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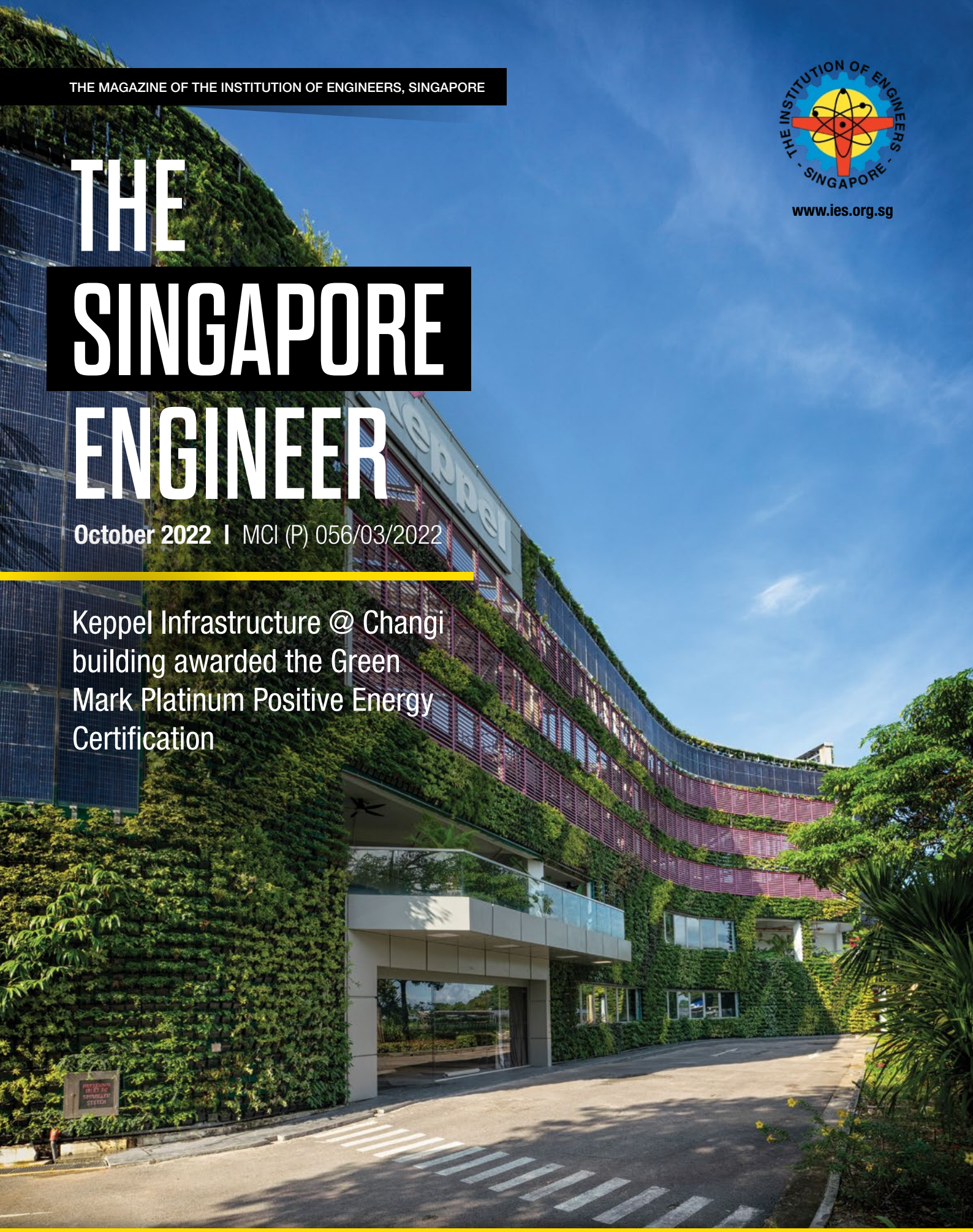

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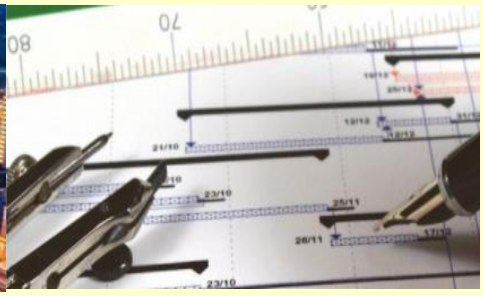

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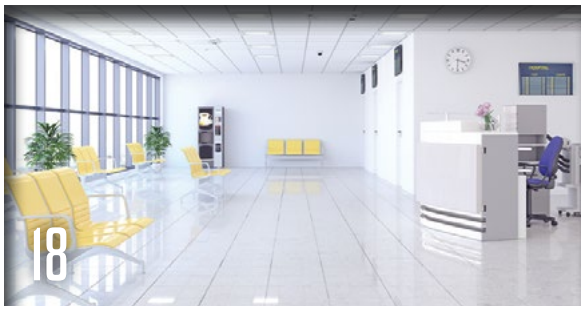

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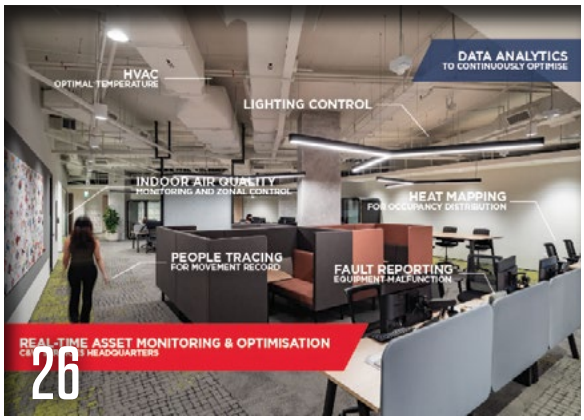

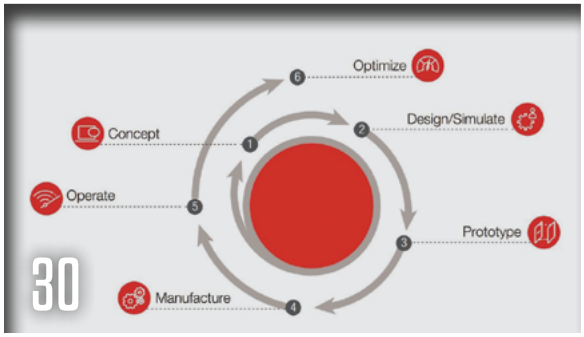

REGULAR SECTIONS

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ASHRAE and UNEP invite Lower GWP Innovation Award entries

Entries are now being accepted for the 2022 Lower GWP Refrigeration & Air-Conditioning Innovation Award, by ASHRAE and UN Environment Programme (UNEP) OzonAction.

The award promotes innovative design, research and practice, by recognising people who have developed or implemented innovative technological concepts, applied in developing countries, to minimise the global warming potential (GWP) through refrigeration and air-conditioning applications. The award is part of the ASHRAE-UNEP OzonAction joint workplan for 2021-2023, under the global cooperation agreement established by both parties in 2007.

Due to the global pandemic, judging of submissions received for the 2020 award was not completed. However, entries submitted for the 2020 award will be automatically entered into consideration for the 2022 award. Those who submitted entries for 2020 will be allowed and encouraged to update those entries if desired.

"We must support and recognise innovative efforts that seek to minimise negative impacts on our environment. ASHRAE is proud to continue our partnership with UNEP OzonAction to sponsor this award in support of pioneering refrigerant technologies that will play a crucial role in our global marketplace and help us to achieve important climate management goals", said 2022-23 ASHRAE President, Mr Farooq Mehboob, Fellow Life Member.

The award's selection criteria include:

- Description of innovation in the field of lower-GWP refrigerants.
- Confirmation that the project has been implemented in a developing country.
- Extent of need.
- Environmental impact achieved including specific reference to the GWP chemicals' contribution.
- Description of further application in developing countries from both the technology and economic perspectives, including how the innovation is financially feasible when replicated.

The entry submission period ends on 31 December 2022. Information about the award and the online submission form can be found at ashrae.org/lowerGWP. Entries will be judged by an international jury of experts in the field of refrigerant research and management, selected by ASHRAE and UNEP.

The individuals who worked on projects selected for 2022 awards will be announced at Montreal Protocol-related events. ASHRAE and UNEP will also team up to disseminate information to specialists and government officials in developing countries about the projects selected, to raise awareness of successful technology applications.

In 2019, ASHRAE and UNEP identified five projects – two Residential Applications and three Commercial/Industrial Applications, for awards.

- Low Charge Ammonia Vapour Compression Refrigeration System implemented in India
- HFC-161 Application for High Cooling Capacity Household Air Conditioners implemented in China
- Packaged Chillers with Integrated Air Handling Units Using HFC-32 and HC-290 implemented in Saudi Arabia
- CO_2 Transcritical Refrigeration System for a Hot-and-Humid Region implemented in Thailand
- Low Charge Propane Chiller for a Supermarket Refrigeration System implemented in Brazil

ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organisations in the HVAC&R community and across related industries.

The society is showcasing integrated building solutions and sustainability in action through the opening of the ASHRAE Global Headquarters building in metro-Atlanta, Georgia, USA.

United Nations Environment Programme and OzonAction

The United Nations Environment Programme (UNEP) is the leading global environmental authority that sets the global environmental agenda, promotes coherent implementation of the environmental dimension of sustainable development within the United Nations system, and serves as an authoritative advocate for the global environment. As an Implementing Agency of the Multilateral Fund for the Implementation of the Montreal Protocol, UNEP, through OzonAction, assists 147 developing countries to meet and sustain their compliance obligations under that treaty. More information on OzonAction can be obtained from https://www.unenvironment.org/ozonaction/

Singapore Polytechnic sets up the Environmental Sustainability & Energy Efficiency Centre

The thought leadership conference featured a panel discussion, moderated by Mr Philip Lim, CEO, Aquinas Global and Mentor-at-Large, Audacity, on extreme left. The panelists were, from left to right, Mr Atsushi Taira, Managing Director, Mistletoe Singapore Pte Ltd (parent company of Audacity); Dr Amy Khor, Senior Minister of State, Ministry of Sustainability and the Environment, and Ministry of Transport; Mr Humphrey Lau, Group Senior Vice President, Global Industry Business, Grundfos; and Mr Assar Qureshi, Regional Energy Counsellor (Asia), Embassy of Denmark in Singapore.

Singapore Polytechnic (SP) announced the setting up of the Environmental Sustainability & Energy Efficiency Centre (ESEE), its latest research centre, at the 'Values-Based Green Transition – For Singapore Businesses', a sustainability networking and knowledge sharing conference, held recently.

The conference was organised by SP and its strategic partners, Audacity, Grundfos, JTC Corporation, United Overseas Bank and Singapore Business Federation. Supported by the Singapore Green Building Council, the event was officiated by Dr Amy Khor, Senior Minister of State, Ministry of Sustainability and the Environment, and Ministry of Transport.

The inaugural thought leadership conference brought together the region's foremost industry partners and business leaders to share their expert knowledge and renew their commitment on sustainability, as well as to chart tangible and achievable initiatives that combat climate change within their organisations.

The event featured knowledge sharing by environmental and industry leaders such as global water solutions pioneer, Grundfos, and leading, sustainable industrial developer, JTC Corporation. The participants shared their goals and best practices in driving sustainability to align with Singapore Green Plan 2030, and discussed the impacts of the value-based green transition on businesses and how SP and its strategic partners have supported businesses in their sustainable development transformation.

Moving towards a low-carbon future

Singapore's transition to a low-carbon economy is critical to ensuring that the nation moves in tandem with the ongoing global efforts on sustainable development as well as leveraging new opportunities in the emerging green economy. As such, it is important to help enterprises and the workforce harness sustainability as a competitive advantage, invest in innovation and seize new growth opportunities in the green economy.

As a 'one-stop centre' to bridge this gap, the ESEE will support and streamline the green transition journey for large companies as well as small and medium-sized enterprises (SMEs), by offering a comprehensive suite of carbon emissions and carbon management consultancy services and solutions to industry partners. These include, among others, a programme to provide training on sustainability, energy management and carbon reduction, and masterclasses on best industry practices. The ESEE will be looking to collaborate with SMEs from the built environment, manufacturing, cold chain, food services and lifestyle, maritime and engineering services, as well as electric vehicles and land transport industries.

Additionally, the ESEE will leverage on the polytechnic's extensive strategic network of industry partners and collaborators – through the SP Alliance & Network (SPAN) initiative which includes government agencies, companies, trade associations and chambers, and SP's alumni community – to support corporations and SMEs in their climate action journey. ESEE's partnership with SPAN will empower like-minded enterprises to share invaluable resources and knowledge, via a central hub, to tackle teething issues such as operational costs and administrative processes, hence translating to more efficient work processes and lower costs in the transition towards sustainable operations.

Johnson Controls to mentor SMEs in digital transformation and decarbonisation

Johnson Controls, a global leader for smart, healthy and sustainable buildings, recently announced that it has partnered SkillsFuture Singapore (SSG) as a SkillsFuture Queen Bee for the Built Environment Facilities Management sector. Over a three-year period commencing in 2022, Johnson Controls will mentor small and medium-sized enterprises (SMEs) in the sector, to develop digital capabilities to transform their businesses and kickstart their sustainability journeys.

Johnson Controls has partnered SkillsFuture Singapore as a SkillsFuture Queen Bee for the built environment facilities management sector, to mentor SMEs in digital transformation and decarbonisation.

SkillsFuture Queen Bees are industry leaders that champion skills development in their respective sectors. As Queen Bees, they provide skills advisory and support to guide companies in identifying and acquiring the skills needed for business transformation.

Participating SMEs will undergo a transformation programme curated by Johnson Controls. Spanning a period of six months, the programme consists of three parts. The first will be a digital literacy workshop for participants to understand the fundamentals of digital transformation and decarbonisation. This will be followed by a discovery clinic to review existing technology capabilities, uncover gaps and map out a plan in alignment with the companies' goals and aspirations. Finally, Johnson Controls will guide the companies to design and implement the solution.

The partnership with SSG is in line with the larger effort by Johnson Controls to build the ecosystem that is necessary to achieve super low energy or net zero buildings. The company's OpenBlue Net Zero Buildings is a full spectrum of sustainability offerings that include desired outcomes and risk management models. Employing an eight-step decarbonisation methodology and partnering complementary companies, Johnson Controls provides a single source turnkey delivery for customers to assess, benchmark, plan, execute, track and achieve net zero buildings.

The OpenBlue Net Zero Buildings as-a-Service model has proven to be effective. It is helping the Powerhouse Alliance, a Norwegian collaboration for energy innovation, to implement an energy system that draws heating and cooling energy from the ocean, to power buildings, electric buses, cars and boats, through a local microgrid. Johnson Controls is now rolling out this turnkey solution in Asia Pacific with Singapore as a key market.

Mr Anu Rathninde, President, Asia Pacific, Johnson Controls, said, "Digital transformation is foundational in the journey towards net zero. We now use data to drive measurement, monitoring, resilience and sustainability. By incorporating capabilities from our OpenBlue suite of digital solutions and AI-infused services, we can better understand how exactly buildings are working in real-time, enabling better optimisation. For any transformation to be successful, the people involved are key. We are privileged to partner with SSG to build the necessary skills in our sector for a more sustainable future".

Mr Tan Kok Yam, Chief Executive of SSG said, "The partnership with Johnson Controls as a SkillsFuture Queen Bee is part of our effort to build capabilities in our workforce and companies, in support of the Singapore Green Plan 2030. We are confident that Johnson Controls will be able to reach many SMEs and workers in the Built Environment Facilities Management sector, and equip them with urgently required digital and green skills".

Johnson Controls

Building on a history of more than 135 years, Johnson Controls offers a blueprint for the future of facilities such as healthcare, schools, data centres, airports, stadiums, manufacturing and beyond, through OpenBlue, the company's comprehensive digital offering. Today, Johnson Controls has a large portfolio of building technology and software as well as service solutions, and a global team of 100,000 experts in more than 150 countries.

SkillsFuture Singapore

SkillsFuture Singapore (SSG) drives and coordinates the implementation of the national SkillsFuture movement, promotes a culture of lifelong learning and strengthens the ecosystem of training and adult education. Through a holistic suite of national SkillsFuture initiatives, SSG enables Singaporeans to take charge of their learning journey in their pursuit of skills mastery. SSG also works with key stakeholders to ensure that students and adults have access to high quality and industry-relevant training.

