates to a fraction of those typical of rectangular galvanised sheet metal ductwork thus offers the benefits of cutting energy use, cutting operational carbon dioxide (CO^2) emissions and cutting costs.

E3PANEL DUCT™ is eco-friendly, efficient and easy to install. As a result, the system is the next generation ductwork system where low embodied and operational environmental impact are key requirements.

e3Panel DUCT™

eco-friendly . efficient . easy

INTERNATIONAL PATENT PENDING

ALL RIGHTS RESERVED

Application No.1020160603V

SINGAPORE GREEN BUILDING PRODUCT SGBC VERY GOOD SGBP 2017-964

An Advance, Innovative and Unique Pre Fabricated and Pre Insulated HVAC Ductwork System

E3PANEL™ Duct

Designed and Fabricated In Singapore By

Instad Pre Fabrication Pte Ltd

因斯塔德预制私人有限公司

(A subsidiary of R Glazen group)

101, Pioneer Road, Singapore 639581,

Tel +65 6252 0055 | +65 6265 6063

sales@instad.com.sg |www.instad.com.sg

INNOCITY SOLUTIONS PTE LTD

2.3.1 smart lighting system

2.3.4 controller

2.3.2 alert system

2.3.5 device manager

Innocity Solutions Pte Ltd is a one-stop-solution provider, offering a wide range of innovative products that will enhance lifestyles. The products aim to build a smart and inclusive society with technology and compatibility. Internet of Things (IOT) technology is used in various areas such as Smart switch light control, elderly care rehabilitation, intelligent pest control and environmental temperature & humidity monitoring.

Innocity Solutions selects quality products with an emphasis on the end-users. Their system comprises of wireless, battery-less buttons, completed with a device manager and mobile application. Gathering feedback and research to create the ultimate product to best address usability,

Innocity's core mission is to work with technology and users, with the final aim of enabling them to achieve better, more futuristic home lives.. Innocity Solutions is committed and dedicated to the creation of a smart and sustainable city in Singapore and enhance thousands of people life, to in line with our mission "Innovate for better lifestyle".

SMART SOLUTIONS FOR SMART BUILDINGS

With the growing emphasis on smart technology and applications, Innocity Solutions provide a suite of products and services that help to improve building management and operations. The Smart Lighting System enables remote access using a free mobile application, allowing users to apply and edit multiple usage schedules with ease. The system also makes use of a hub to pair all devices together, providing great coverage without taxing the WiFi router.

Innocity's systems are easily configured and compatible with every household's switchboxes. The system detects its fault automatically and is equipped with voice-control function. Listening closely to users' needs and promptly adapting products to meet ever-changing needs, Innocity's products are compatible with Amazon Alexa, for the 11 million existing Echo users and 24 million more to come in 2017.

Innocity also has a smart indoor air quality monitoring system that is wireless, making it a breeze to install and operate. Powered by an internal solar battery, the system is able to generate accurate temperature and humidity reports, allowing building owners to have updated data on the indoor air quality.

KEPPEL DHCS PTE LTD

Keppel DHCS is the first and largest district cooling systems (DCS) developer and operator in Singapore, providing DCS services at major business and industrial parks.

Keppel DHCS currently operates four DCS plants in Singapore, with combined plant installed capacity exceeding 70,000 refrigeration tonnes (RT), at Changi Business Park, Biopolis@one-north, Mediapolis@one-north and Woodlands Wafer Fab Park. In 2010, we made our first foray into China to provide district heating and cooling systems (DHCS) services in the Eco-Business Park at the Sino-Singapore Tianjin Eco-City.

In 2014, Keppel DHCS expanded its offerings to provide Retail Cooling™ for individual buildings. Retail Cooling™ allows Keppel DHCS to extend its market reach beyond the DCS catchment area by installing dedicated cooling systems at customers' premises.

A GREENER COOLING SOLUTION

District Cooling provides building owners with an environmentally friendly cooling solution with lower upfront and long-run operating costs. Keppel DHCS does this by aggregating cooling demand in the district to free up space in customers' buildings, producing energy-efficient chilled water during off-peak hours, and leveraging on economies of scale for shared redundancies.

