SUSTAINABILITY WHITEBOOK 2020-2021

EuroCham SINGAPORE

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EuroCham SINGAPORE

DIAMOND AND GOLD MEMBERS

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QUOTE

from the President of the European Commission, Ursula von der Leyen

"The European Green Deal is our blueprint for a transformation of our economy. And it is Europe's new growth strategy. We look to Singapore as an important ally to achieve a sustainable recovery and our global commitments towards the UN Sustainable Agenda for 2030 and the Paris Agreement on Climate Change. I applaud the European Chamber of Commerce's work to foster sustainable businesses and promote closer cooperation between European and Singapore companies. There are many business and innovation opportunities in the European Green Deal."

Ursula von der Leyen,
President of the European Commission

MESSAGE

from the Minister for Sustainability and the Environment, Grace Fu Hai Yien

The EU-Singapore Free Trade Agreement (EUSFTA), which is the first FTA between the EU and an ASEAN member state, commits the EU and Singapore to the principles of sustainable development in trade. This is demonstrated by the inclusion of forward-looking provisions on trade and sustainable development in the Agreement, including the protection of the environment.

As we commemorate the first anniversary of the entry-into-force of the EUSFTA on 21 November 2020, Singapore looks forward to taking our partnership with the EU forward in new ways, such as in addressing the challenges posed by climate change, and exploring opportunities presented by the circular economy.

Even as we tackle the COVID-19 pandemic, Singapore is committed to play our part on the climate change front, and to put sustainability at the core of everything we do. We will aim for a recovery that will not only make our economy stronger, but also greener. We will continue efforts to transform our companies and industries to be more carbon-, energy- and resource-efficient. We are also adopting innovative circular economy approaches to achieve greater resource efficiency.

The EU Commission's European Green Deal is a landmark plan that demonstrates the importance the EU places on sustainable development. I hope our common interests in trade and sustainable development will facilitate a meaningful exchange of views between Singapore and Europe and bring forward ideas and solutions which can be employed to create a more sustainable world for our future generations.

I am heartened that the European Chamber of Commerce (EuroCham) has embraced sustainability as the focus of its activities in 2020. The Sustainability White Book will help to raise awareness of and promote partnerships in circular economy and sustainable development, and profile the successes and best practices of European and Singaporean companies.

I thank EuroCham for your steadfast efforts in bridging European companies with Singapore stakeholders. I look forward to new opportunities to work together to chart our path towards a sustainable future.

Ministry of Sustainability and the Environment
SINGAPORE

MESSAGE

from the Ambassador of the European Union to Singapore, Barbara Plinkert

The European Union (EU) and Singapore are fully aligned natural partners when it comes to building sustainable societies. We have a shared vision with the United Nations (UN) Sustainable Agenda for 2030 and the Sustainable Development Goals (SDGs) at the core of our economic and environmental policies. A clear testament to this is the EU-Singapore Free Trade Agreement (EUSFTA), which includes a chapter on Trade and Sustainable Development to ensure that our trading relations support environmental protection.

In recent years, many countries have called for action to correct the course of global unsustainable economic growth. Important steps have been taken to fight vital issues such as climate change, the digital divide and the gender gap. The EU fully embraced this approach and in 2019, Ursula von der Leyen, President of the European Commission, announced that Europe would become the first climate neutral continent by 2050. The European Green Deal adopted in December 2019 lays the ground for this transition, announcing forward-looking initiatives and investments. The ambitious targets announced by the EU to make our economy greener, fairer and digital, find their place also in our strategy to recover from the COVID-19 pandemic.

The idea of competitive sustainability anchors the EU recovery plan released end-May. The Next Generation EU instrument and the revamped EU budget will make investment available to get Europe back on its feet and recover from the unprecedented disruptions of COVID-19, while accelerating green and digital transitions and building a fairer and more resilient society.

For the next seven years, the Commission has proposed that 25% of the EU budget be spent on climate investments. These long-term steps are critical not just for businesses, big and small; they reaffirm our commitment to scale up the global sustainability agenda.

Singapore with its shared vision and strong push on sustainability is a key ally for us in moving forward this crucial agenda. By continuing to work closely together and build on our synergies - in areas such as circular economy, the built environment, mobility, marine plastic litter, and energy (renewables and clean hydrogen) – we can have a bigger collective impact. Thanks to Singapore's support, the first EU-ASEAN high-level dialogue on environmental protection and climate change took place in July last year. We continue our excellent dialogues and reinforce EU-ASEAN cooperation in areas such as renewable energy.

At the international level, the EU and Singapore are cooperating in promising fora, such as the International Platform on Sustainable Finance (IPSF) and the Global Partnership for Artificial Intelligence (GPAI). The IPSF, which Singapore joined in June 2020, aims at facilitating multilateral exchanges on best practices and initiatives to mobilise private capital towards environmentally sustainable investment. While the GPAI supports the development of sustainable AI while using to the fullest the potential of this technology for a green and just transition.

But the shift to a resilient and sustainable society will not be possible without engaging with the private sector. Our new EU industrial strategy, released in March this year, makes clear that to build future-proof economies we need to have a dynamic and open interaction with businesses, big and small.

In this context, the EuroCham Whitebook on Sustainability is an essential part of the dialogue. This timely Whitebook shows the excellence of EU business in crucial industrial ecosystems such as circular economy, green finance, smart mobility, renewable energy, sustainable food. It maps too the important role EU businesses play in this strategically important part of the world.

The deep human and economic impact of the unprecedented COVID-19 pandemic continue to unravel and leave us with many lessons. Today, more than ever we have seen the strengths of working together, the power of collective response and the benefits of openness over closure. It is not just countries, it also industries and public and private sectors that need to cooperate even more to achieve a sustainable and inclusive future.

"Build back better" and together is our once-in-a-generation opportunity.

MESSAGE

from the President of EuroCham, Federico Donato

I am delighted to present the first Sustainability Whitebook by EuroCham Singapore—published in collaboration with Accenture, our knowledge partner.

2019 was an important stepping stone to deeper trade and investment relations between the European Union and Singapore. On 21st November, the European Union-Singapore Free Trade Agreement (EUSFTA) came into force with a landmark chapter on Trade and Sustainable Development: placing environment and sustainability at the heart of our exchanges and setting us on the path to a greener future.

The EUSFTA, in formalizing this decades-long partnership, looks beyond goods, services and capital, to exchanges of best practices around sustainability and deeper, more meaningful collaborations involving companies, organizations and citizens.

In selecting sustainability as the Chamber's main topic in 2020, we address a top priority for many global companies. Sustainability is also a key driver of the European Commission agenda this year, given the launch of the European Green Deal. In Singapore too, it is an important topic that the Government is keeping in highest consideration. For these reasons we take the lead in launching our showcase of European Excellence in Sustainability through Best Practice Sessions where companies share their initiatives and plans, the Sustainability Whitebook containing position papers and surveys on sustainability efforts and the very first Sustainability Awards which recognize leaders and disruptors in the space.

All activities are open to Singaporean and European companies, because our chamber is a place where partnerships are fostered and deeper collaboration between Europe and Singapore begins.

As a European Chamber of Commerce, our mission is to be the voice of European Businesses in Singapore, advocating for a more and free market in Singapore, even as we promote more sustainable investment and trade practices and better corporate citizenship. The Sustainability Whitebook is the reflection of these principles, promoting an exchange of views and practices between Europe and Singapore while encouraging the private sector to act responsibly. Only with sustainable and responsible development will we create an economy suitable for our next generation.

Recent messages from Singapore leaders indicate interest in continuing to grow sustainably, and in this respect, Europe truly qualifies as Singapore's best partner.

The EuroCham Whitebook tells Europe's story as a modern and innovative continent that realises the challenges of this century: it is a story of partnerships between the public and private sectors to overcome borderless challenges. In addition, it also shows what European businesses in Singapore have done so far, employing its trend-setting and creative technology and collaborating with local partners in contributing to the transformation of Singapore and the region.

Through the Sustainability Programme, our Chamber focuses its efforts around five topics that are high on the agenda for both Singapore and Europe. They are Smart Mobility, Circular Economy, Sustainable Food, Green Finance and Clean Energy: areas in which the European Union is an established leader. Given that we share very similar challenges, Europe is well placed to share its insights with partners in Singapore and Asia. The world's dense population, depleting natural resources, and increasing pollution require clean, smart and sustainable solutions. At the same time, limits on public budgets make public-private partnerships more necessary than ever before.

EuroCham's first ever Sustainability Whitebook offers insights into leading European companies and the sustainability practices that help us overcome these challenges in Europe, and now increasingly, around the world.

Allow me to underline that our initiatives under the Sustainability Programme could not have been accomplished without the crucial support of Accenture as our knowledge partner, Prudential and BNP Paribas as our Diamond members and all our Gold and Regular members. Also, a special thanks to our main stakeholders: the EU Delegation to Singapore and the Ambassador for their guidance, the National Business Groups for sharing their vision of Europe's future with Singapore, and all other contributors and editors who made this Whitebook possible. Only through such collaboration and partnership can we tackle the enormous challenges of our world.

MESSAGE

from the Executive Director of EuroCham, Nele Cornelis

It has been an exciting year for the European Chamber of Commerce: a year in which we not only embraced sustainability as our main topic of our activities, but also a year in which we have been challenged by a global pandemic to rapidly reinvent ourselves.

Europe has been a leading partner to Singapore in the area of Sustainability, and so this was an obvious choice of topic for our very first programme at EuroCham Singapore. The choice of topic was made even more compelling by our observation that many of EuroCham's members and stakeholders had begun to pursue Sustainability as a company priority over the years and anticipated it to remain a priority over years to come. This observation is supported by our survey findings on European Sustainability in Singapore, compiled into a report in early 2020, and reproduced in this Whitebook.

With our Diamond member Accenture's offer of support to come on board as the knowledge partner for our programme, EuroCham's vision for 2020's flagship event was complete. Under the title of "European Excellence in Sustainability" we began to draft a plan to execute a series of including breakfast talks, surveys, a Whitebook and even Sustainability Awards. We were keen to collaborate with our members in five different areas: Clean and Efficient Energy, Circular Economy, Smart Mobility, Green Financing and Sustainable Food and Nutrition.

Immediately, the programme triggered a lot of interest from our members. The initiatives were warmly welcomed by both the European Commission, the Singapore government and other key stakeholders.

On 12th of March the programme kicked off with the sharing session on "Smart Mobility". It was the first of a series of 10 monthly events where we not only successfully collaborated with National Business Groups, but also with universities and business schools: LKY School of Public Policy – NUS, NTU, EDHEC Business School, ESSEC Business school and Insead. From the second sharing session onwards, EuroCham team transformed the event format, going fully digital to comply with Singapore's circuit breaker measures in response to the COVID-19 pandemic.

The programme also marked the compilation of content-driven position papers and reports covering the five sustainability focus areas of the sustainability programme. I am most appreciative of the strong support extended by our partners Accenture and KPMG as well as the EU ASEAN Business Council in the preparation of these position papers, as well as that of our skilled intern Lesley Nair who helped us with writing two out of five papers. Conducting the papers and report would not have been possible without their efforts.

The programme would not be complete without showcasing our members' excellence in sustainability, both in Europe and in Singapore. Their views, strategies and objectives appear in this White Book under the chapter "European Excellence in Sustainability", complemented by the efforts of their Singaporean and ASEAN counterparts.

Furthermore, EuroCham surveyed one hundred senior leaders in European organisations based in Singapore to assess their initiatives in the sustainability area and to have a better understanding of their sustainability strategies. We concluded the findings in a Sustainability Report, also included in this Whitebook.

The report highlights the impact of these initiatives and strategies in Singapore and in the region and discusses some of the key challenges that were encountered. Opportunities are also clearly identified in this report.

This first-ever Sustainability Whitebook of EuroCham offers real insight into the strategies pursued by companies and leaders in Europe and in Singapore, the capabilities and smart solutions developed for decades and the calibrated opportunities European companies bring to Singapore. We hope the Whitebook can serve as an inspiration to private and public sector players to join forces to overcome challenges that span across national borders.

A programme of this magnitude commands tireless efforts by many parties: in addition to the contributors, editors, partners and advertisers who made this Whitebook possible, I thank also our Diamond, Gold and regular members for their generous support in helping us achieve our goals, as well as our partners and sponsors with whom we have worked very closely. My team and I look forward to another year of fruitful collaborations and partnership in which EuroCham continues to represent the business interests of your organisations in Singapore.

ABOUT EUROCHAM

WHO WE ARE

EuroCham is an independent non-profit organisation governed by members, representing the common interest of the European business community in promoting bilateral trade, services and investments between Europe and Singapore and the region.

WHAT WE DO

EuroCham represents the voice of the European business community in Singapore. We provide our members with a forum for advocacy, networking and information sharing within the European and Singaporean business communities and governmental circles.

OUR NETWORK

EuroCham gives you access to a large networking pool consisting of the bilateral National Business Groups, European companies operating in Singapore, the Singaporean government, the Singaporean business community, the diplomatic circle and key partners across ASEAN.

Our network helps you connect with business leaders from a variety of business industries. We offer a wide range of events such as prestigious gala dinners or luncheons attended by high-level executives like the "European Luncheon", "Schuman Lecture" and the "Awards Gala Dinner". Take part in discussions rounds with experts and business representatives and social networking events such as the "European Networking Nights" that provide your company with a increased corporate visibility.

OUR COMMITTEES

Our committees provide a common European platform to exchange information, discuss common issues businesses face and undertake coordinated initiatives. Through 13 committees we carry out advocacy work and publish position papers to put forward our recommendations.

- SMART MOBILITY
- DIGITAL ECONOMY
- FINANCIAL SERVICES
- HEALTHCARE
- HUMAN DEVELOPMENT
- INTELLECTUAL PROPERTY RIGHTS (IPR)
- REGIONAL TAX
- REGIONAL TRADE
- SUPPLY CHAIN
- SUSTAINABILITY
- WINE & SPIRITS
- AEROSPACE
- PACKAGING

INTRODUCTION

In 2020, European Chamber of Commerce (Singapore) embraced the topic of Sustainability as our main focus of activities for the year. In doing so, we acknowledged that a rapidly changing climate represents a potent, unprecedented and irreversible threat to habitats, societies and economies around the globe.

Singapore's commitments and aspirations pursuant to the 2015 Paris Agreement are supported by European companies, particularly in the strategic areas common both to the European Union (EU) Commission's European Green Deal and Singapore's Sustainability Concept Plan. These are the topics of focus for the wider 'European Excellence in Sustainability' programme to which this Whitebook belongs.

The 'European Excellence in Sustainability' programme covers the five areas of:

1. Circular Economy
2. Smart Mobility
3. Clean & Efficient Energy
4. Sustainable Food & Nutrition
5. Green Finance

The programme is executed as a series of activities like the 'Excellence in Sustainability' sharing sessions, the publication of the Sustainability Whitebook and finally, the recognition of sustainability front-runners through the EuroCham Sustainability Awards 2020. Each of these activities is intended to highlight sustainability best practices, challenges, and opportunities in Singapore, and they have been very warmly welcomed by the European Commission, Singapore government and other key stakeholders.

This Whitebook outlines the common interest in sustainability that the EU shares with Singapore, our efforts at EuroCham to advocate for a more sustainable future, and European companies positioned to lead the journey to greater sustainability. In doing so, it aims to present the many ways in which European and Singaporean companies can work together in our common pursuit of Excellence in Sustainability— acknowledging, after all, that if we are to tackle the enormous challenge we face, we must involve all existing actors in the space.

IN SINGAPORE AS IN THE EU, PROACTIVE MEASURES HAVE BEEN TAKEN IN RESPONDING TO THE GLOBAL IMPERATIVE FOR BUSINESSES TO BECOME MORE SUSTAINABLE.

Sustainability is a key driver of the EU Commission agenda and an important focus for the government of Singapore. The resulting commonalities between sustainability plans in the EU and Singapore are especially clear in the next chapter of this Whitebook, where the five key focus areas of the European Excellence in Sustainability programme emerge as pivotal aspects of each party's way forward.

EUROCHAM SINGAPORE'S EFFORTS TO ADVOCATE FOR A SUSTAINABLE FUTURE FORMS THE CONTENT OF THE THIRD CHAPTER.

Our two-pronged advocacy efforts have entailed the compilation of five position papers covering the state of sustainability development in Singapore and the region relative to developments, goals and objectives in Europe and a survey of one hundred senior leaders of European organisations based in Singapore, whose initiatives and strategies are presented in the Sustainability Report 2020.

The position papers that together form the third chapter of this Whitebook cover key areas of cooperation between European companies and Singaporean authorities and regulators: Singapore's efforts in relation to circular economy, green finance, smart mobility, clean and efficient energy, and finally, its stance on sustainable food and nutrition against the backdrop of the wider ASEAN region.

- The first of these position papers offers a vision of circularity for three waste streams: electronics, food, and packaging; providing insights on regulatory shifts and responses to such shifts , advocating for local and global collaboration in effectively transitioning to a circular economy.
- The second position paper discusses the landscape of green finance in Singapore as well as its opportunities and challenges, with European policy making and business approaches as a point of reference.
- The position paper on smart mobility provides insights into the process of planning sustainable urban mobility and the attendant ecosystems that span regional organisations, states, and private businesses.
- The clean and efficient energy position paper focuses on energy conservation and energy supply efforts in Singapore and the EU.
- Finally, the report on sustainable food and nutrition explores solutions that can help the ASEAN region produce more food and maintain nutritional value, ensure its people have adequate nutritional intake and an understanding of the food they consume.

Published as a means of raising awareness and closing the gap between company needs and government support programmes in relation to sustainability in Singapore, the European Sustainability in Singapore Report 2020 underscored the need for elevated awareness and understanding of sustainability practices, reflected demand for government incentives and an ecosystem of companies and stakeholders.

THE FINAL CHAPTER OF THE WHITEBOOK PROFILES COMPANIES WITH DEMONSTRATED EXPERTISE IN THE AREA OF SUSTAINABILITY: SHOWCASING BOTH EUROPEAN AND SINGAPOREAN EXCELLENCE IN THE AREAS OF FOCUS.

The sustainability journeys and ambitions of these companies reflect their efforts to actively integrate sustainability principles into their businesses, going above and beyond earlier concern for reputation management as they do so: efforts which, over time, have culminated in growth and returns on capital.

In tracing the EU-Singapore nexus on sustainability, this Whitebook promotes an exchange of views between Singapore and Europe while encouraging the private sector to act responsibly, constructively and collaboratively with Singapore's stakeholders in mind. The pages that follow present a summation of ideas and solutions which can be employed to create a more sustainable world for future generations.

DBS Live more, Bank less

Sustainable businesses with DBS

As a small island country with limited natural resources, Singapore understands better than most the dangers of climate change. That is why Singapore's leading bank, DBS, is committed to helping its clients and community achieve the sustainability goals outlined in the United Nations 2030 Agenda for Sustainable Development.

The DBS approach to sustainability

As a signatory of the United Nations Global Compact, DBS is driving progress towards achieving the Sustainable Development Goals. Our approach to sustainability is based on three pillars: *responsible banking, responsible business practices and creating social impact.*

Responsible banking.
We conduct our business in a fair and responsible manner, taking environmental and social considerations into financing decisions.

Responsible business practices.
We do the right thing by our people, while taking into account environmental and societal impact in our operations.

Creating social impact.
We seek to be a Force for Good by supporting social enterprises and giving back to the communities in which we operate.

DBS helps organisations big and small, meet their sustainability goals. We provide full spectrum support, from grants for social enterprises, to sustainability-linked and structured green loans for SMEs and corporates to sustainable capital markets solutions. DBS is the go-to provider of financing and advice for businesses across Asia.

We support community and social efforts

The DBS Foundation Social Enterprise Grant Programme awards funding to social enterprises to scale their impact. In 2019, the Foundation awarded SGD1.3 million to nine social enterprises across Asia, supporting awardees to deploy innovations to address societal challenges.

TreeDots: Turning food waste into opportunity.

TreeDots
As a beneficiary of DBS Foundation funding, TreeDots used their DBS Foundation grant to enhance their online platform, which aggregates food producers, importers, distributors, and F&B businesses to facilitate the selling of food items that would otherwise have been discarded.

We link sustainability to corporate purpose

DBS offers sustainability-linked financing to incentivise and reward companies to advance their sustainability agenda.

When the borrower meets or exceeds pre-determined ESG (Environmental, Social and Governance) targets, we reduce our already-competitive interest rates.

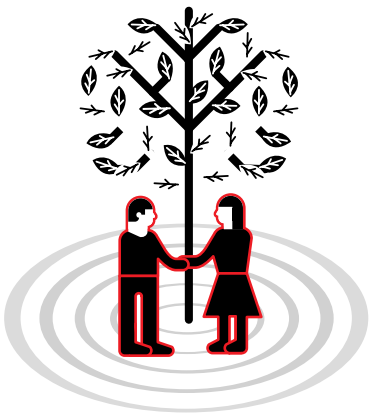
In 2019, Chew's Agriculture, a leading egg producer in Singapore, signed a 10-year, SGD27 million sustainability-linked loan with DBS.

This marked a milestone for sustainable development in Singapore as the nation's first sustainability-linked loan for an SME.

Chew's Agriculture has signed Singapore's first SME sustainability-linked loan with DBS.

DBS is the leading provider of renewable financing and advisory for larger corporates across Asia. In fact, since 2018 DBS has completed 29 renewable projects, amounting to SGD3.6 billion.

In 2020, DBS provided a SGD40 million loan facility to Sembcorp Industries to build an inland floating solar plant in Singapore. Scheduled to be completed in 2021, the project is one of the largest in the world, offsetting about 32 kilotons of carbon annually – equivalent to taking approximately 7,000 cars off the roads.



"We believe there will be a lot of opportunities for companies who are trying to decarbonize, but who may struggle given the pace of economic development. Transition finance complements green finance and can be an area to make incremental progress.

Yulanda Chung,
Head of Sustainability,
Institutional Banking Group, DBS

We are champions of transition finance

One of the most urgent agendas on the fight against climate change is to green industrial sectors that are responsible for carbon emissions. With the launch of a Sustainable and Transition Finance Framework and Taxonomy in June 2020, DBS became a first mover in capturing growing demand for transition financing.

Banks' taxonomies outline the way we manage transactions that are classified as "Green", "Transition", and/or contributing to the United Nations Sustainable Development Goals. Compared to the more commonly used green finance solutions, DBS' new financing framework and taxonomy expands the spectrum of industries that our transition finance team can engage with, allowing carbon-intensive companies to seek financing to support their reduction of reliance on fossil fuels.

Artist impression of the upcoming 60MWp floating solar system on Tengeh Reservoir – PUB, Singapore's National Water Agency and Sembcorp Industries.

For more information on DBS' approach to sustainability please visit us at www.dbs.com/sustainability

THE EUROPEAN GREEN DEAL

The European Green Deal is the European Commission's roadmap to transforming the European Union (EU) into a fair and prosperous society with a modern, resource-efficient and competitive economy. Presented in December 2019, it underscores the Commission's commitment to helping Europeans in fulfilling the defining task of the present generation: that is, to tackle the climate and environmental challenges before them.

The European Green Deal envisions the European Union of 2050 as the first climate-neutral continent. This is a scaling-up of the EU's pre-existing climate ambitions for 2030 and 2050, and its achievement requires a supply of clean, affordable and secure energy, a clean and circular economy, energy-efficient buildings and renovation, a toxic-free environment, well-preserved and restored ecosystems, healthy and environmentally-friendly food systems, and a shift towards smart mobility.

To achieve climate neutrality, the EU's Just Transition Mechanism helps to mobilise €100 billion worth of financial support and technical assistance over the 2021-2027 period to people, businesses and regions adversely affected by the adoption of this new growth strategy; and the European Climate Law reinforces the political commitment of the Commission through the creation of a legal obligation to fulfil it. The Green Deal is integral to EU implementation of the United Nation's 2030 Agenda and the sustainable development goals.

SUPPLYING CLEAN, AFFORDABLE AND SECURE ENERGY

Noting that energy generation and consumption account for three-fourths of EU greenhouse gas emissions, the Green Deal provides for the rapid phasing-out of coal and decarbonisation of gas, with the parallel integration of renewable sources. Energy security and affordability also requires that across the EU, the energy market is integrated, interconnected, digitalised, and technology-neutral.

MOBILISING INDUSTRY FOR A CLEAN AND CIRCULAR ECONOMY

The decarbonisation and modernisation of Europe's energy-intensive industries, circular design of all products, renewed emphasis on reducing and reusing materials prior to recycling them, economically viable reuse and recycling of packaging, and verification of green claims are important aspects of the circular economy. The EU also aims to discontinue its export of waste and diversify its supply of sustainable raw materials.

BUILDING AND INNOVATING IN AN ENERGY AND RESOURCE EFFICIENT WAY

Because building construction, use and renovation require significant amounts of energy and resources (accounting for 40% of energy consumed, for instance), the Green Deal recommends the renovation of public and private buildings and enforces legislation related to the energy performance of buildings with a view to reducing energy consumption, emissions, and energy poverty.

ACCELERATING THE SHIFT TO SUSTAINABLE AND SMART MOBILITY

A quarter of EU greenhouse gas emissions come from transport: a number that continues to grow. If Europe is to achieve climate neutrality by 2050, this must be reduced by 90%. More affordable, accessible, healthier and cleaner alternatives are essential to achieving this reduction. At the same time, the Green Deal works towards boosting multimodal transport, discontinuing fossil fuel subsidies, and ramping up the production and use of sustainable alternative transport fuels.

FROM 'FARM TO FORK': DESIGNING A FAIR, HEALTHY AND ENVIRONMENTALLY-FRIENDLY FOOD SYSTEM

Building on Europe's reputation for safe, nutritious and high-quality cuisine, the Green Deal aspires to set the global standard for sustainable food, placing farmers and fishermen at the focus of the transition. This would involve practices such as precision agriculture, organic farming, agro-ecology, agro-forestry and stricter animal welfare standards. It will also contribute to a more circular economy.

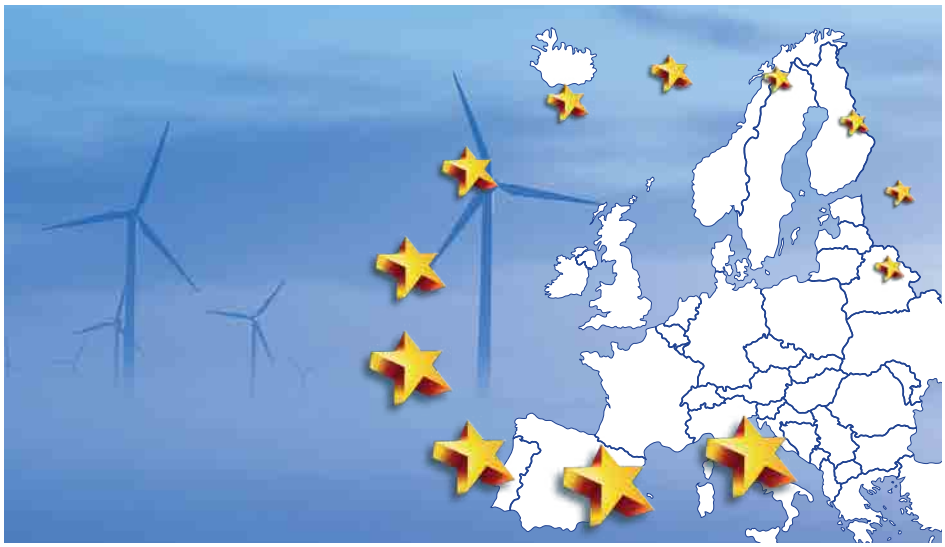
A ZERO POLLUTION AMBITION FOR A TOXIC-FREE ENVIRONMENT

The Green Deal identifies the need to better monitor, report, prevent and remedy pollution from air, water, soil, and consumer products with a view to achieving the EU's zero pollution ambition for a toxic-free environment. Systematic adoption of appropriate policies and regulations is essential to achieving these goals.

PURSUING GREEN FINANCE AND INVESTMENT AND ENSURING A JUST TRANSITION

The investment needs arising in relation to the ambitions set by the Green Deal have been estimated at €260 billion of additional annual investment or about 1.5% of the EU's 2018 GDP. To meet these needs on a sustained basis, the EU will combine dedicated financing for sustainable investments, adopt an enabling framework for green investment – including a taxonomy for environmentally sustainable activities, prepare a pipeline of sustainable projects, and integrate climate and environmental risks into the financial system.

On a global scale, the EU's 'green deal diplomacy' strives to convince its partners to adopt more sustainable growth strategies alongside Europe's ambitious environment, climate and energy policies, and supports them in mounting a global response to climate change and environmental degradation. Having set its own credible example, Europe now advocates for similar action through diplomacy, trade policy, development support and other external policies, across all relevant international fora.



SINGAPORE'S SUSTAINABILITY PLANS

In Singapore, the national vision for a more sustainable and liveable city is articulated in the Sustainable Singapore Blueprint of 2015. The Blueprint also sets out a plan of action to realise this vision by 2030.

Launched in November 2014, the Blueprint builds on Singapore's 50-year journey towards becoming Asia's greenest city, under the guidance of the country's visionary and far-sighted leaders. It also responds to global challenges of climate change, resource pressure, and emissions by strengthening the country's climate resilience, resource resilience, and economic resilience.

The Blueprint focuses on three key outcomes: a liveable and endearing home, a vibrant and sustainable city, and an active and gracious community. These are achieved by moving towards eco-smart towns, a car-lite Singapore, a zero-waste nation, and becoming a leading green economy. Several programmes support these efforts.

ACHIEVING ENERGY EFFICIENCY THROUGH THE SINGAPORE CLIMATE ACTION PLAN

Key sustainability programmes arising out of the blueprint include the Singapore Climate Action Plan, which seeks to reduce emissions intensity by 36% below 2005 levels by 2030, and to stabilise greenhouse gas emissions in 2030. This is achieved through the economy-wide price signals sent by carbon taxes, improving energy efficiency by 1%-2% annually, adopting green building and renovations practices to ensure 80% of all buildings are green by 2030, improving mass transport networks and accessibility, investing in cleaner sources of power, and encouraging households to become more energy efficient.

GREEN TOWNS PROGRAMME FOR MORE SUSTAINABLE LIVING

In March 2020, the Housing and Development Board (HDB) announced a ten year plan designed to give effect to an annual energy consumption reduction of 15% in HDB towns by 2030. This would be achieved through efforts to reduce energy consumption, rainwater recycling, and cooling of the towns. Solar panels, smart LED lighting, urban water harvesting systems, cool coatings and urban farms will be used towards this end.

PHASING OUT INTERNAL COMBUSTION ENGINES BY 2040

To have all vehicles run on cleaner energy by 2040, Singapore incentivises the adoption of cleaner, more environmentally-friendly vehicles through the Vehicular Emissions Scheme, the Electric Vehicle Early Adoption Incentive and the revised road tax methodology. The country has pledged to expand public charging infrastructure for electric vehicles and also to procure and use cleaner vehicles for government purposes.

ZERO WASTE MASTERPLAN

Aiming to reduce by 30% the amount of waste (per capita) that is sent to the landfill by 2030 and achieve an overall recycling rate of 70%, the Masterplan promotes sustainable consumption and the transition to a circular economy. The Masterplan is supported by Singapore's landmark Resource Sustainability Act, providing for the progressive introduction of extended producer responsibility for e-waste and packaging waste. Along with these waste streams, food waste is also a priority waste stream for closing the resource loop in Singapore.