Institutional investors urge governments to step up climate policy ambition

Investor groups from around the world recently released a statement signed by 533 institutional investors with USD 39 trillion in assets under management, urging governments to enact policies that would leverage the private capital required to address the climate crisis.

The statement is coordinated by the Founding Partners of the Investor Agenda – Asia Investor Group on Climate Change, CDP, Ceres, Investor Group on Climate Change, Institutional Investors Group on Climate Change, Principles for Responsible Investment, and UNEP Finance Initiative.

The signatories are urging governments to take the following five priority policy actions:

- Ensure that the 2030 targets in their Nationally Determined Contributions (NDCs) align with the goal of limiting global temperature rise to 1.5° C.
- Implement domestic policies across the real economy and take early action to ensure that their 2030 greenhouse gas emissions are aligned with the 1.5° C goal.
- Contribute to the reduction in non-carbon dioxide greenhouse gas emissions and support the effective implementation of the Global Methane Pledge to reduce emissions by at least 30% from 2020 levels by 2030.
- Scale up the provision of climate finance from the public and the private sectors, for mitigation, adaptation and resilience, particularly for developing countries.
- Strengthen climate disclosures across the financial system.

Decarbonisation programme for SMEs launched

Small and Medium Enterprises (SMEs) in Singapore can now tap on a first-of-its-kind mentorship programme that will make it easier for them to kickstart their sustainability journeys and build capabilities to decarbonise. Known as the 'SME Kickstarter Decarbonisation Programme', the initiative is conceptualised and implemented by Schneider Electric, a global leader in the digital transformation of energy management and automation.

The programme, supported by Enterprise Singapore (EnterpriseSG), under the Enterprise Sustainability Programme (ESP), was announced by Minister of State for Trade and Industry, Ms Low Yen Ling, at the SME Centre Conference held in Singapore, recently.

Under the programme, Schneider Electric will provide training and mentorship to participating SMEs over three years, to ensure they are equipped with the necessary knowledge and guidance needed throughout their sustainability journeys, with a focus on decarbonisation. Participating SMEs will undergo workshops covering key concepts on sustainability as well as emissions reporting frameworks.

Schneider Electric will also support the SMEs in charting their strategies by establishing their Scope 1 and 2 emissions, developing decarbonisation roadmaps and identifying opportunities for energy efficiency.

The focus of the programme is to measure and reduce Scope 1 and 2 emissions which can be directly influenced by the organisation. Scope 1 emissions are direct emissions resulting from combustion of fossil fuels within the facility, leakage of refrigerant gases and vehicle usage. Scope 2 emissions are indirect emissions resulting from purchase of electricity and heating / cooling.

In addition, the programme will enable SMEs to undertake digital transformation and grow a pipeline of skilled digital talent. They will receive hands-on guidance to track their energy consumption as well as emissions via Schneider Electric's digital solutions. SMEs can also expect to adopt Schneider Electric's cloud-enabled platform which aims to simplify energy management and provide data and insights on energy usage. Schneider Electric will also support the SMEs in keeping track of their energy savings and corresponding emissions reduction over three years.

Mr Yoon Young Kim, Cluster President, Singapore, Malaysia and Brunei, Schneider Electric, said, "Schneider Electric is excited to be partnering Enterprise Singapore to enable our SMEs to kickstart their sustainability journeys, in support of the Singapore Green Plan 2030. Many SMEs may not have the resources, knowledge, talent and skills to realise sustainability targets. Hence, we hope this comprehensive mentorship programme will help them overcome their challenges and, by leveraging innovative technological solutions, the SMEs will also be empowered to strategically digitise and achieve progress in decarbonisation".

The 'SME Kickstarter Decarbonisation Programme' is expected to benefit about 100 SMEs, over the next three years. The programme is supported by EnterpriseSG under the ESP which was launched in October 2021 to support Singapore businesses on sustainability initiatives and to capture new opportunities in the green economy. The ESP aims to uplift the sustainability capabilities of local enterprises through such partnerships with industry experts, which complement existing initiatives such as sustainability courses to build awareness and knowledge, support for sustainability projects via the Enterprise Development Grant and Enterprise Financing Scheme – Green which facilitates access to green financing.

Mr Geoffrey Yeo, Assistant Chief Executive Officer (Urban Solutions, Sustainability & Enterprise Finance), EnterpriseSG, said, "We are happy to partner Schneider Electric to enhance the sustainability capabilities of our SMEs, who play a crucial role in Singapore's green economy. The focus on decarbonisation and energy efficiency is timely for enterprises seeking to invest in green innovation and optimise their energy usage. Enterprise Singapore welcomes more of such partnerships to support SMEs along their sustainability journey and bring us closer to achieving Singapore's carbon emissions goals."

The programme is open to Singapore-registered SMEs across all sectors. Currently SMEs, such as precision engineering solution providers, including Ichi Seiki and PLC Industries, as well as office automation systems company, The Automated Lifestyle, IT systems integrator, ServBridge Incorporated, and building system designer, IG Solutions, are looking to participate in this programme.

Mr Simon Lim, Executive Director, Singapore Precision Engineering and Technology Association (SPETA), said "We are encouraged that there is now this programme specifically tailored to helping SMEs to embrace sustainability and develop the relevant capabilities more easily. With the digital solutions and expertise shared by Schneider Electric, our SMEs will be better equipped to become more sustainable in their own practices and ready themselves for a more digital and greener future".

Interested SMEs can find out more about the 'SME Kickstarter Decarbonisation Programme', from https://www.se.com/sg/en/download/document/SME_Decarbonisation/

UTAC Holdings installs rooftop solar PV system

UTAC Holdings Ltd (UTAC), a global semiconductor test and assembly services provider, has installed a solar photovoltaic (PV) system at its Singapore factory, helping the company to reduce its carbon footprint and extend sustainability initiatives that have already cut the CO_2 emissions by 38%, since 2012.

Completed in June this year and now fully operational, the PV system maximises available rooftop space at USG1, UTAC's factory site in Serangoon, Singapore, for on-site clean energy generation. The system enables the company to generate over 1,000,000 kWh of electricity per year, offsetting its operational consumption needs and saving 467,000 kg of CO_2 emissions.

"We continue to do everything we can to improve our ESG profile, building on our accomplishments to-date. Over the last 10 years, we have reduced electricity demand across the enterprise, by more than 19%, which has enabled us to fulfil a significant proportion of our needs, from our new renewable capacity", said Mr John W Nelson, CEO and President of UTAC.

UTAC's partner in the solar PV project, Sembcorp Industries, is a leading energy and urban solutions provider, with a portfolio of 7.1 gigawatts (GW) of gross renewable energy capacity, globally.

UTAC's rooftop installation will generate over 1,000,000 kWh of green energy annually.

"Sembcorp is proud to be a part of UTAC's sustainability journey in adopting renewable energy for their business. The continued decarbonisation of the semiconductor industry will be key in achieving Singapore's national climate goals. We are encouraged by the positive reception of industry players like UTAC towards on-site, renewable energy generation, for their daily operations' use", said Mr Fendy Nursalim, General Manager, Sembcorp Solar Singapore.

This project is one of the recent examples of UTAC's sustainability initiatives, since 2012, for achieving a zero carbon footprint for all sites across the globe. In 2020, UTL, UTAC's Thailand site, also installed solar panels on its roof, and on a larger scale, removing over 2,000,000 kg of CO_2 emissions per year.

UTAC is actively working to improve environmental, social, and governance (ESG) credentials, continuously, and has additional ongoing projects, including water savings schemes as well as schemes for recovering and recycling water from manufacturing processes. There are also initiatives to increase energy efficiency and reduce waste throughout the enterprise, including upgrading machinery with advanced variable-speed motor drives and installing solar lighting.

Sustainable technologies deployed at new surgical gloves plant in Malaysia

Mölnlycke is investing EUR 50 million in a new plant in Kulim, Malaysia, to meet future demand for high-quality surgical gloves. The new plant is expected to generate 500 new local jobs.

With sustainable manufacturing as one of the main drivers for the initiative, Mölnlycke is partnering ENGIE for energy solutions and Veolia Water Technologies for wastewater treatment solutions, to ensure best-in-class energy management and waste water management, at the new plant.

Mölnlycke is focused on driving continuous energy efficiency and transition to 100% renewable electricity across all its sites, globally.

The company intends to optimise the new plant's energy consumption, by tapping digital energy management to monitor how energy is being used and where it is being lost. This increased transparency will help Mölnlycke to optimise its efforts to reduce consumption.

ENGIE, a global leader in providing low-carbon energy, will support Mölnlycke's production operations by providing sustainable energy solutions to the new Kulim plant, under a long-term power-purchase agreement spanning over 15 years.

Mölnlycke's journey to become a zero waste company by 2050, at the latest, continues with a focus on both promoting a circular economy to reduce waste in all its manufacturing processes as well as recycling and reusing process water. The waste water treatment solutions for the new plant, from Veolia, will enable water recovery and reuse, while minimising discharge quantity.

Installing large-scale rooftop solar system across six properties in Singapore

AIMS APAC REIT Management Limited (the Manager), as manager of AIMS APAC REIT (AA REIT), and SP Group (SP), a leading provider of utilities and sustainable energy solutions in Asia Pacific, have announced a partnership to install rooftop solar PV system across six of AA REIT's industrial, logistics and warehouse properties in Singapore by December 2023.

The six properties are 20 Gul Way, 27 Penjuru Lane, 30 Tuas West Road, 103 Defu Lane, 8 & 10 Pandan Crescent and 8 Tuas Avenue 20. The 10.8 Megawatt-peak (MWp) combined solar PV system will be one of the largest rooftop solar installations by any Singapore-listed real estate investment trust.

To be deployed and maintained by SP, the 20,157 rooftop solar panels will span across 5.2 hectares and can collectively produce 14,500 MWh of energy per year. This will help avoid over 5,900 tonnes of carbon emissions a year.

The solar energy generated from the combined rooftop solar PV system is recognised as a renewable energy source and AA REIT will receive all the renewable energy certificates (RECs) associated with the green energy generated. These RECs can be used to offset carbon emissions by AA REIT as well as support its tenants in their emission reduction efforts.

The Manager's CEO, Mr Russell Ng, said, "We believe in embedding sustainability into our business practices, which not only benefits the environment and our stakeholders, but creates long-term value for our unitholders. Furthermore, we are pleased to partner with one of Asia Pacific's leading utilities company, SP Group, on this significant milestone and continuation of our decarbonisation journey. We are also proactively reviewing our portfolio to identify measures and potential opportunities to reduce the brown energy consumption and carbon footprint across our properties".

Mr S Harsha, Managing Director of Sustainable Energy Solutions, Singapore, SP Group, said, "Accelerating Singapore's transition to a clean energy future is a key priority for SP Group. We are pleased to support AIMS APAC REIT in achieving this milestone on their sustainability agenda, with the incorporation of solar and carbon solutions. Our expertise in renewables and smart energy management solutions helps industrial, commercial and residential properties green their energy consumption and enhance the energy efficiency and performance of buildings".

Solar PV will be installed on the roof of AA Reit's largest logistics and warehouse property in Singapore, at 20 Gul Way.

Singapore EV fleet operator in tie-up with Thailand-listed company

SEV, which has one of the largest fleets of commercial electric vehicles (EVs) in Singapore, is teaming up with Thailand-listed Planet Communications Asia (PlanetComm) to supply electric cars, vans and scooters to Pattaya's tourism industry, in a pilot project that could pave the way for more of such vehicles to be rolled out to other tourist spots in the kingdom.

SEV will work with PlanetComm's subsidiary, Planet EV, for the pilot programme which aims to make EVs available at hotels, tourist attractions and the airport in Pattaya. Users will be able to book the vehicles online and return them afterwards at designated locations within the city.

The tie-up will also sell EVs to commercial users such as taxi and car-rental companies as well as food-delivery platforms. It will also install EV charging points and battery-swap stations in select locations in Pattaya. At least 1,000 cars and no fewer than 1,000 scooters will be made available in the pilot programme.

SEV is an authorised distributor of EVs in four Southeast Asian countries – Singapore, Malaysia, Thailand and Indonesia. It has the most EV charging points in a single location in Singapore. Earlier this year, it placed orders for 500 BYD e6 electric cars for the Singapore market. It has since taken delivery of about 200 cars, most of which have been leased out to drivers on ride-hailing platforms Gojek and Grab.

PlanetComm, a distributor of telecom equipment and enterprise IT software, set up Planet EV to diversify into the EV trade.

Infineon announces initiatives to address decarbonisation and digitalisation

At Infineon Technologies' OktoberTech Asia Pacific 2022, held on 13 October 2022, the company announced collaborations in the region – with Vietnam-based smart electric car maker, VinFast and South Korea-based LG Group's research and development hub, LG Sciencepark – to drive Asia's innovation ecosystem.

"As a market leader in power and IoT systems, Infineon aims to innovate with our key partners to continue making life easier, safer and greener. Today marks the expansion of Infineon's innovation ecosystem beyond Singapore and Malaysia. With our new innovation partners based in South Korea and Vietnam, Infineon is shaping a sustainable future by driving solutions for decarbonisation and digitalisation in Asia", said Mr Chua Chee Seong, President and Managing Director, Asia Pacific, Infineon.

At the core of these partnerships are semiconductors. The communities of creators, manufacturers and startups will leverage Infineon's hardware solutions including sensors, microcontrollers, actuators and secured connectivity, to create new solutions or to power emerging technologies.

VinFast and Infineon will establish a joint application centre in Hanoi, Vietnam, in the first quarter of 2023. The VinFast Infineon Competence Center will accelerate the co-development of future solutions for smart mobility, such as the next-generation electric drive train for electric vehicle platforms.

LG Sciencepark and Infineon will identify and support promising startups which are looking to commercialise or scale their solutions in South Korea and Southeast Asia. Both parties will support startups with access to business partners, office space (in the Infineon Co-Innovation Space in Singapore or the Superstart Lab in LG Sciencepark located in South Korea), mentorship, technical support and assistance in expanding their existing markets.

Celebrating innovations at OktoberTech Asia Pacific 2022 are, from left Ms Yan Huey Miin, Senior Vice President and Chief Financial Officer, Asia Pacific, Infineon; Mr Bernd Hops, Executive Vice President, Communications and Public Policy, Infineon; Dr Rutger Wijburg, Chief Operations Officer, Infineon; the Guest-of-Honour, Dr Amy Khor, Senior Minister of State, Ministry of Sustainability and the Environment, and Ministry of Transport; Mr Chua Chee Seong, President and Managing Director, Asia Pacific, Infineon; and Mr Christoph Hallier, Deputy Head of Mission and Chargé d'affaires, German Embassy in Singapore.

Witnessing the collaboration agreement between Infineon and Vietnam smart electric car maker, VinFast, are, from left, Mr Stuart Ian Taylor, Director of Smart Service Institute, VinFast; Dr Rutger Wijburg; Dr Amy Khor; Mr Chua Chee Seong; and Mr Francis Foo, Head of Power and Sensors Systems, Asia Pacific, Infineon.

In Singapore, a startup from South Korea, Deep-In-Sight, and five local startups, Datakrew, Extend My Runway, Flow Tech, Tack One and WeavAir, will be based at Infineon's Co-Innovation Space.

This year-long commitment is backed by technologies, expertise, and guidance from Infineon in Singapore and around the world, to help startups fast-track their product development.

OktoberTech

OktoberTech is Infineon's global event format, aimed at demonstrating how future technology can drive decarbonisation and digitalisation.

Hosted in areas with vibrant innovation ecosystems, OktoberTech brings together startups, business leaders and experts.

Infineon

Infineon Technologies AG is a world leader in semiconductor solutions.

FairPrice Group and A*STAR launch pilot for smart bins

FairPrice Group is leading the launch of a pilot for the deployment of smart waste sorting bins, named 'BINgo', in partnership with the Agency for Science, Technology and Research (A*STAR). BINgo employs artificial intelligence (AI), Internet of Things (IoT) and smart sensors, to help address the issues of incorrect recycling practices and low recycling rates in Singapore. As part of pilot trials, one prototype BINgo machine has been deployed at AMK Hub, and other prototype BINgo machines are expected to be progressively deployed at NEX and FairPrice Hub, and will be kept at the premises until October 2023.

"FairPrice embraces sustainability practices in our business by proactively championing and introducing efforts to nurture and protect our environment. Through this smart bins initiative, we aim to educate and imbue the importance of recycling right in the community, and inculcate the habit of reducing our environmental footprint", said Mr Jonas Kor, General Manager, FairPrice Foundation.