Retail CoolingTM provides building owners with quality cooling service as utility. With Keppel DHCS' expertise and established track record in chilled water production and utility service delivery, they are able to provide quality and reliability at a lower cost.

DHCS is a more cost effective and greener choice compared to conventional heating and air-conditioning systems which provide warm or cool air to the building environment.

KNX ASSOCIATION SEA

KNX Association is the creator and owner of the KNX technology – the worldwide STANDARD for all applications in home and building control. Over 400 member companies worldwide from different application domains have more than 7000 KNX certified product groups in their catalogues. The KNX Association has partnership agreements with more than 65,000 installer companies in more than 125 countries.

A PIONEER IN BUILDING CONTROL SYSTEMS

KNX's solutions range from lighting and shutter control to various security systems, heating, ventilation, air conditioning, monitoring, alarming, water control, energy management, smart metering as well as household appliances, audio/video and lots more. KNX comes with a single, manufacturer independent design and commissioning tool (ETS), with a complete set of supported communication media (TP, PL, RF and IP) and complete set of supported configuration modes (system and easy mode).

From the office to the household, whatever the kind of building is, KNX opens up complete new opportunities for building control systems while keeping the costs at a low level. KNX can provide solutions that can only be realized with considerable effort with conventional installation techniques. From heating, ventilation and access control to the remote control of all household appliances – KNX allows completely new ways to increase comfort, safety and energy savings in the home or building.

KNX is approved as an International Standard (ISO/IEC 14543-3), European Standard (CENELEC EN 50090, CEN EN 13321-1) and Chinese Standard (GB/t 20965). This standard is based on more than 20 years of experience in the market. KNX is therefore future proof. KNX products from different manufacturers can be combined – the KNX trademark logo guarantees the interworking and interoperability. KNX is therefore the world´s only open Standard for the control in both commercial and residential buildings.

38 MARINE AND OFFSHORE (KOL ENGINEERING)

38 Marine And Offshore is strategically based in Singapore and Myanmar to provide a comprehensive range of services to serve and meet the specific needs of the Onshore, Marine and Offshore Industry. The company operates both regionally and internationally, through the support of our global network and partners, in the onshore, marine and offshore industry.

38 Marine And Offshore wholly owns KOL Global Engineering, the authorised distributor and integrator for the VAF Water Filtration Systems & VAF Centrifugal Separator system for commercial building and industrial application, a product that has cleared the stringent Singapore Green Building Product labelling scheme assessment process.

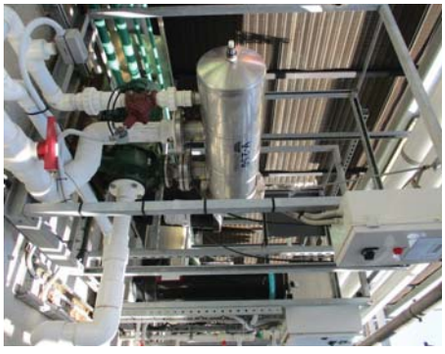
KOL Global Engineering is also the authorised distributor for BSRIA compliant VEXO X-POT combined 4-In-1 Filtration, Dirt & Air Separator and Dosing Pot Systems to maintain excellent quality chilled-water or closed system water ensuring main system plant items including Chillers, Pumps and Heat Exchangers operate at their designed efficiencies.

ENHANCING FILTRATION SYSTEMS

VAF Filters provide smarter filtration solutions for commercial buildings and industrial use. Removing silt, dirt and organic matter (such as algae) from cooling tower water. The patented VAF Filtration technology keeps an open recirculating cooling water systems clean, improve circulating water quality, assists in maintaining optimum heat transfer efficiency.

The Patented BSRIA compliant VEXO X-POT Side Stream Filtration and Dosing Units are suitable for all sizes of heating & chilled water systems on commercial buildings and much larger district cooling or Data Center projects. The X-POTs are unique combinations of Air & Dirt Separation, Double Side Stream Filtration using both magnetic and cartridge/bag filters (down to 0.5 microns), Dosing Pot and are all made from 304 or 316 SS.