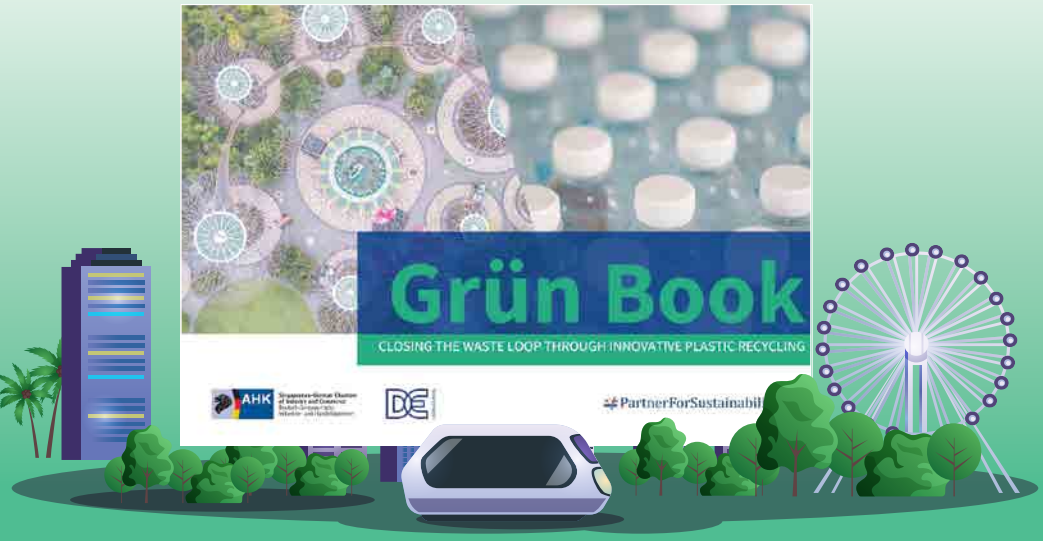
MEETING SINGAPORE'S FOOD NEEDS, DOMESTICALLY

Singapore's 30 by 30 goal aims to produce 30% of Singapore's nutritional needs locally by 2030, including in urban farms, LED-lit and climate-controlled greenhouses, indoor recirculating aquaculture systems, and contained systems for fisheries farming at sea. The initiative is supported by a SGD 30 million '30x30 Express' grant from the Singapore Food Agency.

A GREEN FINANCE ACTION PLAN

This 2019 strategy by the Monetary Authority of Singapore (MAS) seeks to make sustainable finance a defining feature of Singapore's role as an international financial centre. It will do so by building financial system resilience to environmental risks, developing markets, and leveraging technology. This includes strategic shifts in capital allocation away from carbon-intensive businesses to those that are greener, as well as the development of green finance solutions and markets—including through the MAS Green Bond Grant Scheme, an upcoming Green Investments Programme worth USD2 billion which funds public-market investment strategies having a strong green focus, and a Green Investments Programme allocating USD100 million to the Green Bond Fund of the Bank for International Settlements.

As with Europe, Singapore too sees international linkages and cooperation as a key aspect of its sustainability journey.



SCAN ME

TO DOWNLOAD THE GRÜN BOOK FOR FREE ON THE SGC WEBSITE

Release of the "Grün Book" Publication by the Singaporean-German Chamber of Industry and Commerce (SGC)

What is the "Grün Book"?

The publication addresses the importance of Plastic Recycling in Singapore and covers a comprehensive summary of the Zero Waste Masterplan, an over-view of German Recycling capabilities, a case-study on a specific project in international cooperation for a bottle-to-bottle recycling plant, and an exten-sive listing of more than 400 recycling companies and organizations.

The objective is to establish a Centre of Excellence for Plastics Recycling (PRCOE) in Singapore and a PET bottle-to-bottle recycling plant at its core, with the aim of becoming the regional hub for knowledge on Plastics recycling.

The Grün Book was launched and presented to Ms Grace Fu, Minister of Sustainability an Environment (MSE) during SGC's virtual Dialogue on Sustain-ability and Plastics Recycling.

The publication is supported by Advantage Austria (WKO), the Embassy of Switzerland in Singapore and the German association bvse.

For further information, please contact Ms Melissa Brandner (melissa.brandner@sgc.org.sg).

Handover Grün Book Publication: Ms Grace Fu, Minister of Sustainability and Environment (MSE) (right), Mr Jens Rübbert, President SGC (left)

You can download the publication for free on the SGC website in the section "Publications" by scanning the QR code above.

AHK Singaporean-German Chamber of Industry and Commerce
Deutsch-Singapurische Industrie- und Handelskammer

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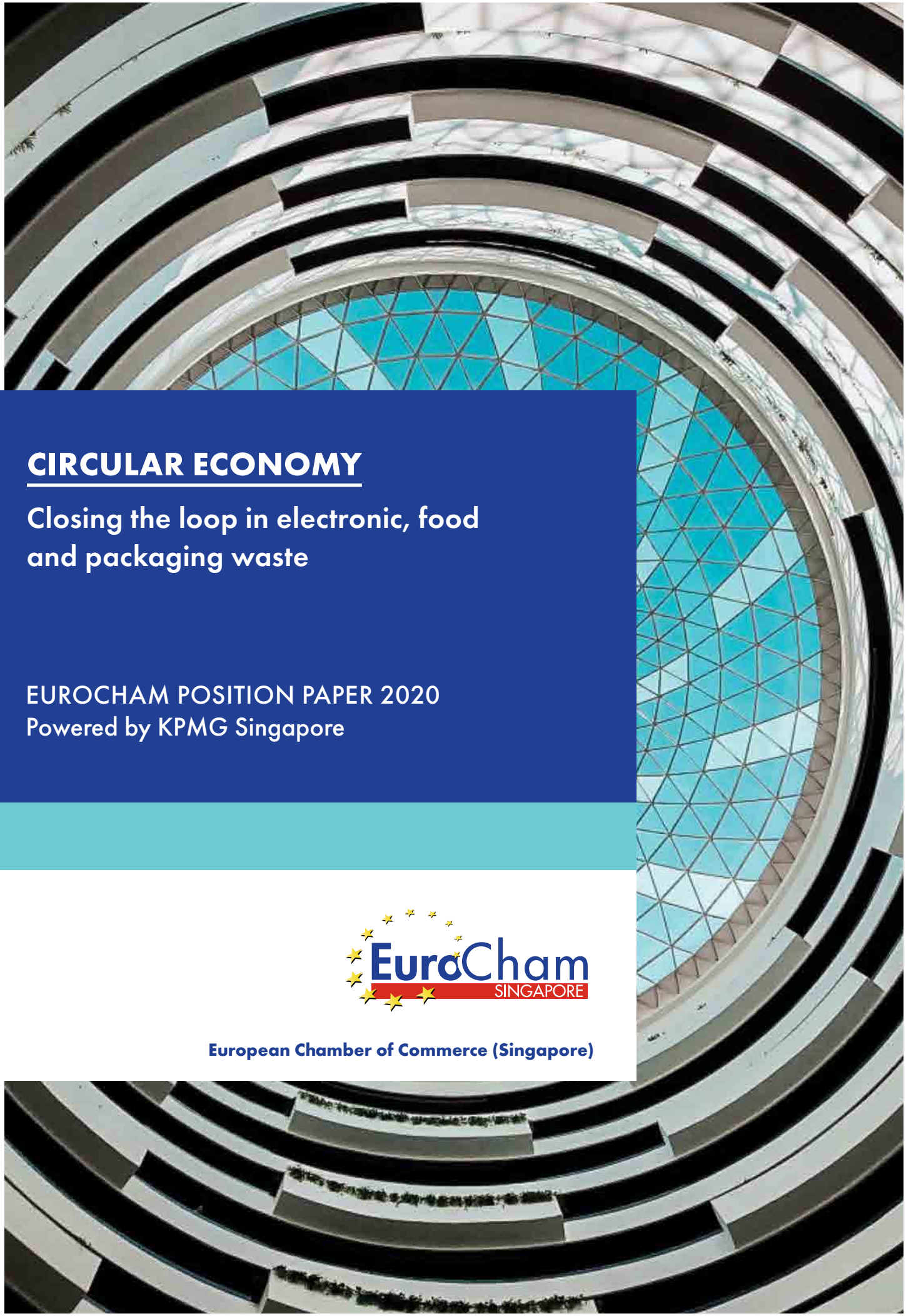

CIRCULAR ECONOMY

Closing the loop in electronic, food and packaging waste

EUROCHAM POSITION PAPER 2020
Powered by KPMG Singapore

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

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EXECUTIVE SUMMARY

In the wake of the coronavirus pandemic which offers a glimpse of what the world might look like under a climate breakdown, the dire need to delineate from current linear systems of "take, make, dispose" and embrace the transformative concept of a circular economy has never been more apparent.

The key drivers and challenges of advancing the circular economy are summarised below:

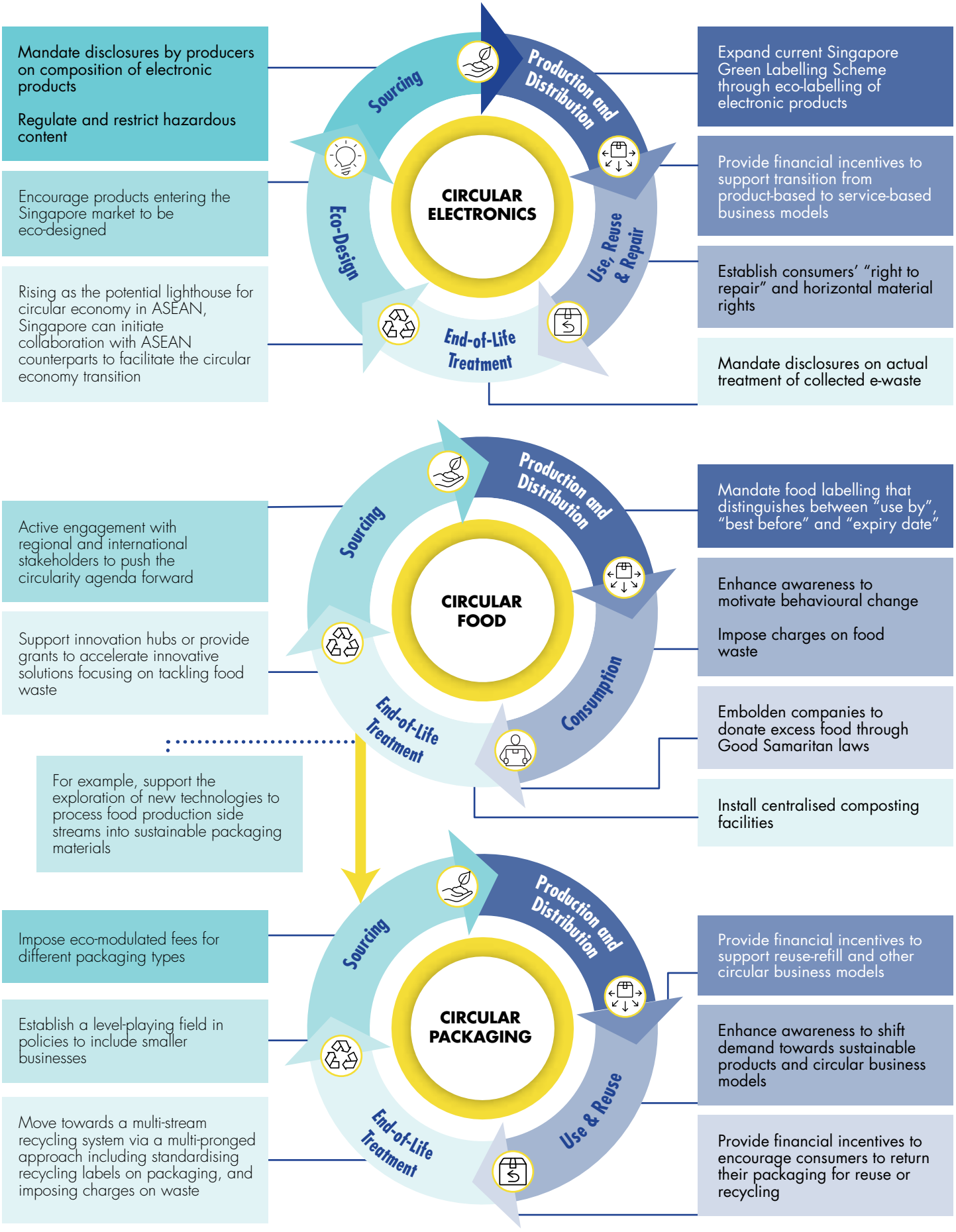
Drivers towards the circular economy	Challenges of advancing the circular economy
• Improve resource productivity • Reduce social inequalities • Build supply chain resilience • Support the economic recovery • Foster innovation • Create profit opportunities • Reduce costs • Strengthen relationships with stakeholders • Strengthen food security • Reduce significant greenhouse gas emissions	• Lack of consumer awareness • Perceived associated risks with used and refurbished equipment • Unconstructive consumption habits • Lack of a tracking system to monitor circularity progress and impacts • Inadequate support for circular business models in current purchasing policies • Current focus on short-term profits • Trade barriers • Incongruent policies, regulations and infrastructure internationally • Need for multi-stakeholder collaboration • Need for robust government support and infrastructure • Mentalities geared towards end-of-life treatment • Circular economy commonly misconceived as recycling economy

There is a growing momentum for a transition towards the circular economy in the European Union ("EU") and Singapore, supported by regulatory shifts in both regions. In this position paper, we offer a vision for advancing the circular economy with a focus on three waste streams – electronics, food and packaging waste – by analysing the regulatory shifts and policies in the EU and Singapore and featuring the circularity journeys of EuroCham member companies operating in Singapore.

The objectives of this position paper are to:

- Raise public awareness on the circularity concept and
- Recommend an approach to policy-making that considers the full life cycle of a product to advance the circular economy for electronics, food and packaging in Singapore as summarised on the next page:

Figure 1 - Recommended life cycle approach to advance the circular economy for electronics, food and packaging in Singapore



INTRODUCTION

Since the early days of industrialisation, our economies have been built on a linear model of production and consumption – one that relies precariously on finite resources. We take materials, make products, use them and dispose them, based on the assumption that they have minimal value and recoverability at the end of their "useful life". Our reliance on these finite resources and fossil fuels creates problems such as price volatility and escalating climate change. Today, the coronavirus ("COVID-19") pandemic has revealed the fragility of our linear economic systems as border restrictions and lockdowns disrupt global supply chains and unveil entrenched inequalities in the distribution of resources. In many ways, the current crisis offers a glimpse of what the world might look like under a climate breakdown, which will be the biggest global health threat of the century[1].

In the wake of the COVID-19 pandemic, the dire need to delineate from current linear systems and embrace the circular economy has never been more apparent.

The dire need to delineate from current linear systems of "take, make, dispose" and embrace the transformative concept of a circular economy has never been more apparent. A circular economy entails creating a closed-loop system that boosts economic, natural and social capital by decoupling economic activity from finite resource consumption, designing out waste and pollution and regenerating natural systems[2]. One of its key principles is to reduce the extraction of raw materials by designing products and services that enhance product durability, reusability, repairability and recyclability. These principles aim to redefine growth and have the potential to improve resource productivity, reduce social inequalities and build supply chain resilience within planetary boundaries. By stimulating a pivot towards circular thinking and regeneration, surpluses can be redirected to more beneficial uses and innovative ways can be applied to optimise resource use.

As businesses are directly impacted by the COVID-19 pandemic and our global economy deeply relies on intertwined supply chains, there is a heightened urgency to build resiliency and embrace fundamental change. Yet, circularity agendas may be put on a backburner as governments and corporations prioritise the healing of a pandemic-disrupted economy. Further, the pandemic-induced oil plunge has lowered prices of virgin plastic and the demand for single-use plastic packaging has risen as a result of quarantine-related home deliveries and fears associated with reusing materials and products[3].

Retrenchments in Singapore could hit 65,000 employees in 2020 as a result of the COVID-19 pandemic and the ensuing business disruptions[4]. It is therefore crucial for governments to recognise the role that a circular economy transition can play in building a resilient post-pandemic economy[5]. The Economic Research Institute for ASEAN and East Asia ("ERIA"), a Jakarta-based think tank, found that adopting circular principles across Asia could lead to the economic growth of US$324 billion and create 1.5 million jobs by 2025[6]. Governments should leverage this window of opportunity to stimulate the economy through circular strategies and business models which foster innovation, create profit opportunities, reduce costs and strengthen relationships with stakeholders.

Apart from jobs, the security of Singapore's food systems has been severely impacted. For a country that imports over 90% of its food, global supply chain disruptions due to the pandemic have highlighted the imperative to strengthen Singapore's food security[7]. Moving into the circularity of food which includes reducing food loss and waste will enhance Singapore's food security, helping Singapore to achieve its goal of producing 30% of the population's nutritional needs by 2030[8]. Therefore, commitment to a sustainable growth trajectory by establishing a circular economy must be part of our post-pandemic reality.

1 *Reuters. (2018). Climate change 'biggest global health threat' of century, doctors warn. https://www.reuters.com/article/us-global-climatechange-health-idUSKCN1NX2ZX*
2 *Ellen MacArthur Foundation. Circular Economy Concept. https://www.ellenmacarthurfoundation.org/circular-economy/concept*
3 *Hicks, Robin. (2020). Coronavirus-induced oil price plunge is hurting the circular economy for plastic. https://www.eco-business.com/news/coronavirus-induced-oil-price-plunge-is-hurting-the-circular-economy-for-plastic/Kechichian, Etienne & Mahmoud, Nidal. (2020). The circular economy can support COVID-19 response and build resilience. World Bank Blogs.*
4 *Yong, Jun Yuan. (2020). Covid-19: Economists expect S'pore retrenchments in 2020 to hit 45,600 to 65,000. TodayOnline. https://www.todayonline.com/singapore/covid-19-economists-expect-spore-job-losses-rise-sharply-foreign-workers-be-hardest-hit*
5 *Kechichian, Etienne & Mahmoud, Nidal. (2020). The circular economy can support COVID-19 response and build resilience. https://blogs.worldbank.org/psd/circular-economy-can-support-covid-19-response-and-build-resilience*
6 *Economic Research Institute for ASEAN and East Asia. (2018). Industry 4.0 Empowering ASEAN for the Circular Economy. https://www.eria.org/uploads/media/ERIA-Books-2018-Industry4.0-Circular_Economy.pdf*
7 *Channel News Asia. (2020). COVID-19 Pandemic highlights importance of strengthening Singapore's food security, says experts. https://www.channelnewsasia.com/news/singapore/covid10-singapore-food-security-farming-innovation-12649468*
8 *Singapore Environment Council. (2019). Singapore Environment Council Launches "Advancing a Circular Economy for Food: Key Drivers and Recommendations to Reduce Food Loss and Waste in Singapore. http://sec.org.sg/wp-content/uploads/2019/08/Press-rel.-SEC-food-study.final-2-1.pdf*

While we are battling the pandemic, the bigger threat of climate change cannot be neglected. Adopting a circular economy framework in areas such as steel, plastic, aluminium and food has the potential to achieve a global reduction totalling 9.3 billion tonnes of greenhouse gases in 2050 - equivalent to eliminating current emissions from all forms of transport globally. This highlights the essential role of circular strategies in reducing greenhouse gas emissions that cannot be achieved by shifting to renewables alone[9]. Enhancing circularity and closing resource loops, while underpinned by the transition to renewable energy, can therefore help Singapore to achieve its carbon emissions reduction target of halving its emissions from its peak to 33 million metric tonnes of carbon dioxide equivalents ("MtCO2e") by 2050, and net-zero emissions as soon as viable in the second half of the century[10].

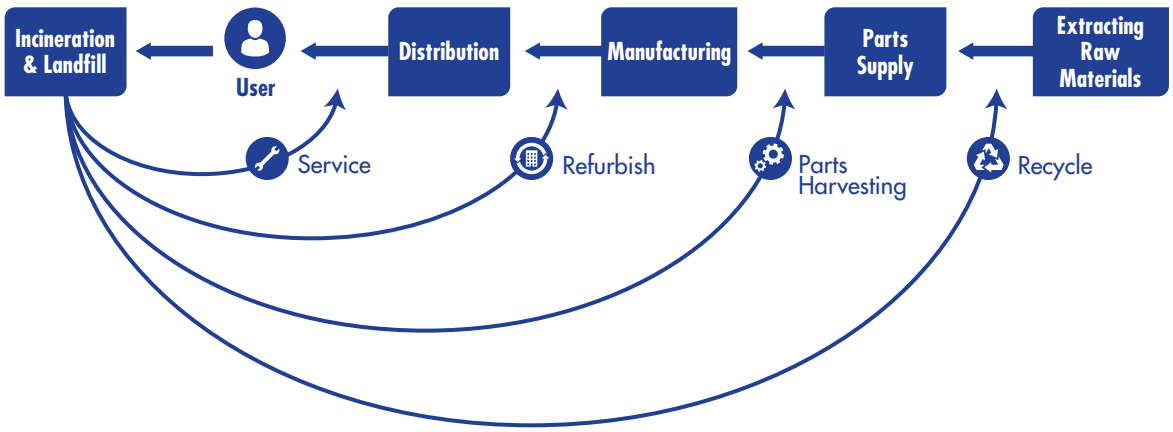
Globally, electronic waste produced per year is estimated to reach 120 million tonnes by 2050 if recycling does not improve[11], approximately one third of food produced is never eaten - at a cost of US$1 trillion[12] and plastic packaging waste represents US$80 to US$120 billion loss to the global economy every year[13]. While these waste streams present global challenges, they also stimulate global opportunities within the circular economy. Both Singapore's Zero Waste Masterplan and the European Green Deal: Circular Economy Action Plan adopt the circular economy approach to address these waste streams.

In this position paper, we offer a vision for establishing a circular economy with a focus on three waste streams – electronics, food and packaging waste. It first analyses both the Zero Waste Masterplan and the European Green Deal: Circular Economy Action Plan and breaks down the ways in which the difference in approaches can result in unintended outcomes. In addition to providing companies with a view on how their businesses need to respond to the regulatory shifts and thrive in a circular economy future, the paper sheds light on how expanding circularity solutions in Singapore will enhance trade and economic activities between Singapore and the EU.

The position paper then highlights best business practices based on circular economy principles as exemplified by EuroCham member companies operating in Singapore, with a focus on each of the three waste streams. The case studies provide valuable insights into the challenges these companies face in adopting circular economy practices in Singapore. Most importantly, through the case studies, the interviewed companies have emphasised the need for policy advancements and avenues from the Singapore government to create a business environment that aligns with their circularity ambitions.

Through the case studies, policy recommendations are put forth for Singapore to create an environment conducive for circularity.

By reassessing current foundations and incorporating further improvements, such as incentivising the move towards service-oriented business models and establishing the consumer right to repair, Singapore can shift its economic landscape towards circularity and establish a sustainable, resource-efficient and climate-resilient future.



9 *Ellen MacArthur Foundation. (2019). Completing the Picture - New circular economy and climate change paper presented at the COP25. https://www.ellenmacarthurfoundation.org/news/completing-the-picture-new-circular-economy-and-climate-change-paper-presented-at-the-cop25*

10 *National Climate Change Secretariat Strategy Group, Prime Minister's Office. (2020). Charting Singapore's low-carbon and climate resilient future. https://www.strategygroup.gov.sg/files/media-centre/publications/nccsleds.pdf*

11 *Ryder, Guy and Zhao, Houlin. (2019). The world's e-waste is a huge problem. It's also a golden opportunity. World Economic Forum. https://www.weforum.org/agenda/2019/01/how-a-circular-approach-can-turn-e-waste-into-a-golden-opportunity/*

12 *Sustainability Accounting Standards Board. Wasted Food is Wasted Money. https://www.sasb.org/blog/blog-wasted-food-wasted-money/*

13 *Fon Mathuros (2016). World Economic Forum. More Plastic than Fish in the Ocean by 2050: Report Offers Blueprint for Change. https://www.weforum.org/press/2016/01/more-plastic-than-fish-in-the-ocean-by-2050-report-offers-blueprint-for-change/*

GAP ANALYSIS: SINGAPORE ZERO WASTE MASTERPLAN AND EUROPEAN GREEN DEAL CIRCULAR ECONOMY ACTION PLAN

The difference between the life cycle approach adopted by EU's Circular Economy Action Plan and the focus on end-of-life treatment by Singapore's Zero Waste Masterplan may create a divergence between EU companies' circularity ambitions and the market environment in Singapore.

By embracing circularity principles beyond waste management, Singapore's policy objectives could be aligned with that of the EU's to enhance opportunities for trade and economic development between both regions.

There is a growing momentum for a transition towards the circular economy in the EU and Singapore, supported by regulatory policies and incentives in both regions. To date, the Zero Waste Masterplan and the Circular Economy Action Plan of the European Green Deal appear to adopt different approaches to closing resource loops. As seen in Table 1, EU's Circular Economy Action Plan proposes a comprehensive approach of regulating products along various phases of their life cycle while aiming to normalise sustainable products, services and business models and transform consumption patterns. On the other hand, Singapore's Zero Waste Masterplan has a focused approach on tackling end-of-life treatment and waste management.

The difference between the EU's and Singapore's policy approaches may be explained by the distinct roles they play in international trade. Based on the interviews with the EU companies, Singapore's role in the value chain for electronics, food and packaging typically starts from the sales and distribution stage, whereby such products are usually manufactured and/or sourced overseas and imported into Singapore for consumption. Singapore's smaller participation in the earlier stages of the value chain may have influenced its inclination towards prioritising waste management measures over a broader suite of circularity solutions.

However, the different approaches to policy making may create an unintended divergence between EU companies' circularity ambitions and the market environment in Singapore, where the latter may not fully support those ambitions and circular business models. For example, with respect to electrical and electronic equipment ("EEE"), Singapore's policy focus is on e-waste management (reuse, recycling or disposal) whereas the EU's policy focus is on extending the lifetimes of products. In this case, while a product may be designed by EU companies to be reparable, consumers in Singapore may underestimate the product's life span and call for a take back of the product prematurely for recycling or disposal despite having the option to repair. These misconceptions may curtail the opportunity to earn revenue from additional repair services.

By embracing circularity principles beyond waste management considerations, Singapore's policy objectives could be aligned with that of the EU's to enhance opportunities for trade and economic development between both regions. While the Zero Waste Masterplan may create a strong foothold for the circular economy in terms of developing robust take-back and recycling systems in Singapore that accommodate EU companies' circular products or packaging, other key circular economy principles including sharing, prolonging product lifespan, reusing and refurbishing need to be prioritised in policy-making to appeal to EU companies that adhere to these principles. For instance, government incentives could be used to foster a market environment that supports and sustains EU businesses in Singapore that adopt circular economy business models such as leasing or performance-oriented models.

Table 1 – Key elements of Singapore's and the EU's circular economy plans for electronics, food and packaging

	SINGAPORE	EU
Overarching Plan	Zero Waste Masterplan[14] (A Circular Economy Approach to Closing Three Resource Loops), Legislated in Resource Sustainability Act[15]	European Green Deal – Circular Economy Action Plan[16]
Electrical and electronic equipment ("EEE")	**Built around the Extended Producer Responsibility (EPR) concept**, all manufacturers and importers of regulated EEE* will bear the physical and/or financial responsibility for the proper treatment and disposal of regulated products that have reached end-of-life from 2021	**Mandates on products to lengthen product lifetimes and reduce waste** **Electronics and Information and communications technology ("ICT"):** The 'Circular Electronics Initiative' to promote longer product lifetimes includes:
	• Producers of consumer EEE will be required to join a Producer Responsibility Scheme ("PRS"), where the operator of the PRS will be appointed by National Environment Agency ("NEA"), to collect, send e-waste for recycling and meet collection targets	• Regulatory measures for electronics and ICT under the Ecodesign Directive so that devices are designed for energy efficiency and durability, reparability, upgradability, maintenance, reuse and recycling
	• Producers of non-consumer EEE, which includes solar photovoltaic ("PV") panels and servers, will be required to provide free take-back services for all their end-of-life equipment from their clients upon request	• Implementing the 'right to repair' by 2021, including a right to update obsolete software
		• Regulatory measures on chargers for mobile phones and similar devices, including the introduction of a common charger, improving the durability of charging cables, and incentives to decouple the purchase of chargers from the purchase of new devices
		• Improving the collection and treatment of EEE waste including exploring options for an EU-wide take back scheme to return or sell back old mobile phones, tablets and chargers
		• Review of EU rules on restrictions of hazardous substances in electrical and electronic equipment
		Batteries: New regulatory framework will be proposed including:
		• Rules on recycled content and measures to improve the collection and recycling rates of all batteries, ensure the recovery of valuable materials and provide guidance to consumers
		• Progressively phasing out of non-rechargeable batteries where alternatives exists
		• Sustainability and transparency requirements for batteries (e.g. carbon footprint of battery manufacturing, ethical sourcing of raw materials and security of supply, and facilitating reuse, repurposing and recycling)
Food	**Mandate food waste segregation for treatment**	**Aim to reduce food wastage through several measures such as the Farm to Fork strategy[17]**
	Food	**Food, water and nutrients**
	• The Resource Sustainability Act (2019) stipulates timeline for segregation of food waste by large food waste generators	• The Commission plans to propose a new EU-wide target on food waste reduction as part of its Farm-to-Fork strategy

(*) Regulated EEE include solar PV panels, ICT equipment, batteries, lamps, large household appliances and electric mobility devices

14 *Towards Zero Waste. Singapore's inaugural Zero Waste Masterplan charts Singapore's path towards a zero waste nation https://www.towardszerowaste.sg/zero-waste-masterplan/*
15 *Ministry of the Environment and Water Resources. Factsheet on Resource Sustainability Act. https://www.mewr.gov.sg/news/factsheet-on-resource-sustainability-act*
16 *European Commission. (2020). Circular Economy Action Plan. https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf*
17 *European Commission. Farm to Fork Strategy – for a fair, healthy and environmentally-friendly food system. https://ec.europa.eu/food/farm2fork_en*

	• From 2021	• The Commission will determine scope of a legislative initiative on reuse to substitute single-use packaging, tableware and cutlery with reusable products in food services
	– Owners of large public sector buildings with food and beverage outlets to segregate their food waste for treatment. This could be done under the Public Sector Taking the Lead in Environmental Sustainability initiative	• The new Water Reuse Regulation implemented in 2019 will encourage circular approaches to water reuse in agriculture. The Commission will facilitate water`w reuse and efficiency, including in industrial processes. The Commission will develop an Integrated Nutrient Management Plan, with a view to ensuring more sustainable application of nutrients and stimulating the markets for recovered nutrients
	– Mandatory for developers of new commercial and industrial premises, where large amounts of food waste are expected to be generated, to allocate and set aside space for on-site food waste treatment systems in their design plans	
	• 2024	
	– Large commercial and industrial food waste generators will have to segregate their food waste, but they can choose the food waste treatment method	
	– Developers of new developments who were required to set aside space for on-site food waste treatment systems in their design plans from 2021 will be required to implement the onsite treatment of food waste	
Packaging	**Mandate packaging reporting from 2020 to lay foundation for EPR framework by 2025**	**Aim to make all packaging placed on the EU market reusable or recyclable in an economically viable way by 2030**
	Packaging	**Packaging**
	• From 2021, producers of packaging and packaged products (i.e., brand owners, manufacturers, importers, and supermarkets) with an annual turnover of more than $10 million will be required to report on the types of packaging they put on the market and their corresponding weights. And from 2022, their plans to reduce, reuse and recycle the packaging are required to be submitted	• The Commission will review the Directive to reinforce the mandatory essential requirements for packaging to be allowed on the EU market, with a focus on: – Reducing (over)packaging and packaging waste, including by setting targets and other waste prevention measures – Driving design for reuse and recyclability of packaging, including considering restrictions on the use of some packaging materials for certain applications – Considering reducing the complexity of packaging materials, including the number of materials and polymers used
	• This will lay the foundation for the introduction of an EPR framework which will be implemented by 2025. This ensures producers are responsible for the collection and recycling of the materials they use to package their products	• Assess the feasibility of EU-wide labelling that facilitates the correct separation of packaging waste at source
	• National Environment Agency will be implementing a Deposit Refund Scheme (DRS) for beverage containers by 2022 as the first phase of the EPR approach for packaging waste management. Packaging waste, including plastics, is one of Singapore's priority waste streams due to its high generation and low recycling rate	• Strictly monitor and support the implementation of the requirements of the Drinking Water Directive to make drinkable tap water accessible in public places, which will reduce dependence on bottled water and prevent packaging waste
		Plastics • Mandatory requirements on use of recycled plastics • Develop a policy framework on: – Sourcing, labelling and use of bio-based plastics – Use of biodegradable or compostable plastics

While governments are instrumental in advancing the circular economy by producing a regulatory framework for all stakeholders, corporations are also key players in the journey of achieving circularity. Our Case Studies section discusses the featured companies' circular practices, challenges and specific policy recommendations to push Singapore's circular economy landscape further.

CASE STUDIES

By instituting practices within their businesses, corporations not only exemplify the applicability of circular strategies aligned with regulatory shifts, but also demonstrate their preparedness for a changing marketplace where consumer demand and multi-stakeholder pressure render such practices mainstream and essential.