Features and functions of BINgo

BINgo aims to encourage correct recycling practices and improve recycling rates. Through the deployment of AI-enabled automated sorting technology and smart sensors, the processes for the collection of recyclables, including metal cans, glass, paper and plastic packaging, in a recyclable condition, will be improved. This means that waste fed into the machine can be identified as material suitable or unsuitable for recycling, and identified as having any contamination present that may affect its suitability for recycling (e.g. remnant liquid and pearls in a half-empty bubble tea cup). The machine's interface also educates the users about useful recycling facts as they go through the process of feeding waste into the machine.

In line with its commitment to promote a circular and low carbon economy, FairPrice Group endeavours to implement reduce, reuse and recycle programmes, to minimise unnecessary use of materials and the amount of waste generated, especially packaging.

The development of BINgo was financed by FairPrice's Sustainability Fund and led by A*STAR's Singapore Institute of Manufacturing Technology (SIMTech). Established in 2019, FairPrice's Sustainability Fund aims to address sustainability and environmental issues, by raising awareness, supporting innovative ideas and initiatives, as well as fostering strategic partnerships. A*STAR's SIMTech contributed its expertise in manufacturing technologies and product design, and integrated AI, IoT and smart sensor technologies, in the creation of the prototypes, to enable BINgo to automatically sort recyclables.

Dr David Low, Executive Director of A*STAR's SIMTech, said, "The use of innovative manufacturing and artificial intelligence technologies in the development of BINgo will make it easier to identify recyclables and improve the efficiency of waste collection and sorting, using automation. A*STAR is excited to co-innovate this solution with FairPrice Group and embark on this meaningful pilot which will help generate greater awareness about the importance of recycling correctly and aim to increase recycling rates in Singapore".

BINgo is packed with interactive and educational elements, and incorporates a simple, step-by-step guide and user-friendly interface, to help shoppers identify recyclables from non-recyclables, enabling them to recycle more and recycle correctly. Its design boosts efficiency and helps streamline collection processes, creating an enhanced experience for users. Additionally, the data on the waste collected, over time, will improve recognition of the recyclables, as well as improve statistical analysis for better waste management.

Other green programmes

Beyond this initiative, FairPrice has taken the lead in various other green programmes, such as the No Plastic Bag initiative, where FairPrice was the first supermarket to implement charges on plastic bags. It also champions the reduction of food waste, through its FairPrice-CSR Food Waste Reduction Framework, and is also the Pioneer Partner for the BCA Green Mark Portfolio Programme. Today, more than 40 FairPrice stores have attained Green Mark certification. In particular, the stores at Zhongshan Park and Kallang Wave Mall, have received Green Mark Platinum awards.

BINgo employs artificial intelligence, Internet of Things and smart sensors to help address the issues of incorrect recycling practices and low recycling rates in Singapore.

Lendlease Digital launches Podium Property Insights in Asia

Lendlease Digital recently announced the launch of Podium Property Insights in Asia. Launched in partnership with Accenture and Google Cloud, the software platform for workplace managers and real estate owners is expected to optimise space utilisation and cost savings within buildings, to support employers in improving the employee experience.

Designed for large scale enterprises, government agencies, and portfolios, the platform allows users to view, analyse and predict future requirements, as well as gain value from specific data, at a portfolio, building and team level. The partners have begun pilots in select locations, including Accenture's Singapore office and the Csuites flexible workspace at Paya Lebar Quarter.

Leveraging data for future insights

The Podium Property Insights software tool creates personalised insights and recommended actions to inform future workspace decisions, and drive improvements to employee satisfaction. Podium Property Insights intelligently supports 20 unique metrics including employee satisfaction, space utilisation, health & safety, and sustainability, in any building, to create real-time models for optimal building usage.

Unlike purely sensor-led solutions, Podium Property Insights offers concise insights and analysis at the individual team level, and provides forward looking forecasts. The platform brings together place, people, and business data collected through sensors and surveys, to create a staircase to value – from business intelligence to artificial intelligence and ultimately to operational intelligence. This means users have the insights needed to improve cost efficiency, employee engagement, and workplace productivity.

At the launch event are, from left to right, Mr William Ruh, Chief Executive Officer, Lendlease Digital; Mr Amit Bansal, Managing Director, Applied Intelligence Execution and Data Led Transformation for Growth Markets, Accenture; and Mr Johann Kruse, Global Alliance Lead for Lendlease, Google Cloud.

Workplaces where people thrive

Employees are now demanding dynamic, personalised workplace experiences. In response, Podium Property Insights sets employee satisfaction as the 'hero metric'. By combining AI with practical tools to enable workplace teams to respond to ever-changing employee needs, along with insights built on complete data sets, the software platform helps the workplace thrive by correlating building data with employee data.

Through the pilot phase of the rollout of Podium Property Insights, teams have discovered that sometimes it is the simple things that need changing – for instance replacing high-chairs with standard chairs. Other teams have been able to relook at the space requirements, based on how unique teams prefer to work and collaborate.

Podium Property Insights promotes safer and healthier buildings, through tracking real-time data analytics and predictive and immediate action recommendations, which aims to decrease employee complaints by up to 30% and increase workplace productivity by up to 12%.

Optimising space

For workplace managers seeking to reduce overhead costs, Podium Property Insights tracks underutilised floors, meeting rooms and places in the office, that have the least engagement, enabling an optimal model for space usage and a thriving office environment.

Companies will be able to monetise non-utilised spaces at non-peak times, by reconfiguring floorplate designs and adjusting for a hybrid work model. This model is expected to generate maximum workplace performance, and grow employee engagement and retention. Podium Property Insights will continuously evolve to include additional data sources and metrics, based on feedback received.

Reducing carbon footprint

For building owners seeking to reduce their building's carbon footprint, Podium Property Insights can monitor air quality, temperature, and acoustics across the office. The platform also identifies electricity intensity and use per occupant, enabling building owners to redeploy resources more efficiently. After piloting Podium Property Insights, buildings will have a much stronger visibility of utility spend against occupancy, enabling action to reduce energy consumption footprint by 10% to 20%, depending on building infrastructure design. Podium Property Insights supports the entire real estate value chain, while encouraging industry collaboration and co-innovation.

Helsinki Partners launches its first corporate business programme in Singapore

Helsinki Partners, a company owned by the City of Helsinki in Finland, is launching its first corporate business programme, Finbound Helsinki. The programme serves as a catalyst for business and innovation, particularly between corporates in Helsinki and Singapore, as well as to attract investment and talent to expand in Finland.

"We have chosen Singapore to launch our very first corporate programme, Finbound Helsinki. Singapore and Helsinki have a lot of similarities. Both are high tech countries with world class education and a passion for sustainability. We believe that, by combining our strengths, we can discover solutions for global challenges. This special corporate programme offers a fast track to the Finnish business ecosystem and the European market. It will help the corporations to identify new business opportunities in Helsinki, Finland. Helsinki Partner's team of experts will give participating organisations the support they need to reach their business objectives in Helsinki", said Ms Clarisse Berggårdh, CEO, Helsinki Partners.

Finbound Helsinki provides an easy-access, fast track for organisations to explore and enter the European market. Customised to suit the business priorities of each participating company, the programme offers the landing crew of these companies the added benefit of being located in Helsinki – the capital of the 'world's happiest country'.

Finbound Helsinki is designed for large organisations with a strategic interest in Europe. The programme consists of modules, both on-line and in person, tailored to suit corporates' annual activities. Built on one of the world's best ranked education systems, Helsinki offers innovators, from around the world, a welcoming business ecosystem and a stable and well-functioning platform for operating in Europe.

Helsinki Partners has been cooperating with the Singapore Exchange-listed CapitaLand Investments (CLI)-led Smart Urban Co-Innovation Lab, over the past two years. The cooperation was recently reinforced by the signing of a Memorandum of Understanding (MoU). Helsinki Partners is committed to helping Singaporean firms, or any other foreign firms, introduced through the lab, to set up, grow and develop their business in Helsinki. In addition, Helsinki Partners will serve as a gateway and springboard for Singapore companies to expand in Europe.

"As one of the most innovative cities in the world, Helsinki is a strong partner, serving as a launch pad for Singapore companies to venture into Europe. The Smart Urban Co-Innovation Lab is thrilled to collaborate with Helsinki Partners to bridge the two cities and to facilitate the development of smart cities solutions", said Mr Aylwin Tan, Chief Customer Solutions Officer, CLI, and Director of Smart Urban Co-Innovation Lab.

The MoU affirms the strong ties and collaboration efforts between Helsinki Partners and Smart Urban Co-Innovation Lab, to tap on the huge growth potential driven by the rising demand for sustainable built environments, worldwide.

Siemens and Shell sign MoU to advance low carbon and efficient energy solutions

Siemens Smart Infrastructure and Shell Global Solutions International BV have signed a Memorandum of Understanding (MoU) to collaborate on developing low carbon and highly efficient energy solutions that support the energy transition.

The agreement will focus on projects that produce green hydrogen for industrial applications at Shell and its customers, as well as enhancing collaboration in the areas of biofuels and circular chemistry. Under the MoU, Siemens and Shell will create solutions that increase energy efficiency and generate sustainable power, consisting of, but not limited to, digitalisation; efficient networks; and the production, distribution and application of green hydrogen.

The partnership, inked with Siemens' Electrification and Automation business unit, has the potential to strengthen synergies for both parties. While Siemens intends to work with Shell to accelerate the latter's transition towards net-zero operations, Shell seeks to supply Siemens and its affiliates with low carbon products, such as biofuels, that reduce emissions across the supply chain in Siemens' operations, and in the use phase of Siemens products.

"Siemens is committed to decoupling electrification from fossil fuel resources. Partnerships are key to driving this effort and transitioning towards sustainable energy supplies. The partnership with Shell fits perfectly with Siemens' vision", said Mr Stephan May, CEO of Electrification and Automation at Siemens Smart Infrastructure.

Exhibits at Light + Building Autumn Edition 2022 addressed current challenges

Light + Building Autumn Edition 2022 was held from 2 to 6 October 2022, in Frankfurt, Germany. The event addressed the areas of lighting and building services technology. In the area of electrical engineering, and home and building automation, the focus was primarily on technical innovations that contribute to increasing energy efficiency in homes and buildings. The exhibits also covered regenerative energy sources such as solar or photovoltaic panels, charging management systems for e-mobility and lighting control.

Efficiency and sustainability also play an important role in the lighting sector. High quality, modular lighting systems, in combination with digital control, provide light when needed. The newly planned lighting area, which proved to be of great interest to exhibitors and visitors, displayed these solutions. At 60%, this area still accounts for the largest share of the trade fair.

Connected security technology in focus

In the immediate vicinity of Intersec Building, featuring exhibitor displays on security technology, the Intersec Forum, a specialist conference for connected security technology, was also impressive. On four conference days and from a total of 30 lectures and panels, participants learned about the coming trends, the latest guidelines and tangible strategies for the successful, data-secure and AI-based interconnection of building services. The Intersec Building section recorded a high level of satisfaction, with 89%.

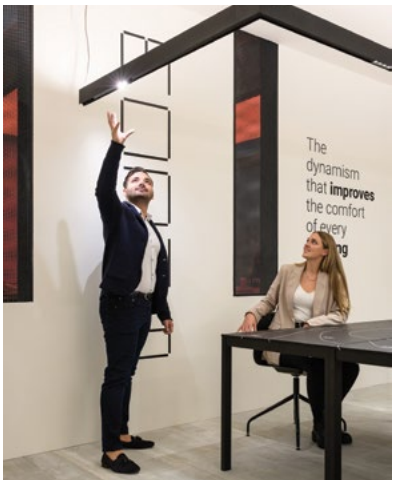
Light + Building Digital Extension

For the first time, new perspectives also opened up for all participants in the digital space. At the Light + Building Digital Extension, exhibitors and visitors were able to make targeted contact with each other and expand their network on the basis of intelligent match-making. The Digital Extension facility continued until 14 October 2022.

Lectures, discussion rounds and presentations were also available on-demand, on the platform.

Light + Building Autumn Edition 2022 featured the products and solutions presented by 1,531 exhibitors from 46 countries, and attracted 92,838 visitors from 147 countries. Most of the visitors came from Germany and also from Italy, the Netherlands, France, Switzerland, Belgium, Spain, Austria, Great Britain and Poland. The international participation was at 55%. The level of visitor satisfaction was high, with 95% of the trade visitors satisfied with the achievement of their visiting goals and the range of exhibits. Over 83% are already planning to visit Light + Building 2024 which will be held from 3 to 8 March 2024.

“We are delighted with the extremely high level of interest shown by the visitors who came to the Light + Building Autumn Edition. The themes of the event offer the answers to the current challenges of our time. In addition – and this runs through all the discussions we have – personal encounters are and remain the central element of trade fairs. Business is done between people. The following applies to all participants. In times of crisis, it takes courage and a willingness to take risks, to look positively and solution-oriented into the future. The exhibiting companies have impressively demonstrated this at the Light + Building Autumn Edition”, said Mr Wolfgang Marzin, Chairman of the Board of Management of Messe Frankfurt, organisers of the event.



Modular system for human-centric lighting. Image: Messe Frankfurt Gmbh / Pietro Sutera.

Browser-based building management and organisation system. Image: Messe Frankfurt GmbH / Jochen Gunther.

Keppel Infrastructure @ Changi building awarded the Green Mark Platinum Positive Energy Certification

First building in Singapore to achieve this certification under the new BCA Green Mark 2021 scheme.

The Keppel Infrastructure @ Changi building, which houses an intelligent operations control centre and energy transition innovation centre, was conferred the highest accolade of Green Mark Platinum Positive Energy (GM: 2021) by the Building and Construction Authority (BCA).

A Green Mark Platinum Positive Energy building has at least 115% of its energy consumption, including plug load, supplied from onsite renewable sources.

Keppel Infrastructure @ Changi is the first building in Singapore to receive this certification under the new BCA GM: 2021 scheme which raises environmental standards in energy performance and places greater emphasis on other important sustainability outcomes, such as enhancing a building's resilience to climate change, adopting smart technologies and creating healthier environments for building users.

Such smart technologies include the use of AI-enabled Internet of Things, real-time data analytics and machine learning to predict, optimise and drive performance.

The Keppel Infrastructure @ Changi building, an annexe to Keppel DHCS's Changi District Cooling Systems Plant, was built in 2013, on a site layout of 1.06 ha. The fast-track retrofitting works commenced at the end of 2021 and were completed in May this year.

The works included upgrading of the high-efficiency air conditioning and mechanical ventilation system, as well as installing smart sensors, LED lights, electric vehicles charging infrastructure and vast vertical greenery. Over 4,000 m² of photovoltaics (PV) were also installed on the rooftop and building façade,

Keppel Infrastructure @ Changi building

which are expected to yield about 600,000 kWh/year of renewable energy, an amount that is more than double the building's consumption. This is equivalent to the reduction of about 245 tonnes of CO_2 emissions per year or the carbon sequestration capacity of more than 7,000 new trees planted.

The building is also fitted with water-efficient fittings to reduce potable water usage and it is able to harvest rainwater for irrigation. In addition, the internal fit-outs, road kerbs, wheel stoppers and waterproofing system were implemented using sustainable materials and products.

Ms Cindy Lim, CEO of Keppel Infrastructure, said, "We are delighted that the retrofitted Keppel Infrastructure @ Changi building meets the highest standard of the BCA Green Mark and is the first in Singapore to be conferred the Green Mark Platinum Positive Energy building under the new scheme. We thank BCA and the National Parks Board (NParks) for their support, as we seek to work with stakeholders to contribute continuously to global sustainable development and decarbonisation efforts".

Commenting on the achievement, Mr Kelvin Wong, CEO of BCA, said, "The Green Mark 2021 scheme was developed to help raise sustainability standards in buildings and support Singapore's push towards a low-carbon built environment. The refreshed scheme launched last year places greater emphasis on criteria such as design for maintainability, reduction of embodied carbon throughout a building's life cycle, integration of smart technologies, and creation of healthier environments for building users. We are pleased that Keppel Infrastructure @ Changi has met the requirements to be certified Green Mark Platinum Positive Energy".

As part of the refurbishment of the Keppel Infrastructure @ Changi building, NParks co-funded the building's vertical greening and biophilic landscaping, under the Skyrise Greenery Incentive Scheme (Vertical Greenery), which added over 910 m² of greenery to the building. This greenery reduces the urban heat island effect, improves the performance of the indoor environment and also enhances the health and mental well-being of occupants.