NARADA ASIA PACIFIC PTE LTD

Narada Asia Pacific Pte Ltd (NAP) was established in 2005 and is involved in the supply and distribution of lead-acid/Li battery systems. Narada has established partnerships with the research community and companies to develop smart city applications and energy storage solutions to supply electricity & related services.

Narada is committed to develop innovative energy storage solutions, Solar-Hybrid Energy Storage Solutions, Smart Grids, Green buildings and energy efficiency services.

Narada has advanced & intelligent energy storage systems and offers scalable & flexible designs that can be specially tailored to suit each customer's needs.

IMPACTING LIVES WITH ENERGY

Committed to developing innovative energy storage solutions, NAP provides a broad range of Solar-Hybrid Energy Storage Solutions, Smart Grids, green building and energy efficiency services.

The Narada E Box, a highly advanced and intelligent energy storage system, offers a scalable and flexible design that can be specially tailored to suit any need. It can be used as a standalone power source or as a backup power generation system, and can also be integrated with solar energy generators, electrical generators as well as regular grid power. Additionally, the E Box can be deployed in remote and isolated locations where grid power is not readily available.

Narada has also developed an intelligent energy storage solution that utilises Big Data for predictive analytics and schedule optimization. This photovoltaic energy storage system (PVESS) has been deployed in residential settings in Singapore, fully integrated with existing rooftop solar panels.

NITTO DENKO (SINGAPORE) PTE LTD

Nitto is a global pioneer in state-of-the-art technology. Founded in 1918 with its 100th anniversary next year, Nitto has immense global presence with 94 group companies situated all over the world. Nitto has grown from making electrical insulation materials to be a leader in energy materials, industrial tapes, environmental solution and optronics. Using its knowledge in tapes and advanced technology, the company has created innovative solutions for the building and construction industry.

Nitto's building and construction products have functions such as waterproofing, soundproofing, low VOC, painting solutions and heat shielding. Having a presence in Japan for a long time, Nitto's products have a track record for being reliable and durable with the proper applications.

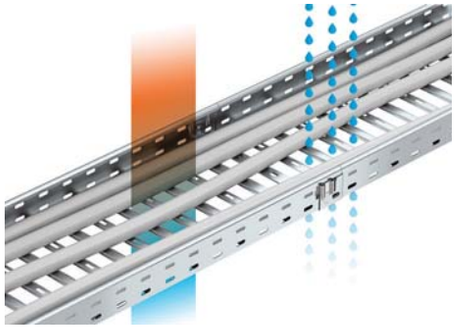
RELIABLE & DURABLE

Nitto provides customers with products suited optimally to their needs by leveraging on four core technologies: Adhesion, Coating, Polymer Function Control and Polymer Analysis & Evaluation.

- Adhesion Technology: Nitto combines its vast experience in adhesive technology with new technologies to create adhesives that are optimally suited to the needs of its customers.
- Coating Technology: Nitto's proprietary processing technology plays an indispensable role in the creation of high performance films.
- Polymer Function Control: Nitto designs polymers and creates unique materials in order to realise the many and varied functions required by the industry.
- Polymer Analysis & Evaluation: Nitto examines and optimises every facet of polymer synthesis and production to deliver proven technology and reliability to clients.

Using Nitto's core technologies, the company is able to provide solutions to customers with a combination of Nitto core technology with various tape functions that are able to adhere well, peel off, let through, endure, slide, clean, cover and protect.

OBO BETTERMANN



Wherever electricity flows, energy is controlled and data routed, that's where engineers and craftspeople all over the world rely on OBO Bettermann. The company is one of the leading manufacturers of installation systems for the electrical equipment of buildings and systems. OBO applies its slogan "Think connected" to around 30,000 high-quality branded electrical products and services to application solutions for projects in industry, business and infrastructure systems.