In the following case studies, we analyse the practices of EuroCham member companies operating in Singapore which are targeting to close the loops in electronic, food and packaging waste. Apart from regulatory compliance and a commitment towards sustainability, we observed that one of the biggest pushes towards circularity is the increasing recognition of circularity by corporations as a strategy for business differentiation and competitive advantage. Companies are beginning to appreciate the value of circularity as closed-loop supply chains enable them to minimise dependence on natural resources and transform waste into sources of revenue, whilst establishing long-term relationships with stakeholders - especially consumers. This analysis includes an examination of the companies' circular economy practices, business results and challenges. Of great importance is their insights and recommendations for policy advancements and avenues needed to drive circularity in Singapore.

CASE STUDY 1
CLOSING THE LOOP IN ELECTRONIC WASTE

Company interviewed: Philips Singapore (Philips)

CIRCULAR ECONOMY PRACTICES

Philips, a leading health technology company from the Netherlands, is transforming its business model to enable value-based healthcare, moving from selling equipment alone to a long-term solutions model serving hospitals and other care providers. This new model enables care providers to reduce costs, share risks and access state-of-the-art solutions and services at a more predictable cost. At the heart of this value-based healthcare model is a transition from a product-oriented to an access-based business model, allowing consumers to purchase access to the equipment without having the responsibility of owning the products. With this transition, Philips aims to build longer term relationship with customers by including maintenance, repair, latest technology upgrades and software releases in their purchase agreements. Such elements will also have to be considered in the equipment's design stage and as such, Philips has developed a modular platform approach whereby parts of the equipment can be easily removed to facilitate repair, upgrade and recycling.

Philips's initiatives, such as the Philips Diamond Select programme, offer pre-owned first-rate medical equipment and systems that have been thoroughly refurbished, upgraded and quality-tested with a full Philips warranty. This allows customers to benefit from state-of-the art technology at a more affordable price.

As a result of a shortened supply chain attributed to a healthcare imaging systems refurbishment facility in the Netherlands, Philips has been able to refurbish computed tomography ("CT") scanners in only two weeks[18] during the COVID-19 pandemic to meet the swelling demand for diagnostic equipment[19].

Philips has pledged that by 2020, it will take back all large medical systems equipment that its customers return, such as magnetic resonance imaging ("MRI"), CT and cardiovascular systems, and ensure that all traded-in materials are repurposed in a responsible way[20].

BUSINESS RESULTS FROM GOING CIRCULAR

By moving away from a transactional approach whereby interaction with customers typically end upon completion of sales, the extended communication with consumers allows Philips to gain better insights of consumers' usage of the equipment, which can be routed back to the design stage and enhance customer satisfaction in the long run.

Depending on the product, Philips predominantly achieves 50 - 90% material reuse through its refurbishing activities, including its reuse of 940 tonnes of refurbished medical imaging equipment in 2016. Improving material productivity is critical especially since manufacturing firms in the EU spend on average about 40% of their costs on materials[21]. Companies

18 *Le Moigne, Remy. (2020). Circular economy principles could help businesses face the worst recession ever. Greenbiz. https://www.greenbiz.com/article/circular-economy-principles-could-help-businesses-face-worst-recession-ever*
19 *Slavin, Terry (2020). How COVID-19 has brought circularity into sharp focus for Philips. Reuters Events: Ethical Corporation Magazine. https://events.ethicalcorp.com/reports/docs/548965/EC-Magazine-June-2020.pdf*
20 *Royal Philips. (2020). Philips marks new milestones to improve people's health across the globe at WEF 2020. GlobeNewswire. https://www.globenewswire.com/news-release/2020/01/20/1972302/0/en/Philips-marks-new-milestones-to-improve-people-s-health-across-the-globe-at-WEF-2020.html*
21 *European Commission. (2020). A new Circular Economy Action Plan.*

stand to gain competitive advantage from closed-loop models that could increase their profitability while sheltering them from resource price fluctuations.

Business results:

- Enhance customer relationships
- Increase profitability whilst being sheltered from resource price fluctuations

CHALLENGES IN ADVANCING CIRCULARITY

There are often perceived risks such as the risk of malfunction associated with used and refurbished equipment, especially for medical equipment, which is a difficult barrier to overcome. Additionally, a key challenge in moving towards an access-based business model lies in hospitals' conventional capital expenditure budgets for medical systems, which often entails the purchase of equipment. Therefore, hospitals' purchasing policies and budgeting need to be reviewed to enable agreements for access-based service models, such as rental of pre-owned, refurbished MRI machines maintained by the manufacturer, to be preferred over the acquisition of equipment.

Hence, more awareness is needed around the value driven through these circular business models. By showing customers the cost savings and the assurance of quality combined with the guarantee of premium maintenance, repair and upgrades, both barriers can be overcome. The success of sharing economy models suggests consumers' increasing comfort with the concept of reduced responsibility as opposed to full ownership.

Another challenge faced by companies is the trade barriers imposed by some countries such as restrictions on the import of refurbished or second-hand products[22]. In addition, the import restrictions on waste and scrap materials to avoid excessive waste dumping hinder the flow of recyclables and product components for refurbishing, resulting in difficulty matching supply and demand of electronic parts[23]. Although Singapore does not impose such trade restrictions, a global circular economy relies on international trade to channel waste and materials to countries with comparative advantage in sorting and processing these materials. Therefore, these logistical barriers impede the transition towards circular models of rebuilding products.

Key challenges:

- Perceived risks associated with used and refurbished equipment
- Traditional purchasing policies which do not support service-based models
- Trade barriers

22 *Organisation for Economic Co-operation and Development (OECD). (2018). International Trade and the Transition to a Circular Economy. https://www.oecd.org/environment/waste/policy-highlights-international-trade-and-the-transition-to-a-circular-economy.pdf*
23 *European Commission. (2020). A new Circular Economy Action Plan.*

RECOMMENDATIONS FOR POLICY IMPROVEMENTS

Under Singapore's EPR framework, all producers[24] of regulated EEE will be responsible for the collection of e-waste for proper disposal or recycling by licensed companies. To ensure this, other than providing records of weight and number of the regulated electronics[25], it could be made mandatory for producers to disclose information on the chemical and material composition of their electronic products as well as the actual treatment of the e-waste collected for recycling and other purposes.

To facilitate measures such as recycling, refurbishing and repairing, policies could also be placed to regulate and restrict hazardous content in electronics. Eco-labelling of electronic products that enter the Singapore market can also be considered, further expanding the Singapore Green Labelling Scheme[26] which currently apply to specific product categories.

While most of the electronic products are not locally manufactured in Singapore, the government can encourage products entering the local market to be designed for durability, reusability, reparability, upgradability and recyclability through pricing externalities. This will allow environmental costs of production and consumption to be better reflected in market prices. For example, this could be done via eco-modulation[27] whereby taxes could be levied on products entering the Singapore market which are deemed to be environmentally unfriendly, whereas tax rebates could be granted to products which adhere to eco-design requirements. Taking inspiration from the European Commission that is establishing a 'right to repair'[28] and horizontal material rights for customers such as the availability of spare parts, access to repair and upgrading services[29], Singapore can consider such measures to lengthen the lifespan of products. For example, the French Consumption Law requires customers to be informed about the availability of a product's spare parts and if necessary, calls for manufacturers to provide spare parts to the customers[30].

Moreover, the government can support the move from product-based to service-based and circular business models such as through enhanced tax deductions or capital allowances for leasing conventionally purchased equipment or acquisition of refurbished products and recycled materials. This will help to create the demand for such products and services, allowing producers to recognise the business potential of shifting towards circular business models. In the case of Philips, this could incentivise hospitals to review their purchasing and budgeting policies to consider such circular product and service models.

In addition, international collaboration is needed to overcome trade barriers and boost the demand and supply of refurbished products and recycled materials across various sectors, whilst ensuring problems such as dumping of waste do not arise. Singapore can take the lead in collaborative efforts to set standards and minimise such trade barriers especially within the ASEAN region where waste and scrap materials are often sent for processing and recycling. Rising as the potential lighthouse for circular economy in ASEAN, Singapore can initiate collaboration with its ASEAN counterparts to facilitate the circular economy transition on a broader level.

Recommendations

- Mandate disclosures by producers on composition of electronic products
- Mandate disclosures by producers and e-waste collectors on the treatment of e-waste
- Regulate and restrict hazardous content
- Eco-label electronic products that enter the Singapore market
- Encourage products entering the local market to be designed for durability, reusability, reparability, upgradability and recyclability
- Establish 'Right to repair' and horizontal material rights
- Support move towards circular business models
- Initiate collaboration with ASEAN counterparts to facilitate the circular economy transition

24 *Under the EPR framework, a company is a Producer of regulated electrical and electronic product if it carries on the business of supplying the regulated product in Singapore and in the furtherance of the business imports the regulated product into Singapore, manufactures the product in Singapore or engages another person to manufacture the regulated product in Singapore, or otherwise causes such manufacture. Source: https://www.nea.gov.sg/our-services/waste-management/3r-programmes-and-resources/e-waste-management/extended-producer-responsibility-(epr)-system-for-e-waste-management-system*

25 *National Environmental Agency, Singapore. (2020). Extended Producer Responsibility (EPR) System for E-waste Management System. https://www.nea.gov.sg/our-services/waste-management/3r-programmes-and-resources/e-waste-management/extended-producer-responsibility-(epr)-system-for-e-waste-management-system*

26 *Administered by the Singapore Environment Council (SEC) since 1999, the Singapore Green Labelling Scheme (SGLS) is Singapore's leading environmental standard and certification mark with over 3800 unique products certified across 43 countries. The scheme aims to help the public identify environmentally preferred products that meet certain eco-standards. https://sgls.sec.org.sg/cms.php?cms_id=3*

27 *Under a modulated fee approach, the fees paid by the producer will vary according to specific criteria relating to aspects of their products' environmental performance.*

28 *The term "right to repair" refers to the legal concept that allows consumers to repair the products they buy or choose with their own service providers instead of going through the manufacturer.*

29 *European Commission. (2020). A new Circular Economy Action Plan.*

30 *European Environment Agency. (2017). Circular by design – Products in the circular economy. https://circulareconomy.europa.eu/platform/sites/default/files/circular_by_design_-_products_in_the_circular_economy.pdf*

CASE STUDY 2
CLOSING THE LOOP IN FOOD WASTE

Companies interviewed: Sodexo, Asia Pacific Brewery ("APB") Singapore, Pernod Ricard

CIRCULAR ECONOMY PRACTICES AMONGST THE COMPANIES INTERVIEWED

Preventing and reducing food waste at source is a priority for Sodexo, a French food services and facilities management company. Sodexo launched its WasteWatch Programme[31] in Singapore which leverages analytics to identify and tackle the root causes of food waste. The programme is powered by Leanpath, a global leader in food waste prevention technology. Food producers often lack visibility of how much food is consumed and wasted, making it hard for them to take meaningful action to reduce their food waste[32]. WasteWatch utilises a tracker tool and generates real time reports along with pre-configured weekly reports to indicate the specific food item and the day or time that creates the most waste. With this programme, Sodexo subsequently sets targeted goals to optimise the amount of food produced and provides recommendations to limit waste, such as controlling food portions and batch cooking. Moreover, Sodexo has developed numerous recipes that use edible food parts which are usually overlooked such as pumpkin skin and watermelon rinds. These food parts have nutritional value but would otherwise go to waste[33]. The WasteWatch programme has resulted in a 45% reduction in food waste, illustrating how monitoring and tracking metrics can assist in waste management and control.

For unavoidable food waste, Sodexo actively works to divert them from the landfill and maximise resource recovery, such as utilising co-digesters or on-site composters to treat food waste. A composter is installed at the clients' site if there is available land mass, allowing clients to leverage the opportunity to educate others about composting through first-hand experience. The resulting compost can be used on the clients' on-site garden or farm to provide food such as herbs back into the kitchen, essentially closing the loop by turning waste into food. Similarly, APB Singapore, Heineken's brewing and operating company in Singapore, uses its brewing by-products e.g. spent grains as animal feed in Singapore. The company is currently exploring ways to upcycle its spent grains, either by looping them back into beer production as a valuable product that can grow beer yeast or as a packaging material. Pernod Ricard, a French company that produces and distributes wines and spirits, deploys innovative practices at their Absolut distillery in Sweden. Out of Pernod Ricard's organic by-products, 99% are recycled to manufacture products including animal feed, biogas and farm compost. Nearly 300,000 pigs and cows are nourished by their animal feed daily.

A pivotal circular economy practice is the dynamic engagement with stakeholders on reducing food waste. This is particularly stressed by Sodexo, which educates its stakeholders including employees, suppliers and clients within its extensive operations. The WasteWatch program includes online training through an e-learning module, followed by subsequent training programmes. In addition, Sodexo engages its clients through effective communication of the economic benefits, such as reduced costs of waste disposal and food loss, and long-lasting climate and social impacts of food waste reduction. Peer benchmarking, development of measurable goals and calculations of carbon emissions savings are also performed to build up the business case of food waste reduction for clients through the WasteWatch programme. By going beyond the mere provision of a product or service and embedding their stakeholders' needs into their service offerings, companies can build stronger stakeholder relationships as well as brand reputation.

Overall, circular economy practices for food waste vary depending on the business operations and supply chains involved. Ultimately, a circular business strategy requires close oversight of a company's entire value chain. It starts with the prevention of food waste through accurate tracking and monitoring and is accompanied by various solutions including food distribution and transformation of food waste into alternative uses.

31 *Sodexo. WasteWatch powered by Leanpath. https://www.sodexo.com/en/positive-impact/food-conscience/food-waste/wastewatch.html*
32 *Leanpath. (2016). 5 Factors Driving Food Waste in Foodservice. https://blog.leanpath.com/5-factors-driving-food-waste-in-foodservice*
33 *Lam, Fiona. (2019). A taste for sustainability. The Business Times. https://www.businesstimes.com.sg/life-culture/company-of-good/a-taste-for-sustainability*

BUSINESS RESULTS FROM GOING CIRCULAR

The financial benefits of food circularity are tangible. WRAP UK's research finds that for every US$1 invested in food loss and waste reduction, there is a US$14 return[34]. By 2050, a circular economy for food could deliver up to US$2.7 trillion per annum of benefits, including US$700 billion which could result from reducing food waste and recovering the value of by-products for new uses[35]. At APB Singapore, such benefits manifest in the cost savings of at least S$1.5 million per year in waste disposal fees as a result of its upcycling efforts for about 20,000 tonnes of spent grains.

Moreover, the interviewed companies have built stronger relationships with their customers and other stakeholders through engaging them in conversations about circular food waste solutions. Sodexo frequently receives positive feedback on their pioneer sustainability innovations and strategies that align with its clients' business strategies. By sharing its holistic perspectives on sustainability, the company's clients appreciate the insights and value-added economic, social and environmental benefits realised through circular business models and strategies. As such, the business results of integrating circularity in business operations and strategies extend beyond financial benefits and culminate in the longer-term and inherent reputational gains, while enabling such businesses to be a part of the solution to the climate crisis.

Business results

- Benefit financially from food waste reduction and recovery
- Strengthen relationships with customers

CHALLENGES IN ADVANCING CIRCULARITY

Facing challenges such as limited consumer awareness and demand for sustainability is a part of many companies' circularity journey in Singapore, including that of APB Singapore, Sodexo and Pernod Ricard. APB Singapore noted that this is common among their beer consumers, who tend not to make purchase decisions based on the company's sustainability practices. Nonetheless, circular economy practices clearly confer benefits across other parts of the value chain as evident in the continuance of such practices in the companies. This highlights that circular economy principles need not be popular amongst consumers to work.

Moreover, the prevailing mindsets about food pose a threat to the goal of eliminating food waste. Instead of reducing or eliminating food waste at source and along the value chain, mentalities are often geared toward the end-of-life treatment of food waste. While waste management is important, the primary goal should be the reduction or elimination of food waste. The option to donate surplus food may cause more food waste to be generated as a charitable act or with the assumption that the food surpluses will get a second lease of life. Additionally, there are habits concerning food handling, improper storage and purchasing patterns, such as buying aesthetically appealing products and rejecting edible but cosmetically unappealing food, that contribute largely to food waste in Singapore[36]. These habits originate from consumers' detachment from food sources and misconceptions about food which can be duly addressed through education and awareness-raising to ensure that food as a resource is valued. Another challenge the companies face is in expanding circular practices beyond their operational control as key decisions may lie in the hands of external stakeholders. For example, as Sodexo's clients ultimately decide whether to invest in composting or co-digestor facilities, the company's strategy is to engage with them and provide compelling reasons for them to adopt circular strategies. As such, implementing circular economy practices calls for effective multi-stakeholder collaboration and incentives to close the loop within the entire value chain.

Challenges

- Lack of consumer awareness
- Mentalities geared toward end-of-life treatment
- Unconstructive consumption habits
- Need for multi-stakeholder collaboration

RECOMMENDATIONS FOR POLICY IMPROVEMENTS

In view of the above challenges raised, the companies interviewed urge for stronger governmental regulations and incentives in Singapore to encourage key stakeholders, including industry players and consumers, to operate to a minimum standard. Currently, there is no penalty for disposal and incineration of food waste in Singapore[37]. Negative externalities could be priced by imposing a charge on food waste by weight to deter wastage and incentivise the reduction of food waste

34 *World Business Council for Sustainable Development. (2017). New Research Finds Companies Saved $14 for Every $1 Invested in Reducing Food Waste. https://www.wbcsd.org/Programs/Food-and-Nature/Food-Land-Use/FReSH/News/Companies-Save-by-Investing-in-Reducing-Food-Waste*

35 *Ellen MacArthur Foundation. (2019). Cities and circular economy for food. https://www.ellenmacarthurfoundation.org/assets/downloads/Cities-and-Circular-Economy-for-Food_280119.pdf*

36 *Low, Youjin. (2019). Every Singaporean household throws away an average S$258 worth of food a year: Study. Today online. https://www.todayonline.com/singapore/every-singporean-household-throws-away-average-s258-worth-food-year-study?cid=h3_referral_inarticlelinks_03092019_todayonline*

37 *Singapore Environment Council (2019). Advancing a Circular Economy for Food: Key Drivers and Recommendations to Reduce Food Loss and Waste in Singapore.*

at source. In South Korea, the implementation of pay-as-you-recycle machines[38] have reduced food waste in the city by 47,000 tonnes in six years[39]. To complement such policies tackling food waste at source, Good Samaritan laws which provide legal protection for criminal or civil liabilities for people who render assistance to others can be implemented. This way, companies will be more emboldened to donate food instead of fearing legal complications[40].

Presently, the Ministry of Sustainability and the Environment ("MSE", previously known as Ministry of the Environment and Water Resources) and National Environment Agency ("NEA") mandated that from 2024, all food generated by owners and operators of commercial and industrial premises that generate large amounts of food waste, such as large malls and hotels, will be segregated for treatment. From 2021, MSE and NEA will also work with large public sector building owners with food and beverage outlets to implement food waste segregation for treatment[41]. While these address large food waste generators, there could be a concerted effort to assist smaller stakeholders. Due to numerous logistical issues of installing individual onsite composting facilities, some companies interviewed recommended that the government could provide a centralised composting facility in each district. In addition to enabling the participation of smaller food and beverage merchants or producers and helping them to save upfront costs of installation, centralised facilities can create larger efficiencies and economies of scale.

The government can also support innovation hubs or provide grants to accelerate innovative solutions focusing on tackling food waste. For example, the current Food Waste Valorisation programme under the FoodInnovate[42] initiative could be further expanded to support the exploration of new technologies that process food production side streams into sustainable packaging material, thereby tackling two waste streams concurrently. This would support APB's research endeavour in upcycling its spent grains into packaging materials.

While the steps taken towards food recycling are laudable, the linchpin of tackling food waste is at its inception. The companies emphasise the need for policies and regulations to focus on the reduction of food waste at source to play down our dependence on end-of-life waste management. Currently, the Singapore Food Agency does not distinguish between "use by", "best before" or "expiry date" labels, resulting in huge food wastage because products are not allowed to be sold or distributed beyond these dates and/or because consumers are not aware of the differences of such labels. Studies have shown that consumers are more willing to purchase food beyond its use-by/best-before dates when they are educated on the environmental impact of food waste and there is clear labelling to indicate that "use by" and "best before" mean lower food quality without compromising food safety[43]. Coupled with Good Samaritan laws, a clear policy and mandate on food labels will help to prevent food wastage at the onset and propel producers to donate their excess food when necessary. This is paralleled in France, which became the first country to ban supermarkets from throwing away unsold food approaching its "best-before" date and require them to donate surplus food to charities and food banks instead[44].

Holistic solutions beyond end-of-life management are required to consider the entirety of the food value chain and address food waste using the Food Recovery Hierarchy of prioritising waste elimination over composting and incineration[45]. As Singapore currently imports over 90% of its food supply[46], active engagement with regional and international stakeholders can push the circular agenda forward such as through regional and international dialogues, agreements and roadmaps. Strengthening food security through food waste reduction and circularity would be a vital anchor point in international dialogues amidst the COVID-19 pandemic which has shattered supply chains and severely threatened food security. With the ASEAN Integrated Food Security ("AIFS") Framework[47] lasting from 2015 to 2020, and the ASEAN Summit

38 *Automated bins equipped with scales and Radio Frequency Identification (RFID) which weigh food waste as it is deposited and charge residents using an ID card in Seoul, South Korea. https://www.weforum.org/agenda/2019/04/south-korea-recycling-food-waste/*

39 *Broom, Douglas (2019). South Korea once recycled 2% of its food waste. Now it recycles 95%. World Economic Forum. https://www.weforum.org/agenda/2019/04/south-korea-recycling-food-waste/*

40 *Kwan, Jacklin and Tan, Audrey. (2019). Good Samaritan laws may help reduce food waste. The Straits Times. https://www.straitstimes.com/singapore/environment/good-samaritan-laws-may-help-reduce-food-waste*

41 *National Environment Agency. (2019). Food Waste Segregation For Treatment By Large Commercial & Industrial Food Waste Generators To Be Mandatory From 2024. https://www.nea.gov.sg/media/news/news/index/food-waste-segregation-for-treatment-by-large-commercial-industrial-food-waste-generators-to-be-mandatory-from-2024#:~:text=From%202024%20onwards%2C%20the%20Ministry,their%20food%20waste%20for%20treatment.*

42 *FoodInnovate is a multi-agency initiative to grow Singapore's food manufacturing industry through innovation. FoodWaste Valorisation is one of the programmes under FoodInnovate which specifically targets food waste through developing solutions to convert food manufacturing by-products into new usable products and gain cost savings. Source: https://www.enterprisesg.gov.sg/industries/type/food-manufacturing/foodinnovate*

43 *Ong, Anthea. (2019). Reduce waste by redistributing food surplus to those in need. Channel News Asia. https://www.channelnewsasia.com/news/commentary/reduce-waste-redistribute-food-surplus-to-lower-income-11902132*

44 *Lemos, Liv. (2019). How governments around the world are encouraging food waste initiatives. Winnow Solutions. https://blog.winnowsolutions.com/how-governments-around-the-world-are-encouraging-food-waste-initiatives*

45 *KPMG Australia. (2020). Fighting food waste through the circular economy. https://assets.kpmg/content/dam/kpmg/au/pdf/2019/fighting-food-waste-using-the-circular-economy-report.pdf*

46 *Singapore Food Agency. (2020). The Food We Eat. https://www.sfa.gov.sg/food-farming/singapore-food-supply/the-food-we-eat#:~:text=Supporting%20Local%20Produce-,The%20Food%20We%20Eat,markets%20mainly%20comes%20from%20overseas.*

47 *ASEAN Integrated Food Security ("AIFS") Framework and Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS). 2015-2020. https://www.asean-agrifood.org/?wpfb_dl=58*

2020 focused on pandemic recovery plans, Singapore could take the lead in establishing dialogues and agreements on food waste reduction and circularity in this region. For example, the Singapore government can work with the ASEAN CSR Network[48] and Food Industry Asia[49] to engage the food and beverage sector in the region and develop joint agreements with other ASEAN governmental agencies to reduce food waste and adopt circular economy practices. After all, environmental challenges cannot be tackled in silos and effective circular economy transitions require collaborative efforts locally and globally.

Like most other environmental problems, education is key to addressing the food waste challenge. Enhancing public awareness on the impact of food waste from farm to fork to landfill could motivate behavioural changes such as buying consciously and optimising food use to prevent food wastage at the onset.

Recommendations

- Impose charges on food waste
- Embolden companies to donate excess food through Good Samaritan laws
- Install centralised food composters
- Support innovation hubs or provide grants to accelerate innovative solutions focusing on tackling food waste
- Mandate food labelling that distinguishes between "use by", "best before" and "expiry date"
- Engage actively with regional and international stakeholders
- Enhance public awareness to motivate behavioural change

CASE STUDY 3
CLOSING THE LOOP IN PACKAGING WASTE

Companies interviewed: Asia Pacific Brewery (APB) Singapore, Pernod Ricard, Lego and Wipak

CIRCULAR ECONOMY PRACTICES AMONGST THE COMPANIES INTERVIEWED

While the interviewed companies adopt approaches that cover the full life cycle of their products and services, their circular practices are implemented most effectively within their operations where they have direct control. Therefore, most of the circular practices that minimise packaging waste begin at the inception of the product's life cycle - its design. This involves designing packaging with recycled content or other renewable and sustainable materials, reducing its thickness or physical components to maximise delivery and storage, or ensuring all the packaging can be fully recycled. The companies resolutely ensure that while the products incorporate circularity principles in the design or materials used, they do not compromise the integrity and quality of their materials and the health and safety of their consumers.

In a bid to understand and respond to consumers' needs, technology comes into play in the companies' strategies. Lego, a Danish toy manufacturing company, uses data analytics to gain a deeper insight into consumers' attitudes towards plastics and accordingly drives the development of new, sustainable materials for their packaging and products in collaboration with key suppliers. Similarly, Wipak, a global supplier of sustainable packaging solutions for food products and medical devices, identifies the move towards sustainable packaging as a clear business imperative arising from market needs. To strengthen customer experience and transparency, Wipak provides life cycle analyses of its products through a mobile application which enables customers to compare the carbon dioxide emissions of various packaging offerings.

Some companies go further to close the loop. For example, all glass bottles provided by APB Singapore to its partner establishments such as pubs and bars will be collected, cleaned and reused. If the bottles are found to have defects, they will be sent back to the manufacturer to be remade into bottles.

BUSINESS RESULTS FROM GOING CIRCULAR

Minimising packaging and the materials used has a direct impact on reducing production costs for companies[50]. Apart from the costs saved from purchasing new bottles, the reuse of returned bottles by APB Singapore enhances its supply chain resiliency as it is less reliant on its bottle manufacturer – a priority highlighted by the COVID-19 pandemic.

Although the use of more sustainable materials in packaging may be more costly depending on the materials, it is a long-term investment that opens doors to new business opportunities while staying relevant to market demands. Worldwide, 6% f

48 *ASEAN CSR Network. https://www.asean-csr-network.org/c/*
49 *Food Industry Asia. https://foodindustry.asia/home*
50 *McKinsey & Company. By rethinking packaging, a company reduces production costs while enhancing brand. https://www.mckinsey.com/business-functions/operations/how-we-help-clients/reduce-packaging-costs#*

consumers are willing to pay more for sustainable products and brands[51] and more than half of consumers said they would pay more for sustainable products designed to be reused or recycled[52]. While the immediate business returns of circular practices for each company may vary, the market for sustainable and circular products and their packaging is projected to expand and flourish in the long-term.

Business results

- Reduce costs
- Build supply chain resilience

CHALLENGES IN ADVANCING CIRCULARITY

Despite a growing demand for sustainable products globally, the companies noted that a key barrier to bringing sustainable packaging to the Asian market is their observable lack of consumer demand. This could be attributable to the nascence of the sustainability in Asia, especially if sustainable packaging translates to relatively higher prices. Furthermore, consumers are often inclined to be sceptical of the recycling process in Singapore, which might be attributable to the lack of robust recycling infrastructure, facilities and approach to education[53]. The companies have launched publicity events in a bid to raise public awareness on sustainability, such as APB Singapore's Sustainable Pop-up Bar. This event featured a reverse vending machine which received recyclable bottles or cans from visitors who were rewarded with free beer. The success of the event is evident from the reverse vending machine's subsequent breakdown due to receiving an overabundance of recyclable packaging. This suggests that a financial incentive or penalty could be a key driver in encouraging sustainable behaviour, therefore serving as a successful pilot test for Singapore's upcoming Deposit Refund Scheme. Although such events have seen efficacious results, whether this translates to long-term sustainable habits is yet to be determined.

Besides the difficulty in gaining traction among consumers, these companies also observe hesitation from other industry players in acquiring circular practices in their packaging. To many industry players, circularity and sustainability are not key focus areas despite the risks posed by linear business models and shifting consumer behaviour. In order to motivate supply chain stakeholders to play their part, it is crucial for them to recognise the business need for circularity and its positive business results. Without industry players' commitment and collaboration to push for a change in the packaging ecosystem, incorporating a closed-loop system would be difficult.

A closed-loop logistics system such as that established by APB Singapore involving the collection and reuse of packaging may be more challenging to implement for companies like Pernod Ricard that do not have production sites in Singapore. In addition, Pernod Ricard has expressed that a factor impeding the implementation of such take-back programmes is the fear of counterfeit alcohol being sold using the brand's returned bottles if they get lost in the supply chain.

One of the key challenges faced by the companies in developing appropriate circular strategies is the absence of adequate waste management systems in some countries. For example, Wipak will only attain the intended outcomes of its inventive recyclable flexible packaging if there are necessary collection and recycling facilities to handle such materials. In addition, regulatory discrepancies in different countries render it difficult for companies to implement homogeneous solutions. For instance, Pernod Ricard's glass bottles are unable to be recycled in South Korea based on its standards of classification for glass recyclability.

Amidst the COVID-19 pandemic, single-use plastics and packaging have been dubbed as heroes of the fight against the virus, as they are viewed as the more sanitary choices. In addition, the recent oil price plunge has caused the price of recycled plastic to be much higher than virgin plastic. Hence, companies focusing on short-term profits find it more difficult to justify their switch to sustainable options as opposed to the cheaper option of single-use virgin plastic packaging.

Challenges

- Lack of consumer demand
- Scepticism of the recycling system in Singapore
- Need for multi-stakeholder collaboration
- Closed-loop logistics systems challenging for companies without local production sites
- Incongruent policies, regulations and infrastructure internationally
- Current focus on short-term profits

51 *McCaskill, Andrew. (2015). Consumer-Goods' brands that demonstrate commitment to sustainability outperform those that don't. https://www.nielsen.com/eu/en/press-releases/2015/consumer-goods-brands-that-demonstrate-commitment-to-sustainability-outperform/#:~:text=Sixty%2Dsix%20percent%20of%20global,and%2050%25%20in%202013).&text=Consumers%20across%20regions%2C%20income%20levels,remain%20loyal%20to%20their%20values.*

52 *Cantwell, Guy, Nolan, Maggie and Corser, Matt. (2019). More than Half of Consumers Would Pay More for Sustainable Products Designed to Be Reused or Recycled, Accenture Survey Finds. Accenture. https://newsroom.accenture.com/news/more-than-half-of-consumers-would-pay-more-for-sustainable-products-designed-to-be-reused-or-recycled-accenture-survey-finds.htm*

53 *Mohan, Matthew and Ang, Hwee Min. (2020). Contamination of recyclables, incorrect recycling among possible factors for Singapore's low domestic recycling rate: Experts. Channel News Asia. https://wworous w.channelnewsasia.com/news/singapore/contamination-of-recyclables-incorrect-recycling-among-possible-12648240*

RECOMMENDATIONS FOR POLICY IMPROVEMENTS

The companies interviewed have recommended for Singapore's upcoming EPR framework to introduce eco-modulation of fees[54] for packaging to incentivise the use of packaging with a smaller environmental impact. Rather than levying a fee on companies based on the overall weight of packaging put into the market, the EPR framework can consider the characteristics of different packaging materials such as the ability of the material to be reused or recycled. This is to avoid penalising companies for using materials, such as reusable glass or metal, that fulfil their sustainability criteria but are invariably heavier than less easily recyclable materials such as plastic.