Dr Yap Him Hoo, Deputy Chief Executive Officer, Professional Development & Services Cluster, National Parks Board said, "The National Parks Board (NParks) is heartened by Keppel's continued efforts to green up their built environments and their recognition of skyrise greenery benefits. We are happy to have supported their efforts to install extensive green walls co-located with existing solar panels, through our Skyrise Greenery Incentive Scheme (SGIS)".

Keppel Infrastructure

KEPPEL INFRASTRUCTURE @ CHANGI: A POSITIVE ENERGY BUILDING

600,000 kWh
of renewable energy collected annually using solar panels

>200%
replacement of building's annual energy consumption

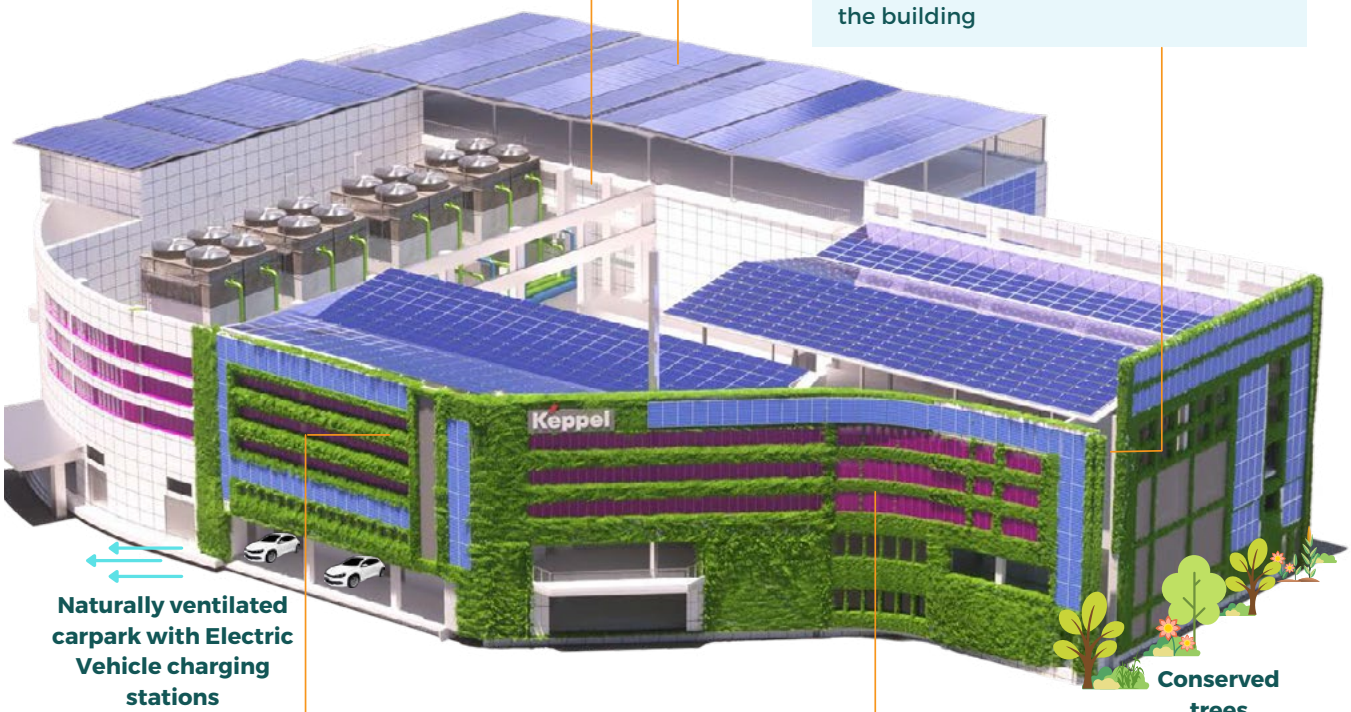
245 tonnes
reduction in CO2 emissions annually

7,000 new trees
carbon sequestration capacity

1 Use of **highly efficient** Air-Conditioning and Mechanical Ventilation systems, sun pipes, smart sensors and LED lights

2 **>4,000 square meters** of solar panels on rooftop and building façade yields more than **200%** of the building's annual energy consumption

3 Sustainable materials such as low-volatile organic compound paint, zero-ozone depletion potential refrigerant, and products with **Singapore Green Building Certification** are used for the building



Naturally ventilated carpark with Electric Vehicle charging stations

Conserved trees

4 **>910 square meters of vertical greenery and sky gardens** reduces urban heat island effect and incorporates biophilic design in building

5 **Rainwater harvesting, automatic drip irrigation with rainwater and NEWater** and efficient water fittings certified to **PUB Water Efficiency Labelling Scheme** reduces the building's water consumption

Hitting the Green Mark through smart lighting

Signify Singapore discusses some of the solutions to achieve the enhanced rating.

To help Singapore further raise sustainability standards for its built environment, the Building and Construction Authority (BCA) introduced the Green Mark 2021 (GM 2021) on 1 November 2021.

The tightened scheme is aimed at enhancing overall environmental performance and driving decarbonisation in the built environment. It includes a set of revised energy-efficiency standards and a re-certification process to spur greater reduction in energy consumption and carbon emissions from buildings.

Under the new standards, energy efficiency via demand reduction (w/m²) and consumption reduction (KWhrs) have become the major determinants of a building's rating. The updated scheme also recognises sustainable parameters via badges of honour for health & well-being, whole life carbon emissions reduction, resilience, maintainability and intelligence.

Although it has been a year since GM 2021 came into effect, not all buildings in Singapore have been able to stay on the mark. What are the primary considerations to obtain the GM 2021 recognition? Would adoption of green solutions make a difference to the scoring and lead to the desired outcome? Here is a breakdown of the key considerations, with a special emphasis on lighting.

ENERGY EFFICIENCY

DEMAND REDUCTION

Be it developing a new building or retrofitting an existing one, achieving the targeted Lighting Power Density (LPD), shown in the table below, is not an easy task.

Green Mark Award	LPD in W/m²
SLEB	5.0
Platinum	5.5
Gold^{Plus}	6.0

As it is challenging to achieve these LPDs, while maintaining the required uniformity and glare limit, it is important to incorporate high-efficiency LED luminaires with sophisticated optics and control systems. It is also necessary to obtain the services of experienced designers who are able to help architects, mechanical & electrical consultants and facility managers, to achieve the required scoring under the scheme.

CONSUMPTION REDUCTION

Dimming or switching off lights through sensors that detect occupancy and daylight penetration has a direct impact on consumption reduction. A retrofit-ready wireless control system will enable multi-site management and monitoring of lighting infrastructure suitable for large spaces.

Such a system will monitor temperature, air quality, noise level and relative humidity, to optimise the environment for end-users. It can also guide employees to uncrowded areas of a building and enable them to reserve a space, based on acceptable occupancy levels, while maintaining physical distance. Small and medium-sized offices or shops can opt for a stand-alone control system.

SUSTAINABILITY BADGES

In addition to mandatory energy efficiency, buildings can also obtain Sustainability Badges by scoring 10 points in each of the following categories:

HEALTH & WELL-BEING

It is possible to achieve a score of 3 out of 10 points in this category, with the adoption of circadian lighting, high colour rendering index and Ultraviolet-C (UV-C) lamps in airconditioning ducts.

Humans have internal clocks, in the brain that synchronise physiological functions with dynamic lighting levels. When inside a building, it can be disturbed due to non-exposure to direct daylight.

Circadian rhythms play a major role in good sleep quality, cognitive performance and the functioning of the immune system. Lighting is connected with stimulating the production of the important hormone, cortisol, which helps to reduce stress, and reducing the sleep-inducing effects of another

Circadian rhythms improve physiological functions.

hormone, melatonin, so that we can stay more alert during work hours and get better sleep at night. The art of balancing the correct type of light by replicating natural variations in colour temperature, at the correct time of day, helps improve our energy levels and overall well-being.

The other category under Health & Well-being, known as 'Restorative and Community Spaces', refers to a range of spaces in a building, catering to a broad spectrum of human activities designed to provide rest, relaxation or community bonding.

To further enhance the environment for relaxation, while gaining an additional point, under this category, builders can opt for energy-efficient, colour-changing lights. These solutions can promote quality sleep, by automatically dimming the lights before bedtime and gradually brightening the lights when morning arrives, to allow for a gentle, waking up process.

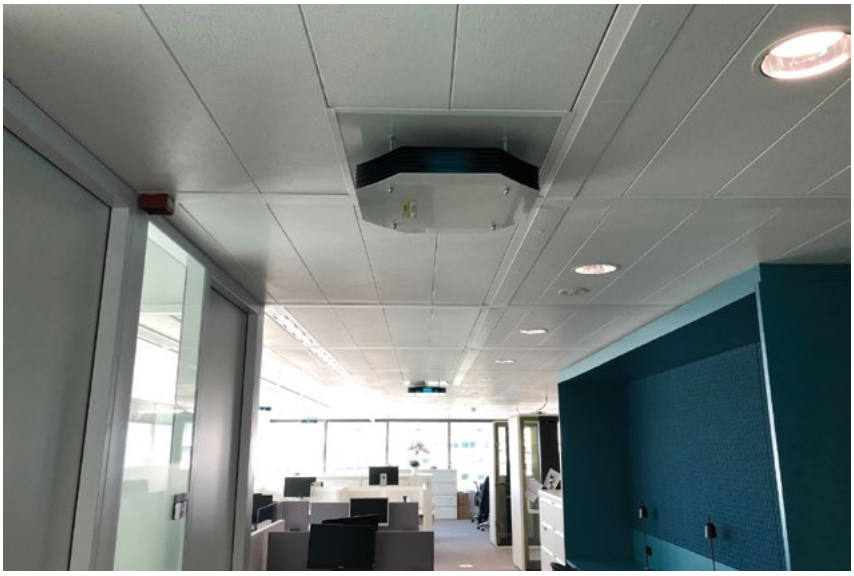
MAINTAINABILITY

The quality of the lighting products is extremely important and the following factors must be taken into account – eliminating the flickering of lights and minimising colour shifts. This contributes to 2.5 out of 10 points. Good lighting should also have a long lifespan and should be made from sustainable materials that limit wastage, facilitate recycling and automatically contribute to the circular economy.

INTELLIGENCE

Smart lighting control systems can further increase the Green Mark rating. Consideration of the following parameters is therefore important:

Maximising energy savings
LED luminaires and control systems should be installed, as they help buildings achieve over 70% savings in the building's Operating Expenditure (OPEX). Facility managers benefit from the luminaires' lifespan of more than 50,000 hours which is equivalent to about 14 years of operation in an office, with little maintenance expenses.



UV-C systems can be used to disinfect air-conditioning ducts. Image: Signify Singapore.

Indirect UV-C lighting for hospital interiors. Image: Signify Singapore..

UV-C disinfection at workplaces
The emergence of COVID-19 has also underscored the profound impact of the built environment on our health and well-being. The quality of the air we breathe, the water we drink and the cleanliness of the surfaces we touch, can all affect our health. Generally, we are always at some risk of contracting and spreading viruses in enclosed, indoor areas like offices, factories, restaurants and schools.

UV-C light is a known disinfectant for air, surfaces, objects and water, that can help mitigate the risk of falling sick. This technology has been proven to be effective and safe in eliminating all bacteria and viruses tested to-date, including the SARS-CoV-2 virus.

Builders can adopt a broad range of UV-C lamps and luminaires for a variety of applications and purposes. These include UV-C systems for air-conditioning ducts, indirect UV-C systems for workplaces, classrooms and eateries; and portable UV-C desk lamps for homes. UV-C trolleys can be used to disinfect large, vacated rooms, overnight, and small portable UV-C chambers can be used to disinfect objects like mobile phones, car keys and computer mice.

LIGHT MATTERS

Achieving GM 2021 certification is not an end in itself, but a channel for the built environment to transition towards a low-carbon, sustainable future. Signify Singapore believes the adoption of the right lighting, a central component of any building or structure, is an essential strategy in the pursuit of a net zero future.

Developing renewable energy projects to decarbonise corporates

Mr Glenn Lim

Mr Glenn Lim, CEO of NEFIN Group gives an overview of the group's objectives and plans, as well as the technical challenges and solutions.

The Singapore Engineer (TSE): Could you provide a brief background on the NEFIN Group and its activities?

Mr Glenn Lim (GL): NEFIN is a premium, green, independent power producer (IPP) offering bespoke carbon-neutral technologies and financing solutions in Asia Pacific. Incubated by the Hong Kong Science & Technology Park eight years ago, NEFIN was founded by a core management team, including myself, from DuPont's solar business. The management team has grown into a well-rounded team of engineers, legal experts, investment bankers and techno-commercial experts, with a combined experience of over 40 years in project development in Asia, and over 50 years of experience in engineering.

NEFIN has collectively installed over 3,400 MW of utility-scale, commercial and industrial renewable energy systems with funding from ACEN, the listed energy platform of the Ayala Corporation, one of the largest conglomerates in the Philippines. With our regional and multidisciplinary team, NEFIN offers comprehensive assessments and a full-suite of services to evaluate the ESG impact and commercial viability of projects through innovative approaches to technology under our unified energy management platform.

With a mission of 'Achieving Carbon Neutrality for You', we are committed to achieve the global climate goals and aim to accelerate the decarbonisation of our clients' portfolios. NEFIN Group's different business segments are advisory and consultancy, technology deployment, project financing and asset management. We also conduct ESG consulting, energy audit, green financing and sustainability talks for external parties.

TSE: What are the reasons for selecting Singapore as the location for the group's APAC headquarters?

GL: The members of my team and I realised the importance of 'returning to where the dream first started', and believe that setting up the APAC Headquarters in Singapore is a significant milestone in NEFIN's growth, allowing the group to expand into Southeast Asia and to better attract talent. It is also timely that the Singapore Green Plan was launched on 10 February 2021, charting the country's green targets for the next decade, which include increasing solar energy deployment five-fold.

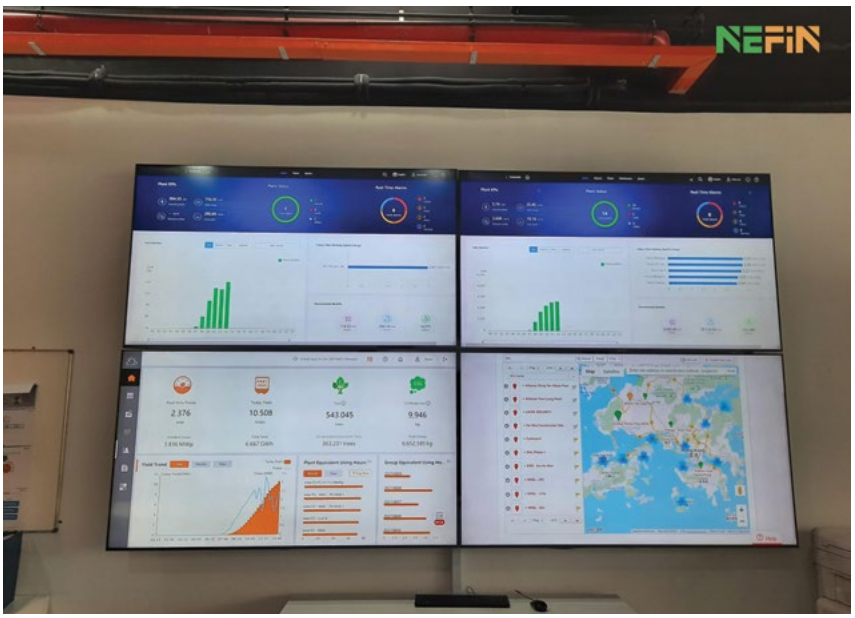
TSE: Could you elaborate on NEFIN's SGD 100 million renewable energy plan for Singapore and, in particular, on the carbon-neutral technology and financial solutions that it will be bringing into Singapore?

GL: We hope to assist ESG-committed companies which aim to achieve carbon neutrality, especially those companies that are part of the RE100 initiative. We provide customised system designs, focusing on safety, reliability, performance optimisation, reliability of operations and professional PV asset management.

We also offer an OPEX (zero upfront cost) financing model to companies which may not be comfortable to put in the significant initial investment required.

As an IPP, NEFIN offers the following solutions to achieve carbon neutrality, focusing on offsetting Scope 2 carbon emissions:

- AI-powered Energy Management System.
- Energy Audits and LEED Gap Analysis, to achieve energy efficiency.
- HVAC & Lighting Retrofits & Refurbishment.
- Energy Management Gold Standard (EMSG) & Green Building Index (GBI) Certification.