OBO operates a global network and employs around 3,000 people in more than 60 countries. The headquarters of the family company, which was founded in 1911, is located in Menden. A total of 40 subsidiaries and agents ensure that the company is present in markets on every continent like South East Asia. The key to the company's success is the consistent alignment to the requirements of the customers from the electrical wholesaling/ Distributors and specialist sectors. OBO Bettermann SEA together with his Distributor Partners can offer you perfectly functioning products and systems, as well as comprehensive support in each phase of the operation in the entire South East Asia & Pacific Market.

THE FUTURE OF CABLE SUPPORT SYSTEMS

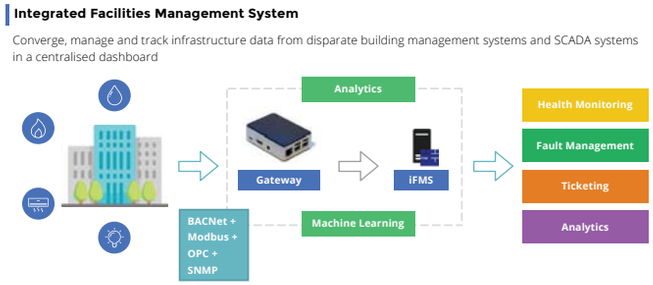
OBO offers cable support systems made by professionals for professionals. It focuses on technical properties from the area of application, through test conditions, up to corrosion resistance and temperature classifications. BIM modelling is also available on the range of Magic cable tray to help designers and planner achieve a better and more efficiency design in the early stage of the project. Overall installation time can be greatly reduced with the usage of smart and innovative snap on solutions. Strong, better looking and longer lasting cable support systems pave the way for the next generation of building technologies.

Available in different grades of material and finishing, suitable for every industrial, commercial and infrastructure application, the Magic cable tray system is designed to ease installation, increase the loading capability, maximise support structures and most importantly to better hold and protect the cables which they are supporting.

The Magic cable tray system is the world's first completely screw-less tray system. All the system components and tray types are equipped with the innovative Magic connection from the tray through to the fitting. The combination of both advantages makes mounting simpler and quicker. To illustrate this, a 400 meter length of cable tray connection requires only 24 minutes compared to 4 hours and 16 minutes with the conventional cable tray using bolt and nut connection. This will greatly improve productivity and free up manpower for other tasks.

The use of the new, highly innovative and patented manufacturing method DUO-Plus leads to a considerably optimised CO2 balance for the entire product family. This technological leap saves 2,600 tonnes of CO2 emissions per years.

S3 INNOVATE



As a pioneer in delivering high-tech IoT and cloud solutions, S3 Innovate works towards building a reliable and feasible environment for its clients. Headquartered in Singapore, the firm yields real-time integration platform for enterprises looking to move into the connected world.

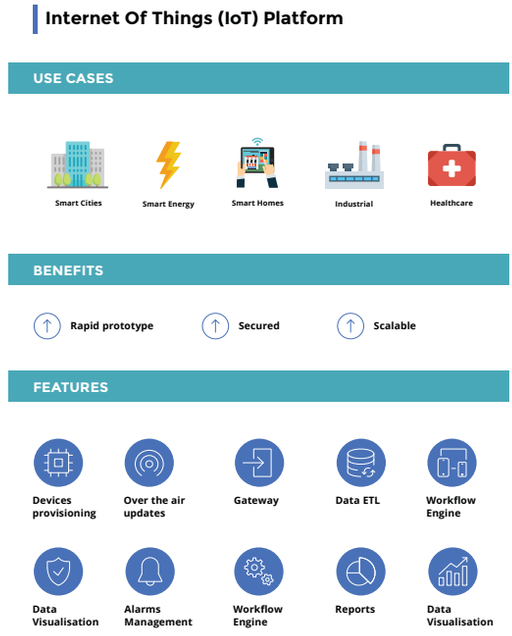
S3 Innovate offers a comprehensive suite of solutions in the Building Sector, Facilities Management, Energy Management, and Engineering services sectors with cloud, IoT, Big Data, and Mobility technologies. Having partnered with Microsoft BizSpark, the company has helped its customers embrace the cloud platform and reap benefits of the Azure solution. Acclaimed as a tech savvy company in Singapore, S3 Innovate brings high-shield solution for Building performance, service management, and workspace management. The company focuses on the need of a connected architecture to accommodate the burgeoning data through Azure cloud solutions and integrated IoT platform.