The EPR schemes in the EU could serve as a guide in this respect. In the EU, all packaging EPR schemes include a fee modulation to producers for each packaging material placed on the market. These schemes also consider the end-of-life waste management in different EU countries. For instance, fees for plastic and composite materials tend to be significantly higher than other materials such as paper, card, glass and metals, and in the Czech Republic, they do not apply fees for reusable packaging[55]. In Singapore, one third of the 1.6 million tonnes of domestic waste disposed in 2018 is packaging waste and more than half of this packaging waste is made of plastic, of which only 4% is recycled[56]. Therefore, a targeted approach to pricing each packaging material, especially plastic, would be needed to reduce packaging waste and encourage eco-design.

In Singapore, commingled recycling bins are used to collect recyclables. However, about 40% of the items deposited in these bins do not get recycled because they are either non-recyclable or are contaminated[57]. The relatively ineffective recycling system would be challenging for companies, such as Wipak, to achieve the intended outcomes of their inventive recyclable packaging. A robust recycling system and a multi-pronged approach is vital to improve Singapore's domestic recycling from the meagre rate of 17% in 2019[58].

Other than standardised recycling labels on packaging and installation of separate recycling bins for different materials to move Singapore towards a multi-stream recycling system, education coupled with monetary incentives and/or penalties are key to inducing consumers to reduce and properly sort out their waste. Given the high population density in Singapore, an incentive system to sort and bring back waste to respective producers or collection facilities is recommended as it may offer higher efficiencies for recycling. For example, Singapore's upcoming Deposit Refund Scheme targeted to be implemented by 2022 that incentivises consumers with rewards to return used beverage containers can be extended to include other forms of packaging. In addition, many EU Member States have pay-as-you-throw schemes in place, whereby households are charged based on the amount of waste they generate[59]. This pressurises households to reduce waste and sort their waste for recycling, thereby facilitating separate waste collection. While these solutions could be difficult to implement in current housing estates where infrastructure such as individual rubbish chutes in each flat have been established, they could be more easily integrated into newer estates or retrofits, such as under the Housing Development Board ("HDB") Green Town Programme, which plans to implement sustainable living with green features for residents[60].

In addition, the companies consider it important for policies and regulations to create a level playing field in Singapore. Under Singapore's Mandatory Packaging Reporting Framework, reporting requirements will apply to brand owners, manufacturers, importers of packaged goods, as well as supermarkets with an annual turnover of more than $10 million[61]. While this is intended to minimise the impact on micro and small enterprises, it might create unintended consequences such as confusion among consumers. For example, if the Deposit Refund Scheme only applies to packaging produced by large

54 *Under a modulated fee approach, the fees paid by the producer will vary according to specific criteria relating to aspects of their products' environmental performance.*
55 *E. Watkins, S. Gionfra, J-P. Schweitzer, M. Pantzar, C. Janssens and P. ten Brink. (2017). EPR in the EU Plastics Strategy and the Circular Economy: A focus on plastic packaging. Institute for European Environmental Policy. https://ieep.eu/uploads/articles/attachments/95369718-a733-473b-aa6b-153c1341f581/EPR%20and%20plastics%20report%20IEEP%209%20Nov%202017%20final.pdf?v=63677462324*
56 *Towards Zero Waste. Packaging Waste. https://www.towardszerowaste.sg/waste-streams/packaging-waste/*
57 *Tan, Audrey. (2019). Education campaigns and spot checks on recycling bins among ideas to improve household recycling. The Straits Times. https://www.straitstimes.com/singapore/education-campaigns-and-spot-checks-on-recycling-bins-among-ideas-to-improve-household*
58 *National Environment Agency. (2019). Waste Statistics and Overall Recycling. https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling*
59 *E. Watkins, S. Gionfra, J-P. Schweitzer, M. Pantzar, C. Janssens and P. ten Brink. (2017). EPR in the EU Plastics Strategy and the Circular Economy: A focus on plastic packaging. Institute for European Environmental Policy.*
60 *The Straits Times. (2020). Singapore Budget 2020: New programmes to ensure sustainable living in HDB estates. https://www.straitstimes.com/singapore/singapore-budget-2020-new-programme-to-ensure-sustainable-living-in-hdb-estates#:~:text=Singapore%20Budget%202020%3A%20New%20programme%20to%20ensure%20sustainable%20living%20in%20HDB%20estates,-The%20new%20HDB&text=Called%20the%20HDB%20Green%20Towns,rainwater%20and%20cooling%20HDB%20towns.*
61 *Ministry of the Environment and Water Resources. Factsheet on Resource Sustainability Act.*

business establishments, consumers may be confused about which packaging brands are eligible for a deposit refund or may be discouraged to participate due to the limited scope and convenience. For comprehensive and effective policies targeted at catalysing both consumer behaviour and corporate action, the government can establish plans to include smaller businesses and assist them through incentives or subsidies for the packaging reporting framework and subsequent EPR schemes. The key to establishing effective systems or policies is to enable a uniform application that are understandable by producers and consumers.

Furthermore, the packaging reporting and EPR schemes should not exist in isolation; there are other policy levers that can augment the waste management policies. For one, governments can offer both financial and non-financial support to foster innovation and new markets[62]. For instance, the government can encourage businesses to adopt circular practices to minimise packaging waste such as transiting to reuse-refill models through policies and incentives. The value of such models is corroborated by an Ellen MacArthur Foundation report, whereby 20% of plastic packaging (by weight) is shown to be profitably re-used and hence reduced, for example through product refill models[63].

Awareness-raising is a crucial policy lever to support the transition towards a circular economy. One can observe how consumers in Singapore readily accept excessive packaging for their purchases[64]. Existing educational and information programs can be improved to provide individuals with a better understanding of the unintended consequences of their consumption choices. This could then increase demand for sustainable products or business models, thereby supporting businesses in their adoption of circular strategies.

Recommendations

- Impose eco-modulation of fees for different packaging
- Move towards a multi-stream recycling system
- Establish a level-playing field in the EPR framework and policies
- Encourage transitions towards circular business models
- Enhance public awareness to shift demand towards sustainable products and circular business models

CONCLUSION

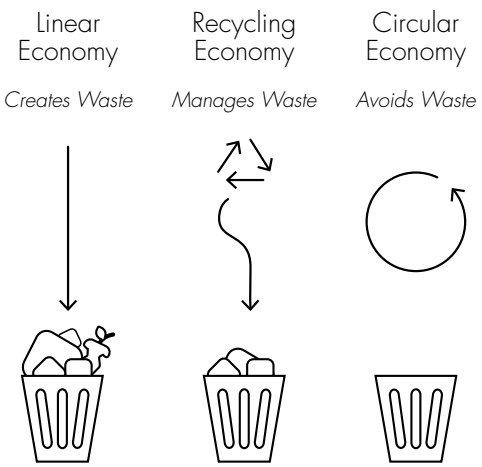
This position paper offers guidance to drive the imperative transition to a circular economy through our policy gap analysis and insights gleaned from companies which are actively putting circular economy principles into practice. As exemplified in our case studies, companies that embed circularity in their business DNA can build strong stakeholder relationships, limit environmental impacts and experience transformative benefits. Technology, such as Sodexo's Leanpath tool and Lego's use of data analytics, has also demonstrated its capacity as an enabler for the circular economy.

A key observation from our case studies is that the interviewed companies lack tracking systems to monitor the progress and impacts of their circularity strategies. This might be challenging to prove a business case for the circular economy when upfront investments are required, and tangible benefits are not yet realised. Tools such as the KPMG True Value[65] methodology can help companies comprehensively understand the impact of circularity and make more informed business decisions by combining economic, social and environmental impacts from circularity in a single financial metric. Similarly, the Circular Transition Indicators ("CTI")[66] framework developed by World Business Council for Sustainable Development ("WBCSD") provides a common metric to measure and monitor circular progress. This provides a basis to identify circular opportunities and collaboration and to better communicate the impacts and progress of circularity. Singapore can necessitate the use of this framework to have a common measurement tool across industries and facilitate progress tracking, targets setting and policy-making. CTI is critical to creating a circular economy ecosystem and to strengthen policy-making. Without such measurement indicators, policies would remain high level and at best visionary.

The interviewed companies also identify common challenges when pursuing circularity which can be addressed through a range of measures. For example, they encounter minimal consumer awareness, lack of industry cooperation and the need for ambitious governmental support to advance circular economy. While raising public awareness on the circularity concept is essential in this ecosystem, not all respond to social responsibility appeals. Therefore, it is just as crucial to have other incentives and policies to encourage sustainable behaviour. For instance, Singapore's Carbon Pricing Act, which imposes a carbon tax on industrial facilities that emit more than 25,000 tonnes of greenhouse gases[67] may induce electric power consumers to seek energy efficiency measures as a way to save costs if the carbon pricing is passed on to them by power-

62 *Ellen MacArthur Foundation. (2019). City governments and their role in enabling a circular economy transition. https://www.ellenmacarthurfoundation.org/assets/downloads/CE-in-Cities_Policy-Levers_Mar19.pdf*
63 *Ellen MacArthur Foundation. (2017). Industry endorses plan to recycle 70% of plastic packaging globally. https://www.ellenmacarthurfoundation.org/news/new-plastics-economy-report-2-launch*
64 *Wong, Kai Yi. (2018). Gone to waste: a hard look at our recycling effort. The Business Times. https://www.businesstimes.com.sg/brunch/gone-to-waste-a-hard-look-at-our-recycling-effort*
65 *KPMG. KPMG True Value Services. https://home.kpmg/xx/en/home/services/advisory/risk-consulting/internal-audit-risk/sustainability-services/kpmg-true-value-services.html*
66 *World Business Council for Sustainable Development. Circular Transition Indicators (CTI). https://www.wbcsd.org/Programs/Circular-Economy/Factor-10/Metrics-Measurement/Circular-transition-indicators*
67 *National Environment Agency. Carbon Tax. https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/climate-change/carbon-tax#:~:text=Under%20the%20Carbon%20Pricing%20Act,submit%20an%20Emissions%20Report%20annually.*

generating taxpayers. The decarbonisation of supply chains through closing resource loops could be one such measure. To fully utilise carbon pricing and incentivise organisations throughout the supply chain to decarbonise and become circular, an expansion of the current scope of targeted facilities and/or a substantial increase in the carbon price could be considered.



An approach to policy-making that considers the full life cycle of a product can advance the circular economy of electronics, food and packaging in Singapore.

The common challenges faced by the interviewed companies are also underpinned by the overemphasis of the circular economy as an advanced recycling process, in which recycling is the first and often only approach. While effective recycling systems are important for waste management, it is only a single facet of the multi-dimensional aspects of the circular economy. Paying oversaturated attention on waste management at the end-of-life stage often results in a never-ending rabbit hole of continuously generated waste and renders it difficult to pull away from the linear model.

While it is important to build a robust recycling system, the main objectives should be to advance genuine circular innovations, optimise product use and repair, and move away from a waste-based model. Based on the insights gained from our policy gap analysis and case studies, Singapore can adopt a life cycle approach to policy-making in order to advance the circular economy of electronics, food and packaging.

As seen from the above, diverse steps need to be taken to lay the foundation and brace for the desired policy changes in Singapore to align with that of the EU and establish a supportive ecosystem that enables the adoption circular business models. Only with policies that complement each other across national boundaries, can our world and businesses thrive in the new economic trajectory.

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LIST OF ACRONYMS

AIFS	ASEAN Integrated Food Security
CT	Computed tomography
CTI	Circular Transition Indicator
CTI	Circular Transition Indicators
DRS	Deposit Refund Scheme
EEE	Electrical and electronic equipment
ERP	Extended Producer Responsibility
ICT	Electronics and Information and communications technology
MRI	Magnetic resonance imaging
MSE	Ministry of Sustainability and the Environment
NEA	National Environment Agency
PRS	Producer Responsibility Scheme
PV	Photovoltaic
WBCSD	World Business Council for Sustainable Development

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GREEN FINANCE

in Singapore and ASEAN: Opportunities and Challenges

EUROCHAM POSITION PAPER 2020

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This position paper was drafted by the Financial Services Committee of the European Chamber of Commerce (FSCECCS) in collaboration with Accenture as a strategic partner. The paper examines the state of Green Finance in Singapore and ASEAN with the aim of creating an understanding and awareness of the sector to facilitate an open and constructive dialogue with the green finance ecosystem in Singapore. The main focus of the paper is Green Finance in Singapore and how to evolve this further. The paper is based on research and interviews of experts from key members and Singaporean stakeholders, including Banks, Insurance companies and Governmental entities.

In the light of the growing focus on sustainability it is only natural that there is an increased focus on Green Finance as well. Green Finance is growing not only in Singapore but in the entire region. From the paper, it was identified that Green Finance is becoming a high priority for the Singapore Government which has started a range of new initiatives such as a Green Finance Action Plan and a US$ 2 billion Green Investment Programme. Despite the increasing efforts from the government and industry initiatives in the area several major challenges still need to be addressed.

The following key challenges for Green Finance have been identified by the members of the Financial Services Committee of the European Chamber of Commerce in Singapore.

- **Greenwashing**
  The absence of official taxonomy or green bond standard increases the risk of greenwashing.
- **Data, Benchmarking & Verification**
  No standard approach exists for ESG ratings at the moment, which results in potentially significant differences in the rating of the same company by different rating agencies.
- **Misalignment between supply & demand**
  There is a misalignment between corporates and banks in relation to funding green projects. The banks are eager to fund green projects but they are looking for larger projects whereas corporates would like to start at a smaller scale. The sector lacks high-quality projects that are ESG-compliant and commercially viable.

The FSCECCS members acknowledge the strong and steady development of Green Finance in the region, and would like to propose several key measures to advance Green Finance in Singapore and ASEAN:

- **Driving Convergence of Green Finance Standards**
  A dialogue between the EU Platform on Sustainable Finance and Asian regulators is necessary to discuss the different perspectives and identify how national standards can be aligned. The FSCECCS members also recommend for regulators to mutually recognise each national standard when appropriate as it could be the key to drive Green Finance forward.
- **Improving ESG Ratings practices**
  The FSCECCS members propose three different solutions including the (1) Endorsement of ESG rating providers, (2) developing an Ecolabel for financial products and/or (3) regulation of ESG rating providers
- **Building a Green Finance Talent Pool in Singapore**
  It is equally important to have individuals with a strong skillset in both sustainability and finance. Internships and dedicated courses are the best way to build the necessary skills and experience.
- **Leveraging Technology**
  As in many other sectors, technology can help advance Green Finance and ease the regulatory burden.

FOREWORD

INTRODUCTION & OBJECTIVES

This position paper was produced by the Financial Services Committee of the European Chamber of Commerce in Singapore (FSCECCS) in collaboration with Accenture. The FSCECCS represents the European financial services industry in Singapore.

The paper addresses various issues related to the development of green finance in Singapore and ASEAN, largely from the perspective of financial institutions that are members of EuroCham (SG). Throughout, it touches upon Singapore's current situation, opportunities and challenges, in addition to providing a comprehensive comparison between the policymaking and business approaches adopted by Singapore and the European Union.

The key objectives of this paper are:

- To contribute to the awareness on and understanding of green finance in Singapore.
- To encourage European businesses in Singapore to harness new opportunities presented by this emerging and fast-growing economic sector.
- To facilitate open and constructive dialogue to make Singapore's green finance ecosystem more comprehensive.
- To propose key recommendations to the Singaporean government to help enhance further development of green finance in Singapore.

In order to craft this position paper, the FSCECCS established a task force consisting of financial services experts (including bankers, insurance professionals, asset managers and consultants). All views and statements expressed in this position paper

are based on reports, market observations and the knowledge and expertise of the members of the FSCECCS. In addition, interviews were conducted with Singaporean stakeholders like the Monetary Authority of Singapore (MAS).

CONTEXT

Green Finance promotes and supports the flow of financial investments and related services towards the development and implementation of sustainable business models, investments, trade, economic, environmental and social projects and policies. Green Finance offers tremendous opportunities for the financial sector through innovative financial mechanisms and by supporting the investments in projects with positive and sustainable externalities.

For the longest time, green finance has not been aggressively pushed by the market – due to different reasons. One is that some financial institutions feel there are still several risks associated with new technologies from clean energy or that the infrastructure related to the new technologies seem overwhelming. However, the urgency of climate change has put more pressure on all participants to increase the focus on the topic.

Green projects can offer a lower rate of return. However, in order to transition to lower carbon emissions, green financing needs to be scaled up. This can be achieved through new financial instruments and new policies, such as green bonds, green banks, green central banking, financial technologies, community-based green funds, etc., which are collectively known as "green finance".

Green finance consists of the integration of environment, social and governance (ESG) criteria into financial services. For the purposes of this paper, the focus will solely be on the environmental aspect of green finance.

GROWTH OF GREEN FINANCE IN ASEAN

ASSOCIATION OF SOUTH-EAST ASIAN NATIONS (ASEAN)

There is an increased focus on green finance, and it is gaining interest and growing rapidly. According to the report "ASEAN Green Finance State of the Market 2019" from the Climate Bond Initiative[1], the volume of green bond and loan issuance has strongly increased between 2013 and 2019.

The Asia-Pacific issuance (in turquoise below) has kept growing and now represents 23% of the global total. The numbers for 2019 illustrate that the ASEAN[2] region makes up 3% of the global total and 12% of the Asia-Pacific region.

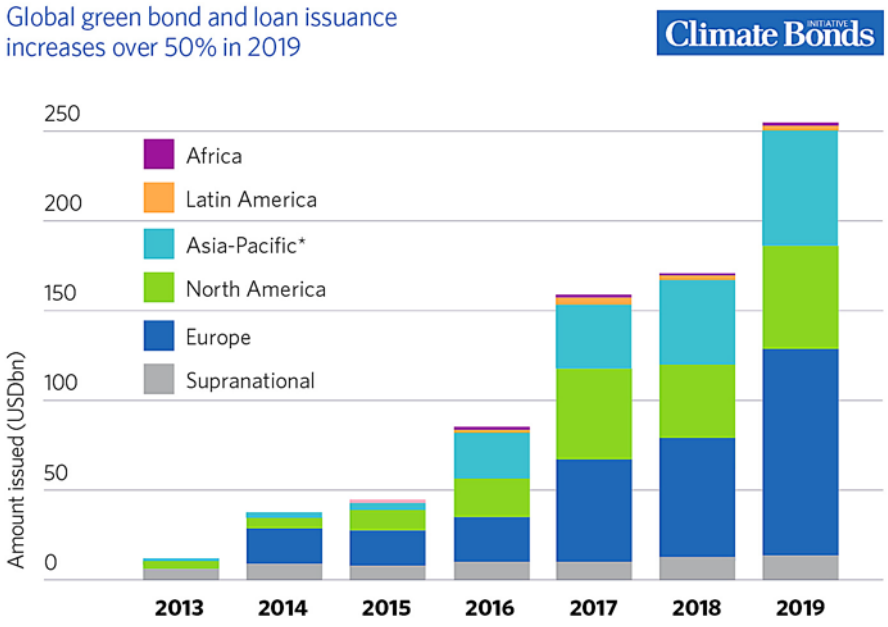


Figure 1: Green bond and loan issuance in the world since 2013

1 *Rimaud, Cedric, Haran Siva, Miguel Almeida, Andrew Whiley and Krista Tukiainen. "ASEAN Green Finance State of the Market 2019". Retrieved from https://www.climatebonds.net/resources/reports/asean-green-finance-state-market-2019*

2 *The Association of Southeast Asian Nations (ASEAN) comprises ten countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam*

As stated in the Climate Bond Initiative report, the six biggest ASEAN countries measured by GDP have all issued green debt instruments such as green bonds, loans or sukuk. In 2016, the first green bond in ASEAN was issued in the Philippines. In Indonesia, the authorities have been actively engaged in green finance by implementing guidelines for the domestic market as well as issuing two sovereign green sukuks in 2018 and 2019. In Thailand, green finance is driven by the private sector which has been issuing green bonds, all of which were certified under the Climate Bonds Standards. As for Singapore, the majority of green finance deals were loans for the real estate sector so far. Finally, Malaysia is mainly focused on the energy sector and green finance keeps growing in the country with six issuances in 2019 alone.

As evident in figure 2, both financial and non-financial corporates represented the bulk of the issuer types (29% and 27% respectively) in ASEAN in 2019[3]. Sovereign issuers were the third largest issuer type with 15%. Green loans also made up a significant portion of the total issuance, which was largely due to Singapore's real estate sector.

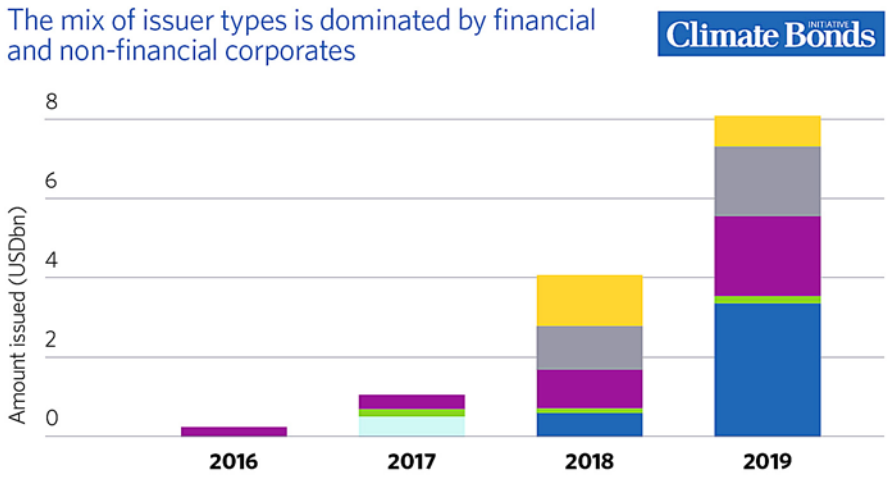


Figure 2: Overview of issuer types in ASEAN since 2016

As described in Figure 3 from the Climate Bond Initiative report, green finance proceeds in ASEAN are mostly allocated to buildings and energy related projects with a smaller focus on transport and water. However, the proceeds allocation varies across countries. Singapore, for example, mainly focuses on building, whereas green finance in Thailand, Indonesia and the Philippines largely focuses on the energy sector. In Malaysia, there seems to be a more equal allocation of green finance between buildings and energy.

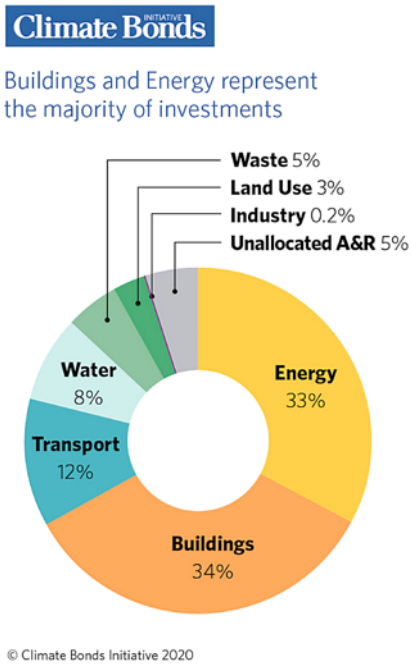


Figure 3: Overview of sectors in which green bond and loan proceeds have been allocated in ASEAN in 2019

As per Figure 4, since 2017, issuance of green finance loans and bonds in Singapore has grown significantly. In 2019, Singapore became the largest ASEAN green finance market, a position previously held by Indonesia (2018) which is now in third place. It is worth noting that despite the active bond issuance by the Indonesian authorities to implement guidelines for the domestic market, there has been limited engagement from the private sector. The green bond market is still relatively new in Thailand, but it is a market in growth with no less than four green bond issuances by non-financial Thai corporations amounting to USD 734 million.

3 *The high share of financial corporates deals is largely driven by ICBC Singapore classified as Singapore in the Climate Bond Initiative report, rather than as China. Please refer to endnote #2 in the Climate Bond Initiative report page 17.*

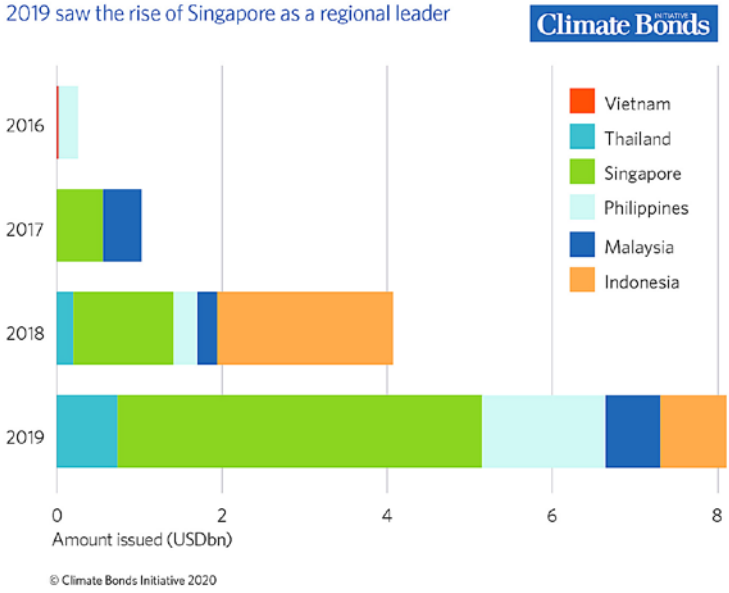


Figure 4: Cumulative issuance of green finance in ASEAN up to 31 December 2019

In 2019, green bonds issuance in the Philippines was dominated by AC Energy, the power arm of conglomerate Ayala Corporation with a total issued amount of USD 810 million, representing 54% of the total amount issued through green bonds in 2019. Most of the proceeds were allocated to renewable energy.

In Malaysia, the green bond market saw six issuances in 2019, mainly from the energy sector. The proceeds were allocated to hydropower plants and solar power plants. A small portion was allocated to water, waste, land use and adaptation to increase the resilience of agricultural systems in the face of increasing climate threats.

The Vietnamese government issued two small green bonds in 2016 to provide funding for water projects. However, there were no new issuances prior to the completion of this paper.

SINGAPORE

In Singapore, green finance issuance is dominated by green loans and real estate. As explained in the Climate Bond Initiative report and the table below, green loans account for almost half of the cumulative issuance in green finance and nine of the fourteen deals in 2019 were loans. Furthermore, in 2019, 43% of the amounts issued were allocated to building projects. Most, if not all, of the proceeds from deals issued to real estate companies were used for certified green buildings and / or energy efficiency in buildings.

However, there have been examples of green finance proceeds allocated to the energy sector in Singapore. As an example, Sunseap Group, a renewable energy firm that has operations in South East Asia and the Pacific region has secured an SGD 43 million green loan to install solar power systems on rooftops across Singapore in 2019[4].

4 *Tan, Lynette. "Sunseap gets S$43m green loan to put solar power systems on rooftops in Singapore". Retrieved from https://www.businesstimes.com.sg/energy-commodities/sunseap-gets-s43m-green-loan-to-put-solar-power-systems-on-rooftops-in-singapore*

Issuer	Green Finance Debt Issued	Bondholder / Lender	Year of Issuance	Nominal Value (SGD M)	Purpose
M+S	Green loan[5]	DBS, OCBC, UOB	2020	1950	Partially refinance the office and retail components of Marina One
City Developments (CDL)	Green loans[6]	DBS: 400M HSBC: 100M	2019	500	Finance green developments in Singapore and abroad
City Developments (CDL)	Green bond[7]	CDL Properties Ltd (CDLP)	2017	100	Enhance energy and water efficiency in Republic Plaza
Frasers Property Ltd	Syndicated green loan[8]	Consortium	2018	1,200	Refinance existing loans relating to the development of Frasers Tower
Capitaland	Green loan[9]	DBS: 150M HSBC: 250M	2020	400	Finance or refinance of the development, investment and acquisition of certified green buildings
DBS Group Holdings	Green bond[10] [11]	Non-U.S. investors outside the United States	2017	685	Provide financing for green assets such as green buildings
Olam	Green loan[12]	ANZ, DBS, Standard Chartered: senior mandated lead arrangers	2020	USD 250	Finance general corporate purposes
NUS	Green bond[13]	DBS Bank	2020	USD 300	Finance green projects under the University's new Green Finance Framework.

Figure 5: Overview of green finance issuance in Singapore in the past 3 years

The National University of Singapore (NUS) became the first university in Asia to issue a green bond, working with OCBC and DBS Bank. NUS issued SGD 300 million to finance projects targeted at green buildings, renewable energy, and sustainable management of water and land.

EUROCHAM'S PERSPECTIVE ON GREEN FINANCE MARKET

Sustainability will eventually permeate every economic activity, not just the financial sector. In the future, FSCECCS members believe green bonds will become an essential debt instrument in the debt market due to increasing demand from both retail and institutional investors.

As an example, FSCECCS members believe that in the future, if a bond is not labelled as a Green Bond (i.e. not certified under the Climate Bonds Standard or without a second-party opinion that the Use of Proceeds (UoP) is green), the cost of capital for issuing a conventional bond will be higher, leading to higher yield and to such bonds trading at a discount in the market.

The first reason for green bonds trading at a premium in the market is that there is a higher demand for such bonds. Funds dedicated to following environmental principles can only buy green bonds while conventional bonds can be bought by anyone[14]. Therefore, higher demand lead to high prices and green bonds trading at a premium (and consequently lower

5 *The Strait Times. "M+S bags $1.95b green loan for Marina One. Retrieved from: https://www.straitstimes.com/business/companies-markets/ms-bags-195b-green-loan-for-marina-one*
6 *Mui, Rachel. "CDL bags S$500m in green loans for new property developments. Retrieved from https://www.businesstimes.com.sg/companies-markets/cdl-bags-s500m-in-green-loans-for-new-property-developments*
7 *Ming, Yiong Yim and Esther An. "Republic Plaza Green Bond – Final Report" Retrieved from https://www.cdlsustainability.com/pdf/CDL_Final_Bond_Allocation_Report.pdf*
8 *Rimaud, Cedric and Loo Choo Leong. "Growing evolution of green finance in Singapore". Retrieved from https://www.businesstimes.com.sg/wealth-investing/growing-evolution-of-green-finance-in-singapore*
9 *CapitaLand. "CapitaLand secures S$400 million in green loans to catalyse greening of global portfolio by 2013". Retrieved from https://www.capitaland.com/international/en/about-capitaland/newsroom/news-releases/international/2020/apr/400_million_green_loans_to_green_global_portfolio.html*
10 *DBS. "DBS Group Holdings Ltd's first green bond offering attracts tring interest. Retrieved from https://www.dbs.com/newsroom/DBS_Group_Holdings_Ltds_first_green_bond_offering_attracts_strong_interest*
11 *Today Online. "DBS raises S$685m through first green bond by local financial institution". Retrieved from https://www.todayonline.com/business/dbs-raises-s685m-through-first-green-bond-local-financial-institution*
12 *Leow, Anabeth. "Olam International secures US$250m sustainability-linked loan". Retrieved from https://www.businesstimes.com.sg/companies-markets/olam-international-secures-us250m-sustainability-linked-loan*
13 *https://news.nus.edu.sg/highlights/nus-green-bond*
14 *Gilbert, Mark. "The explosion in Green Bonds Comes Without a Premium. Retrieved from https://www.bloomberg.com/opinion/articles/2019-10-28/exploding-demand-for-green-bonds-doesn-t-come-with-a-premium*

yield which means lower cost of capital), all else being equal. The second reason is that investors would, in theory, be willing to sacrifice some yield in exchange for the knowledge that their money is benefiting the planet[15]. The third reason is that corporations are increasingly starting to realise that managing environmental exposure may be more than just risk management and it may improve their economic performance[16]. Therefore, investors in green bonds tend to believe that such bonds hedge risk better which is a trade-off for lower yield. The hope is that in the future green bonds will be cheaper to issue as demand and supply of green bonds will grow.

ONGOING EFFORTS TO ADVANCE GREEN FINANCE

WORLDWIDE

ICMA GREEN BOND PRINCIPLES

The International Capital Markets Association (ICMA) is a not-for-profit association which aims at promoting high standards of market practice and appropriate regulation amongst others[17]. The ICMA's Green Bond Principles (GBP) are voluntary process guidelines that list down high-level categories for eligible green projects . They were put together by major private financial institutions under the auspices of the ICMA.