Unified Energy Management Platform.

- Long-term PV asset management service with the highest level of security and comfort to clients, in terms of on-site operation and maintenance services, as well as data management for PV systems.

TSE: What is the likely impact of NEFIN's investment in Singapore on businesses and consumers?

GL: Our investment will accelerate the adoption of green assets in Singapore and support Singapore's journey to net zero emissions, thereby ensuring a more sustainable living environment for future generations, while being economically competitive in a low-carbon future. Solar PV systems and associated services from NEFIN provide corporations with the full spectrum of tools necessary for increasing the use of renewable energy and becoming more environmentally-friendly. Hence, it is not just about providing green energy, but also about providing ESG advisory services in order to advance Singapore's sustainability agenda and roadmap.

TSE: Any other information that you would like to provide?

GL: NEFIN has grown exponentially over the past few years, amidst economic challenges and COVID-19. We have expanded into nine regions and are currently serving Fortune 500 clients who are committed to achieving carbon neutrality by 2030. We are entering some emerging markets in Asia in the upcoming months and aim to achieve 1GW of renewable energy assets, by 2025, and another 3 GW, by 2030. As of 2021, NEFIN Group has already generated approximately 130 GWh across our portfolio of distributed solar PV assets. We are actively involved in educating corporations and the public, on the importance of renewable energy and carbon neutrality.

Cost-effective and safe solar energy systems

NEFIN's system design focuses more on cost-effectiveness and safety, rather than sacrificing these factors to maximise installed capacity. The module installation will thus avoid heavy shading, and certain areas would be reserved for future maintenance of the module system as well as existing equipment on the rooftop.

The solar energy systems, from NEFIN, are characterised by the following features:

- Remote modular monitoring to minimise on-site diagnostics work and maximise safety on the roof.
- SafeDC function: No high VDC (Volts of Direct Current) during installation or maintenance and reduced risk of working around damaged cables.
- Rapid shut down: Built-in protection designed to mitigate the effects of some arcing faults that may pose a risk of fire, in compliance with the UL1699B arc detection standard. The PV system and DC connection are automatically shut down when the inverter is off or disconnected.
- Real-time hot spot detection & mitigation technique to enhance the output power performance of the solar modules and to prevent the occurrence of fire.
- DuPont safety standards for solar PV system deployment.
- Fire safety compliance with FM Global standards.
- Endorsement by FM Global Insurance, with no increase in insurance premium during the operational stage. .

An aerial view of a high-rise rooftop solar project, based on a customised design and the adoption of materials that can withstand strong winds.

NEFIN usually uses grade 6061-T6 aluminium, grade C30 (or equivalent) concrete as the plinth, and grade A4-70 stainless steel screws. Spaces are created between modules to ensure that the module arrays do not cast shadows on one another.

In Singapore, since the shading effect could potentially affect the energy yield, NEFIN proposes to deploy power optimisers to minimise the impact of shading on the PV system. The power optimisers (or equivalent devices) will be part of a robust monitoring system that will facilitate the monitoring of project performance at the module-level.

Reducing the cost of energy

Dr Franck Zhang, Head of Product Strategy and Marketing, Trina Solar, talks about the significance of the Levelized Cost of Energy (LCOE)-oriented principle, the performance of 600 W+ modules, new technology trends and responding strategies, and the company's strategic positioning and planning.

Dr Franck Zhang

The Singapore Engineer (TSE): What is the strategic significance of the LCOE-oriented principle to Trina Solar?

Dr Franck Zhang (FZ): The LCOE-oriented principle is a result of our real-world experience. The development of the solar industry proves that high power, high efficiency, high energy yield and high reliability, or 'the four keys', as we call them, are essential for reducing LCOE. We hope to boost R&D and commercialisation of products that meet the LCOE-oriented principle, for high-quality and sustainable development of the PV industry.

TSE: What are the advantages of 600 W+ modules, in terms of energy yield, from a full life cycle perspective, and what does the empirical test data indicate?

FZ: The energy yield advantage of 600 W+ modules comes from their excellent, low irradiation performance. We consider an irradiance range lower than 1,000 W/m² as low irradiation, because the standard test conditions (STC) are based on an irradiance range of 1,000 W/m². Globally, we selected outdoor test sites from high, middle, and low latitudes.

Results show that the energy yield of 600 W+ modules is superior to that of reference modules – with an increase of 1.4% to 2.24%, at 800 W/m², and about 0.8% between 800 W/m² to 1,000 W/m². If the irradiation range is above 1,000 W/m², there is no obvious gap in energy yield between 600 W+ modules and reference modules. As in typical regions of the world, the irradiation range is less than 1,000 W/m², about 90% to 99% of the time, and 600 W+ modules have the edge in energy yield, in most areas.

A comprehensive analysis shows that 600 W+ modules have a gain of 1.5% to 1.8% in energy yield over regular 500 W+ modules.

TSE: Could you talk about the efforts that Trina Solar has made to meet the LCOE-oriented principle?

FZ: In terms of module reliability, we conducted static mechanical load tests and five other rigorous tests, to verify the mechanical performance of 600 W+ modules under extreme conditions. Modules are expected to be in service, reliably, for 25 or even 30 years, which guarantees continuous power generation and LCOE reduction.

In terms of energy yield, we have conducted empirical tests at different latitudes, covering different irradiation ranges and climates worldwide.

In terms of the ecosystem, as an initiator of the 600 W+ Photovoltaic Open Innovation Ecological Alliance, we have been implementing the concept of open innovation and collaborative development, connecting core links from R&D and manufacturing, to application, overcoming numerous challenges in the industry and accelerating the industrialisation of 600 W+ modules. We have about 100 partners on 600 W+. The LCOE-oriented principle will not only drive Trina Solar to develop products and technologies, but also facilitate the development of industry partners.

TSE: What cell technology does Trina Solar use in 600 W+ products? Could you also elaborate on the '210 technology platform'?

FZ: Two-hundred and ten refers to the size of the solar cell. Square-shaped 210 solar cells measure 210 mm by 210 mm. We are also using PERC technology, and the module

Advent of the 600 W+ PV modules

Low-carbon development has become a global megatrend. The International Renewable Energy Agency forecasts that solar PV capacity will reach a total of more than 14,000 GW by 2050, in a scenario where carbon emissions are reduced sufficiently to cap the increase in global warming to 1.5° C.

Solar energy's key advantage over conventional sources of energy is its ability to help the planet transition away from fossil fuels as well as reduce the Levelized Cost of Energy (LCOE). According to BloombergNEF, solar LCOE has fallen 84% over the past 10 years.

Trina Solar's Vertex 600 W+ module is a product that fully meets the four keys to unlocking low LCOE – high power, high efficiency, high energy yield and high reliability.

Almost all top solar companies have developed 600 W+ products, as evidenced in recent events, such as Intersolar South America and Intersolar Europe, with about 30 companies exhibiting more than forty 600 W+ modules. With various products on the market, the solar sector has entered the 600 W+ era.

Listed on the Shanghai Stock Exchange, Trina Solar is a leading international PV and smart energy total solutions provider.

power can reach 660 W to 670 W. With mass production of N-type TOPCon modules, the power can increase to 680 W to 690 W. Combined with Heterojunction Technology (HJT), in the future, it could reach 700 W+.

We call it the 210 technology platform because it is compatible with most cutting-edge cell technologies, including HJT. Almost 90% of HJT companies choose our 210 technology platform. We believe that it will also be compatible with perovskite and other tandem solar cells in the future.

Trina Solar has shipped more than 30 GW of 210 modules worldwide, with the industry as a whole shipping more than 50 GW by June this year. Total shipments of 210 modules are expected to reach 80 GW by the end of the year.

TSE: When do you expect 600 W+ modules to become a mainstream product in the market?

FZ: According to third-party forecasts, the market share for 600 W+ modules will exceed 50% in the second half of 2024 or 2025.

In China, 600W+ products are used in all applications, at both utility-scale and in distributed applications. In overseas markets, 600 W+ modules are used in almost all utility-scale projects. Trina Solar has supplied 600 W+ modules to a number of GW-level utility power stations, with a presence throughout Latin America, Europe and elsewhere, in commercial and industrial markets, helping many industries to attain low carbon emission goals.

TSE: Many companies have 700 W+ modules using HJT technology. How does Trina Solar see the competition with new technology products, and what is Trina Solar's strategy?

FZ: Trina Solar is ready with a large supply capacity in terms of TOPCon and PERC technologies.

With the 210 technology platform, we are not in competition with HJT but rather in a complementary relationship. We also have new technologies in the pipeline. The schedule of their industrialisation will be determined by company strategy, market demand and future investment plans.

As technology advances, module power will continue to increase – which is an inevitable trend. We believe that 600 W+ is an important phase. 700 W+ modules may become mainstream, three years from now.

The 210 technology platform is compatible with a variety of leading cell technologies. Most companies can adapt it to reduce iteration costs and open up new tracks for industry development. Trina Solar has N-type products which are also created on the 210 technology platform, and mass production power will reach 680 W to 690 W – which is more competitive.

We would like to share our LCOE-oriented principle with the industry. We look forward to working with our partners, especially PV module manufacturers, to further reduce LCOE and make contributions to the goal of carbon neutrality.

Trina Solar's Vertex 670 W modules and N-type Vertex 690 W modules have been installed in a 70 MW fishery photovoltaic project, in China.

Passenger service commences with hydrogen-operated trains

They will help to reduce emissions in the transportation sector.

Exterior front view of the Coradia iLint train. Image: Alstom / Sabrina Adeline Nagel.

Alstom, a global leader in smart and sustainable mobility, recently announced that the world's first hydrogen train, the Coradia iLint, has started passenger service on the first 100% hydrogen operated train route. This regional train emits only steam and condensed water and operates with a low level of noise. The 14 Coradia iLint vehicles in operation, with fuel cell propulsion, belong to LNVG who had already started looking for alternatives to diesel trains in 2012 and thus provided momentum for the development of the trains in Germany. Other project partners for this world debut are the Elbe-Weser railways and transport company (evb) and the gas and engineering company, Linde.

"Emission free mobility is one of the most important goals for ensuring a sustainable future and Alstom has a clear ambition to become the world leader in alternative propulsion systems for rail. The world's first hydrogen train, the Coradia iLint, demonstrates our clear commitment to green mobility combined with state-of-the-art technology. We are very proud to bring this technology into series operation, as part of a world premiere, together with our great partners", said Henri Poupart-Lafarge, CEO and Chairman of the Board of Alstom.

On the route between Cuxhaven, Bremerhaven, Bremervörde and Buxtehude, the14 hydrogen-powered Alstom regional trains will be operated by evb on behalf of LNVG, gradually replacing 15 diesel trains. They will be fuelled daily and round-the-clock, at the Linde hydrogen filling station. Thanks to a range of 1,000 km, the multiple units of the Coradia iLint model, which are emission-free in operation, can run all day long on just one tank of hydrogen on the evb network. A successful trial run, with two pre-series trains, was conducted, lasting almost two years.

Despite numerous electrification projects in several countries, a significant part of Europe's rail network will remain non-electrified in the long term. In many countries, the number of diesel trains in circulation is still high, with more than 4,000 cars in Germany, for instance.

Alstom currently has four contracts for hydrogen fuel cell powered regional trains. Two are in Germany, the first for 14 Coradia iLint trains in the region of Lower Saxony, and the second for 27 Coradia iLint trains in the Frankfurt metropolitan area. The third contract comes from Italy, where Alstom is building six Coradia Stream hydrogen trains in the region of Lombardy, with the option for eight more, while the fourth is in France, for 12 Coradia Polyvalent hydrogen trains shared across four different French regions. Further-

more, the Coradia iLint has been successfully tested in Austria, the Netherlands, Poland, and Sweden, to name a few countries.

The Coradia iLint train

The Coradia iLint is the world's first passenger train to run on a hydrogen fuel cell that generates electrical energy for propulsion. This completely emission-free train is quiet and emits only water vapour and condensation. The Coradia iLint features several innovations including clean energy conversion, flexible energy storage in batteries, and intelligent management of motive power and available energy. Specifically developed for use on non-electrified lines, it enables clean, sustainable train operation while maintaining high performance. On evb's network, the train travels at speeds of 80 km per hour to 120 km per hour, with a maximum speed of 140 km per hour.

The iLint was designed by Alstom teams in Salzgitter (Germany), the company's centre of excellence for regional trains, and in Tarbes (France), the company's centre of excellence for traction systems. The project benefits from the support of the German government and the development of the Coradia iLint was funded, as part of the National Innovation Programme for Hydrogen and Fuel Cell Technology (NIP), by the German government.

The Coradia iLint received the 2022 German Sustainability Design Award. The award recognises technical and social solutions that are particularly effective in driving the transformation to sustainable products, production, consumption, or lifestyle, in line with the United Nations' 2030 Agenda.

The fuelling system

The Linde facility in Bremervörde contains sixty-four, 500-bar, high-pressure storage tanks, with a total capacity of 1,800 kg; six hydrogen compressors; and two fuel pumps. The use of hydrogen as a fuel for trains reduces the burden on the environment, as 1 kg of hydrogen replaces approximately 4.5 litres of diesel fuel. Hydrogen production on site, by means of electrolysis and regeneratively generated electricity, is planned for a later date.

Exterior side views. Images: Alstom / Sabrina Adeline Nagel.

A view of the interior. Image: Alstom / Christoph Busse.

The project is funded by the Federal Ministry of Digital Affairs and Transport, as part of the National Hydrogen and Fuel Cell Technology Innovation Programme. The federal government is contributing 8.4 million euros to the costs of the vehicles and 4.3 million euros to the costs of the filling station. The funding directive is coordinated by NOW GmbH and implemented by Project Management Jülich (PtJ).

Leveraging technology to achieve desired outcomes

Ms Natalie Craig

Ms Natalie Craig, Managing Director, C&W Services, Singapore, explains.

The Singapore Engineer (TSE): How can innovation in Facilities Management contribute to sustainability in the built environment?

Ms Natalie Craig (NC): Smart Facilities Management (Smart FM) is not just about automation. It is about an optimal partnership between human experience and expertise, combined with technology which can automate, digitise and create efficiencies. This is paramount to creating a more sustainable built environment. The sophistication of technology in recent years has introduced innovations such as sensors, robotics, and data analytics – which have reshaped the way we carry out FM work and changed the expectations of building owners and users.

We see a shift in the role of FM, from just being a service provider to empowering businesses through enhanced information and insight about the operation and use of the built environment. This enables FM to also support the organisation's sustainability goals, delivering better overall user experience, safety, and well-being.

As a testament to our belief in the importance of sustainability, we have deployed various Smart FM innovations, that incorporate sustainability elements, at our new C&W Services headquarters at Chai Chee. These include motion and photocell sensors that detect and adjust to movement and daylight in workspaces as well as digital solutions, such as room and desk booking apps, to create a more efficient and user-friendly work environment for our staff.

TSE: How can Smart FM help achieve operational efficiency and occupant comfort?

NC: Smart FM enhances and improves the knowledge and understanding of asset performance. Through the deployment of automation and robotics tools as well as improved maintenance standards, Smart FM can significantly improve operational efficiency. FM has evolved beyond just asset performance and is now also focused on occupant or user experience.

Products, such as air quality and temperature sensors are widely deployed to ensure comfort and health in the workplace. Many user experiences have been digitised and occupants can give feedback about them and log issues they encounter. This also means that occupants will receive better and more tailored responses from FM rather than just following a strict schedule.

Also, in the post-pandemic environment, hygiene has become increasingly important at the workplace. The use of Smart FM solutions can help to monitor various aspects of the workplace, such as air quality. Air quality monitors can be installed to emit minute-by-minute analysis, enabling asset managers to make accurate decisions relating to ventilation, upon receiving triggered notifications.

Beyond this, smart toilet systems can be utilised to monitor cleanliness in real-time, through people counting and feedback provision, resulting in a more hygienic and comfortable restroom experience.

TSE: Could you provide a brief overview of C&W Services and the company's capabilities and initiatives in Smart Facilities Management?

NC: C&W Services is a leading integrated facilities management in Singapore. We deploy a wide range of technologies as part of our integrated FM solutions for clients in a reliable, cost-effective, and efficient way.

We leverage the expertise of our in-house teams and third-party vendors to roll out numerous tech-related initiatives and FM projects across Singapore. Some of these initiatives include cleaning and security robots, drones to carry out façade building inspections, leveraging Artificial Intelligence to analyse data, remote security surveillance, as well as the application of Smart FM IoT systems that monitor and provide precise building information.