ENHANCING BUILDING PERFORMANCE, TRANSFORMING OCCUPANTS EXPERIENCE

S3 Innovate proffers a hardware technique that can connect the on-premises infrastructure with Azure IoT solution. With this integration, S3 Innovate's clients can leverage advanced analytics, visualization, and machine learning along with taking predictive and preventive measures to outsource the existing risk of network.

S3 Innovate aims to disrupt the Facilities Management industry by combining Building Performance, Services Management, and Workspace Management in an integrated smart platform. Additionally, with Mobile Asset IoT Inspection System, S3 Innovate attenuates the manual job of inspecting the workflow and assembles end-to-end connectivity throughout the network. This system enhances the visibility and optimizes the efficiency for better productivity and real-time actionable insights.

In the coming years, S3 Innovate envisions bringing more flexible cutting-edge models to improve the connectivity for its global customers.



SYSTEMNIX TECHNOLOGIES PTE LTD

An environmental innovation organisation incorporated in 2013, home-grown SystemNix Technologies offers a revolutionary ecological engineering system which offers several benefits to the industry.

Headquartered locally, SystemNix drives research, development, engineering concept, product design, product testing, manufacturing, marketing activities and project implementation from Singapore.

Holding the belief that future living depends on today's planning, SystemNix drew inspiration from the natural environment when developing its core product, resulting in a revolutionary system that minimises damage to the earth during construction.

PROTECTING THE EARTH

The Soil Chain® system, invented in Singapore, is essentially an ecological engineering system that consists of eco-friendly modular block and chain components that are designed for erosion protection and control as well as for a wide range of applications to form engineering structures. These structures can be used to support earth embankment, lateral earth pressure or load surcharge without any single conventional hard material or materials that can cause chemical reactions.

Soil Chain® is probably the first few ecological engineering systems that are certified for their environmentally-friendly qualities. The system has direction structure shear strength, capable of handling applications near the area or where the land and water meet in coastal zones. Moreover, the system is able to support the planting and growth of vegetation through a root-friendly bioengineering system, allowing various types of plants to grow healthily and naturally from the structure. This results in a uniform look that is aesthetically pleasing while still allowing water to permeate through.

This system can be used for a variety of applications, including but not limited to:

- Earth retaining structure
- Green and façade feature
- Reclamation land protection
- Erosion protection and control
- Vertical planting and gardening wall
- Steepen slope repair and reinforcement
- Shoreline protection and breakwater structure
- Riverbank, reservoir and waterway greenery protection

Build Greener Buildings

SINGAPORE GREEN BUILDING COUNCIL

As the first and only industry-led organisation that certifies green building products and green building services, the Singapore Green Building Council ensures that our buildings are constructed as sustainably and as healthily as possible.

SINGAPORE GREEN BUILDING PRODUCT SGBC

Singapore Green Building Product

Assesses and evaluates a large variety of green building materials based on a holistic, industry-oriented criteria that looks at every stage of the product life cycle.

SINGAPORE GREEN BUILDING SERVICES SGBC

Singapore Green Building Services

Accredits consultancy firms active in the green building circuit including architecture firms, engineering firms, environment sustainability consultants, etc.

Widely recognised by the industry, certification with SGBC will enhance your company's visibility and profile, allowing your green building solutions to make a difference in Singapore's green building landscape.

Make your mark in the industry, certify with SGBC today!

www.sgbc.sg

+65 6732 5518 +65 6732 5517 certification@sgbc.sg

Singapore Green Building Council 390 Havelock Road, #06-05 King's Centre, Singapore 169662 **www.sgbc.sg**

INNOVATING SUSTAINABILITY

In contemporary buildings, air-conditioning is part and parcel of the structure: almost every conceivable building type requires or possesses some form of air-conditioning system, whether to provide thermal comfort to human occupants or simply to keep sensitive machinery at optimum temperatures. Especially in hot and humid Singapore, air-conditioning is principally a prerequisite for most buildings.