The GBP have four core components:

- Use of Proceeds
- Process for Project Evaluation and Selection
- Management of Proceeds
- Reporting

In terms of project categories of eligibility for Green Projects, they are aligned with the categories listed in the taxonomy and standards established by countries or other non-profit organisations[18]. Additionally a majority of the ICMA green bonds require a third-party verification.

CERTIFICATION UNDER THE CLIMATE BONDS STANDARD

The Climate Bonds Initiative and the Climate Bond Standards Scheme are funded by grants from non-profit and public organisations, revenues from public sector project contracts and by subscription fees from the Climate Bond Partnership program.[19]

The Climate Bonds Standard and Certification Scheme is a "labelling scheme for bonds, loans & other debt instruments"[20]. Bonds and loans which are confirmed to comply with the Climate Bonds Standard are labelled "Certified Climate Bonds". In order to receive the certification mark, a third-party reviewer appointed by the issuer must ensure that the bonds meet the Climate Bonds Standards' requirements. The Climate Bonds Standard Board would then provide the final confirmation of all Climate Bond Certifications.

Similarly, to the ASEAN Green Bond Standards, the Certification under the Climate Bonds Standard is done on a voluntary basis. If applied by market regulators and key players, the Certification can help level the playing field across the ASEAN region. At the time of writing, this standard has been used across the world by issuers in 30 countries. For investors, the Climate Bond Standard can be used as a screening tool to guarantee the low-carbon nature of their fixed-income investments. Compared to the Green Bond Principles, the CBI's Climate Bonds Standard defines sector-specific eligibility criteria to assess whether an asset is suitable for issuance as a green bond or not[21].

15 *Bachelet, Maria, Leonardo Becchetti and Stefano Manfredonia. "The Green Bonds Premium Puzzle: The Role of Issuer Characteristics and Third-Party Verification". Retrieved from https://www.researchgate.net/publication/331225715_The_Green_Bonds_Premium_Puzzle_The_Role_of_Issuer_Characteristics_ and_Third-Party_Verification*
16 *International Capital Market Association. "Mission". Retrieved from https://www.icmagroup.org/About-ICMA/mission/*
17 *International Capital Market Association. "Green Bond Principles June 2018". Retrieved from https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf*
18 *International Capital Market Association. "Green Bond Principles June 2018". Retrieved from https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf. Refer to page 4 of the GBP guidelines for the list of project categories*
19 *Climate Bonds Initiative. "Our Founders". Retrieved from https://www.climatebonds.net/about/funders*
20 *Climate Bonds Initiative. "Certification under the Climate Bonds Standard". Retrieved from https://www.climatebonds.net/certification*
21 *Ehlers, Torsten and Frank Packer. "Green bond finance and certification". Retrieved from https://www.bis.org/publ/qtrpdf/r_qt1709h.pdf*

EUROPEAN UNION (EU)

EU TAXONOMY

The EU taxonomy is a classification system for environmentally sustainable economic activities and help set forth criteria for or such activities as shown below:[22]

Make a substantial contribution to one of the six environmental objectives that are:

- Climate change mitigation
- Climate change adaptation
- Sustainable and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems
- Do no significant harm (DNSH)

Economic activities making a substantial contribution to climate change mitigation or adaptation (#1 and #2 listed above) must be assessed to ensure they do not cause significant harm to all remaining environmental objectives (#3, #4, #5 and #6)[23].

Seven macro-sectors that have large greenhouse gas emissions footprint have also been identified:

- agriculture and forestry
- manufacturing
- electricity, gas, steam and air conditioning supply
- water, sewerage, waste and remediation
- transport
- information and communication technologies
- buildings

The Technical Expert Group (TEG), mandated by the European Commission to develop the EU taxonomy does acknowledge that there is "no intention to bind third countries on their own sustainability or sustainable finance activities"[24]. The TEG also recognises that "locally relevant standards may reasonably be applied in countries outside the EU. […]. In cases were locally relevant threshold has been used to assess the environmental performance of an economic activity, […], companies and investors may wish to provide an additional, second disclosure setting out the details and rational for variation from the TEG standard."

EU GREEN BOND STANDARD

The EU Green Bond Standard (GBS) aims to address the key challenges issuers are facing in the bond market[25] :

- **Lack of green projects.** The EU GBS leverages the EU taxonomy to clarify and possibly expand the universe of eligible Green Projects.
- **Issuers' concerns with reputational risks and green definitions.** The EU GBS provides a standardised reporting framework, giving issuers a common methodology to disclose sustainability initiatives.
- **Absence of clear economic benefits for issuers.** Some potential incentives to support green bonds issuance are a possible subsidy to offset the additional cost of external verification.
- **Complex and potentially costly procedures for reporting and external review.** Standardised verification process with a clear scope of services will streamline the verification process, avoid duplication of efforts and reduce costs of external reviews.
- **Labour intensive reporting procedures.** The EU-GBS simplifies the reporting requirements by distinguishing between the Allocation Reporting, which needs to be verified, and the Impact Reporting, for which verification is encouraged, but not required.

22 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf*

23 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Taxonomy Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf*

24 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Taxonomy Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf. Section 2.1.6 International use of the EU Taxonomy.*

25 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Report on EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf*

In the TEG report, Proposal for an EU Green Bond Standard[26], published in June 2019, a few incentive schemes that "could contribute to establishing a "level-playing field" between green bond issuers and issuers of conventional bonds"[27]are discussed.

One of them consists of subsidising – totally or partially – the additional cost associated with external verification of EU Green Bonds in order to equalise issuance costs with mainstream bonds. However currently, as explained in the EU Green Bond Standard Usability Guide[28],"there is no public sector-supported scheme in the EU that would compensate for the verification expenses"[29].

Another potential scheme is tax incentives. Since taxation is mainly a prerogative of individual member states, "the European Commission could encourage member states to […] support the green bond market through tax incentives for assets located in the EU"[30]. On the other hand, "examples of tax incentives in the fixed income market exist in jurisdictions outside the EU, such as, […] the US federal government Clean Renewable Energy Bonds (CREBs) and Qualified Energy Conservation Bonds programmes"[31].

LMA GREEN LOAN PRINCIPLES

The Loan Market Association (LMA) was established in the late nineties to help develop the secondary loan market in Europe[32]. Its remit now covers Europe, the Middle East and Africa (EMEA) region.

The Green Loan Principles (GLP) were initially published in 2018 in order to provide a consistent methodology that can be used across the green loan market[33]. The GLP were built on the ICMA Green Bond Principles and are voluntary recommended guidelines.

As per the Green Loan Principles, green loans are "any type of loan instrument made available exclusively to finance or re-finance, in whole or in part, new and / or existing eligible Green Projects"[34]. GLP provide indicative categories of eligibility for green projects[35]

The Green Loan Principles are based on the same framework as the Green Bond Principles which is around: use of proceeds, process for project evaluation and selection, management of proceeds and reporting.

BENCHMARKS

The EU ETS (Emission Trading System), launched in 2005 is the largest international system for trading greenhouse gas emissions allowances. EU-ETS benchmarks are used as a proxy of the EU taxonomy thresholds[36]. The ETS benchmark is defined as the average of the first decile of the installations, ranked by emission efficiency.

In addition to the greenhouse gas intensity criteria (measured against the ETS benchmark), an economic activity has also to pass the DNSH criteria in order to meet the taxonomy requirements.

The combination of the ETS benchmark and the DNSH criteria allows to set a clear environmental yardstick to label an economic activity as green.

26 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Report on EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf*

27 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Report on EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf*

28 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Useability Guide: EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-green-bond-standard-usability-guide_en.pdf*

29 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Useability Guide: EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-green-bond-standard-usability-guide_en.pdf . Page 31.*

30 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Report on EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf. Section 5.2.1 Tax Incentives.*

31 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Report on EU Green Bond Standard". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf. Section 5.2.1 Tax Incentives. Wikipedia. "Loan Market Associations". Retrieved from https://en.wikipedia.org/wiki/Loan_Market_Association*

32 *Wikipedia. "Loan Market Associations". Retrieved from https://en.wikipedia.org/wiki/Loan_Market_Association*

33 *Loan Market Association, LMA. "Green Loan Principles. Supporting Environmentally sustainable economic activity". Retrieved form https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf*

34 *Loan Market Association, LMA. "Green Loan Principles. Supporting Environmentally sustainable economic activity". Retrieved form https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf. Page 1.*

35 *Loan Market Association, LMA. "Green Loan Principles. Supporting Environmentally sustainable economic activity". Retrieved form https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf. Appendix 1*

36 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf*

CORPORATE DISCLOSURES

Financial institutions that are offering financial products in the European Union and investors are required to make Taxonomy disclosures. That is mandatory for specific product and on a comply-or-explain basis for all others.

The main disclosure requirement is to disclose the proportion of underlying investments that are taxonomy-aligned, expressed as a percentage of the investment, fund or portfolio.

Taxonomy disclosure obligations are made at an aggregated level, not at the individual financial instrument level (e.g. bonds)[37]. For instance, products in scope for taxonomy disclosure are mostly funds (equity funds, exchange-traded funds (ETFs), real estate funds, private equity funds, pension products, insurance-based investment products (IBIPs)).

As for verification, the Taxonomy Regulation recommends corporate disclosures to be reviewed by a third-party independent firm but does not make it mandatory for companies and investors to do so:

- "The Taxonomy Regulation does not explicitly require any formal verification of Taxonomy-related disclosures". […] The TEG considers it good practice for issuers to seek external assurance on their Taxonomy-related disclosures"[38].
- "The Taxonomy Regulation does not require that investors seek external verification or assurance of their disclosures"[39].
- The Taxonomy Regulation does not impose fines or penalties for companies or investors not making full disclosure[40].

ASEAN

ASEAN GREEN BONDS STANDARDS

In 2017, the ASEAN Capital Markets Forum (ACMF), composed of market regulators from the ten ASEAN countries published the ASEAN Green Bond Standards[41]. These standards are a set of voluntary guidelines and are based on the International Capital Market Association (ICMA)'s Green Bond Principles (GBP) as they are internationally accepted and widely used for the development of national green bond guidelines or standards issued globally. The ASEAN Green Bond Standards aim at increasing transparency, consistency and uniformity to reduce costs for issuers and investors.

Amongst the categories of eligibility for Green Projects[42] which contribute to environmental objectives defined within the ASEAN Green Bond Standards, there are:

- Renewable energy
- Energy efficiency
- Pollution prevention and control
- Clean transportation
- Green buildings which meet regional, national or internationally recognized standards or certifications

As mentioned by the ACMF, the Issuer of ASEAN Green Bonds must clearly communicate to investors[43]:

- The environmental sustainability objectives;
- The process by which the Issuer determines how the projects fit within the eligible Green Project categories identified

37 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf. Section 3.3.2 Which products must complete Taxonomy disclosures?*

38 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf. Section 3.2.8 Verification*

39 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf. Section 3.3.10 Verification*

40 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustainable European Economy. Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf. Section 3.3.10 Verification*

41 *ASEAN Capital Markets Forum. "ASEAN Green Bond Standard". Retrieved from https://www.theacmf.org/initiatives/sustainable-finance/asean-green-bond-standards*

42 *ASEAN Capital Markets Forum. "ASEAN Green Bond Standard" - section 4.1.5. Retrieved from https://www.theacmf.org/images/downloads/pdf/AGBS2018.pdf*

43 *ASEAN Capital Markets Forum. "ASEAN Green Bond Standard" - section 4.2.1. Retrieved from https://www.theacmf.org/images/downloads/pdf/AGBS2018.pdf*

above; and
- The related eligibility criteria, including, if applicable, exclusion criteria or any other process applied to identify and manage potentially material environmental and social risks associated with the Green Projects.

In addition, the Issuer must make the following publicly available on a website designated by the Issuer at the time of the issuance and throughout the tenure of ASEAN Green Bonds[44]:

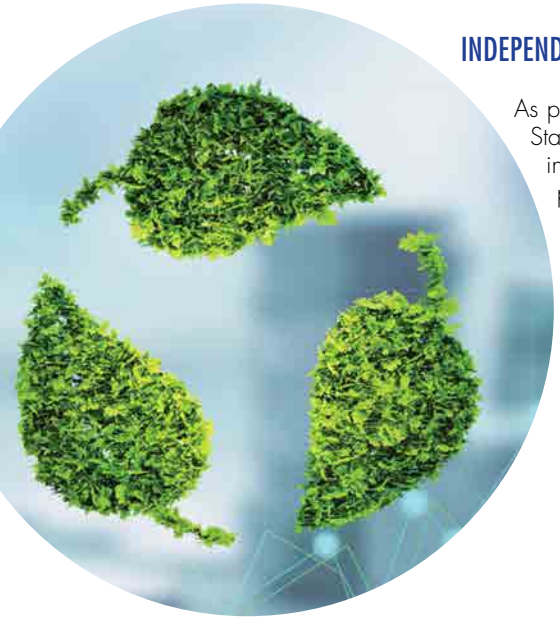
- The process for project evaluation;
- The use of proceeds; and
- External review report on the process (if any).

MALAYSIA'S DEVELOPMENT OF A GREEN FINANCE TAXONOMY

In December 2019, the Central Bank of Malaysia (Bank Negara Malaysia or BNM) issued a discussion paper on "Climate Change and Principle-based Taxonomy".[45]BNM is working with the World Bank and the Malaysian Securities Commission to develop the principles that would support the Malaysian green taxonomy and help Malaysia's financial sector classify green assets transparently and consistently[46]. At the time of writing, BNM is seeking written feedback on the paper from relevant stakeholders.

This taxonomy would be the third categorisation system of this kind globally following the EU taxonomy and similar developments happening in Canada[47]. Malaysia would be the first emerging market country to introduce a green taxonomy to help financial institutions tackle climate-related risks[48].

As explained in the response[49] from ASIFMA (Asia Securities Industry & Financial Markets Association[50]) to BNM's discussion paper, the Malaysian taxonomy considers the commitment and willingness to improve practices. The EU taxonomy only assesses whether activities are aligned with its taxonomy or not and does not take into account the company's motivation to follow regulations. It is worth noting that the ASIFMA does share its concerns around establishing regional and local taxonomies. That may "lead to unintended market fragmentation"[51] and may "hamper comparability of data and disclosure standards across jurisdictions"[52].



INDEPENDENT REVIEWS MORE AND MORE COMMON

As pointed out by the Climate Bonds Initiative report, "both the ASEAN Green Bond Standards and the Certification under the Climate Bonds Standard require an independent review that the UoP (Use of Proceeds) is green"[53]. Therefore, a third-party review is performed when most green bonds in ASEAN are issued. However, that is not the case for most green loans in Singapore and two Malaysian sukuks.

The two most prevalent types of independent reviews in 2019 in ASEAN are the obtention of second-party opinion (SPO) and the certification under the Climate Bonds Standard. The wide range of providers probably makes SPO the most common type of review. In ASEAN, Sustainalytics and CICERO are dominating the market. However, three issuers got their bond Certified under the Climate Bonds Standard.

44 *ASEAN Capital Markets Forum. "ASEAN Green Bond Standard" - section 4.2.5. Retrieved from https://www.theacmf.org/images/downloads/pdf/AGBS2018.pdf*
45 *Bank Negara Malaysia. "Climate Change and Principle-based Taxonomy". Retrieved from https://www.bnm.gov.my/index.php?ch=57&pg=144&ac=894&bb=file*
46 *Hussain, Farah Imrana. "Defining green: Malaysia's big step towards sustainability". Retrieved from https://blogs.worldbank.org/climatechange/defining-green-malaysias-big-step-towards-sustainability*
47 *Robinson-Tillett. "Malaysian central bank calls for feedback on green taxonomy proposals". Retrieved form https://www.responsible-investor.com/articles/malaysian-central-bank-calls-for-feedback-on-green-taxonomy-proposals*
48 *ESG Clarity. "Malaysia targets green taxonomy". Retrieved from https://esgclarity.com/malaysia-targets-green-taxonomy/*
49 *AFISMA. "AFISMA Responds to Bank Negara Malaysia's Discussion Paper on Climate Change and Principle-based Taxonomy". Retrieved from https://www.asifma.org/wp-content/uploads/2020/04/asifma-response-to-bnm-climate-change-taxonomy-dp-v20200331-final-draft-clean4.pdf*
50 *Asian Securities Industry & Financail Markets Association. "About". Retrieved from https://www.asifma.org/about/*
51 *Asian Securities Industry & Financail Markets Association. "AFISMA Responds to Bank Negara Malaysia's Discussion Paper on Climate Change and Principle-based Taxonomy". Retrieved from https://www.asifma.org/wp-content/uploads/2020/04/asifma-response-to-bnm-climate-change-taxonomy-dp-v20200331-final-draft-clean4.pdf*
52 *Asian Securities Industry & Financail Markets Association. "AFISMA Responds to Bank Negara Malaysia's Discussion Paper on Climate Change and Principle-based Taxonomy". Retrieved from https://www.asifma.org/wp-content/uploads/2020/04/asifma-response-to-bnm-climate-change-taxonomy-dp-v20200331-final-draft-clean4.pdf*
53 *Rimaud, Cedric, Haran Siva, Miguel Almeida, Andrew Whiley and Krista Tukiainen. "ASEAN Green Finance State of the Market 2019". Retrieved from https://www.climatebonds.net/resources/reports/asean-green-finance-state-market-2019*

SINGAPORE

GREEN FINANCE ACTION PLAN

Singapore through the Monetary Authority of Singapore, which is Singapore's central bank and integrated financial sector regulator, is actively driving the green finance agenda. Last year, it announced a Green Finance Action Plan which consists of three steps. The first is to "build financial system resilience to environmental risks". The second is to "develop green finance solutions and markets". The third is to "leverage innovation and technology". With its experience in financing the region and capabilities in technology, Singapore aims to make a significant contribution to the global green finance agenda and to be a leading centre for Green Finance in Asia and globally[54].

BUILDING FINANCIAL SECTOR RESILIENCE

In order to reinforce industry efforts and build financial resilience, MAS will issue Environmental Risk Management (ENRM) Guidelines across the banking, insurance and asset management sectors. [55]MAS has published a set of three consultation papers on its proposed Guidelines and has invited parties to submit their comments on the proposed Guidelines by August 2020. These guidelines will set standards on governance, risk management and disclosure of environment risk by financial institutions.

DEVELOPING GREEN FINANCE SOLUTIONS AND MARKETS

As part of its action plan, MAS launched a US$ 2 billion Green Investments Programme (GIP) in 2019 to invest in public market investment strategies that have a strong green focus.[56]

MAS has been at the forefront of supporting green, social and sustainable bond issuances in particular due to its Sustainable Bond Grant Scheme. The grant is open to all issuers and applies to bonds denominated in any currency with an external review or rating done to demonstrate alignment with internationally recognised green, social or sustainability bond principles. In 2019, MAS lowered the issuance size requirement from SDG 200 million to SGD 20 million to support more issuers.[57]The grant will fully offset cost incurred in respect of the above-said independent external review or rating done up to an amount of SGD 100,000.

To mainstream green and sustainable lending, MAS is developing a grant scheme for green and sustainability-linked loans. The scheme would defray the cost of external review and bank framework for such loans. To support an increase in activity, MAS is also working on an anchor sustainability advisory and assessment service provider who can strengthen local technical capacity for green finance-related assurance and verification, and play a key role in ensuring the transparency and integrity of green finance solutions.

MAS is planning to collaborate with local and international universities to establish Centres of Excellence in Singapore to drive Asia-focused green finance research and training. Such centres would "support the development of innovative green finance solutions, examine perspectives on financial policy and regulation, and grow the pipeline of green finance talent to support the financial sector"[58] .

To support the upskilling and growth of the green finance talent pool in Singapore, the Institute of Banking and Finance Singapore (IBF) offers courses spanning across sustainability and green finance. MAS and IBF have enhanced course fee subsidies for finance professionals attending such courses accredited or recognised by IBF up to 90%[59]. The IBF has also rolled out a 5% credit for their accredited and recognised courses, to further defray the cost of training for employers and individuals.

54 *Excerpt of Keynote Speech by Mr Ong Ye Kung, Minister for Education, Singapore and Board Member, Monetary Authority of Singapore, at SFF x SWITCH 2019 on 11 November 2019. Retrieved from https://www.mas.gov.sg/news/speeches/2019/green-finance-for-a-sustainable-world*

55 *Monetary Authority Singapore. "MAS Consults on Environmental Risk Management Guidelines for Financial Institutions". Retrieved form https://www.mas.gov.sg/news/media-releases/2020/mas-consults-on-environmental-risk-management-guidelines-for-financial-institutions*

56 *Monetary Authority Singapore. New US$2 billion Investment Programme to Support Growth of Green Finance in Singapore. Retrieved from https://www.mas.gov.sg/news/media-releases/2019/new-us$2-billion-investments-programme-to-support-growth-of-green-finance-in-singapore*

57 *Monetary Authority Singapore. "Reply to Parliamentary Question on Green Bond Grant Scheme." Retrieved from https://www.mas.gov.sg/news/parliamentary-replies/2020/reply-to-parliamentary-question-on-green-bond-grant-scheme*

58 *Monetary Authority Singapore. "Greening the Financial System". Retrieved from https://www.mas.gov.sg/who-we-are/annual-reports/annual-report-2019-2020/greening-the-financial-system/developing-green-finance-solutions-and-markets*

59 *The Institute of Banking and Finance. "ESG Programmes". Retrieved from https://www.ibf.org.sg/programmes/Pages/ProgrammeFinder.aspx?keyword=ESG&type=1*

LEVERAGING INNOVATION AND TECHNOLOGY

MAS launched the Global FinTech Hackcelerator, as part of 2020's Singapore FinTech Festival themed "Building Resilience, Seizing Opportunities, Emerging Stronger"[60]. The challenges seeks to recognise ground breaking solutions that enable the financial sector to respond better to (among others), green finance solutions that support the transition to low-carbon economic activities and provide coverage for climate and disaster risk as well as green finance enablers that support transparency and decision making for green transition.

MAS' CONTRIBUTION TO INTERNATIONAL INITIATIVES

MAS is also involved in various international bodies set up to promote green financing and manage environmental risk. MAS is a founding member of the Network for Greening the Financial System (NGFS). Launched in 2017, the NGFS is a group of central banks and supervisors willing to share best practices around environment risk management and green financing.[61] In one of its latest reports, NGFS Climate Scenarios for central banks and supervisors published in June 2020[62], a parallel is drawn between COVID-19 and the NGFS climate scenarios to show how sudden policy or behavioural changes could lead to a drop-in asset value.

MAS also joined the International Platform on Sustainable Finance in June 2020[63]. The IPSF, comprising government ministries and central banks from countries across regions, including the EU, China and India seeks to enhance global coordination in areas such as taxonomy, standards and labels, and disclosures to mobilise private capital towards environmentally sustainable investments.

SUSTAINABILITY LINKED BONDS/LOANS: A MIDDLE GROUND?

The Malaysia taxonomy is offering a less strict approach on recognising green projects compared to the EU taxonomy. Likewise, Sustainability-Linked Bonds (SLBs) and Sustainability-Linked Loans (SLLs) allow issuers and borrowers access to the green debt market without committing to established standards such as the Green Bond Standards or the Climate Bonds Standard.

Under a SLB or a SLL, the issuer or the borrower is incentivised to improve its sustainability profile, by aligning bond or loan terms to the issuer or the borrower's performance against mutually agreed, pre-determined Sustainability Performance Targets (SPTs).The key advantage of a SLB or a SLL is to provide to issuers and borrowers a positive impact on reputation and credibility while not channelling the proceeds in green assets but, instead, towards initiatives defined between them as sustainable.[64]

SPTs are defined between the borrower and the lender and the SASB[65] Materiality Map is used as a benchmark. The SASB Materiality Map[66] provides metrics for a variety of industries across environmental issue categories. The SPTs "should be ambitious and meaningful to the borrower's business and should be tied to a sustainability improvement in relation to a predetermined performance target benchmark"[67] . Targets can either be internal (defined by the borrower with regards to their sustainability strategy) or external (verified by independent third-party firms against external rating criteria).

ISSUES AND CHALLENGES IN GREEN FINANCE

GREENWASHING

Greenwashing consists of providing misleading information about how a company's products are more environmentally sound[68]. In the context of green finance, greenwashing would be using the proceeds of a green bond or green loan for non-green activities.

60 *Singapore Fintech Festival. "Global Fintech Hackcelerator 2020". Retrieved from https://www.fintechfestival.sg/global-fintech-hackcelerator*
61 *Climate Action in Finance. "Central Banks and Supervisors Networks for Greening the Financial System (NGFS). Retrieved from https://www.mainstreamingclimate.org/ngfs/*
62 *Network for Greening the Financial System. "NGFS Climate Scenarios for central banks and supervisors". Retrieved from https://www.ngfs.net/sites/default/files/medias/documents/ngfs_climate_scenarios_final.pdf*
63 *Monetary Authority Singapore. "Greening the Financial System. International corporation for green finance". Retrieved from https://www.mas.gov.sg/who-we-are/annual-reports/annual-report-2019-2020/greening-the-financial-system/international-coorporation-for-green-finance*
64 *Loan Syndication and Trading Association. "Guidance on Sustainability Linked Loan Principles (SLLP)". Retrieved from https://www.lsta.org/content/guidance-on-sustainability-linked-loan-principles-sllp/, page 2*
65 *The Sustainability Accounting Standards Board (SASB) is a non-profit organization founded in 2011 to develop sustainability accounting standards: https://en.wikipedia.org/wiki/Sustainability_Accounting_Standards_Board and https://www.sasb.org/*
66 *The Sustainability Accounting Standards Board. "SASB Materiality Map". Retrieved from https://materiality.sasb.org/*
67 *Loan Syndication and Trading Association. "Sustainability Linked Loan Principles (SLLP)". Retrieved from https://www.lsta.org/content/sustainability-linked-loan-principles-sllp/*
68 *Kenton, Will. "Greenwashing". Retrieved from https://www.investopedia.com/terms/g/greenwashing.asp*

Taxonomies and green bond standards (whatever they are: ICMA Green Bond Principles, EU Green Bond Standards) were introduced to reduce greenwashing to a minimum.

Though the green bond market in ASEAN is relatively small, in 2019, green bond issuance grew to USD 7.8 billion[69]. The global bond market is estimated at USD 1,338 billion[70], green bonds representing less than 1%. Creating a robust framework to avoid green washing is important for any market that wants to grow its credibility in this sector

DATA, BENCHMARKING & VERIFICATION

There are a few ESG data providers in the markets that are assessing the bonds (use of proceeds, project selection and evaluation process and reporting) such as MSCI, Sustainalytics, Cicero and Vigeo Eiris. Some financial institutions in Singapore like DBS have adopted MSCI ESG ratings[71] for its wealth management business while SGX has partnered with Sustainalytics[72].

The problem lies in the fact that ESG ratings providers can evaluate the same company very differently. As an example, some of these providers, such as MSCI, Sustainalytics, and Vigeo Eiris, rate companies globally, while others focus on comprehensive ESG ratings data for a specific country or region.

THE 20 LARGEST MARKET-CAP COMPANIES IN THE UNITED STATES AS OF DECEMBER 31, 2017

			ESG Score		E Score		S Score		G Score	
Company	Sector	Weight	*1	*2	*1	*2	*1	*2	*1	*2
Apple	Technology	3.52%	0.41	0.43	0.69	0.96	0.10	0.42	0.54	0.19
Microsoft	Technology	2.78%	0.88	0.94	0.89	0.92	0.90	0.83	0.74	0.84
Alphabet	Technology	2.76%	0.33	0.48	0.54	0.67	0.50	0.75	0.10	0.10
Facebook	Technology	2%	0.29	0.20	0.77	0.23	0.32	0.63	0.07	0.01
Berkshire Hathaway	Financial	1.97%	0.04	0.04	0.06	0.07	0.04	0.24	0.04	0.04
JP Morgan Chase	Financial	1.53%	0.79	0.76	0.97	0.75	0.88	0.82	0.45	0.45
Johnson & Johnson	Health Care	1.34%	0.95	0.87	0.95	0.90	0.97	0.45	0.78	0.92
Bank of America	Financial	1.27%	0.59	0.81	0.86	0.79	0.58	0.88	0.29	0.54
Exxon Mobil	Energy	1.24%	0.70	0.53	0.45	0.35	0.65	0.91	0.86	0.37
Wells Fargo	Financial	1.10%	0.84	0.31	0.82	0.87	0.80	0.30	0.70	0.03
Visa	Financial	1.07%	0.75	0.65	0.67	0.63	0.53	0.37	0.98	0.71
Walmart	Cyclical	1.03%	0.72	0.35	0.64	0.77	0.61	0.10	0.73	0.42
Intel	Technology	0.89%	0.75	0.99	0.81	0.84	0.99	0.99	0.37	0.99
Cisco	Technology	0.86%	0.98	0.98	0.88	0.86	0.95	0.98	0.93	0.78
AT&T	Telecomm	0.86%	0.94	0.86	0.98	0.82	0.84	0.50	0.80	0.87
UnitedHealthGroup	Health Care	0.84%	0.18	0.51	0.16	0.60	0.20	0.16	0.40	0.67
Pfizer	Health Care	0.84%	0.68	0.67	0.65	0.59	0.85	0.66	0.39	0.57
Chevron	Energy	0.82%	0.32	0.30	0.32	0.21	0.41	0.87	0.35	0.25
Boeing	Industrial	0.82%	0.51	0.24	0.48	0.42	0.38	0.08	0.63	0.47

Notes:
** Provider*
(1) The shaded areas indicate instances in which the two providers have ratings differences greater than 25%
(2) In order to normalize ESG scores between the two providers, the scores in this table are determined by the percentile ranking of each company (with 0 being the lowest and 1.00 being the highest) by the respective provider's raw ESG score (or individual environmental, social, and governance score) and then taking the cumulative market-cap weight of that company relative to the overall universe. For example, Apple's ESG score of 0.41 by Provider 1 means that Apple's cumulative market-cap weight within the investment universe is 41% after ranking the universe by Provider 1's ESG scores.
Source: Research Affiliates, LLC

Figure 6: Table summarising differences in ESG ratings between two ESG rating providers

69 *The Business Times. "ASEAN green bond issuance doubles to US$7.8b in 2019". Retrieved from https://www.businesstimes.com.sg/asean-business/asean-green-bond-issuance-doubles-to-us78b-in-2019*
70 *https://stats.bis.org/statx/srs/table/c1?f=pdf: sum of total debt securities for all ASEAN countries: Singapore (493) + Indonesia (259) + Malaysia (413) + Philippines (169) + Thailand (465) + Vietnam (4) = USD 1,338 billion*
71 *Tan, Claudia. "DBS adopts MSCI ESG ratings for its wealth management business". Retrieved from https://www.businesstimes.com.sg/companies-markets/dbs-adopts-msci-esg-ratings-for-its-wealth-management-business*
72 *Systainalytics. "SGX launches SGX Sustainability Indices". Retrieved from https://www.sustainalytics.com/esg-investing-news/sgx-launches-sgx-sustainability-indices/*

In an article produced by Research Affiliates[73], researchers have examined the 20 largest US companies by market capitalisation as of December 31, 2017, in terms of their overall ESG rating and individual environmental ratings from two providers. The environmental rating for Apple and Facebook show significant differences (~20 to 30%) between the two providers. This is due to a lack of a common standards and/or a key matrix to standardise evaluations.

DIFFERENT LEVELS OF SCRUTINY BETWEEN STANDARDS AND TAXONOMY

The FSCECCS members have observed that the various taxonomies already in place or being designed cover more or less the same topics. For instance, most of them include, in the eligible green project categories, the following macro-sectors:

- Agriculture, forestry and fishing
- Manufacturing
- Electricity, gas, steam and air conditioning supply
- Water, sewerage, waste and remediation
- Transportation and storage
- Information and Communication Technologies (ICT)
- Buildings (construction and real estate activities)

In addition to these elements, the EU taxonomy also provides a detailed description of the economic activity, the metric used, the threshold as well as a "Do no significant harm". The ICMA Green Bond Principles, on the other hand, only indicate at a macro level the project categories. Likewise, the Malaysia taxonomy only provides "examples of economic activities that are generally considered as green and environmentally friendly"[74].