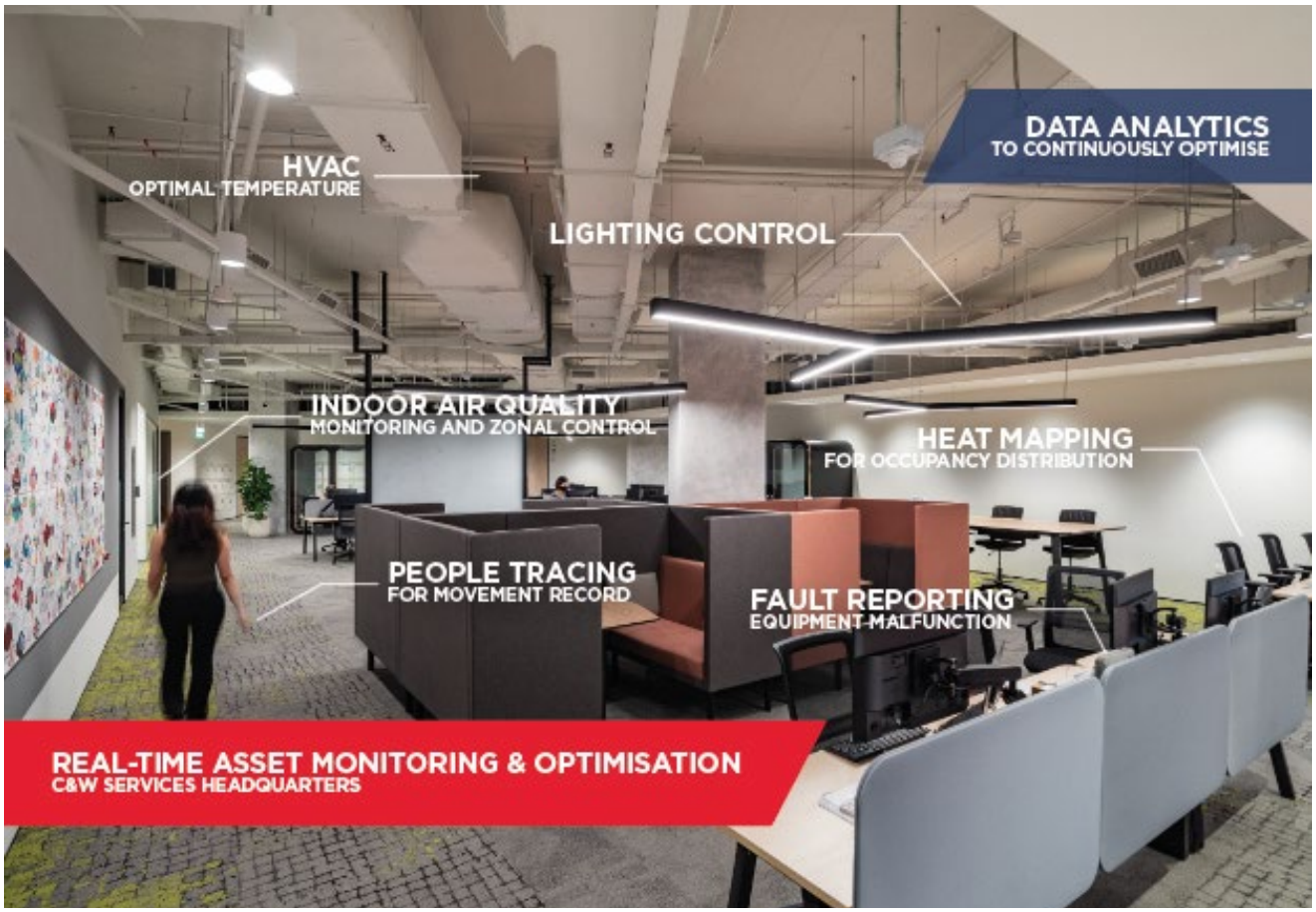
TSE: Could you elaborate on the challenges in transforming ageing buildings into cost- and energy-efficient buildings and how they can be addressed?

NC: One of the challenges of transforming older buildings is the perception that only new buildings can be green buildings. In fact, this is not true. Green and sustainable building goals are not limited to only new constructions. By taking a data-driven approach, C&W Services helps clients address this concern and transform ageing buildings into cost-efficient and energy-efficient environments which can perform with the same efficiency standards as new buildings.

Another challenge is the perception that transforming ageing buildings is prohibitively expensive. Implementing Smart FM solutions can help to improve energy efficiency which, in turn, lowers the building's overall operational costs and reduces the redundancy requirements in case of failure. Therefore, transforming ageing buildings into green and sustainable buildings can help to pay for themselves in the long term, by reducing energy costs and the need for additional maintenance.

A security robot, equipped with AI vision analytics that supports security and facility inspection, was used to enforce Safe Management Measures during the COVID-19 pandemic.

The transformed C&W Services workplace is a 'living lab' where new technologies are being tested to drive better client service and support employee experience.



At the C&W Services workplace, real-time asset monitoring and optimisation are enabled by over 350 IoT sensors, including 270 motion and photocell sensors, 70 air-conditioning and mechanical ventilation sensors, indoor air quality monitors and occupancy sensors.

Advantages of edge computing for manufacturers

Mr Nevzat Ertan

by Nevzat Ertan, Chief Architect & Global Manager for Digital Machining Architecture, Sandvik Coromant

Clearing misconceptions and overcoming barriers in its adoption.

Defining the edge

Let us start by defining edge computing. Edge computing and edge analytics describe data capture, processing and analysis, that take place on a device – on the edge of the process – in real-time. Unlike traditional methods, which typically collate data from several machines at a centralised store, edge computing is distributed computing that brings the computing by a single, or a group of machines, and data storage, closer to the sources of data. This can improve response times and save bandwidth.

In an industrial environment, conducting analytics at an individual device can provide significant cost and resource savings compared to data processing using a purely cloud-based method. For clarity, the cloud-based method refers to streaming data from multiple devices to one centralised store and conducting data analysis there.

Drowning in data

In using the centralised method, huge volumes of data must be collected and transferred to one place before they can be analysed. While there are advantages to having every piece of machinery data in a central hub, it can be painfully difficult to manage. This complexity will be heightened in facilities with a large number of machines, especially if the communication protocols differ on each device. Unfortunately, not all data is communicated in the same language.

This method can also create a massive glut of operational data, and weeding out insightful knowledge from the monotonous can be a painstaking task. Let us face it, spotting inaccuracies in the metal cutting process to produce a large and expensive part is crucial knowledge, but the energy efficiency of a small conveyor at the end of the process, for instance, is not quite as valuable.

With edge computing, operators can, instead, set parameters to decide which data is worth storing – either in the cloud or in an on-site server – and which is not.

To be clear, though, edge computing is not an alternative to cloud-based methods, or an industrial Internet of Things (IIoT) process in which cloud-based technology and edge computing can work together. However, each of these technologies is making the other's job easier. The computing environments associated with IIoT take a variety of forms, from an industrial PC (IPC) remote server to a gateway or back-office infrastructure. These tools are essential to support edge computing because they are distributed away from the core, or the cloud. They have the capacity to perform a variety of tasks – particularly tasks that do not necessitate analytics at the edge.

The benefit of this combined model is that it allows enterprises to have the best of both worlds – reducing latency by making decisions based on edge analytics for some devices, while also collating the data in a centralised source. The model also allows future analysis of data and other processes, and the capturing of data required for regulatory reasons.

Edge computing in practice

As with other industrial innovations, some manufacturers perceive edge computing as daunting, unobtainable or out-of-reach. However, that could not be further from the truth. The primary benefit of edge analytics is its scalability. Pushing analytics to sensors and network devices can significantly reduce the strain on enterprise data management (EDM) and analytics systems. Plus, there is the opportunity to start small.

Unlike the 'smart factory' concepts hailed in the early 2010s, deploying edge computing does not require an entire systems overhaul or investment in several machines. Instead, manufacturers can opt for just one device that provides analytics at the edge.

For instance, with Sandvik Coromant's CoroPlus edge computing offering, intelligent tools and sensors can be deployed on one piece of equipment. This has proven especially beneficial in the boring of large components, for example, where one small mistake can be costly.

To avoid mistakes, the newly-launched machine integrated version of Sandvik Coromant's Silent Tools Plus, with CoroPlus Connected, uses data generated at the cutting zone to identify potential problems. Automated cutting actions can then be performed to avoid costly mistakes.

Overcoming barriers

As with all industrial technologies, security concerns about edge computing are rife. In fact, according to a Kollective report, 66% of IT teams view the architecture as a genuine threat to their organisation. The primary reason for this concern is apprehension about edge security.

Naturally, the distributed nature of edge computing does require some changes to security methods – especially if the facility has relied previously on a traditional centralised or cloud-based infrastructure. With edge computing, data instead travels between different distributed nodes, which may require special encryption mechanisms that are independent of the cloud.

On the other hand, processing data at the edge minimises the transmission of sensitive information to the cloud. Some could argue this is more secure but, in reality, it depends on your security protocols.

That being said, malicious, routing information and Distributed Denial of Service (DDoS) attacks are still possible – as they are with any internet-enabled device. The first and most important step is to seek reassurance from the manufacturer of your edge device.

At Sandvik Coromant, for instance, we have designed a new security principal to give our customers peace of mind. It has been developed to support the ANSI/ISA-95 Standard, an international standard from the International Society of Automation for developing automated interfaces between enterprise and control systems.

Better understanding

Edge computing is widely hailed as a ground-breaking technology for the industrial realm, and wider IT applications. However, there are multiple misconceptions that must be dispelled before edge systems are deployed in industrial settings.

First, as mentioned earlier, the technology does not replace IIoT, nor does it compete with other cloud-based analytics methods. In fact, the technologies must work harmoniously for manufacturers to reap the true benefits of edge computing. Similarly, the technology does not pose any greater security risk than existing internet-enabled data collection methods. Security protocols may simply need updating.

It is clear that edge computing can provide significant benefits to manufacturers. They include reducing the latency involved in decision-making, optimising cloud-based data collection, and reducing the energy required to consistently stream data from every device in a facility to a centralised hub.

What is more, deploying edge computing is more straightforward than many believe. Manufacturers need not overhaul entire systems to reap the benefits of the edge. The proper deployment of edge nodes can provide several benefits including reduced latency for real-time applications, more efficient use of bandwidth and storage resources, enhanced scalability, reduced energy costs, improved environmental performance, as well as better opportunities for privacy control and data protection.

Edge computing has yet to be widely deployed in industrial applications. However, as indicated by Google Trends data, web searches for 'edge computing' have increased by a colossal 473% in the last five years. This clearly shows that there is an appetite for understanding the edge. But manufacturers must fully understand its potential before they invest.

Sandvik Coromant collaborates with Siemens

Sandvik Coromant has collaborated with Siemens to run a customer event in Indonesia, demonstrating how its PrimeTurning technology integrates with Siemens NX software. Focusing on the overarching theme of digitalisation in the manufacturing value chain, the event featured presentations from Sandvik Coromant, Siemens and partner, Hitachi Sunway.

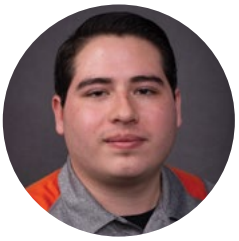
The partnership between Sandvik Coromant and Siemens allows NX users to efficiently define PrimeTurning operations through the integration of the PrimeTurning module. PrimeTurning methodology is based on the tool entering the component at the chuck and removing material as it travels towards the end of the component, away from the chuck.

Heading up the event from Sandvik Coromant Indonesia was Tri Yatno, Regional Sales Manager for Indonesia, Aris Kusdarjadi, Turning Specialist for South-East Asia Oceania (SEAO) and Budi Hermawan, Application Specialist for Indonesia. In addition to exploring PrimeTurning, Sandvik Coromant also discussed the way to maximise the use of its high feed milling tool, the CoroMill MH20 and its digital tool recommendation solution, the CoroPlus Tool Guide.

The event addressed the theme of digitalisation in the manufacturing value chain.

Siemens discussed the NX CAM Software Technology update and how the technology can be configured to get the most out of CoroTurn Prime tools, while Hitachi presented a digital machine workshop.

Robotic process automation optimises test instrumentation



Mr Andrew Herrera

by Andrew Herrera, Product Marketing Manager, RF Test Software, Keysight Technologies

The benefits include greater innovation as well as improved productivity and employee satisfaction.

Product innovation is stoking the demand for new features and driving up the cost of research & development (R&D). Electronics companies spend a lot of money on components, labour, and testing, as part of the R&D process. Testing spans every phase of R&D. When incorporating a new design element into a product, manufacturers must test the element for performance. If they replace a small component with a lower-cost or higher-performance component, they must test again.

This applies not only to components, but also to software. As many products are software-controlled, performance is based on the allowed outputs of the design, measured by software. In wireless solutions, this can be an extra step in R&D. To ensure they are not exceeding restrictions set by wireless standards, there are often many repetitive tests to perform.

Design, testing and verification are time-consuming, repetitive, and costly. Design validation engineers must ensure their solution designs perform well under demanding environments, while minimising manufacturing costs and verification stages.

Figure 1 shows one type of product life cycle development. Each step requires testing, debugging, and verification.

Many applications use automation to increase efficiency. Robotic process automation (RPA) can help reduce the repetitive and manual labour involved in testing, such as clicking on software or swapping out test instruments.

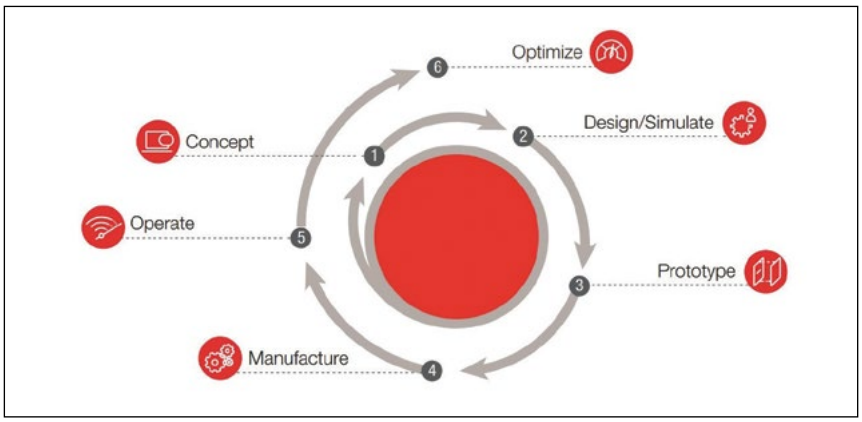


Figure 1: Example of the product life cycle development.

RPA speeds up hardware validation by allowing engineers to work on other projects or tasks during repetitive testing. Before determining whether RPA saves design validation engineers time, we must first understand the tests and associated costs.

Time and cost for hardware verification tests

In hardware verification tests, there are numerous repetitive tasks:

- Testing hardware under conditions that simulate real-world environments.
- Verifying hardware to ensure it conforms with specifications, user expectations and local environmental regulations.
- Debugging hardware to ensure it will perform as expected under normal and abnormal conditions.
- Ensuring that appropriate security measures are in place and that they perform to appropriate safety and security standards.

The time and cost of each test vary, depending on the project or task at hand. Assume three hours per test, as an example. Using the four examples above, that would be 12 hours of engineers' time spent on four tests. This estimate assumes that engineers performed all steps correctly, every measurement came out as expected, and there were no errors during instrumentation changes and adjustments. If not, a test can go from three hours to four or five. Automating engineers' repetitive processes can save a lot of time.

Validation engineers perform each measurement in a configured environment, then stop and set up the next environment and perform the same tests again. They repeat this process until they have tested each scenario.

Figure 2 shows an example of the workflow in hardware verification for a device under test. Throughout the process, the engineers need to switch out the test instruments, change probes and hardware, and adjust settings. Not every test uses the same instruments or software and changing those elements can delay testing.