However, heating, ventilation and air-conditioning (HVAC) systems account for 40-50 percent of a building's energy consumption. Naturally, it is an ongoing quest to seek out products and solutions that are able to lower energy use from air-conditioning systems, which will help to lower overall energy usage and result in cost savings for the entire building. Despite the potential benefits from retrofitting - let alone overhauling - an air-conditioning system for greater efficiency, some building owners may not be very keen to undertake such a project due to cost and operational issues.

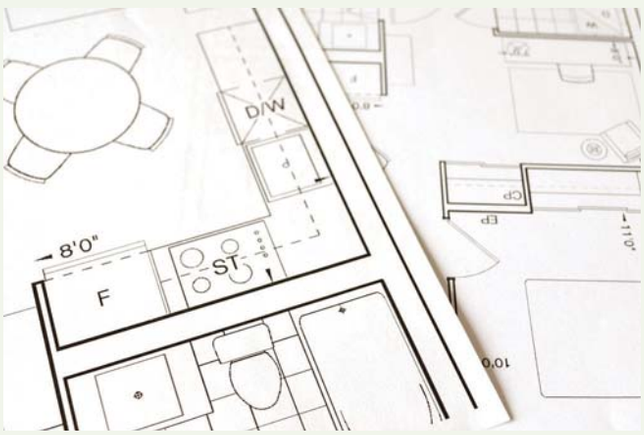
In June this year, Chinatown Point – a shopping mall cum office building first opened in 1993 – began use of its brand new, state-of-the-art air-conditioning system provided by energy service company Kaer Pte Ltd. A little different from usual air-conditioning retrofits, the solution in use at Chinatown Point is air-conditioning-as-a-service, an innovative green building solution that bears certain similarities to software-as-a-service (SaaS) distribution models used in information technology (IT) circles.

Basically, Chinatown Point has outsourced its entire chilled water production to Kaer, allowing the SGBC-accredited energy performance contracting firm to design, install, finance, monitor and operate

the chilled water system within the building for the next 10 years. As opposed to pumping in resources, capital and manpower to manage and upkeep the chilled water system from before, Chinatown Point now only needs to pay a single rate for the consumption of chilled water on a monthly basis. The building does not have to pay for repairs, maintenance, electricity and all other costs associated with the chiller water system. The new Kaer Water system also runs at a chiller efficiency of 0.60 kW/RT, which means that the system operates at the established BCA Green Mark Platinum benchmark for chiller efficiency.

Best of all, the new system did not cost Chinatown Point a single dollar to implement and install; anything associated with the new chilled water system was taken care of by Kaer.

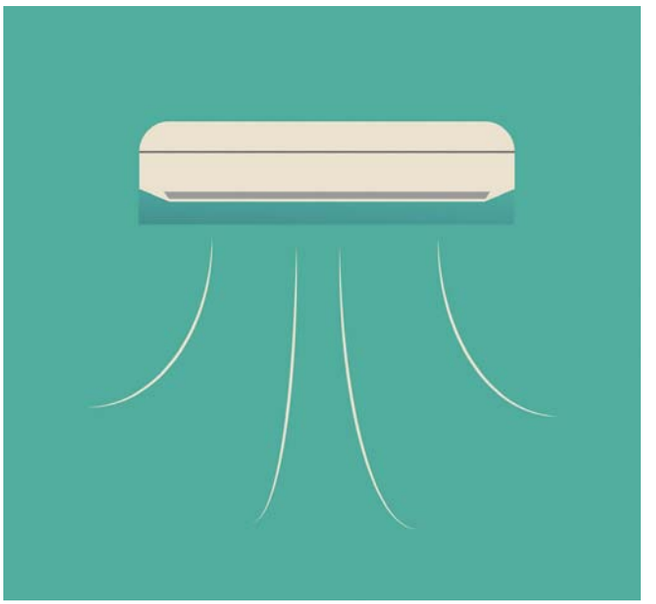
What all these means is that the building no longer has to worry about its air-conditioning system, since it is now in the hands of professionals who are committed to ensuring the maximum operational efficiency of the chilled water system. This also frees up resources for Chinatown Point: the building



owners can now commit more resources to their strategic business functions and core activities while essentially outsourcing non-core activities to a team of industry professionals at Kaer, which is tremendously valuable.