Considering production of electricity from wind power as an example, the table below summarises the level of scrutiny on a specific economic activity each taxonomy has:

	EU Taxonomy	Malaysian Taxonomy	Climate Bond Initiative Taxonomy	ICMA Green Bond Principles
Description	Construction and operation of electricity generation facilities that produce electricity from Wind Power	Facility construction and operation of wind power generation	Generation facilities (power & heat) such as: • Onshore wind farms • Manufacturing facilities wholly dedicated to onshore wind energy development such as wind turbines • Offshore wind farms • Manufacturing facilities wholly dedicated to marine renewable energy development such as wind turbines and platforms	Renewable energy (including production, transmission, appliances and products);
Principles	• Support a transition to a net-zero emissions economy • Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy • Ensure that economic activities meet best practice standards • Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target • Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds	Not communicated	Not communicated	Not communicated

73 *Li, Feifei and Ari Polychronopoulos. "What a Difference and ESG Ratings Provider Means". Retrieved from https://www.researchaffiliates.com/en_us/publications/articles/what-a-difference-an-esg-ratings-provider-makes.html*
74 *Bank Negara Malaysia. "Climate Change and Taxonomy Principles". Retrieved from https://www.bnm.gov.my/index.php?ch=57&pg=144&ac=894&bb=file. Page 22*
75 *EU Technical Support Group on Sustainable Finance. "Financing a sustainable European Economy. Taxonomy Technical Report". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf*
76 *Bank Negara Malaysia. "Climate Change and Taxonomy Principles". Retrieved from https://www.bnm.gov.my/index.php?ch=57&pg=144&ac=894&bb=file.*
77 *Climate Bonds Initiative. "Climate Bonds Taxonomy". Retrieved from https://www.climatebonds.net/files/files/CBI_Taxonomy_Tables_January_20.pdf*
78 *International Capital Market Association. "The Green Bond Principles. Voluntary Process Guidelines for Issuing Green Bonds". Retrieved from https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf*

Metric	Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14044-compliant Life Cycle of Emissions (LCE) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold. However: • Wind Power is exempt from performing a LCE – This exemption is subject to regular review in accordance with the declining threshold	Not communicated	Not communicated	Not communicated
Threshold	Facilities operating at life cycle emissions lower than 100gCO2e/kWh, declining to 0gCO2e/kWh by 2050, are eligible.	Not communicated	Not communicated	Not communicated
Do no significant harm assessment	☑	Not communicated	Not communicated	Not communicated

Figure 7: Comparison of four different taxonomies

MISALIGNMENT BETWEEN SUPPLY AND DEMAND IN GREEN FINANCE

Governments and regulators have been pushing for corporations to launch green projects more and more in the past few years.[79] Most corporations have taken up initiatives but are only willing to start small considering the uncharted territory of such projects across jurisdictions. On the other hand, banks have committed a very large amount of funds to green finance projects. They would rather kick-start with projects above a certain threshold due to economies of scale.

They main challenge is to identify high-quality projects that are ESG-compliant and commercially viable. This is necessary to align the demand from the banks with the interest of corporates to start the sustainability journey. Due to the complexity and high number of compliance-related requirements of such projects, the effort needed to issue funding for small-size project is almost the same a as for large-size project. This explains the reluctance of banks to offer green financing to small-size projects. This leads to some corporations not having access to funding to launch green projects since banks are not willing to release funds below a certain size.

One area of improvement for all industry players (regulators, financial institutions and corporations) may be to agree on common standards for specific sectors in order to industrialise the process of issuing green financing. This would allow banks to fund green projects in a sustainable manner.

ADVANCING GREEN FINANCE IN SINGAPORE AND ASEAN

DRIVING CONVERGENCE OF GREEN FINANCE STANDARDS

As outlined in section IV, the recognition of the environmentally friendly nature of debt instruments highly depends on the framework used. For instance, the EU taxonomy standards provide a higher level of details in terms of criteria to define a debt security as green than other standards. This misalignment between frameworks is a challenge to promoting green financing across the world in a consistent manner.

The FSCECCS members have observed an intent from Asian governments and regulators to set their taxonomy based on internationally recognised standards. For example, the ASEAN

79 *For the definition of green finance projects, please refer to the categories of eligibility for Green Projects defined by ASEAN Green Bonds Standards: https://www.theacmf.org/images/downloads/pdf/AGBS2018.pdf*

Capital Markets Forum (ACMF) has used ICMA Green Bond Principles for its ASEAN Green Bond Standards and the Monetary Authority of Singapore (MAS) the Task Force on Climate-related Financial Disclosure for its Environmental Risk Management (ENRM) guidelines.

However, as pointed out in a recent article addressing the future of the green bond market[80], the differences of category eligibility for green debt are still material: for instance, the People's Bank of China's Green Bond Endorsed Project Catalogue includes "clean utilisation of coal" as well as nuclear energy as eligible sectors while the EU taxonomy excludes them.

The FSCECCS members believe that a dialogue should be initiated between the Technical Expert Group (TEG) on sustainable finance set up by the European Commission in 2018 and Asian regulators to iron out their different perspectives. The EU taxonomy offers a strong foundation also for a similar taxonomy in Singapore and the wider region. Putting aside coal, which is a sensitive topic, the FSCECCS members believe that there is still room to define specific stringent conditions under which some sectors like nuclear energy or natural gas production, currently deemed as "brown" under the EU taxonomy may be labelled as green. There would be two benefits to that: increased alignment of what green finance means across the world and providing a framework to make brown sectors greener. In addition to the above, the FSCECCS members believe that another way forward could be the mutual recognition between taxonomies meaning that if taxonomies are for instance 95% similar there could be an understanding of mutual recognition for the last 5% between the countries.

Regardless, the FSCECCS members believe Asia is catching up with the rest of the world as shown by innovative initiatives by regulators like the MAS to subsidise the cost of ESG verification for green debt.

IMPROVING ESG RATINGS PRACTICES

As described in section IV, ESG ratings providers appear to be using different types of data and assessment methodologies. This leads to an inconsistency around ESG ratings and potential confusion for retail investors. Though the importance of ratings versus other frameworks to measure the adherence to ESG standards is still debatable, it is desirable for investors and issuers to harmonize the approach. As such, the FSCECCS members believe there may be three solutions that Asian regulators can consider.

The first is for regulators to officially endorse a certain group of ESG rating providers that would meet strict criteria on data sources used and ESG assessment methodology. This would bring a bit more transparency for institutional investors on how ESG ratings are defined. However, this solution also limits which ESG providers, corporates can make use of and this might create further issues for the corporations.

The second is to develop an Ecolabel for financial products on the basis of the EU Ecolabel. The European Commission is currently working on such scheme to "provide retail investors desiring to invest in sustainable economic activities with more and better information"[81]. Extending the EU Ecolabel to Asia would enhance the use of the EU taxonomy but existing divergences between taxonomies at this point of time may prevent that from happening. Therefore, Asian countries, through pan-regional bodies such as the ACMF, may want to look at creating an ecolabel based on the ICMA Green Bond Standards. That would at least provide retail investors with a consistent sense of what green bonds look like.

The third option could be to regulate the ESG providers in a similar way to credit rating agencies or through licensing in order to better understand the providers' methodology and to ensure that they act in a fair, transparent and equitable manner

BUILDING A GREEN FINANCE TALENT POOL IN SINGAPORE

Different types of talents are required in Green Finance. Individuals with a strong expertise in sustainability are just as important as finance-trained professionals. Green finance covers a wide range of skillsets and all kinds of profiles are welcome. As such, it is also worth mentioning that education and knowledge-sharing on the topic of sustainability cannot begin early enough and is encourage to be a general part of citizens' lives.

Strong finance foundations remain critical. For students interested in pursuing a career in Green Finance, FSCECCS members believe that they should first get strong accounting and finance foundations through, for example, a Bachelor of Business Administration. Then, the options they have is to either enrol for additional undergraduate courses available, for example, through the six month programme "Impact Investing and Green Finance" offered by the Singapore University of Social Sciences[82] or to sign-up for 2-day courses such as the ones offered by the National University of Singapore (Social and Sustainable Investing[83]) and the Singapore Management University (Sustainable Finance & Impact Investing[84]).

80 *Deschryver, Pauline and Frederic de Mariz. "What Future for the Green Bond Market?" Retrieved from https://www.mdpi.com/1911-8074/13/3/61*

81 *EU Technical Expert Group on Sustainable Finance. "Financing a Sustaibale European Economy. Report on EU Green Finance". Retrieved from https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf*

82 *Singapore University of Social Sciences. "Impact Investing and Green Finance". Retrieved from https://www.suss.edu.sg/courses/detail/fin354*

83 *National University of Singapore. "Social and Sustainable Investing". Retrieved from https://web2-bschool.nus.edu.sg/L3/courses/social-sustainable-investing*

84 *Singapore Management University. "Advance Certificate in Sustainability & Sustainable Business: Module 5: Sustainable Finance, Impact*

Academic knowledge should be applied in sustainability-related organisations. The FSCECCS members deem it necessary for students to also participate in projects or seek internships with green finance related institutions such as ESG rating providers, leading green finance banks or market regulators willing to push the green finance agenda further. For example, working in the sustainable finance department of a financial institution would help students understand how their acquired skills in finance can be applied to green concepts such as green bonds.

LEVERAGING TECHNOLOGY

The question of whether the asset underlying an instrument is 'green' persists throughout the lifecycle of the instrument, from the issuance of debt to its maturity. It is costly to regularly verify claims that an asset is green: a factor which may deter issuers

One of the ways around increased cost for green debt may be found in technology. For example, blockchain provides a way to reduce the financial burden of green verification. A Swedish bank, some North European financial regulators and a SPO provider have joined forces to build a platform called The Green Assets Wallet (GAW)[85]. The platform is built on block chain technology and its objective is to make verification more transparent and more accessible.

As promising as it may seem, the adoption of such technology is still at a very early stage. It is mentioned on the official Green Asset Wallet website that seven pilot issuers are currently testing and co-developing the technology. However, the FSCECCS members were not able to find out exactly what this platform does (what kind of data can be stored on the platform, in what format, how to prevent that it gets updated…etc.) and whether market participants are willing to adopt it.

CONCLUSION

While green finance has grown rapidly in Singapore and the region in recent years, there is still room for growth and potential for organisations large and small to benefit from it. This will take the collective effort of multiple stakeholders to work together. Singapore's success as financial centre in South East Asia is the result of building capabilities in critical or emerging areas that will become essential in the near future. Continuous investment in green finance will help making Singapore stay relevant to the world and allow sustainable job creation. In addition, Europe and the EU with its regulatory bodies as a frontrunner on sustainability provides a good guidance also for Asia's development in this area.

As evident from the paper the FSCECCS members have highlighted a number of key challenges and recommendation. However, the hope is that this paper will help to create greater awareness on green finance and move the discussion forward to have a positive impact to our environment. The key challenges highlighted by the members include:

- Greenwashing
- Data, Benchmarking and Verification
- Different levels of scrutiny between standards and taxonomy
- Misalignment between supply and demand in Green Finance

The members have also tried to propose some recommendations on how to address these challenges:

- Driving convergence of Green Finance Standards
- Improving ESG ratings
- Building a Green Finance Talent pool in Singapore
- Leveraging technology

Investing and Stewardship". Retrieved from https://academy.smu.edu.sg/advanced-certificate-sustainability-sustainable-businesses-module-5-sustainable-finance-impact-2871

85 *Patel, Manisha. "Transforming Green Finance with Blockchain". Retrieved from https://greenassetswallet.org/news/2020/5/10/transforming-green-finance-with-blockchain*

These are challenges European financial services corporations face in Singapore and the region. Through this paper they have provided their best recommendations on how to address these to allow for further and better collaboration within the area of Green Finance

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LIST OF ACRONYMS

ACMF	ASEAN Capital Market Forum
ASEAN	Association of South-East Asian Nations
ASIFMA	Asia Securities Industry & Financial Market Association
BNM	Bank Negara Malaysia
DNSH	Do no significant harm
ESG	Environment, Social and Governance
EU	European Union
EU ETS	European Union Emission Trading System
EU GBS	European Union Green Bond Standard
EMEA	Europe, Middle East, Africa
ENRM	Environmental Risk Management
FSCECCS	Financial Services Committee of the European Chamber of Commerce in Singapore
GAW	Green Asset Wallet
GBP	Green Bond Principle
GIP	Green Investment Programme
GLP	Green Loan Principle
IBF	Institute of Banking and Finance
IPSF	International Platform on Sustainable Finance
ICMA	The International Capital Market Association
LMA	Loan Market Association
MAS	Monetary Authority Singapore
NGSF	Network for Greening the Financial System
SASB	Sustainability Accounting Standards Board
SLB	Sustainability-Linked Bonds
SLL	Sustainability-Linked Loans
SPO	Second-Party Opinion
SPT	Sustainability Performance Targets
TEG	Technical Expert Group

LIST OF FIGURES

SMART MOBILITY

EUROCHAM POSITION PAPER 2020

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND

Transport systems have been a cornerstone of urban planning and connecting the globe. The development of the global automotive industry has benefited economies through the provision of access to essentials of education and healthcare, allowing for the creation of jobs to result in a higher quality of life (QoL)[1].

Despite the progress in economic growth and QoL, the automotive industry bears consequences as well. Negative externalities of mass car use comprising of congestion and poor air quality have a detrimental impact on people[2]. In addition, states struggle to manage emissions effectively as well[3].

Today's multi-modal transport systems, account for 24% of direct CO2 emissions, of which land vehicles contribute 18%[4]. This had led to a transition for mobility for community and individuals to have access to a seamless infrastructure of cleaner, more efficient, and connected transport[5], where it is encompassed by the term "Smart Mobility".

Smart Mobility encompasses the following[6]:

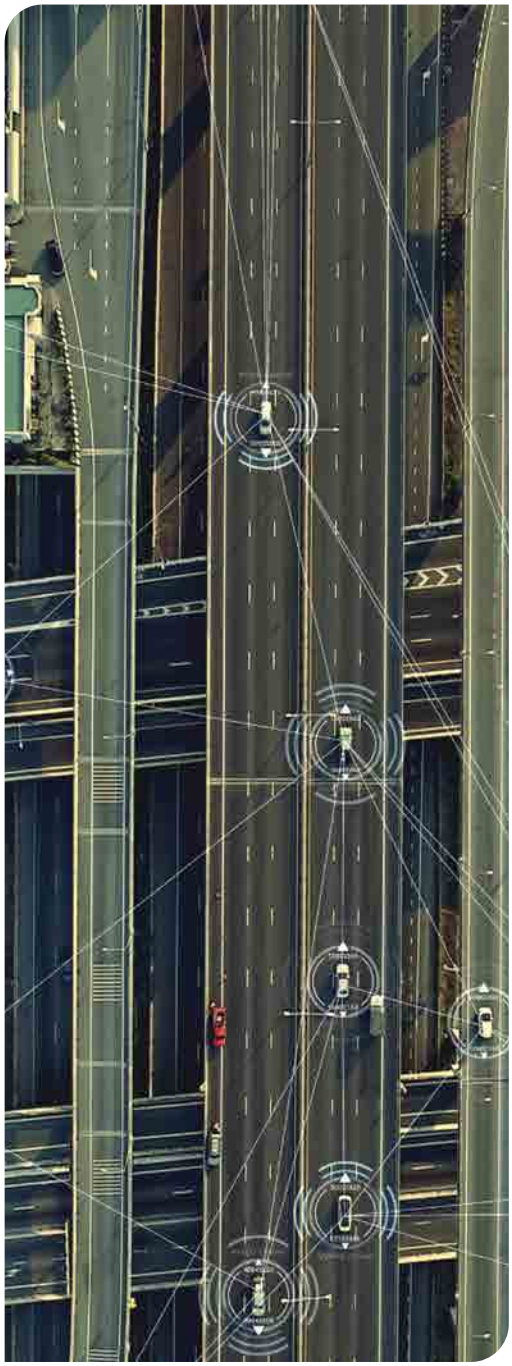
- Mobility as a Service (MaaS)
  - Having an interoperable package of mobility services owned and shared by providers. This is facilitated by the connection of data and integrated platforms of payment.

1 *SIGNALS, EEA. "Towards clean and smart mobility; Transport and environment in Europe." European Environment Agency (2016). Retrieved from https://www.eea.europa.eu/highlights/towards-clean-and-smart-mobility*
2 *Docherty, Iain, Greg Marsden, and Jillian Anable. "The governance of smart mobility." Transportation Research Part A: Policy and Practice 115 (2018): 114-125.*
3 *Ibid.*
4 *IEA (2019), Tracking Transport 2019, IEA, Paris https://www.iea.org/reports/tracking-transport-2019*
5 *Docherty, Iain, Greg Marsden, and Jillian Anable. "The governance of smart mobility."*
6 *Ibid.*

- Digitalization of mobility
  – Crowd-sourced, real-time data allows for the integration of mobility options.
- Electrification of vehicles
  – A smart energy distribution grid in tandem with sustainable mobility through the electrification of vehicles allows for the movement towards lowering emissions via electric vehicles (EV).
- Autonomous vehicles
  – Although the driver has to be present and needs to take over control at some instances, the driver and other occupants will have more time to focus on other tasks.

The above highlight the movement from the traditional form of "ownership" to "usership" of mobility and the shift from fuel-powered vehicles to electric vehicles, underlining a shift in skills required for the development of the above services and products. This shift has been a key priority in both Singapore and the European Union (EU), and the expanding infrastructure of smart mobility provides benefits for sustainability.

SCOPE & OBJECTIVES



Singapore's transport system has been ranked as the best in the world by a 2018 McKinsey report on Urban Transportation[7], based on five criteria – availability, affordability, efficiency, convenience and sustainability. With the emergence of autonomous vehicles (AV), Singapore has rapidly become an attractive location for AV technology development and testing. This is due to Singapore's status as a key financial and digital hub within the region, having resources, ideas and data to support the creation of a world-class integrated transport model.

However, Singapore has much to do to reach the goals it has set for itself. For instance, connectivity and speed, in the area of 5G, needs to be expanded at a faster rate as other peers within Asia, such as Hong Kong, Seoul and Tokyo have been progressing quicker than Singapore. Although having an "island compact" geography, the actions to have 5G coverage by 2025, although one small instance, highlights a larger point: the road to a more sustainable and smarter inter modality transport system will require more adjustments towards policy. We at the European Chamber, situate this road within the context of Singapore and the EU, where both parties have to understand each other's landscapes of smart mobility.

Hence, the objective of the paper is to create in Singapore and the EU a dialogue amongst the various stakeholders of a sustainable urban mobility planning process, ranging from the state/union level to companies as well. Everyone has a responsibility towards creating an ecosystem of smart mobility, to ensure an effective transition towards it.

This transition to Smart Mobility for both Singapore and the European Union – refers to the 27 member states of the economic union and the EFTA[8] countries – will be assessed in this paper, where comparisons will be provided in the following areas:

- Urban Mobility Policy
- Development of Human Capital
- Incentives for EV buyers and users
- EV Homologation Process
- EV Charging infrastructure
- Digitalization and Autonomous driving

The analysis of both Singapore and the EU is crucial as it will allow stakeholders and private companies to understand their respective areas of improvement, establishing an avenue for a smoother transition of smart mobility in Singapore. A combined effort is imperative for ensuring the best possible progress towards sustainability.

7 *Elements of success: Urban transportation systems of 24 global cities (June 2018), McKinsey & Company.*
8 *European Free Trade Association*

METHODOLOGY

This position paper has been developed by engaging the Singapore government's statutory boards and having extensive interviews with industry stakeholders, pertaining to the issue of smart mobility.

This paper has been written by Lesley Nair S/O Dahrma Raj Nair, Research and Advocacy Intern at the European Chamber in Singapore, who is currently an undergraduate from the National University of Singapore. Key contributions towards the position paper have been provided by BMW Asia Pte Ltd, CharIN e. V., HERE Technologies, Pirelli Asia Pte Ltd, Shell Eastern Petroleum (Pte) Ltd, Sipura Enterprise (Pte) Ltd and Volkswagen Group Singapore Pte Ltd.

STRUCTURE

This paper will first commence with the identification of the various stakeholders within the landscape of smart mobility in setting the foundation for the analysis of policies. Next, this paper will streamline the above areas into three chapters, before rounding up and concluding the paper:

Chapter 1: Assessing the web of smart mobility
- Urban Mobility
- Development of Human Capital

Chapter 2: Evaluation of regulations towards EV
- Incentives for EV buyers and users
- EV Homologation Process
- EV Charging Infrastructure

Chapter 3: Future of mobility
- Digitalization and Autonomous driving

Chapter 4: Looking ahead
- Coalescing recommendations and highlighting the micro and macro objectives

Chapter 5: Conclusion
- A meaningful transition towards smart mobility

CHAPTER 1

ASSESSING THE LANDSCAPE OF SMART MOBILITY

In both Singapore and the EU, the transition to Smart Mobility results in an undergoing transformation of the urban landscape and automotive industry. This transition overarches the paper, where shifts have to be assessed in determining the pathway for stakeholders and private companies in ensuring a meaningful transition.

URBAN MOBILITY

Transport is a shared responsibility amongst the state, businesses, and individuals. Urban Mobility is key for the connectivity of people within a state and across borders. Singapore and the EU have made inroads towards transforming their landscape with the transition to Smart Mobility.

SINGAPORE: LAND TRANSPORT MASTER PLAN 2040 (LTMP 2040)[9]

The Land Transport Authority (LTA) outlined their plans through the LTMP 2040, focusing on having a well-connected, swift, and inclusive infrastructure.

9 *European Free Trade Association*

- "45-Minute City & 20-Minute Towns": This plan aims to increase the efficiency of transportation to reduce the time taken for travel from point to point. "Walk-Cycle-Ride"10 target of having 90% of all peak-period journeys will be completed in less than 45 minutes, and journeys to the nearest neighbourhood will be completed within 20 minutes.
- This will be achieved through the expansion of the active mobility network, to achieve 1000km of cycling paths by 2040. Moreover, the rail network will be expanded as well, with the completion of new completion of new railway lines such as Thomson-East Coast Line (TEL), Jurong Region Line (JRL) and Cross Island Line (CRL). In addition, feasibility studies are carried out to demand, alignment, station locations and implementation timeline of upcoming lines.

The LTMP 2040 also sets out initiatives to develop the infrastructure to be clean and green as well.

- The aim is to improve streets and reduce the carbon footprint of the land transport system. Fleet vehicles, such as buses and taxis, have much higher carbon emissions per vehicle compared to private vehicles. For example, the average carbon emission of a taxi is more than seven times that of a private car. The commitment is to have a 100% cleaner bus fleet and taxi fleets by 2040, with trials on 50 diesel hybrid buses since December 2018 and taxi companies committing to have 90% of their fleet run on cleaner energy by 2025.
- Private adoption of cleaner energy vehicles: Reviewing regulatory regimes, vehicle registration schemes and vehicular emissions schemes and expansion of BlueSG by working with relevant stakeholders.

Budget 2020[11]

- The government aims to phase out Internal Combustion Engine (ICE) Vehicles by 2040, in efforts for their transition to EVs.

For individuals in this transition, the government will allow them to play an active role for commuters, transport workers, industry players, academics, and experts to shaping the land transport system. The government will hold extensive consultations when planning local transport infrastructure improvements.

EUROPEAN UNION: SUSTAINABLE URBAN MOBILITY[12]

The European Commission (EC) has in place its Sustainable Urban Mobility policy, where it focuses on having member states commit to action on urban mobility.

- 2013 Urban Mobility Package: Updated through Sustainable Urban Mobility Plans (SUMPs), committing member states to local action on urban mobility. These plans are consistently updated from feedback gathered from member states.
- The EC aims to halve the use of conventionally fuelled cars in urban areas by 2030 and phase them out by 2050, achieve CO2-free city logistics in major urban centres by 2030, and move close to 0 fatalities in road transport and halve casualties by 2050.
- Moreover, by 2050, Greenhouse gases (GHG) from transport is mandated to be lowered by 60% than that of the level in 1990, focusing on the efficiency of the transport system and transition towards zero-emission vehicles.
- On the connectivity front, the EC has outlined in its "Intelligent Transport System (ITS) Directive 2010" that it aims to achieve coordinated and effective deployment and use of ITS within member states and across borders. They are developing the specifications necessary to ensure the compatibility, interoperability and continuity for the deployment and operational use of ITS for-priority actions.
- The EC is also providing financial support for urban mobility. There is the European Structural and Investment funds catered to walking and cycling infrastructure. Research initiatives such as Horizon 2020 are ongoing to develop smart, green, and integrated transport. The focus is on multi-modal inter-urban transport, regional mobility, and spatial planning. Another programme is the CIVITAS Initiative: City, Vitality and Sustainability, which conducts living lab projects such as car-sharing, bike-rental systems, and clean vehicles.

ANALYSIS

Both Singapore and the EU have a mutually beneficial set of complementary policies in addressing Urban Mobility. This presents a golden opportunity for Singapore and the EU to work together. Singapore can share key data and Key Performance Indicators (KPIs) with the EU, and in exchange, the EU can work together¬ with achieving the phasing out of ICE vehicles, through importing more EVs. This can be achieved if both parties set out key regulatory requirements in a joint bilateral effort. Furthermore, both parties are progressing towards transforming their public transport system as well, aiming for zero-emission vehicles. Once again, Singapore and the EU can share information towards achieving a synergy in their efforts.

10 *While "Walk" probably needs no further explanation, "Cycle" refers to travelling by bicycle or other PMDs such as e-scooters. "Ride" refers to public transport such as buses and trains and point-to-point transport defined as taxis, private hire cars and shared cars.*
11 *Singapore Budget 2020: Push to promote electric vehicles in move to phase out petrol and diesel vehicles, Straits Times. Retrieved from https://www.straitstimes.com/singapore/transport/singapore-budget-2020-push-to-promote-evs-in-move-to-phase-out-petrol-and-diesel*
12 *EU policy for sustainable urban mobility, European Commission, Intelligent & Sustainable Transport Unit.*

The current policies towards addressing vehicular emissions are updated to be in line with goals set out by both parties. However, the political mechanisms and policies are not clearly outlined, which is essential towards clarifying the pathway for the transition towards e-mobility. Similar efforts towards reducing the reliance on private transport through car-sharing and bike rentals have also been implemented, where public infrastructure for alternative modes of transports are planned. Car-sharing continues to rise in both Singapore and the EU, albeit at a fairly low level. These are praiseworthy initiatives, but we believe that more can be done, if we approach the issues together.

Urban mobility problems cannot be not solved solely through the improvement of public transport and investments in infrastructure. People are still reluctant to leave their cars, and for good reason: in terms of time savings, flexibility, convenience and privacy, there is a huge gap between private car ownership and public transport. The LTA's approach to "zero car growth" through policies primarily through taxation to curb traffic congestion and discourage private car ownership, although commendable, should be expanded. Instead, the pathway to a safer, more sustainable industry has to consider encouraging competition across various modes of mobility.

Within this COVID-19 pandemic, the emphasis on the government to provide assistance to companies is amplified, as companies within the industry face high operating and maintenance costs. Jobs will be a key area for both Singapore and the EU to consider, where the impact of this pandemic is already being felt. Jobs in retail for car dealerships, in service for insurance and in the aftermarket for car repair, maintenance and the supply of spare parts are some areas to highlight. This area will be explained further in the subsequent sub-chapter.

Therefore, we believe that a more integrated approach towards mobility will be able to revamp the economy whilst making mobility increasingly sustainable, with the government promoting MaaS solutions and the private sector offering integrated first and last mile transport solutions. A combined and coherent inter-modality model with the involvement of all stakeholders is required here.

On the side of cost, road pricing has been proven to be the most efficient political tool of influencing traffic. In Singapore and Stockholm for instance, relatively low fees have led to people changing their travel behaviour. And since congestion is non-linear, a small drop in traffic leads to a large drop in congestion and consequently in emissions. Moreover, financing traffic infrastructure by road pricing – as compared to taxes – is a sustainable solution, where the actual costs for society, both direct and indirect, are charged to the people and businesses that are using it.

Hence, road pricing with a local emissions component would have an additional benefit for e-mobility. In order to pay less for road pricing, customers would want to maximise their electrical driving. This would work as additional motivation to charge frequently and accelerate the build-up of both private and public charging infrastructure. Therefore, cost savings on road pricing would be an important factor to motivate customers to purchase and use electrified vehicles.

RECOMMENDATIONS

- All stakeholders required for a smooth transition for urban mobility policies in both Singapore and the EU must be engaged and involved in the process. Extensive consultations have to be carried out to ensure that all interests and needs are accounted for, where communication is key to achieve this.
- The Singapore government should encourage competition between all modes of mobility, implementing policies to encourage people to choose sustainable travel options, instead of adopting policies that restrict vehicle ownership or ban the usage of vehicles.
- Set up quality objectives for urban mobility. The implementation of a dynamic road pricing scheme based on the quality objectives below would encourage customers to choose more sustainable travel modes:
  - Traffic flow (road usage efficiency, Pax/m2/time)
  - Parking (e.g. average time for parking space search)
  - Emissions (amount of local emissions caused by traffic)

- At the same time, road pricing would be a sustainable way of financing road infrastructure. Revenue generated from road pricing should be re-invested in road infrastructure and public transportation. A well-established infrastructure will reduce time of travel and appeal to users to switch over to more sustainable modes of transport.
- Cost is a primary factor for road users' decision making towards switching over to sustainable modes of transport. A reduction of road taxes for both Electric Vehicles (EVs) and Autonomous Vehicles (AVs) should be considered.

DEVELOPMENT OF HUMAN CAPITAL WITH THE TRANSITION TO EVS

With both parties having urban mobility policies to create a connected, safer, and greener landscape, the transition to EVs and Autonomous Vehicles (AVs) is predicated upon the development of human capital. The requirement for industries to have skilled workers with the effective technical knowledge towards the development and production of EVs and AVs needs to be prioritised by both parties.

SINGAPORE: LAND TRANSPORT INDUSTRY TRANSFORMATION MAP 2.0[13]

The government's adoption of new technologies will require familiarisation by manufacturers and operators, to ensure a smooth transition towards sustainable modes of transport. The Land Transport Authority (LTA) works together with unions and industry players to prepare workers for new job opportunities in the automotive sector. Key initiatives include:

- LTA works with stakeholders such as the National Transport Workers' Union (NTWU) and Public Transport Operators (PTOs) to develop a skills and training roadmap to be launched in 2020. This roadmap will lay out the essential skills required for jobs and the roles of new jobs arising from the deployment of AVs. Therefore, the LTA is planning to first train about 100 bus captains on courses for AV safety protocols and operations.
- This training also extends to the railway workforce, through the Rail Manpower Development Package (RMDP). The RMDP will ensure that operators are trained in key technologies and skillsets such as data analytics and condition-based maintenance.
- On the front of taxi and private-hire car drivers (PHC), the LTA will work with Skillsfuture Singapore, to develop training programmes for drivers, learning skills such as the operation of e-payment technologies. Grab and the National Private Hire Vehicles Association (NPHVA) also launched the Grab Driver-Partner Training Kit that includes courses on safety and digital skills.

EUROPEAN UNION: EUROPEAN SKILLS AGENDA[14]

The European Skills Agenda is an initiative by the European Commission towards pursuing a paradigm shift in skills to take advantage of the green and digital transitions and support a prompt recover from the COVID-19 crisis. Key initiatives include:

- Upskilling Pathways – New opportunities for adults. The EU aims to provide essential skills for the employment of low-skilled adults. Mutual learning workshops are funded by the EU Programme for Employment and Social Innovation (EaSI), where key stakeholders are engaged to cooperate and provide services to upskill the adults. Funding of €30.8 billion is introduced for sustainable and quality employment, where member states plan to engage around 8 million low qualified individuals.
- A blueprint for sectoral cooperation on skills is also created for stakeholders to work together in sector-specific partnerships, called alliances for sectoral cooperation for skills. These alliances help to address skill gaps in identified sectors. Through this blueprint, stakeholders can gather information and develop effective vocational programmes in the long term to be rolled out at the national and regional levels. Alliances have been created in the automotive industry and more recently on batteries for electro-mobility and towards digitalization as well.
- Platforms of Centres of Vocational Excellence (CoVEs) are developed to bring together a wide range of local partners, such as providers of vocational education and training, employers, research centres, development agencies, and employment services to develop "skills ecosystems" that contribute to regional, economic and social development, innovation and smart specialisation strategies. At the national level, the CoVEs are linked to local innovation ecosystems and connects them at the EU level. At the international level, the aim is to establish major hubs through this platform through coalescing centres with common interests in specific sectors or trades to tackle specific societal challenges.