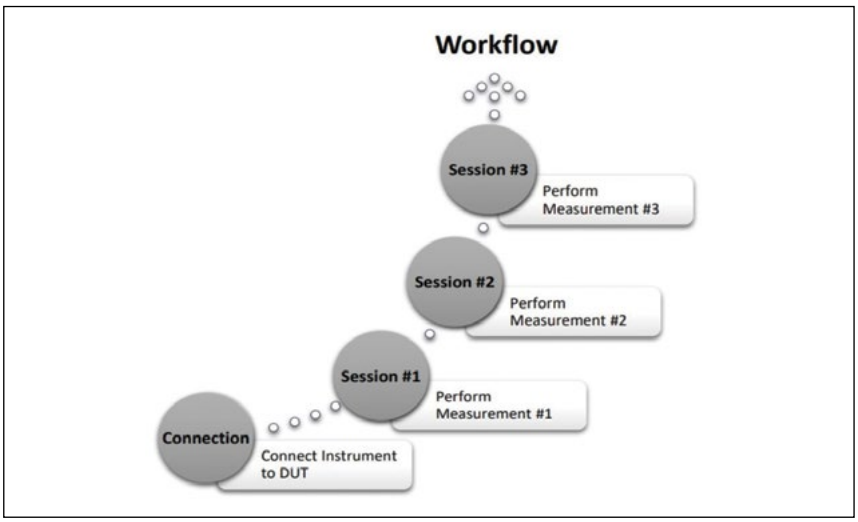


Figure 2: Example of workflow in hardware verification for a device under test.

No test environment is the same. There are multiple manufacturing test instruments on an engineer's test bench, which can cause issues in testing, due to unsupported software or instrumentation. In cases like this, it leads to more time per task, due to instrumentation switching or time lost on having to order new instrumentation that is compatible, along with the cost.

Expanding to 10 or 20 tasks per configuration can delay the project and drive up the costs. We begin to see the actual cost of development and verification testing in R&D, as we dig deeper through each task, but we see a common cost issue in every test – time.

Saving time on hardware verification testing

Every business owner knows that when a project or task takes a lot of time, it means more money spent. However, rushing or cutting corners in engineering hardware verification could lead to catastrophic failures. Therefore, the best way to reduce the amount of time spent on each task is to complete the task more efficiently.

High-volume test environments demand efficiency. Measurement steps must focus on execution speed. To optimise tests, developers need control over everything. Test engineers are familiar with several barriers to optimisation:

- Instrumentation solutions may come from more than one manufacturer.
- Preconfigured analysis routines often lack speed and flexibility.
- Test software applications carry more measurements than needed.
- Equipment utilisation with parallel analysis can be complex and inefficient.

Every step of testing carries a risk of human error. Within the barriers of optimisation, there is a risk of errors during instrument changes or between measurements when inputs are incorrect. Doing a lot of tedious, repetitive tasks can cause engineers to overlook small procedures. These seemingly minor issues can create significant errors in test verification, leading to a large risk of human error.

When these errors occur, engineers spend more time redoing tests, which means more development costs and more time spent doing R&D. RPA can help accelerate debugging and validation, while minimising the risk of human error. Automation removes the risk of overlooking small adjustments because it carries out every step, no matter how tedious.

Let us evaluate RPA in a test instrumentation world. RPA must enable the configuration and building of complex workflows via parameterisation. If automation requires engineers to enable changes, it is not efficient. With that in mind, if an engineer is not nearby, the software automation needs to enable remote access, so that someone can check on the test status and enable any parameter changes. Using test instrumentation from more than one manufacturer adds another automation challenge and a barrier to optimisation.

Finally, all these requirements are challenging on their own, but if an engineer must write all the code to enable this process, that adds more cost, time, and inefficiency. Thus, automation software should allow for recording, playback, and sharing of the automation test, all without manually written software code.

Engineers take many hours to perform different measurements during one test. RPA can help them conduct repetitive tests by changing instrumentation measurement parameters or switching between software applications to take different measurements. This increases performance and efficiency, enabling test engineers to focus on their next project. Those 12 hours on four tasks can become 12 hours for eight tasks by cutting test times in half and getting projects completed on time or even early. In manufacturing, better use of test time provides a better return on investment.

RPA is ideal for test instrumentation

In addition to increasing efficiency in testing tasks, automation enables better performance from employees. The many hours spent on repetitive tasks create stress and affect performance. As automation enables better performance and results, engineers can work on multiple projects without the fear of delays or missing performance goals.

Incorporating RPA into the test instrument environment can help increase innovation through hardware verification and testing, and improve productivity in innovation, through employee satisfaction. RPA is not something to fear or avoid when using test instrumentation, but is something to embrace and incorporate in repetitive testing tasks. RPA can enable us to save time that is a resource we cannot get back once it is spent.

Cobots improve production output at Seng Heng Engineering

Overcoming manpower constraints in the manufacturing industry.

Universal Robots, a global leader in the rapidly growing market of collaborative robots (cobots), has enabled business continuity and improved production output for Singapore-based manufacturer, Seng Heng Engineering, during disruptive periods, with the successful deployment of two cobots in the production line.

Labour shortages caused by the pandemic

The COVID-19 pandemic presented a set of challenges for the manufacturing industry. With the closure of borders, shutdowns of factories, and restrictions on movements, all operations within Asia Pacific ground to a halt. Besides facing the unappealing prospect of shuttering facilities, manufacturers have also faced massive labour shortages since the onset of the pandemic. These challenges are prompting them to embrace automation and robots, to ensure business continuity during such uncertain times.

It was reported that Asia remains the world's largest industrial robot market. According to the International Federation of Robotics, a total of 354,500 units were shipped in 2021, a rise of 33% compared to 2020.

Challenges faced by Seng Heng Engineering

Seng Heng Engineering, a Singapore-based, third-generation manufacturer, with 70 years of experience, is a single-source provider of fasteners, turnkey machining, and corrosion-resistant coating products.

During the pandemic, the company faced unprecedented disruptions to its workforce. This prompted it to consider automating some functions, to ease production bottlenecks caused by labour shortages and uncertainties.

Customised connectors manufactured by Seng Heng Engineering, such as high-quality bolts and nuts, are used to fasten critical onshore, offshore, and subsea safety oil and gas equipment. Each of the fasteners is engraved with information, such as part number, material information and serial number, for ease of reference and traceability. A shortage of manpower needed for the highly intensive processes resulted in declining efficiency in the performance of the engraving processes.

Seng Heng Engineering is one of the few fastener manufacturing companies in Southeast Asia, certified by the American Petroleum Institute (API) to produce critical bolting for the oil & gas industry. As a result, regional industries and supply chains rely on the company for dependable and quality connections in their equipment.

Successful deployment of cobots

With safety being one of the priorities for manufacturers, cobots have become a viable solution. Cobots are capable of working alongside human employees, safely, without the need for safety cages (upon risk assessment). Traditionally, the loading and unloading of fasteners into

A UR10e cobot is deployed for loading parts into, and unloading parts from, the CNC machine.

Employees at Seng Heng Engineering work comfortably alongside UR cobots.

Computer Numerical Control (CNC) machines were conducted manually. For Seng Heng Engineering, the deployment of cobots relieved human employees from repetitive processes that may take up to five minutes, before completing the production of each fastener.

According to the company, its employees were sceptical about deploying cobots in the production line, fearing that the cobots may take over their jobs eventually. The employees now fully understand that cobots are relieving them of monotonous tasks, so that they can work on tasks that require their cognitive skills. Even employees with no background in programming are capable of operating a cobot. In a short period of three months, Seng Heng Engineering saw significant achievements, thanks to the deployment of the cobots.

Dedicated engineering support from Aubotic

The certified system integrator, Aubotic, delivered superior engineering support and created an ecosystem that enabled easy deployment of the cobots at Seng Heng Engineering. After installing two UR10e cobots, with UR+ certified Onrobot electric grippers, as end effectors, to assist with the CNC and engraving machines, Seng Heng Engineering achieved a 50% increase in productivity and efficiency on the production line, within three months.

With the adoption of cobots, the company can accept many orders with a short lead time of three to five days. Before, Seng Heng Engineering used to have only one shift. The company then added a second shift for the CNC section, due to the stringent social distancing measures. With cobots in place, operations on the second shift continue running as the cobot helps to supplement the lean manpower during the night shift, and the company benefits from clearing the bottlenecks by keeping the machines running. With the cobots, orders can be completed within a short lead time and without any operational disruptions.

"We have witnessed a significant increase in productivity and efficiency after the implementation of two UR10e cobots to automate the CNC and engraving processes. In addition, the cobots are capable of working round-the-clock, in tandem with our employees, relieving them from working on dull and monotonous tasks", said Jackie Lau, Managing Director, Seng Heng Engineering.

As Seng Heng Engineering embraces automation as a primary enabler of an intelligent workforce and effective throughput, it is looking into deploying more cobots in the near future.

The UR10e Cobot

A member of Universal Robots e-Series family, the UR10e has a reach of 1,300 mm and weighs 33.5 kg. It can handle a payload of up to 10 kg and has a small footprint of just 190 mm. The UR10e is suitable for applications in machine tending, palletising, and packaging.

Seng Heng Engineering

Over the years, Seng Heng Engineering has forged long-term partnerships with global Original Equipment Manufacturers (OEMs), Engineering, Procurement and Construction (EPC) contractors and major oil companies, to support their needs. Based in Singapore, Seng Heng Engineering is an approved manufacturer of API20E and API20F critical bolting for the oil & gas industry.

Universal Robots

Since introducing the world's first commercially viable cobot in 2008, Universal Robots has developed a product portfolio that includes the UR3e, UR5e, UR10e, UR16e and UR20, to serve a range of reaches and payloads.

Each model is supported by a wide selection of end-effectors, software, accessories and application kits in the UR+ ecosystem. This allows the cobots to be used across a wide range of industries and it means that they can be redeployed for diverse tasks.

Universal Robots, which is part of Teradyne Inc, is headquartered in Odense, Denmark, and has offices in many countries, including Singapore.

The company has installed over 50,000 cobots worldwide.

A UR10e cobot engraving part numbers and information on steel bolts.

The deployment of cobots has enabled Seng Heng Engineering to increase productivity and efficiency on the production line.

Optimising safety in beverage production plants

by Tania B, Freelance Writer

A market with new challenges and opportunities requires advanced technological solutions.

The number one fear that food and beverage manufacturers have is contamination. Along with disruptions and challenges caused by the COVID-19 pandemic and economic uncertainty, companies in this sector have to stay alert to the threats posed by contamination of their products. This is an issue that is only growing, as customers demand more and more transparency around the food products they consume.

Additionally, the increasing complexity of supply chains and the rationalisation of components and raw ingredients supply, to maximise efficiencies in product manufacturing, have led to a multiplying of product recall exposures. This can result in a ripple effect, whereby an issue with one component can impact across a significant number of brands and products, causing reputation damage and financial loss to many different parties.

Compromised products are products that contain contaminants and can include non-food items like metal or plastics, or harmful bacteria, most commonly Listeria, E. Coli and Salmonella. From a production perspective, maintaining process and environmental parameters, like temperature and humidity, within tight tolerances is critical to preventing bacterial growth.

Beverage contamination remains one of the common causes of product recall. The types of contamination include particle and microbial contamination, as well as cross-contamination. Even though contaminations stem from a wide range of sources and are difficult to control, these can be prevented in the manufacturing processes, at the plant level.

Manufacturing and processing plants have embraced initiatives like using radio frequency identification (RFID) to trace food from its origins in the field, through processing and packaging, and into the consumer's hands; monitoring equipment performance through sensors that communicate data to the cloud, to enable predictive maintenance and minimise unplanned downtime; visualising data and key insights for operators, so that they have better information on hand; and applying real-time data analytics to automate restocking, decrease energy consumption and increase productivity.

"In many ways, the food and beverage industry had been moving further along, digitally, than a number of other manufacturing verticals, prior to COVID-19. Technological advancements of Industry 4.0 have created opportunities for improvement, both on the plant floor and in how manufacturers serve the end customer", said Mr Nalin Amunugama, General Manager, BOGE Kompressoren Asia Pacific.

"The capability to monitor, measure and evaluate the health risks of potentially hazardous chemical and microbiological agents is the foundation for the manufacturing of safe food products", he added.

While big players in the food and beverage industry are well-positioned to innovate internally, creating new food concepts through their own well-funded research and development, they are also expanding their resources outside the company to innovate externally, by nurturing smaller and more cutting-edge food start-ups.

Ultra-rapid detection of microbial contamination

Hygiena, a leader in food safety testing, has developed a new rapid, microbial screening kit for beverage testing, using the Innovate System. The RapiScreen Beverage Kit is specifically designed to neutralise

Hygiena's Innovate System can detect contamination in beverages much faster than traditional methods.

often complex, high-acid content found in fruit juices. The kit has also been validated on a broad range of matrices beyond fruit juices, including teas, energy drinks, smoothie mixes and ketchup. When it comes to obtaining microbial contamination results, the Innovate System can detect contamination much faster than traditional methods. After a 48 hour incubation, results can be obtained in less than 30 minutes.

This is possible with a technology that eliminates somatic cell (non-microbial) adenosine triphosphate (ATP), and allows product testing with a wide range of pH values. Also, the system can accommodate 96 samples at a time. By shortening the time to obtain results, facilities can reduce inventory requirements, warehouse space and safety stock, resulting in significant savings.

Precise detection and measurements

Going by consumer trends today, quality control in products is gaining momentum as consumers focus more on what is inside the packaging and where it comes from, both for their own protection and for the protection of the environment. This demands a complex process for the food and beverage industries because they must consider a combination of factors that have to do with the reliability and effectiveness of production. As a manufacturer and supplier of smart sensor technologies, German company, SICK, enhances quality control with its highly-skilled, non-contact data collection from RFID tags and readers, based on damage-resistant technology.

A requirement for many food, dairy and beverage manufacturing sectors, the IP69K stainless steel level sensors are used for washdown applications. The hygienic sensors with I-O Link connectivity ensure precise measurements and efficient operations to reduce downtime and recall costs for manufacturers. More specifically, the IO-linked smart sensors allow for a smooth integration of the sensor technology into the control network of machines, while offering easy equipment handling and replacement, as well as high-speed measurement and general operation. Manual control of the equipment is reduced to a minimum and settings for the sensors are automatically reconfigured to prevent errors in setups.

SICK's stainless steel level sensors with IO-link connectivity ensure precise measurements and efficient operations to reduce downtime.

Ensuring oil-free air in breweries

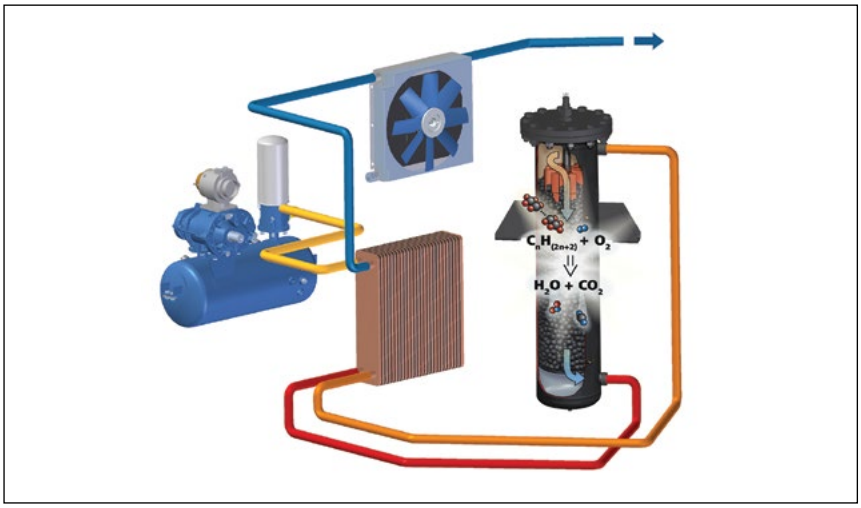
Compressed air is an essential part of practically all commercial manufacturing, including the brewing industry. For brewers, air compressors play an important role. They are used to power the machinery used in bottling, canning and kegging. In the fermentation and aeration processes, because there is close contact between compressed air and the product, the beer or ale is susceptible to contamination with water, dirt and microorganisms.

Oil contamination is particularly unwelcome in beer brewing as it kills the yeast and, in the process, affects the frothing properties. While oil levels in the atmosphere may be very low, once the air is taken into the system and compressed, the oil become much more concentrated. The same can be said for water vapour and anything suspended in the ambient air. So, even if you use an oil-free compressor, you will need purification systems to remove oil and other contaminants.

In this regard, compressed air specialist, BOGE, offers the oil-flooded screw compressor with the BC 110 Bluekat catalytic converter. The downstream converter breaks down long-chain hydrocarbons into water and carbon dioxide, and converts silicone into silicate. It then reduces carbon dioxide levels, spores and viruses. Dirt and impurities are also removed effectively to produce Class 0, oil-free, compressed air. The Class 0 compressed air, which complies with ISO 8573-1 Standard, can be delivered without the need for an oil-free compressor. For breweries, the Bluekat converter ensures a reliable supply of pure compressed air, free from contaminants and expensive product recall risks.