"This innovative business model, which reduces the cost of utilities while ensuring the performance of the air-conditioning system at the same time, will help to significantly improve building efficiency," said Mr Tan Swee Yiow, President of the Singapore


CWP4
kaer



Green Building Council (SGBC), "As the industry continues towards the national goal of greening 80 percent of our existing buildings, we need more of such innovative solutions as we forge ahead in our journey towards greening the built environment."

As a SGBC-accredited energy performance contracting firm, Kaer Pte Ltd is one of close to 20 energy performance contracting firms certified by the Singapore Green Building Services (SGBS) certification scheme, the only programme in Singapore that recognises building consultants and organisations for their commitment to the green building movement. Engaging the services of SGBS-accredited energy performance contracting firms can help green building projects accrue bonus points under the BCA Green Mark Scheme, especially if the scope of work can guarantee operational system efficiency.

Additionally, building owners looking to green their buildings for greater energy efficiency can consider the SGBC-BCA Zero Capital Partnership Scheme. The Scheme provides the building owner with the expertise of an SGBS-accredited energy performance contracting (EPC) firm, which serves as a one-stop solution for both minor and major retrofit options, can provide financing options and also facilitate the application of relevant grants or incentive schemes to fund the retrofit works. Through the Scheme, the building owner can work with a proven professional firm to achieve greater energy efficiency with zero capital outlay.

As more innovative green building solutions come into play, building owners will have a wider selection to choose from to help them advance towards greener, healthier buildings.

All images courtesy of Kaer Pte Ltd.

MAKE GREAT LIVING SUSTAINABLE

- ☑ Promotes resource efficiency
- ☑ Lowers carbon footprint
- ☑ Reduces waste & pollution
- ☑ Promotes environmental stewardship

JOIN AS CORPORATE MEMBER NOW!

SGBC MEMBERSHIP BENEFITS

GET TO KNOW GREEN BUSINESS PROFESSIONALS

Establish connections with green building leaders, advocates and practitioners in both local and international industries.

STAY UPDATED ON THE LATEST TRENDS AND KNOWLEDGE

Participate in numerous programs such as trade missions, seminars, conferences, and networking sessions.

STAY UPDATED ON THE LATEST

Get access to the latest within green building and sustainability: new knowledge and technology, trends, engineering and more.

MAKE YOUR VOICE HEARD

Use your membership influence to set the direction for green building practices.

GAIN EXPOSURE IN THE GREEN BUILDING MARKETPLACE

Get your company and products listed on Directories on the SGBC homepage.

WALK THE TALK

Enjoy the use of the SGBC corporate logo for your business cards and corporate stationery.

GET DISCOUNTED RATES

Enjoy preferential rates to SGBC events, seminars and for a range of certification services.

Contact SGBC today and let us discuss how we can help to give your business an advantage with our corporate membership and green certification.

Don't ask what you can do for 'green'. Ask what going green can actually do for your business.