13 *Speech by Dr Janil Puthucheary, Senior Minister of State for Transport and Communications and Information at The Ministry of Transport's Committee of Supply Debate 2020 on Towards A Future-Ready Land Transport System, Ministry of Transport. Retrieved from https://www.mot.gov.sg/news-centre/news/Detail/speech-by-dr-janil-puthucheary-senior-minister-of-state-for-transport-and-communications-and-information-at-the-ministry-of-transport-s-committee-of-supply-debate-2020-on-towards-a-future-ready-land-transport-system/*

14 *Employment, Social Affairs & Inclusion, European Union. Retrieved from https://ec.europa.eu/social/main.jsp?catId=1224&langId=en*

ANALYSIS

Both Singapore and the EU have key considerations towards the transformation and creation of jobs in the automotive industry. The shift in technical skills required to operate key areas in both EVs and AVs are imperative to be taught to employees. This shift has to be championed by the government, working with other stakeholders, where effective communication allows for the best policies to be rolled out.

Policies are similar in both Singapore and EU. However, the Singapore government is focusing on the public sector transformation and should consider extending its current services to the private sector as well. The shift to EVs and AVs cannot be born by the government in Singapore alone. Similar to the EU, aiming to create an ecosystem for all stakeholders will be important for private companies to be attracted to Singapore and have confidence towards being supported by the government in terms of having their own employees being upskilled and having opportunities to develop themselves.

RECOMMENDATIONS

- Establish a roadmap for both public and private operators in the automotive industry. Currently, grant calls for a proposal are provided by the government. This needs to be expanded through consultations with private companies, to understand their needs for financial support and other innovation programmes.
- The platforms in Singapore through Skillsfuture needs to extend its aid towards private companies. The current landscape of aiding public companies will stunt the progress of the nation's transformation. Employees in private companies also require upskilling and the government can collaborate with companies to roll out programmes catered for respective companies.
- The government can consider expanding this platform for private companies within the regional level as well, where it can establish itself as a hub for attracting companies to develop solutions for creating jobs and innovating current ones as well.
- Singapore should leverage its position to attract R&D in this region, and the government should leverage on its opportunities to develop global solutions with the transition towards electrification. This will be beneficial for all parties, where cost-efficient methods can be developed, and Singapore can be a leader in its region to lead this transition.

CHAPTER 2

EVALUATION OF REGULATIONS TOWARDS ELECTRIC VEHICLES (EVS)

Electric Vehicles (EVs) have been highlighted as a key priority within Smart Mobility by Singapore and the EU. Both Singapore and the EU are working together in this issue, where articles within the European Union-Singapore Free Trade Agreement (EUSFTA) highlight the following[15]:

Article 3 (3) of Annex 2-B (Motor Vehicles and Parts Thereof) to the FTA provides that Singapore will "accept new Union products covered by this Annex and which are covered by an EC or UNECE type-approval certificate on its market as complying with its domestic technical regulations and conformity assessment procedures, without further testing or marking requirements to verify or attest compliance with requirements covered by and EC or UNECE type approval. …"

Article 4 (1) of Annex 2-B states: "Neither party shall prevent or unduly delay the placing on its market of a product covered by this Annex and approved by the exporting party, on the ground that the product incorporates a new technology or a new feature that the importing party has not yet regulated, unless the importing party can demonstrate, based on scientific or technical information, that such new technology or new feature creates a risk for human health, safety or the environment."

The above underline the supposed streamlining for the entry of European products into the Singaporean market, where technologies or vehicles covered by

15 *EUSFTA, MTI. Document retrieved from https://www.mti.gov.sg/Improving-Trade/Free-Trade-Agreements/EUSFTA*

regulations will be accepted by both parties. However, in practice, there are areas of improvement which will be explained in the following sub-chapters.

INCENTIVES FOR EV BUYERS AND USERS

Customers worldwide have similar concerns about switching to EVs:

- They are afraid that using an EV will become an inconvenience due to limited range, long charging times and poor charging infrastructure.
- They do not want to pay more for an EV than a comparable ICE vehicle.

This sub-chapter will consider the cost. One of the major challenges Singapore faces is the higher cost of an EVs, when compared to comparable ICEs. In order to encourage customers to transition to EVs, policies need to be adjusted to reduce these costs. Financial incentives will boost consumer demand for EVs and make it more cost competitive as compared to Internal Combustion Engines (ICE) in Singapore.

SINGAPORE: BUDGET 2020[16]

In 2018, the Government introduced the Vehicular Emissions Scheme for cars and taxis. Under the scheme, car buyers and taxi operators who choose cleaner car models can receive an upfront rebate of up to $20,000 and $30,000, respectively.

For cars and taxis, Singapore will provide an EV Early Adoption Incentive, those who purchase fully electric cars and taxis will receive a rebate of up to 45% on the Additional Registration Fee, capped at $20,000. This incentive will be implemented for three years, from January 2021.

The government will also revise the road tax methodology for cars to better reflect the current trends in vehicle efficiency from January 2021. This will lead to an across-the-board reduction in road tax for EVs and some hybrids. To compensate for losses in fuel excise duty, a lump-sum tax for Battery-powered Electric Vehicles (BEVs) will be introduced.

EUROPEAN UNION: ELECTRIC VEHICLES: TAX BENEFITS & PURCHASE INCENTIVES IN THE EUROPEAN UNION[17]

Presently, there are 20 EU member states which offer incentives, such as bonus payments or premiums to buyers of electric vehicles. 6 countries – Belgium, Bulgaria, Cyprus, Denmark and Latvia and Malta - do not provide purchase incentives, granting tax reductions or exemptions for electric cars. Lithuania does not provide any form of tax benefits or incentives.

For example, Germany has a range of incentives, some of which summarised below[18]:

- Ownership Tax Benefits: there is a 10-year tax exemption for initial registration from 2016-2025 for electric vehicles (purely electric or fuel-cell vehicles, not hybrid vehicles). After the exemption, the car tax will amount to 50% of €11.25 (up to 2,000kg), €12.02 (up to 3,000kg) or €12.78 (up to 3,500kg) for each 100cc or part thereof.
- Local incentives: for Battery-powered EVs, there are reserved parking spots, free parking and bus lane use accorded.
- Purchase incentives: electric vehicles having a nett list price of up to €40,000 have more subsidies. For purely electric and fuel-cell vehicles the total bonus is €9,000 and for plug-in hybrid and range-extended electric vehicles it is €6,750. The costs of these bonuses are equally shared between the government and the manufacturers.

ANALYSIS

Singapore, similar to many countries in Europe, has already implemented financial incentives to speed up the adoption of EVs. As cost is a primary factor in decision-making for the purchase of vehicles, incentives can have a strong pull factor for customers. It is important to consider reducing the Total Cost of Ownership (TCO) of EVs, compared to similar combustion engine vehicles.

Countries that have been most successful in promoting e-mobility – Norway, Sweden, Netherlands and China etc – have taken a holistic policy approach. By adjusting fiscal policies and providing usage incentives, they have made it more attractive, more convenient and less expensive to choose an electrified vehicle over a conventional vehicle. For instance, purchase and ownership taxes such as annual road tax, have been drastically reduced or even exempted for EVs. Some countries have introduced special license plates for electrified vehicles. This allows national and local authorities to introduce usage incentives easily, such as free parking and charging, bus lane access, and reduced fees for toll roads.

16 *Singapore Budget 2020: Push to promote electric vehicles in move to phase out petrol and diesel vehicles, Straits Times. Retrieved from https://www.straitstimes.com/singapore/transport/singapore-budget-2020-push-to-promote-evs-in-move-to-phase-out-petrol-and-diesel*
17 *Overview - Electric vehicles: Tax benefits & purchase incentives in the European Union, ACEA. Retrieved from https://www.acea.be/publications/article/overview-of-incentives-for-buying-electric-vehicles*
18 *Germany, European Alternative Fuels Observatory. Retrieved from https://www.eafo.eu/countries/germany/1734/incentives*

Through the announcements from its 2020 budget, Singapore is taking steps to increase the attractiveness of purchasing and owning an EV. However, the annual road tax for Plug-in-Hybrids (PHEVs) is as high as ICE vehicles. For BEVs, including the annual lump sum tax mentioned above, the annual road tax can range from being 2 to 4 times the tax for a comparable ICE vehicle.

Therefore, targeted policy changes towards the above areas are required to encourage customers in Singapore to choose EVs. In addition, there is much more room to promote EVs by providing incentives, such as free parking and charging, access to bus lanes and reduce Electronic Road Pricing (ERP) fees.

RECOMMENDATION

- Singapore should revise the road tax system to encourage EV adoption. Road taxes for BEVs and PHEVs should ideally be exempted or significantly be reduced compared to an ICE vehicle.
- The government should continue with CO2 based taxation schemes – such as the Vehicular Emission Scheme (VES) – to promote sustainable vehicles. However, the government should analyse if the complexity of additional pollutants can be reduced, as the current Particle Matter levels often times vastly reduce the chances of receiving incentives.
- Free and preferential parking for electrified vehicles and low-polluting vehicles should be considered, whilst increasing the cost for high polluting vehicles.
- Electric vehicles should be allowed to use bus lanes, which has been effective in countries such as Norway.
- Charging solutions should be intelligent to allow peak shaving and Vehicle-to-Grid solutions. For customers, this would enable charging at lower electricity rates during off-peak hours.
- With the move to ERP 2.0, a GPS based road pricing system, Singapore should consider introducing a local emission-based component in the pricing scheme. Thus, electrified cars would pay less so long as they are driven electrically. This will definitely encourage customers to choose EVs and make sure that they are primarily utilized electrically.
  - This incentive can be understood through the behavioural psychology term of "Loss aversion". People prefer to avoid losing as compared to receiving an equivalent gain. To visualise this, people will prefer to not lose $5 than to find $5. Hence, this same principle can be employed to encourage the purchase and usage of EVs. With road pricing, in order to avoid a small charge, people make small but still helpful changes to their mobility behaviour.
- The Singapore government has to consider the categorization of EVs to ensure the effectiveness of rebates.
  - The following chapter, on homologation highlights the various categories of vehicles in Singapore. Virtually all EVs have more than 97kW of power and fall into the Certificate of Entitlement (COE)[19] category (Cat) B. The COE for Cat B is higher than Cat A vehicles, translating to higher prices. An expected fall in the COE quota will likely result in a rising gap between Cat A and Cat B vehicles, where the COE gap is ascertained to be more than S$ 10,000. This would effectively wipe out the rebates offered by the government. Therefore, the Singapore government should consider all e-vehicles to be categorized under a special category to reduce the premium on them and for incentives to be effective.

EV HOMOLOGATION PROCESS

It requires that all vehicles that are being manufactured have to undergo approval, known as the homologation process. This process is required for the vehicle to be allowed into the respective parties' markets. EU and Singapore have the European-Union Singapore Free Trade Agreement (EUSFTA) in place, where the annex below underlines the benefit:

SINGAPORE

During the homologation process in Singapore, the Original Equipment Manufacturer (OEM) understand the classification of vehicles highlighted below, ranging from Category (Cat) A to E:

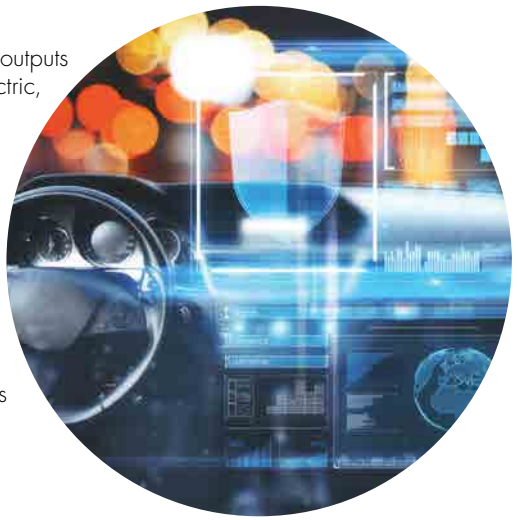
- Cat A - Cars 1600cc & below, and the engine power should not exceed 97 kilowatts (kW)
- Cat B - Cars 1600cc & above, or the engine power output exceeds 97 kW
- Cat C - Goods Vehicles & Buses (including public transport buses)
- Cat D – Motorcycles
- Cat E - "Open" (for any kind of vehicle, in 2017 motorcycles are no longer included in Cat E COE)

Category A cars will be required to undergo the power output testing process for both Internal Combustion Engines (ICE) and EVs[20]:

- ICE:
  - When a new vehicle arrives in Singapore, it is homologated with test reports based on UN ECE R101 from the

19 *The Certificate of Entitlement (COE) is a quota licence received by vehicle users which allow them to have the legal right to register, own and use a vehicle in Singapore for a period of 10 years.*

20 *E-Mobility Technology Roadmap, 2015, National Climate Change Secretariat (NCCS). Retrieved from www.nccs.gov.sg › e-mobility-technology-roadmap*



test lab. The vehicle then undergoes a power testing, ranging from power outputs of 81 -97 kW. It then is placed under 1 of 4 categories: Petrol, Petrol-Electric, Diesel, Diesel Electric, before being approved by LTA.

- EV/PHEVs:
  - When a new vehicle arrives in Singapore, it is homologated with test reports based on UN ECE R101 + 100. The vehicle then undergoes a power testing, ranging from power outputs of 81 -97 kW. It is placed under 1 of 3 categories: Electric, Petrol-Electric (Plug-in) and Diesel-Electric (Plug-in). The local CO2-Output formula added with grid factor to determine the grid emission factor – which is an emission factor that is associated with each unit of electricity, before being approved by LTA.

All EV charging systems have to be certified compliant to technical safety standards (TR25) before they can be installed and used.

EUROPEAN UNION

The EU introduced its new laboratory test, the Worldwide harmonised Light-duty vehicles Test Procedures (WLTP)[21], updating its current processes with technological innovations in the automotive industry.

- The WLTP is a new regulatory test procedure for light passenger cars and commercial vehicles to determine fuel consumption and emissions. It provides a more uniform procedure for calculating a vehicle's fuel consumption and emissions.
- Manufacturers are required to ensure correspondence between the CO2 emissions recorded in the certificates of conformity of their vehicles and the CO2 emissions of vehicles in-service measured according to the WLTP.
- The homologation process is based on the Whole Vehicle Type-Approval System (WVTA). The EU's Regulation – 2018/858 of the European Parliament and of the Council of 30 May 2018 – will replace the current directive and be made mandatory for all vehicles by 1 September 2020.
- Under the WVTA, a manufacturer who has obtained the Certificate of Conformity (CoC) after approval, will be able to market their vehicle throughout the EU, without any further tests which would delay the process.

ANALYSIS

Both Singapore and the EU have been updating their approval requirements with the changing developments in the automotive industry. The National Environment Agency (NEA) announced its acceptance for emission test results for pollutants from the WLTP employed by the EU, for type approval of new vehicles and assessment under its Vehicular Emissions Scheme (VES). It aims to monitor international developments and work with the local motor industry towards a complete switchover to the WLTP in the longer term.

This is in line with the EUSFTA signed by both parties, where neither Singapore nor the EU should, under Article 4 (1) of Annex 2-B, delay the entry of products into their markets. The movement towards the common approval standard is well-received.

As for the previously mentioned Vehicular Emissions Scheme (VES), we hope that the new VES could better distinguish between the different propulsion technologies, which is essential and crucial towards customers' decision-making, and also aid in the implementation of Singapore's adoption of EVs.

For charging systems, charging networks have been deployed across Europe and they have been certified to ensure that users have access to convenient high-powered EV charging. However, in Singapore, the current local regulation (TR25) charging systems impose technical barriers and limitations. The regulation is not consistently reviewed and its not does not have provisions to accommodate technology advancement or updates which resulted in the debarment of certified equipment and products from entering the market.

RECOMMENDATIONS

- As the government accepts the WLTP, it should work towards a common type approval process for EVs in Singapore. If there are additional safety guidelines required for the homologation process, the Singapore government should clarify them to ensure that there is no delay between both parties in approval of EVs.
- The current regulatory requirements for the homologation and certification process of charging systems have to be reviewed. Charging systems are essential for EV users and the Singapore government has to ensure that technical requirements are justified, as they only drive up the EV infrastructure costs and increase time for implementation,

21 *Will wltp end the discrepancy between the laboratory and on-road performance of cars? WLTP FACTS. Retrieved from https://www.wltpfacts.eu/wltp-discrepancy-laboratory-road-performance-cars/*

which is detrimental for the transition towards EV. A clearly defined process for the above and towards ownership will serve as a catalyst to promote investor confidence and help materialize and swiftly implement the government's target of 28,000 charging stations.
- A clear timeline towards the WLTP implementation by LTA and NEA will provide manufacturers with a certainty and confidence towards the time they can bring in newer and cleaner engine technologies currently used in the EU.
- Overall, the homologation requirements should be streamlined and lead times for new vehicles be reduced. This is highly possible due to the existing EUSFTA in place.

CHARGING INFRASTRUCTURE

The Charging Infrastructure is imperative towards establishing a seamless network for the EVs in Singapore. Regulations by both parties are explained below.

SINGAPORE

Budget 2020[22] in Singapore has outlined the following details. There are currently an estimated 1,600 charging stations in Singapore. The government aims to increase the number of charging stations to 28,000 by 2030. The status of the charging infrastructure in Singapore consists first of an estimated 1,100 AC stations, which range from 3.7 – 50 kW and an estimated 45 DC stations, ranging from 22 kW - 50 kW. Although there are charging infrastructure challenges, there is positive traction and more Charging Point Operators are expected to enter this business domain.

The Singapore government recommends the Combined Charging System (CCS), with Type 2 for AC and CCS Combo 2 for DC. This is the same standard as used in Europe, as well as in most world markets. Most Original Equipment Manufacturers (OEM) prioritise Type 2 and CCS Combo 2 as well.

EUROPEAN UNION

The EU has a robust charging infrastructure in place, where there are common charging standards amongst member states. As of 2020, there are 6 charging points per vehicle[23]. The EU also utilizes Type 2 for AC connectors and inlet, with high power DC charging utilizing CCS Combo 2. The CCS has identical safety measures and identical charging communication.

ANALYSIS

Both the EU and Singapore have adopted the same charging standards. This is great news to customers, original equipment manufacturers (OEMs) and charging providers alike, as it ensures that investments into charging infrastructure remain relevant and that charging infrastructure can be used by all vehicles. Singapore has announced ambitious plans for the roll out of charging infrastructure and is on the right direction. However, we feel that more could be done in terms of communicating a clear roadmap for the establishment of the charging infrastructure, as well as adjusting policies to make it happen more organically. In addition, different agencies must obtain the technical knowledge on EVs, charging technologies and communication protocols.

There are a number of things governments can do in order to improve the conditions for charging infrastructure. In all markets today, 80-90% of charging happens where people spend most of their time – at home or at work. Charging installation in residential buildings is often limited by bureaucracy or by bottlenecks in power distribution. Having the right policies and incentives to prepare new buildings in advance (e.g. require that new buildings have sufficient power capacity to prepare for charging of vehicles) can help to overcome this.

In many markets, there are plenty of companies that are trying to install Public Charging Infrastructure. But oftentimes they are struggling on the business side, since there are not enough EVs, and the few that are around do not get charged. The best thing governments can do is to make it attractive for customers to own and charge EVs. In addition they can help out with incentives to the charging providers. There are already a lot of countries doing all of this. Best practices can be found in the Nordics, Netherlands, France, Japan, and Korea.

It is of paramount importance to ensure that different ministries, agencies, and companies are collaborating in order to maximize the efficiency of the charging infrastructure. In Singapore, there are different agencies in charge of various developments, and this could potentially cause a delay towards the operation of the charging infrastructure.

22 *Singapore Budget 2020: Push to promote electric vehicles in move to phase out petrol and diesel vehicles, Straits Times. Retrieved from https://www.straitstimes.com/singapore/transport/singapore-budget-2020-push-to-promote-evs-in-move-to-phase-out-petrol-and-diesel*
23 *European Union, European Alternative Fuels Observatory. Retrieved from https://www.eafo.eu/electric-vehicle-charging-infrastructure*

RECOMMENDATIONS

- The Singapore government needs to establish a clear roadmap towards the implementation of charging stations in both public places and places of residence. This roadmap must focus on tangible steps, and not solely focus on the end goal of a numerical quantity of charging stations in Singapore. A detailed roadmap will allow companies to understand the aims of the government and provide their feedback as well.
- As there are multiple agencies concerned with the transition to EV, it will be beneficial for both the government and companies if a joint taskforce was created to set out the goals for the charging infrastructure in Singapore, to discuss both the short and long term aims.
- Government agency coordination needs to be in tandem with private companies, for investment in charging stations and equipment. Effective communication is required and further financial incentives such as tax reductions for private companies can be considered to develop an attractive climate towards investment in the charging infrastructure.
- The approval process for the installation of charging infrastructure needs to be streamlined, also including establishing policies for both condominiums and HDBs. For parking, dedicated parking lots can be considered, where consumers will purchase parking lots in Singapore for their charging systems to be installed.
  – This recommendation is in tandem with the increasing number of charging stations planned in Singapore.
- The government should take into consideration the homologation process for charging equipment as well, to reduce confusion and ambiguity for both manufacturers and users.
- Ideally, Singapore should strive for the implementation of smart charging solutions with Vehicle 2 Grid (V2G) technology. This enables the grid operator / the OEMs to control when the actual charging (and potentially discharging) of vehicles takes place. Thereby, peak loads on the grid can be prevented, redundant (short term) capacities can be avoided, and the integration of renewables can be simplified.

CHAPTER 3

THE FUTURE OF MOBILITY

DIGITALIZATION & AUTONOMOUS DRIVING

The shift towards smart mobility is also based upon the digitalization of the automotive industry and the attainment of autonomous driving. The future of mobility is one that is Connected, Autonomous, Shared and Electric. Within this chapter, the focus will be on connectivity between users and industries boosted by data connectivity, where autonomous driving is being pushed to ease congestion, reduce emission and allowing people to be more productive.

Through autonomous vehicles, the element of human error margin is removed, and this will be beneficial towards having a decline in accidents, making roads safer. To achieve this, connectivity is essential and important data must be gathered and shared. The opportunities for this industry is high, where education is required to upskill workers and job opportunities can be created as well, for the operations of newer systems.

SINGAPORE: SMART NATION INITIATIVES[24]

The government has been rolling out initiatives with the shift towards Intelligent Transport Systems (ITS) being targeted towards achieving Smart Mobility in Singapore. The initiatives are summarised below:

- Autonomous vehicles (AV)
  – Trials for AV has been undertaken by A*STAR, where testing was done in 2015 at One-north. Collaborations with institutions such as the National University of Singapore and the Singapore-MIT Alliance for Research and Technology (SMART) has led to working research prototypes being tested as well, around the NUS campus and

24 *Transport, Smart Nation Singapore. Retrieved from https://www.smartnation.gov.sg/what-is-smart-nation/initiatives/Transport*

with Self-Driving Vehicles (SDVs) being tested at the CleanTech Park in Singapore.
  - The Land Transport Authority (LTA) in collaboration with ST Kinetics, aims to develop AV technologies onto buses, these buses will use a satellite-based GPS and sensors to scan surroundings and assess actions to be taken.
  - Singapore has expanded the testing area for AVs to the entire western part of Singapore. This will increase the length of public roads for AV testbeds from 70km to more than 1000km. This expansion will allow developers to progressively test AVs in a wider range of traffic scenarios and road conditions and demonstrate the safety and reliability of AV systems in order to gain wider public acceptance.
- Open Data & Analytics for Urban Transportation
  - The LTA highlights that there will be 92% reduction in the number of bus services with crowding issues through transport planning aided by public data. Data on bus arrival timings, taxi availability, traffic conditions and carpark availability are accessible by both the public and third-party developers. In the future, a new ERP system will be developed to optimize traffic systems and the Fusion AnalyticS for public Transport Emergency Response (FASTER) system will analyse data to develop commuting patterns and provide better predictions towards first response in times of emergencies

Within the LTMP 2040, the government highlighted a new initiative of an Autonomous, Dynamically Routed Services (DRS)

- DRS services can adjust their routes based on passenger demand so that commuters can make fewer transfers, while optimising the resources of our transport network. When paired with Autonomous Vehicles, it will be able to reduce operating and manpower costs. Current pilot programmes are ongoing in Punggol, Tengah, and the Jurong Innovation District.

EUROPEAN UNION: CONNECTED AUTOMATED DRIVING ROADMAP[25]

The Union has been working on initiatives as well, with its aim to increase the availability of automated cars in 2020. The current target is set towards having level 4 of automation – a high level of automation which will still require human control over vehicles. The initiatives towards the digitalization of mobility and autonomous vehicles are summarised below:

- STRIA Roadmap on Connected and Automated Transport (CAT)
  - The Commission is in close cooperation with member states and stakeholders from industry, academia and national authorities to develop transport mode-specific roadmaps towards CAT. This will allow the identification of areas where innovations can overlap, allowing the acceleration of deployments. These roadmaps are also targeted with short, medium and long terms, pointing to 2023, until 2030 and beyond 2030.
- Horizon 2020 Programme
  - The Aligning Research & Innovation for Connected and Automated Driving in Europe (ARCADE) is a project conducted by the commission to coordinate consensus-building across stakeholders for sound and harmonized deployment of Connected Automated Driving (CAD) in Europe. It collaborates with member states, to ensure that automated road transport systems and services are compatible at EU level and are deployed in an efficient manner. A knowledgebase via a website has been created to share information amongst member states, allowing for effective communication and understanding on the combined shift towards CAD. Cooperation at an international level is also undertaken through ARCADE, shown by Trilateral ART Working Group formed with the US and Japan.
  - Public-Private Partnerships (PPPs) are set up at the European level, where funding for research and development are provided through Horizon 2020. These partnerships allow for a connected approach to accelerating the development of technologies required for connectivity and automated vehicles. 5G is also considered with the 5G-PPP, where fast connectivity is essential for communication with the target of increasing autonomous vehicles to be launched.
- Cooperative Intelligent Systems (C-ITS) & C-Roads
  - The C-ITS establishes the connection of vehicles with one another and combined with an effective infrastructure, this will allow road users and traffic managers to share information and use it to coordinate actions. This benefits road safety and traffic efficiency. In addition, the C-Roads platform is a joint initiative for the development of harmonised specifications towards communication in the road network. The platform supports the use of hybrid communication technologies.
- European Data Task Force (DTF)
  - The European Member states also launched the European Data Task Force (DTF), which aims to prioritise access to safety data and enable collaboration between vehicle manufacturers and member states. This will ensure that traffic safety is enhanced for all road users. The Memorandum of Understanding (MoU) is based on the principle of reciprocity where safety data will be offered in return for safety services.

ANALYSIS

The European Union's initiatives provide critical insights that are essential for the digitalization of mobility and the progress towards AVs in Singapore. The Singapore government's initiatives highlighted above lay the inroads towards the development of AVs and the digitalization of mobility. However, more could be done towards engaging businesses. Europe's overarching focus towards establishing a clear roadmap for the infrastructure and for communication between the Union,

25 *Connected Automated Driving Roadmap, European Road Transport Research Advisory Council (ERTRAC) Working Group.*

member states and other stakeholders within the industry is important. This focus is important in Singapore too. Despite the benefits of testing AVs and allowing access to traffic information for third-party developers, the infrastructure needs to be firmly established and assessed with companies' perspectives being understood as well.

Digitalization requires clear two-way communication, where the government can expand its efforts on this front, which will be beneficial for companies to view Singapore as an essential hub to invest in and conduct operations.

RECOMMENDATIONS

- The government should consider, similar to EVs, to have standard approval processes which will allow for companies' products seamlessly enter the market. In addition, extensive consultations with such companies should be carried out, for them to understand specific regulations pertaining to issues such as software and safety.
- Despite Singapore garnering first place in KPMG's annual autonomous vehicle readiness index this year, we believe that progress in Singapore can continue to be optimized. Within the index, Singapore is ranked 11th in terms of Technology & "Innovation", which highlights opportunities for improvements. Industry Investments and Investments into AV are some areas which Singapore can consider towards having partnerships with private companies.
- The development of an open data network should also be considered for the exchange of key information on the operations of AVs, where optimal information available will be important for safety. This will require a development of standards to be agreeable by all stakeholders in this industry.
- The expansion of AV testing in public roads in Singapore, although beneficial for the government, should prioritize safety at all times. This is an effective initiative, and for it to be an effective implementation, more areas of AV testing should also be considered, working together with companies for smooth operations.
  - With the various projects towards AVs, there is sentiment that such projects are geared towards publicity. The government needs to spread awareness of its commitment towards AV testing. Singapore should consider more EU examples. E.g. autonomous ports.
- The data consumption through connectivity also needs to be considered with the ongoing testing with AVs. Similar to the EU, Singapore should consider connectivity via LTE/5G Networking, which will provide better support for the vehicle-to-vehicle communication. This would also require consultations with companies.

CHAPTER 4

LOOKING AHEAD

As the Singapore government takes action for its transition to Smart Mobility, it will need to consider the micro and macro levels of initiatives. Within the micro level, the government's initiatives will be required to expanded and detailed to provide an attractive climate for companies to continue investing in and conducting operations in Singapore. At the macro level, the government needs to consider its current agreements with the EU, such as the EU-Singapore FTA, to ensure clarity between both parties. This will be optimal for all stakeholders, ranging from the government, to companies and to individuals as well.

The transformation of the automotive industry should be embedded in the whole region of ASEAN, not just in Singapore. Here, Singapore has the capacity to establish itself as a hub and for the progress of conversion of the region towards smart mobility. Championing the role to communicate with neighbouring countries and understanding their own regulations towards smart mobility will be a key priority in the future, as the automotive industry continues to become more data-driven and where Mobility as a Service (MaaS) will continue to rise.

CONCLUSION

The objective of this paper, as mentioned above, is to facilitate discussion between parties in the EU and Singapore on the transition towards Smart Mobility. This began with the understanding of initiatives by both Singapore and the EU, which this position paper has summarised in the respective chapters above. Following which, analysis and recommendations have been put forth, to prescribe a pathway for both parties to consider for their actions in the future.

This paper enables all stakeholders to further identify their role and work towards the creation of an effective, efficient and an exemplary ecosystem for smart mobility. Ultimately, we strongly believe this transition for both Singapore and the EU,

must be a combined and synergic effort, leveraging on existing bilateral agreements and more importantly, trust between all stakeholders. The amalgamation of shared experiences and knowledge will ensure that the transition will be a meaningful one.