Removing scale and hard water deposits

Hard water deposits can result in scale formation, providing the perfect environment for bacterial growth. Scale can also reduce the life of equipment and raise the costs of heating processes in beverage plants. Madison Chemical formulated MadBrew STONE ACID, a specially inhibited, low-foam acid blend, for the removal of hard water deposits and scale, extracts from wort, lipids from hop compounds, and more. The low foaming acid blend dissolves the crystalline calcium carbonate, which permits the complete remov-



The Bluekat catalytic converter developed by BOGE oxidises hydrocarbons to water and carbon dioxide, thereby ensuring the production of the highest-quality, Class 0 compressed air by the compressor.

MadBrew STONE ACID is ideal for food and beverage plants, where hard water deposits and scale are problematic.

al of the deposits from kettles, heat exchangers and other equipment.

Ideal for use in equipment made with stainless steel and copper alloys, the formulation is recommended for use prior to Enviro-Clean BOIL-OUT on the hot side, brew house cleaning applications, and in advance of Enviro-Clean BOIL OUT on heat exchangers. STONE ACID is ideal for craft breweries of all sizes and volumes, as well as food and beverage plants, where hard water deposits and scale are problematic. An A3 compound, the formulation is safe for use throughout every department in a beverage plant, and customers typically 'dial in' on final concentrations, after several trials and cleanings.

Making food safety a priority

While the pandemic focused consumer attention on health and food safety, for food and beverage producers, this shift in mindset is a major opportunity. They need to clearly show customers how their technology investments are increasing safety, reducing potentially infectious touch points and increasing product traceability and transparency. This will be a defining, competitive advantage in the years to come.

"Producers must be ready to adapt their production models and food safety and hygiene practices, if they want to protect their brand reputation and succeed in today's marketplace", said Mr Amunugama.

Report on global food testing and certification markets

The 'Food Testing, Inspection and Certification Market: Global Market Opportunities and Competitive Landscape' report has been added to ResearchAndMarkets.com's offering. This report provides an array of information, including market size, expected growth rates, market drivers and restraints, and other market trends and developments.

The report includes the following:

- An overview of the global market opportunities for food testing, inspection and certification along with the competitive landscape.
- Analyses of the global and regional market trends, with historical revenue data for 2021, estimates for 2022 and 2023, and projections of compound annual growth rates (CAGRs) through 2027.
- Estimation of the actual market size and market forecast for food testing, inspection and certification, and corresponding market share analysis by technology, contaminant types, and region.
- Discussion of current and future demand in the global food testing and inspection market.
- A discussion of environmental, social, and governance (ESG) standards and market outlook for ESG services for the food industry.
- Analysis of the competitive landscape based on recent developments and segmental revenues.
- Market share analysis of the key manufacturers in the food testing, inspection, and certification market.
- Profiles of the leading global players.

Innovative air solutions from LG

LG Electronics (LG) recently unveiled its new climate-friendly R32 refrigerant for air conditioners and the LG PuriCare AeroTower Air Purifying Fan.

The R32 environment-friendly refrigerant

LG has adopted the industry's next-generation R32 refrigerant for its single and multi-split air conditioners in commercial and residential settings. The energy-efficient R32 refrigerant is combined with LG air conditioners' intelligent features and innovative product design to deliver cool air in a greener way.

With zero Ozone Depletion Potential (ODP) and significantly lower global warming potential (GWP), compared to the mainstream R410A refrigerant, the R32 refrigerant is more environment-friendly. The R32 conveys heat efficiently and offers a higher cooling capacity, so less energy is required to cool indoor spaces.

Users can then reduce their carbon footprint and enjoy more significant savings on electricity costs. The R32, a single-component refrigerant, can also be easily recycled or reused, minimising the environmental impact of HVAC equipment, making it the refrigerant of choice for many businesses, like LG, today.

Unique to its multi-split, residential air-conditioners line-up, LG also developed the peak current control technology to manage energy consumption efficiently. Users can set a maximum consumption level to limit the total power used. An internal test result showed that usage patterns at 1.9 kW and 1.7 kW, compared to the maximum power consumption of 2.5 kW, will help to save 24% and 32% energy, respectively.

With a 5-ticks rating in Singapore's Energy Guide, LG's Multi-Split Smart Inverter Air-Conditioner has a coefficient of performance (COP) that surpasses regulatory expectations. The Dual Inverter Compressor is also structured to operate with low vibration and less noise, resulting in optimised airflow that cools the room quickly and ensures greater energy efficiency.

The compact size of the outdoor unit makes it easy to install. To help users make an informed decision, when choosing new air conditioners, LG's air conditioners that use the R32 refrigerant will be identified with a Climate-Friendly label.

The LG PuriCare AeroTower Air Purifying Fan

The LG PuriCare AeroTower Air Purifying Fan features the combination of an air purifier and a fan, with adjustable, three-way airflow modes, ensuring the delivery of fresh and clean air.

The LG AeroTower is characterised by its sleek design that blends seamlessly with the interior.

Employing a three-step filtration system, comprising the Pre-Filter, 360-degree HEPA filter and Deodorisation Filter, the LG AeroTower effectively removes allergens, fine dust, odours and harmful gases in the air, thereby improving indoor air quality, significantly. In addition, the air purifying fan is equipped with LG UVnano technology, to remove up to 99.9% of bacteria on the fan blades, ensuring that clean air is delivered to every corner of the house.

The LG ThinQ App

The LG ThinQ app provides next-level convenience for users to remotely control and manage their LG products. The app allows users to switch the device on or off, and adjust temperature settings to avoid energy wastage. It also provides updates on indoor air quality and notifications to replace the air purifier's filters.

The LG PuriCare AeroTower Air Purifying Fan. Images: LG Electronics Singapore.

The new HP Metal Jet S100 Solution

HP's new Metal Jet S100 Solution for the global metals manufacturing sector has a strong focus on end-to-end supply chain solutions, in both software and hardware, that are customer-centric and design-led.

The Metal Jet S100 Solution is said to provide a high level of technical and business advantages for customers, helping them to achieve their goals for business transformation. The modular solution enables units to travel between four different stations, meaning users can continually run production at scale for mass metals production.

HP's expertise and IP in thermal inkjet technology and latex chemistry deliver cost, quality, productivity, and reliability advantages. The company's thermal inkjet printhead improves the printing speed, part quality, and repeatability. The advanced latex chemistries developed by HP lend significant benefits to the binder itself, enabling stronger green parts, eliminating the need for de-binding, and yielding industrial production-grade quality.

Key advantages of HP Metal Jet technology include:

- Innovative New Designs – New geometries, density control and designs to lower the weight of, or consolidate, metal parts push the boundaries of what is possible with 3D printing.
- Improved Customer Economics – Process steps needed to create parts are shortened, whilst costs due to manual labour or complexity requirements are reduced, driving efficiencies across the supply chain.
- Increased Productivity – Binder jetting can boost productivity ten-fold, allowing for processing, layer by layer, versus a point process. Isotropic properties also require no post-processing and no support removal, and the use of metal powders is also more cost-effective than laser-based 3D printing of powder.
- Higher Resolution to Drive Part Quality – HP printheads leverage decades of industrial thermal inkjet technology developments, defining geometry and delivering high resolution and system robustness, making mass production of 3D metal parts a viable option in commercial manufacturing.

Innovative collaboration and breakthrough applications

Advancements and new production applications highlight the advantages of Metal Jet, including better productivity, low part cost, and high quality.

HP has already built a momentum with leading partners and customers, including GKN, Parmatech, Cobra Golf, Legor Group, Volkswagen, and more. HP is also collaborating on mass metals production opportunities, with new partners and customers around the world, including Domin Digital Motion, an innovative industrial company focused on hydraulic systems and valves; Lumenium, a startup developer of advanced rotational engines; and Schneider Electric, a global leader in the digital transformation of energy management and automation.

Together with GKN, a new filter used on Schneider Electric's NSX breaker was produced using HP Metal Jet technology, which could not be achieved with conventional industrial manufacturing capabilities due to the shape and material complexity. HP Metal Jet technology not only facilitated the design of new power filter shapes that reduce gas, pressure, and heat impact, in a more limited space, it also resulted in significant productivity gains and environmental benefits.

From left, the HP Metal Jet S100 powder management station, printer, curing station and powder removal station.

Siemens launches cloud-native software for electrical design

Siemens Digital Industries Software recently announced the availability of Siemens' Capital Electra X, a new cloud-native electrical design software as a service (SaaS) offering aimed at individual electrical designers or small teams that require an affordable, yet powerful, electrical design solution.

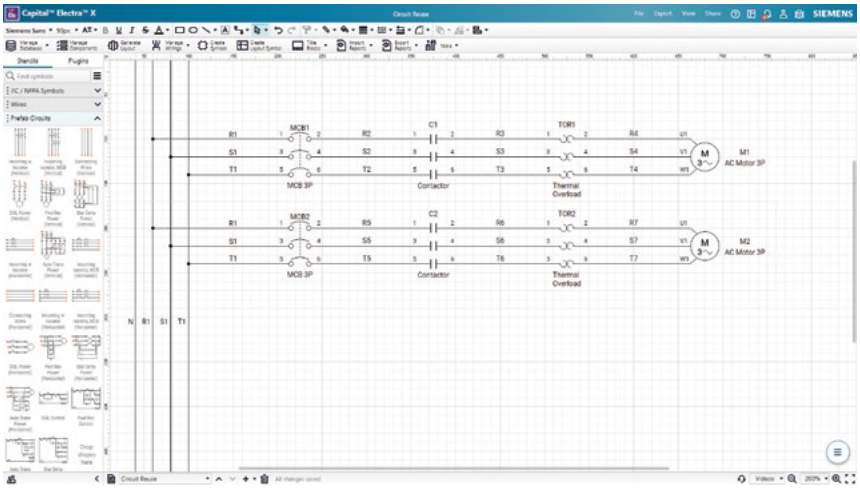
Part of the Siemens Xcelerator portfolio of software and services, Capital Electra X offers users sophisticated electrical design capabilities with lower cost-of-ownership and shorter time-to-productivity than traditional on-premises solutions.

The new Capital Electra X offering is based on pioneering technology from the recently acquired Radica Software Sdn Bhd, a specialist in electrical design software, based in Ipoh, Malaysia.

With Capital Electra X, Siemens supports small and medium-sized businesses' efforts to incorporate electrical systems into their offerings with power and ease of access. More broadly, this acquisition bolsters the entire Capital suite, allowing Siemens to serve the right solution to those working on products of any complexity and in any stage of growth.

The Capital Electra X offering is available immediately.

Siemens Digital Industries Software helps organisations of all sizes digitally transform using software, hardware and services from the Siemens Xcelerator business platform. Siemens' software and the comprehensive digital twin enable companies to optimise their design, engineering and manufacturing processes to turn today's ideas into the sustainable products of the future, across all industries.



Smart Circuit Reuse – Capital Electra X allows one to reuse circuits, with just a drag and drop, and all symbols and wires will be intelligently renamed.

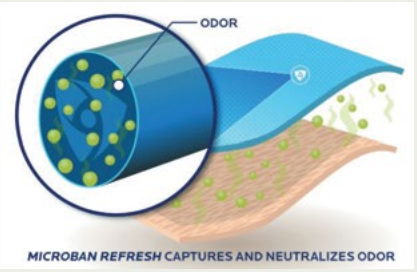
Microban launches new patent-pending odour capture technology

Microban International has introduced Refresh, a new, patent-pending, sustainable odour capture technology that is completely metal-free. According to the company, the technology is proven to reduce odours by up to 93%, on polyester and polyester-rich blends, even after 30 home launderings.

Microban is a global leader in anti-microbial and odour control technology, and has developed Refresh, as part of its ongoing dedication to sustainable textiles manufacturing. The formula for Refresh is designed to address the needs of both manufacturers and consumers, by providing an effective solution to tackle permastink, without relying on traditional heavy metal chemistries. Refresh is proven to effectively reduce odours on polyester and polyester-rich blends, including activewear, hunting gear and other apparel. By keeping garments fresher for longer, this technology will allow end-users to enjoy the benefits of washing items less frequently and therefore reduce water consumption and fibre pollution, preventing premature disposal and decreasing landfill loading. It also allows manufacturers to reduce their use of pesticidal chemistries.

Refresh can be incorporated during the manufacturing processes for polyester and polyester-rich blended products, as an easy-to-use and particle-free, one-part liquid solution, avoiding any concerns about settlement during storage and mixing. It is fully water soluble and will not negatively impact fabric properties.

Refresh is available to apparel brands and manufacturers globally, along with Microban's support and expertise.



Functioning of Microban odour capture technology.

IES-INCA INKS COLLABORATION TO ENHANCE THE GROWTH OF LOCAL DEEP TECH VENTURES

On 19 October 2022, the IES Incubator and Accelerator (IES-INCA) signed a Memorandum of Understanding (MOU) with Action Community for Entrepreneurship (ACE), the national non-profit organisation for driving entrepreneurship and start-up innovation in Singapore.

The MOU aims to support the growth of deep tech ventures and scaling them up from Singapore into regional markets.

Through the formation of a deep-tech venture sub-committee comprising of representatives from IES, IES-INCA, ACE and industry leaders, the partnership will facilitate conversations and feedback to policy makers and start-up ecosystem stakeholders to enable great growth in the sector.

IES-INCA will also work with ACE to build a deep tech venture community that will connect technopreneurs, engineers, mentors, investors and overseas partners for learning, collaboration, investment, and internationalisation opportunities.

"This new partnership with ACE enables the technical and engineering members in IES and the IES-INCA community to work in closer collaboration with ACE to drive more technopreneurial activities on the educational, networking and ecosystem fronts.

"This will help to drive greater interest and investments into the deep-tech sector, tapping on ACE's position as the national voice for entrepreneurship, while leveraging the strengths of its youth and international networks," said Er. Chong Kee Sen, Chairman of the IES-INCA Board of Directors.

Adding on, Mr James Tan, Chairman of ACE, said: "We are committed to growing the deep tech sector together with IES-INCA. We will help the deep tech startups in their commercialisation efforts, scale up and expand into the regional markets.

"We will mobilise both our networks of technopreneurs, mentors, investors, stakeholders in the Institutes of Higher Learning as well as overseas partners to facilitate learning, networking, investment, and internationalisation opportunities. ACE will also continue to serve as a strong voice for the Singapore startup ecosystem and bridge communications between the relevant parties and the Government."

Representatives and guests from ACE and IES-INCA pose for a group photo after signing the MOU. From left: Mr Matthias Yao, former Senior Minister of State, Prime Minister's Office; Mr James Tan, Chairman, ACE; Ms Florence Neo, CEO, ACE; Mr Chow Kok Wah, Executive Director, IES-INCA; Er. Chong Kee Sen, Chairman, IES-INCA; Mr Teo Ser Luck, Board Member, IES-INCA; and Mr Andy Wee, General Manager, IES-INCA. Photo: ACE

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1) Professional Development

- Eligible for Chartered Engineers Certification Application (subject to registration criteria and conditions)
- Enjoy preferential rates for IES conferences, seminars and workshops
- Enjoy 10% to 15% discount for IES Academy Courses (T&Cs apply)

2) International Affiliations

- Interaction with overseas engineering institutions in joint programmes

3) Networking

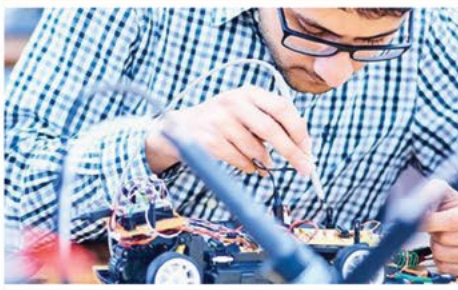
- Exclusive FREE Members' Night (T&Cs apply)
- Enjoy preferential rates for networking activities
- Join our Sports Interest Groups
- Join our Social Events

4) Communication

- Enjoy free subscription of IES weekly e-Newsletter
- Free monthly e-zine – The Singapore Engineer
- Free Annual IES Directory containing the business contacts of all members
- Get the latest updates on government regulations and the activities of allied institutions

5) Others

- Enjoy special rate for IES professional Indemnity Insurance Schemes
- Enjoy exclusive merchant benefits
- Free parking in IES premises
- Get a 5% discount off your membership subscription when you pay by GIRO (T&Cs apply)



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