SINGAPORE GREEN BUILDING COUNCIL

390 Havelock Road,
#06-05 King's Centre,
Singapore 169662

+65 6732 5518 +65 6732 5517 certification@sgbc.sg

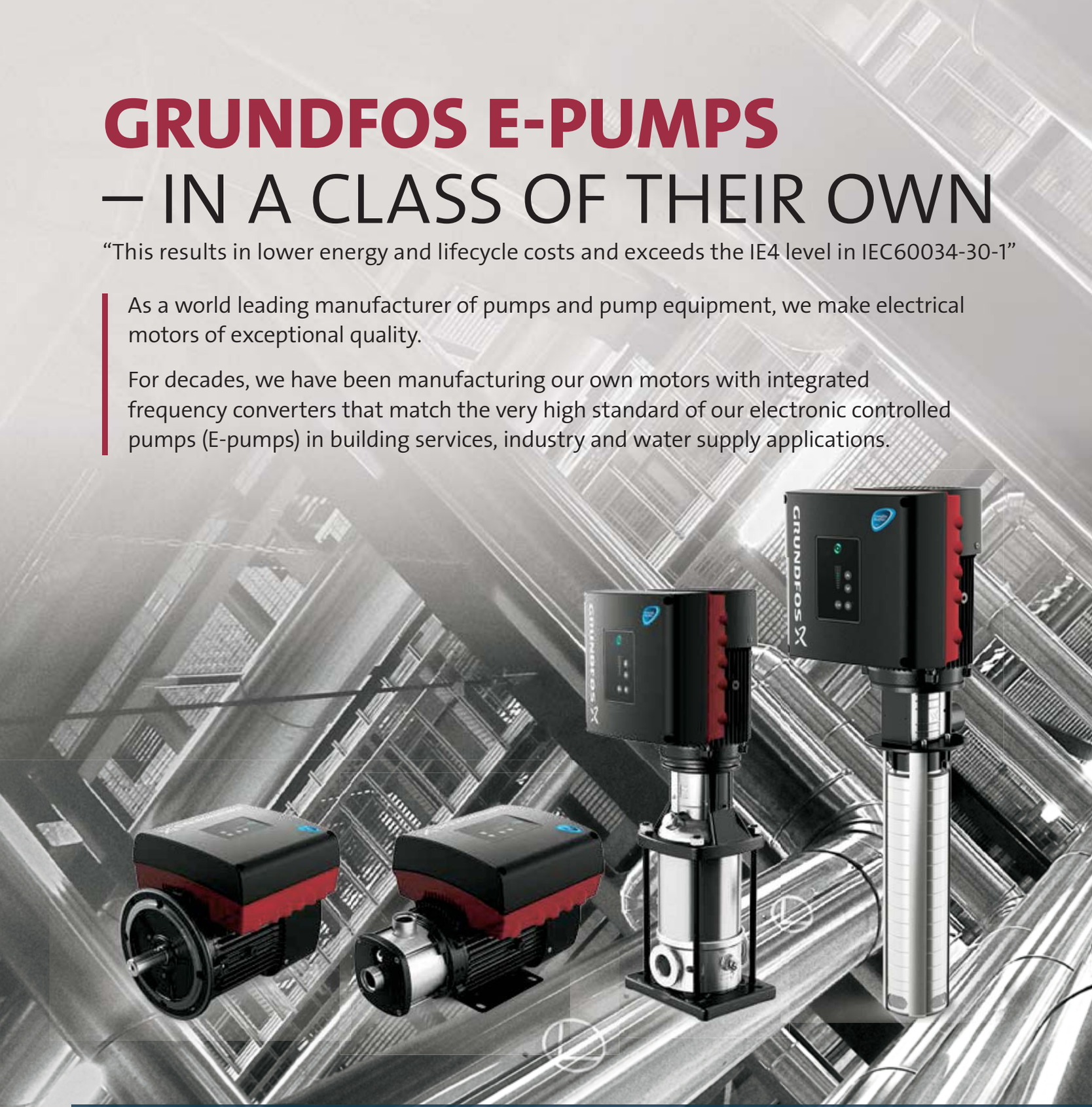
www.sgbc.sg

GRUNDFOS E-PUMPS
– IN A CLASS OF THEIR OWN

"This results in lower energy and lifecycle costs and exceeds the IE4 level in IEC60034-30-1"

As a world leading manufacturer of pumps and pump equipment, we make electrical motors of exceptional quality.

For decades, we have been manufacturing our own motors with integrated frequency converters that match the very high standard of our electronic controlled pumps (E-pumps) in building services, industry and water supply applications.



be
think
innovate

GRUNDFOS