CONTRIBUTORS

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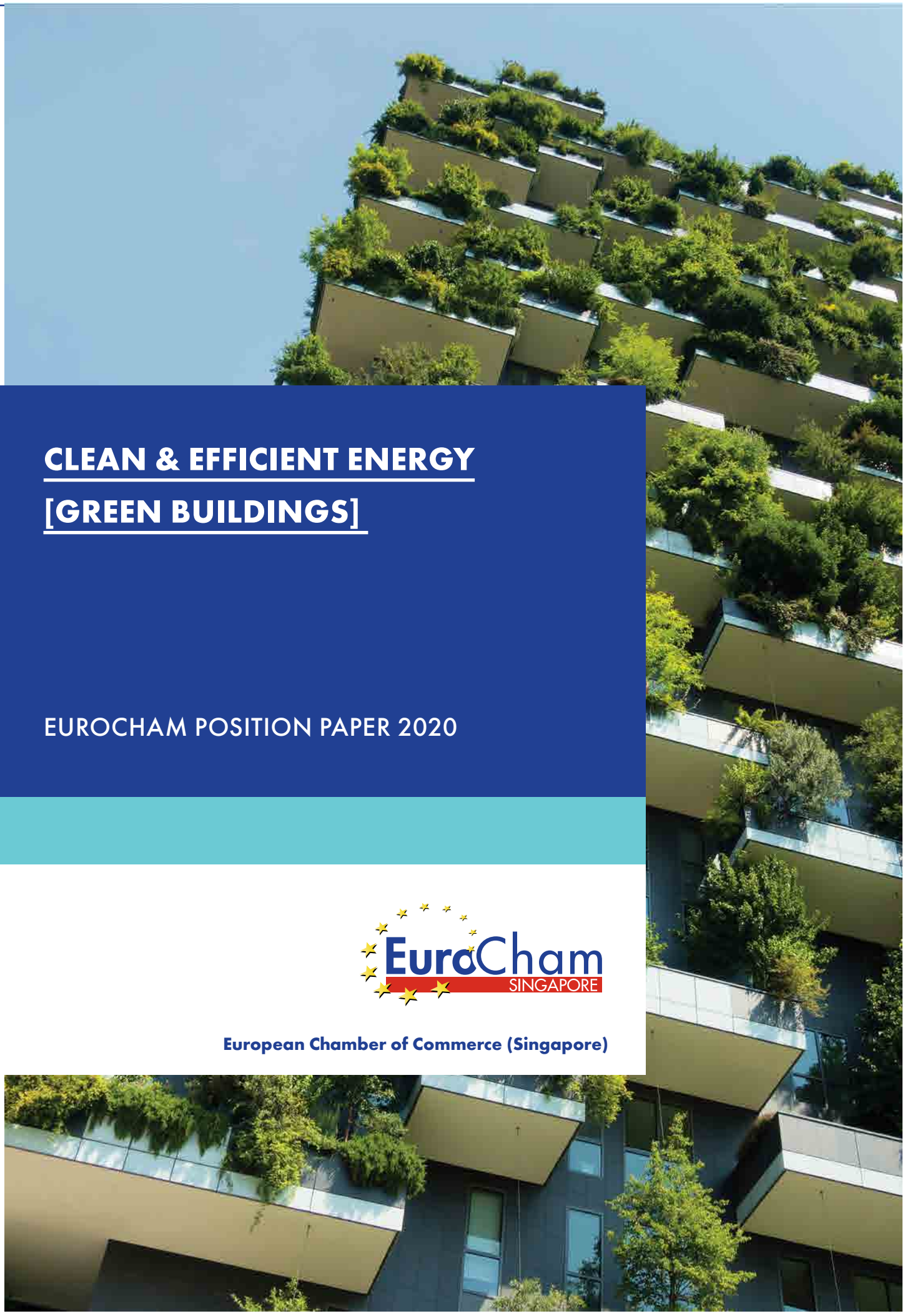
LIST OF ACRONYMS

ARCADE	Aligning Research & Innovation for Connected and Automated Driving in Europe
AV	Autonomous Vehicles
BEV	Battery-powered Electric Vehicles
CAD	Connected Automated Driving
CCS	Combined Charging System
COE	Certificate of Entitlement
CoVE	Centres of Vocational Excellence
CRL	Cross Island Line
EaSI	EU Programme for Employment and Social Innovation
EC	European Commission
ERP	Electronic Road Pricing
EU	European Union
EUSFTA	European Union-Singapore Free Trade Agreement
EV	Electric Vehicles
FASTER	Fusion Analytics for public Transport Emergency Response
ICE	Combustion Engines
ICE	Internal Combustion Engine
ICE	Internal Combustion Engines
ITS	Intelligent Transport System
ITS	Intelligent Transport Systems
JRL	Jurong Region
KPI	Key Performance Indicators
LTA	The Land Transport Authority
LTMP	Land Transport Master Plan
MaaS	Mobility as a Service
NEA	National Environment Agency
NTWU	National Transport Workers' Union
OEM	Original Equipment Manufacturer
OEM	Original Equipment Manufacturers
PHEV	Plug-in-Hybrids
PPP	Public-Private Partnerships
PTO	Public Transport Operators
QoL	Quality of Life
SDV	Self-Driving Vehicles
SUMP	Sustainable Urban Mobility Plans
TCO	Total Cost of Ownership
TEL	Thomson-East Coast Line
V2G	Vehicle 2 Grid
VES	Vehicular Emission Scheme
VES	Vehicular Emissions Scheme
WLTP	Worldwide harmonised Light-duty vehicles Test Procedures



CLEAN & EFFICIENT ENERGY [GREEN BUILDINGS]

EUROCHAM POSITION PAPER 2020

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND

This position paper assesses the developments towards green buildings and utilization of clean and efficient energy in Singapore on the one hand and in the European Union (EU) on the other. Globally, the call for sustainable development is emphasized by the United Nations (UN). The Brundtland Commission formed at the UN Assembly with the resolution 38/161 of 19 December 1983, highlighted in 1987 that sustainable development meant attaining today's needs without compromising future generations' capability to sustain their own necessities[1]. In 2018, the UN Framework Convention on Climate Change underlined that meeting the 1.5°C limit required "rapid, far-reaching and unprecedented" changes in land, energy usage, industry, buildings, transport and cities[2].

Emissions from buildings and their construction are approximately 40% of total carbon emissions, where operational emissions constitute 28%[3]. Green buildings, being more energy efficient, can aid in efforts by both Singapore and the EU towards sustainable development. The World Green Building Council (WGBC) is committed towards the promotion of efforts for buildings to reach net-zero carbon operating emission by 2030, and to advocate for all buildings to be net-zero carbon in operation by 2050. They have defined net-zero carbon buildings as buildings that "are highly energy efficient and fully powered from on-site and/or off-site renewable energy sources"[4]. As net-zero buildings are currently not feasible in a large-scale implementation, green buildings and nearly-zero energy buildings (NZEB) are the midway goal.

SCOPE & OBJECTIVES

This paper will focus on current developments towards green buildings and clean and efficient sources of energy for both Singapore and the EU and in particular in the areas of:

- Energy Demand
- Energy Supply
  – Conventional and renewable energy
- Measurement, Reporting and Verification (MRV) of greenhouse gas (GHG)

1 *Khan, Jam Shahzaib, Rozana Zakaria, Siti Mazzuana Shamsudin, Nur Izie Adiana Abidin, Shaza Rina Sahamir, Darul Nafis Abbas, and Eeydzah Aminudin. "Evolution to emergence of green buildings: A review." Administrative Sciences 9, no. 1 (2019): 6.*
2 *https://www.reuters.com/article/climatechange-ipcc/temperatures-to-rise-1-5-degrees-celsius-by-2030-2052-without-rapid-steps-u-n-report-idUSL8N1WM0JJ#:~:text=LONDON%2FSEOUL%2C%20Oct%208%20(,The%20U.N.*
3 *https://www.worldgbc.org/news-media/WorldGBC-embodied-carbon-report-published*
4 *Ibid.*

The analysis of both Singapore and the EU is crucial as it will allow stakeholders and private companies to understand their respective areas of improvement, establishing an avenue for a development of green buildings in Singapore. A combined effort of multiple stakeholders is imperative for ensuring the best possible progress towards sustainability.

The primary objective of this position paper is to assist stakeholders in both Singapore and in the EU to understand the current developments and issues to be tackled. Constructive recommendations will be provided, which will present opportunities for creating an attractive business environment in Singapore.

METHODOLOGY

This position paper has been developed by engaging the Singapore government's statutory boards and having extensive interviews with members of the European Chamber of Commerce (S) operating in the relevant industries, pertaining to the issue of energy and green buildings.

This paper is written by Lesley Nair S/O Dahrma Raj Nair. Special acknowledgements go to Total Solar Singapore Pte Ltd, Shell Eastern Petroleum Pte Ltd, KPMG Services Pte Ltd and Lys Energy Solutions Pte Ltd for their contributions and assistance in the expert panel.

STRUCTURE OF THE PAPER

This paper will be streamlined into two chapters, the first focusing on addressing energy conservation, comprising innovations by both Singapore and the EU towards increasing the energy efficiency of buildings and their methods of MRV. Second, the paper will focus on energy supply, assessing the access to cleaner, renewable energies that are being utilized by both Singapore and the EU. The efforts of both parties will be analysed, and constructive recommendations will be provided.

The following chapter will then provide an overall recommendation towards the progress of efforts for green buildings, before concluding on the future prospects for stakeholders in both Singapore and the EU.

The structure of the paper:

Chapter 1: Energy Conservation

- Addressing the energy efficiency of buildings
- Assessing the MRVs of Singapore and EU

Chapter 2: Energy Supply

- Access and utilization of renewable sources of energies

Chapter 3: Looking ahead

Conclusion

CHAPTER 1

ENERGY CONSERVATION

Both Singapore and the EU have strong environmental ambitions and have similar goals of achieving nearly-zero buildings towards their decarbonisation efforts, where Singapore aims to halve its emissions by 2050 and where the EU goes beyond and aims to be climate-neutral by 2050.

This chapter focuses on energy conservation efforts by both the Singapore and the EU. This is achieved through energy efficient technologies construction materials as well as digital technologies and legislations for measurement, reporting and verification (MRV), working towards green buildings and NZEBs.

ADDRESSING THE ENERGY EFFICIENCY OF BUILDINGS

SINGAPORE

The Building Construction Authority (BCA) in Singapore works with key industry players and academia towards progressing efforts of developing Green Buildings in Singapore. Within the umbrella term of Green Buildings, Singapore has been working towards Super Low Energy (SLE) Buildings as well. Key initiatives taken by these Singapore authorities are:

- The SLEB Technology Roadmap
  This roadmap was developed to identify and prioritize more than 60 key technologies and strategies towards helping the industry to design and develop cost-effective SLE Buildings. The availability of options allow building owners and developers to select suitable technologies that best enable them to meet their desired building performance and outcomes.

- The SLEB Smart Hub
  This hub was created to facilitate the exchange of knowledge on energy efficient technologies amongst industry stakeholders. This open database of green building technologies is supported by building energy data and analytic tools. The Smart Hub also has an online advisory function to recommend customised retrofitting plans for building owners and developers to green their buildings.

- Green Buildings Innovation Cluster (GBIC)
  BCA and the National Research Foundation (NRF) also established the Green Buildings Innovation Cluster (GBIC) in 2014, which funds collaborative research on environmentally sustainable buildings between the Built Environment sector and the research community. This programme enables collaboration between building owners, developers and research partners to develop innovative green technologies and conduct large-scale demonstrations to assess feasibility of energy-efficient technologies for green buildings.

- Singapore Green Building Master Plan (SGBMP)
  From 2020 onwards, BCA and the Singapore Green Building Council (SGBC) are working together with various industry stakeholders to co-create the Singapore Green Building Master Plan (SGBMP). BCA also engages wider stakeholder groups, comprising financial institutions and end-users such as tenants, homebuyers and youths.

- Building Retrofit Energy Financing (BREEF) Scheme
  This scheme aims to reduce upfront capital cost for energy bills and financing upfront costs for energy efficiency for the retrofitting of buildings. Within this scheme, chiller plants – centralized cooling systems – that provide a portion of the air-conditioning systems, have had their operating efficiency improved by 38%. Along with other retrofits, there was an average total annual electricity savings of 16%, which contributed to 120 GWh per annum. This has been cited to amount to an estimated $30 million in savings per annum.

Within the recently announced Housing Development Board (HDB) Green Towns Programme, HDB has outlined a 10-year plan to make HDB towns more sustainable and liveable by 2030. A key initiative is towards the utilization of Smart LED lighting to increase the energy efficiency of buildings for both common property areas and for homes as well. Smart motion sensors and analytics capabilities are installed within residential buildings, that can automatically adjust the luminosity of the LED lights depending on the motion detected. Using smart sensing control, the LED lights progressively dim and brighten according to whether motion is detected. This usage of Smart LED lighting can reduce energy used for lighting by up to 60% compared with conventional LED lighting.

The Singapore government also plans to continue working with various stakeholders to improve district cooling solutions and explore the feasibility of new areas for implementations. Users of the current Marina Bay District Cooling System enjoy efficiency and energy savings of more than 40%. This higher operational efficiency is being planned for expansion, where upcoming district cooling projects include Jurong Innovation District, Punggol Digital District and Jurong Lake District.

EUROPEAN UNION

At the EU level, the EU directives play an essential role towards promoting the implementation of energy efficient technologies to progress towards a greener building stock. "Energy efficiency first" is a key element as well within the EU directives. Initiatives towards encouraging the implementation of such technologies are:

- The compliance to EU directive 2018/844 of 30 May 2018, amending directives 2010/31/EU on energy performance of buildings and 2012/27/EU on promoting implementation of energy efficiency in buildings has increased the adoption rate of technologies to improve building stock. Member states have been increasing the installation of building insulation and windows with high energy efficiency ratings. In addition, Energy Performance Certificates (EPCs) are proving to be profitable for building owners. In states such as Belgium and Germany, the NZEB standards have been exceeded, where the Passivhaus standard is being implemented for both new and

existing buildings, pushing buildings to be net positive for energy.

- The EU also improved upon the ventilation, space heating/cooling, and water heating/cooling. The EU published its first plan in 2016 to tackle the massive amount of energy used for heating and cooling in the building sector. A major strategy of the plan is to improve integration of the power grid with district heating and cooling systems. Energy efficient technologies in boilers, along with design improvements in vent dampers and Heating, Ventilation and Air-conditioning (HVAC) systems are being developed and implemented to contribute energy savings for residential and commercial buildings.
- EU member states are also required by the 2010 EU Energy Labelling Directive (2010/30/EU) and the Ecodesign Directive to ensure that household appliances, lighting and electronics to meet minimum energy efficiency standards and to carry energy labels, to quantify the expected energy consumption. The role of member states is to promote the awareness of such directives and programmes, which could have more penetration within member states. These energy efficiency requirements also need stringent enforcement by member states. Policymakers at both the EU and member state levels, use legal constraints and information awareness programmes to drive improvements in energy efficiency.

ANALYSIS

In the past decade, both Singapore and the EU have made significant progress towards green buildings. The creation of technologies for HVAC systems increase the efficiency of energy consumption for buildings and this has reduced the energy demand as a result.

However, in both the EU and Singapore, the persistence of the perception that there is no urgency to implement energy efficient technologies is an area which needs to be taken into consideration. Building owners need to understand the benefits, which are often cost savings over long-term, for replacing conventional technologies with more sustainable ones. This mindset results in a fragmented adoption of technologies, highlighted within the report by the United Nations Economic Commission for Europe (UNECE). Within the EU, the adoption of technologies is not a combined effort by member states and this needs to be addressed.

Within Singapore, the government's initiatives thus far have been coalesced around the public sector and the HDB's implementations, which should be expanded as well. Furthermore, additional technologies employed within the EU, such as smart metering, can be considered towards implementation for buildings in Singapore as well.

RECOMMENDATIONS

- The benefits of energy efficient technologies have to be effectively communicated to building owners and users. Despite both Singapore and the EU making inroads towards the development and implementation of technologies that can increase the energy efficiency of buildings, individuals have to be educated on them as well.
- Both the EU and Singapore should consider the awareness of individuals to be included in their respective roadmaps and building masterplans. This will enable the individuals to understand the perspectives of the government and of companies as well, ensuring an effective ecosystem for the promotion of energy efficiency in buildings, where sustainable, resilient and inclusive cities for both parties can be created.
- The commitment towards green buildings, has to see efforts taken by both public and private sectors. Both sectors have to work together to ensure that praiseworthy initiatives in their respective sectors can be coalesced to accelerate their progress.

The Singapore government has been in communication with private companies, yet there is further need for clarity in this communication, to ensure that clear and detailed roadmaps are drawn to constantly update interests, agendas and plans for progression.

ASSESSING THE MEASUREMENT, REPORTING AND VERIFICATION (MRV) OF SINGAPORE AND THE EU

The MRVs are key towards enforcing the effectiveness of efforts towards increasing the energy efficiency of buildings. Both Singapore and the European Union have implemented policies towards ensuring that all buildings adhere to standards set out by the government and union, respectively. These standards will be analysed and assessed subsequently.

SINGAPORE

The Building and Construction Authority (BCA) launched the Green Mark Scheme in 2005, which formed the backbone of Singapore's first Green Building Masterplan (SGBMP). This Scheme mandated stakeholders to adopt technologies for attain green buildings respective to standards of Gold, GoldPlus and Platinum. As the built environment sector began to embrace the idea of sustainable buildings, BCA expanded its target to have "at least 80% of buildings (by floor area) in Singapore to be green by 2030".

Subsequently, the second and third SGBMP were rolled out, allowing BCA to ensure that its plans were updated with the advent of newer technologies for green buildings. In 2018, BCA also launched the Super Low Energy (SLE) Building programme that pushed firms to exceed the Green Mark Platinum standard and attain a higher level of sustainability for their buildings.

BCA also launched the Super Low Energy (SLE) Building programme in 2018 to encourage firms to go beyond the existing Green Mark Platinum standards and push the envelope of environmental sustainability in Singapore. From the Building Energy Benchmarking Report 2017, the proportion of tenant's electricity consumption was observed to be around 50% of total buildings' electricity consumption. Furthermore, it is important to consider the user/occupant behaviour as building's plug loads have been identified to consume about 25% of the total building energy consumption. As the Built Environment sector began to embrace the idea of sustainable buildings, BCA expanded its ambition to green the larger stock of existing buildings and engage buildings occupants to change their energy consumption behaviour. Furthermore, as of March 2020, more than 42% of Singapore's Gross Floor Area (GFA) has been greened. As buildings account for over 20% of Singapore's emissions, greening of buildings is key to Singapore's effort to continue developing sustainably and to mitigate its emissions.

To further the progress towards efficiency in green buildings, BCA is co-creating the next SGBMP with the Singapore Green Building Council (SGBC) and various industry stakeholders this year. The co-creation process will encourage stakeholders to co-own and co-deliver the SGBMP, recognising the shared responsibility to raise building performance and sustain it over the lifecycle of the building. The SGBMP 2020 will thus be a combined effort with stakeholders from the public, private and people sectors, including Trade Associations and Chambers (TACs). One of the key initiatives under the SGBMP 2020 is to review the mandatory minimum environmental sustainability standards for buildings. To support the push towards more energy efficient buildings, BCA plans to raise the minimum energy performance standards for both new and existing buildings in the coming years.

To facilitate building owners to benchmark their electricity consumption against other buildings, BCA has been publishing energy performance data and will aim to continue to cover more types of buildings, from commercial to educational, healthcare and transport as well. This will allow building owners to know how they perform compared to similar types of buildings and spur them to upgrade and benefit from savings for improved energy efficiency of their buildings. The formation of an effective ecosystem is also a key priority for the BCA, where they are working with industry partners, such as the Singapore Green Building Council (SGBC), to develop a suite of programmes to strengthen the industry ecosystem.

In addition, under the current Green Mark scheme, all buildings with footprint of more than 1000m2 will need to conduct a solar feasibility study. Additional Green Mark points are also awarded for solar ready roof and solar deployment. The use of renewable energy is also one of the four main areas of cost-effective features to adopt towards achieving SLEB status, in addition to passive design, active strategies and smart energy management.

EUROPEAN UNION

Within the EU, the Green Deal has been established as a roadmap for making the EU's economy more sustainable. Amongst the various areas, building and renovating is one of the focuses, with overall targets set out at the union level for 2020, 2030 and 2050.

The European Commission (EC) highlights that currently about 35% of the EU's buildings are over 50 years old and approximately 75% of them are energy inefficient. The present rate of progress is slow, where an estimated 1% of building stock is renovated per year. Therefore, there needs to be more done for attaining green buildings.

Therefore, the EU has established a legislative framework that includes the Energy Performance of Buildings Directive 2010/31/EU (EPBD) and the Energy Efficiency Directive 2012/27/EU. Both directives promote policies for the progress

towards "achieving a highly energy efficiency and decarbonised building stock by 2050". These directives were further amended as part of the Clean energy for all Europeans package in 2018 and 2019. These new rules had to be transposed into national law by member states by 10 March 2020.

Within the EPBD, there are a broad range of policies and supportive measures that are summarized below:

- Member states are required to establish long-term renovation strategies to decarbonise national building stocks by 2050, with dedicated milestones for 2030, 2040 and 2050. These should be in line with the National Energy and Climate plans (NECPs) energy efficiency targets. In addition, they must mandate cost-optimal minimum energy performance requirements for new buildings, existing buildings undergoing major renovation, and for the replacement or retrofit of building elements such as heating and cooling systems, roofs and walls.
- In the EU it is defined by the EPBD that requires all new buildings to be nearly zero-energy by the end of 2020. All new public buildings should have been nearly zero-energy already by 2018. Member states had to draw up and submit nearly zero-energy buildings national plans, describing how they intended to increase the number of NZEBs in their respective country to comply with the directive. This is to be combined with Energy performance certificates to be issued when a building is sold or rented, and inspection schemes for systems such as air-conditioning to be established.
- Under the Energy Efficiency Directive (2012/27/EU), member states must undertake energy efficient renovations to at least 3% of the total floor area of buildings and are recommended to only purchase buildings that are highly energy efficient.
- The EU also utilizes the Energy Performance Certificates (EPCs). Within Article 20 (2) of the EPBD, member states are asked to provide their respective objectives towards improving the energy performance of buildings for owners and tenants of the buildings. From these objectives, essential information on the EPCs, inspection reports and financial instruments employed to progress towards greener buildings are communicated. For monitoring, the EPBD requires member states to establish an independent control system to verify a statistically significant portion of EPCs annually. The compliance of the EPCs have its highest levels for newly constructed and sold buildings, with its lowest levels for rented out buildings.

ANALYSIS

The Green Mark Scheme in Singapore and the EU Directives set the precedents for manufacturers within the Built Environment Sector to progress towards greener practices in construction and maintenance. There has been progress on both sides towards MRV for greener buildings. The EU employs more mandates towards having energy efficiency measured, reported and verified in buildings, where Singapore employs more incentives to have companies continue practicing more greener efforts.

On both ends, the direction is positive towards sustainable development. However, the rate at which buildings are currently measured and enforced for their emissions to be reduced, has to be quickened. Despite agencies and member states respectively in Singapore and the EU implementing initiatives to improve their MRV, the potential for improvement should be harnessed effectively.

RECOMMENDATIONS

- The current Green Mark Scheme in Singapore is exemplary, but it can be improved through better MRV. The Singapore government can also consider the implementation of technologies employed within the EU, such as smart metering, towards improving the MRV of buildings, similar to that in the Punggol Digital District (PDD).
- The ability to employ data analytics for both parties should be better utilized. This can increase the pace of MRV for buildings' emissions. Furthermore, strategies drawn up by both the EU and Singapore should ensure that enforcement of the buildings' emissions is effective, and that data should be weaved into their strategies as well.

CHAPTER 2

ENERGY SUPPLY

The conservation of energy to ensure that buildings are more energy efficient is combined with the supply of renewable sources of energies, where the generation of cleaner energy produce less GHG emissions, reducing types of pollution as well. This diversification of energy supply, reducing the dependence on conventional fuels is paramount for sustainable development, and is a key priority for both Singapore and the European Union.

ACCESS AND UTILIZATION OF RENEWABLE SOURCES OF ENERGIES

SINGAPORE

As a "High Rise High Density Urban Tropics" country, Singapore faces limitations in having access to renewable sources of energy. In light of this, solar energy is currently the most viable renewable energy resource.

The government aims to deploy at least 2-Gigawatt peak (GWp) of solar by 2030, and given Singapore's space constraints, various areas and initiatives to facilitate the large-scale deployment of solar in Singapore is being considered, such as in rooftops, reservoirs, and vacant land, to achieve its solar goals. Key initiatives are listed below:

- Rooftop solar deployments on public buildings are outlined through the recently announced SolarNova programme. The programme promotes and aggregates solar demand across government agencies to drive the adoption of solar PV, allowing them to provide lead demand and build up the solar ecosystem in Singapore. HDB aims to commit 70% of High-rise flats in Singapore for solar panel installation on rooftops by 2030, which amounts to a further 320-Megawatt peak (MWp), furthering its aim of generation to a total 540 MWp, to support the new 2GWp solar target.
- The government is also working closely with JTC Corporation to develop new initiatives to encourage the adoption of solar. BCA organized a workshop in February 2020 with JTC, the Energy Market Authority (EMA) and the Sustainable Energy Association of Singapore (SEAS) and received key feedbacks towards improvements of the solar industry. Thus, the government plans to develop a suite of market levers, recognition and research initiatives to stimulate the increase of solar photovoltaic (PV) cells onto private sector buildings. Potential market levers include demand aggregation by developers to improve the business case of smaller rooftops, and government policies to mandate solar deployment on lessee's roof.
- Apart from rooftops, the government is also looking to increase solar deployment in new areas such as reservoirs, vacant land, and Building Integrated PVs (BIPVs). The Public Utilities Board (PUB) will also be increasing the deployment of floating solar panels on reservoirs. Earlier in February, PUB awarded a 60 MWp floating solar deployment on Tengeh Reservoir, to be completed in 2021. JTC will also be expanding its SolarLand initiative to install solar panels on vacant land plots not required for development in the near future. The project will see the development and deployment of mobile solar systems for easy re-deployment when the land is needed for other sues. The government is also devoting R&D efforts to develop and reduce costs of such applications to improve its feasibility of implementation in Singapore, where in the longer term, Singapore could be plugged into a regional power grid to trade electricity with its neighbours to bolster energy security.
- The government also engages in solar research, having built up capabilities in institutes such as the Solar Energy Research Institute of Singapore (SERIS), which conducts industry-oriented R&D and trains manpower for the solar energy sector; and the Energy Research Institute @ the Nanyang Technological University (NTU), which conducts research in a range of energy sectors such as fuel cells, smart grids and green buildings. Beyond the research efforts, BCA is also collaborating with agencies such as NParks, JTC and the Urban Redevelopment Authority (URA) to develop solutions for the co-location of solar panels and green roofs. The government encourages companies to take the lead in adopting innovative technologies, to help collectively increase solar deployment and achieve solar targets.

EUROPEAN UNION

The EU had set a target in 2018 for 32% share of EU energy consumption coming from renewable energy sources by 2030. The revised Renewable Energy Directive (Directive EU 2018/2001), as part of the "Clean energy for all Europeans' package, was aimed at keeping the EU a global leader in renewables and to help the EU meet its emissions reduction commitments under the Paris Agreement. Key renewable technologies in areas of solar and offshore wind have been expanded in the EU. Biomass remains as the key renewable energy source in the EU, where overall deployment of bioenergy is expected to be 55% in 2030. Within the building industry, the following points have been highlighted:

- The current contribution of renewable energy towards energy demand in buildings stands at 22% in 2015. Approximately half of this was biomass and the other half was renewable electricity and district heat derived from renewable sources. The contribution of solar thermal was relatively small, where it was only 2% of renewable consumption. The Energy Performance of Buildings Directive (EPBD 2010/31/EU) mandates both residential and tertiary sector buildings to increasingly utilize renewable sources of energy.
- The European Parliament Committee on Industry, Research and Energy (ITRE) adopted the Maximizing Energy

Efficiency in Buildings' report. As part of the EU's upcoming Renovation Wave initiative in September 2020, the massive roll-out of solar power is encouraged, including the launch of a pan-European solar rooftop programme. However, large scale implementation is required as more than 90% of buildings in the EU go unused. This pushes the need for large-scale implementation of solar PV in the EU, and together with offshore wind and hydro, more opportunities for job growth can be achieved as well.

- Biomass products, such as pellets are used as fuel for space heating installations. Geo and aero thermal energy heat pumps are employed in buildings for ground coupled and air to air heat exchange. This conversion technology offers the possibility of efficient energy used both for space heating and cooling.

ANALYSIS

Singapore's key source of renewable energy is solar, due to its limitations mentioned above. Its efforts towards solar have made progress towards identified targets. In comparison, the EU has greater access to renewable sources of energies, prioritised differently due to member states having different energy mixes based on their natural resources. Northern countries have more resources for wind, hydropower and geothermal, where southern countries have more solar and biomass. The EU's directives towards increased employment of renewable energy is positive; aligns with EU's Renovation wave, solar is currently being prioritised as well.

Despite the EU having more sources of renewable energies, this paper chooses to focus on solar as it the analysis for Singapore, where both parties' direction to solar can elicit key insights. Therefore, with both parties prioritising solar, there are key opportunities for collaboration. Information on technologies can be gathered and shared to develop cost-efficient methods.

RECOMMENDATIONS

- Although both the EU and Singapore have on their own set targets towards attaining solar energy, both parties have to establish clear roadmaps develop the public and private sectors for the implementation of solar technologies. These roadmaps will also need to include the views, interests and agendas of private companies, where effective communication is once again key here, as aforementioned in the earlier chapter of Energy Conservation.
- The rate of implementation of solar in both the EU and Singapore has to be increased to meet their own goals for utilizing solar energy. For this, the authorities will have to work together with private companies. Research and Innovation attain cost-efficient technologies for the employment can be shared amongst the various stakeholders in both the EU and Singapore. The sharing of information through consultations will be crucial to a combined effort for the employment of renewable energy in both the EU and Singapore.

CHAPTER 3

LOOKING AHEAD

This position paper has limited its focus to commercial and residential buildings, as initiatives by both the EU and Singapore have been geared towards these two areas. However, this should not take away the importance of such initiatives – for increasing energy efficiency of buildings and the employment of renewable sources of energies – eventually being implemented into the industrial sector as well.

Looking ahead, both the EU and Singapore will have to consider the industrial sector buildings in expanding their vision of green buildings. Although both parties' efforts are commendable, the impact of the industrial sector on GHG emissions is more than the buildings sector – comprising of both commercial and residential buildings. Therefore, the focus should expand to establishing roadmaps which consider similar recommendations set out in this paper.

CONCLUSION

The EU and Singapore are in prime position to achieve their targets for attaining green buildings. Their efforts have been assessed in this position paper, for readers to understand the respective landscapes and to begin the facilitation of a discussion that is imperative towards the improvement of initiatives taken by both parties. The key theme that is raised in this position clearly points to communication and education. Building owners and residents need to understand the importance of green buildings, the technologies being employed and their benefits. Without this crucial understanding, it will be difficult for EU and Singapore to accelerate their initiatives and attain their targets.

This has to be in tandem with effective communication with private companies. Ministries, Statutory boards and agencies at the governmental level can implement actions towards actualising policies, but they will be incomplete without the cooperation of private companies. Companies within the built environment and renewable energy sectors have to be consulted. Their views are of paramount importance towards having effective operations of technologies and maintenance of green buildings.

Ultimately, the path to green buildings for the EU and Singapore has to be a meaningful one. This requires constant movement by all stakeholders, where communication and education have been re-emphasized in this paper. Even with robust initiatives and technological innovations, the road towards sustainability will not be complete if not for a combined effort. We believe that the recommendations in this paper can help the EU and Singapore towards achieving a coordinated ecosystem for the attainment of clean, efficient energy and for greener buildings.

CONTRIBUTORS

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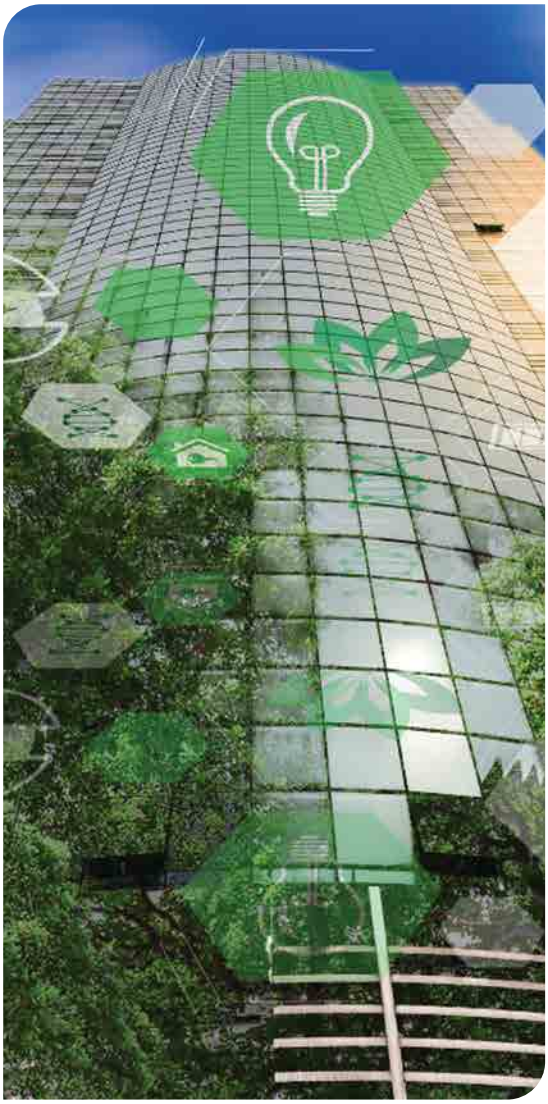
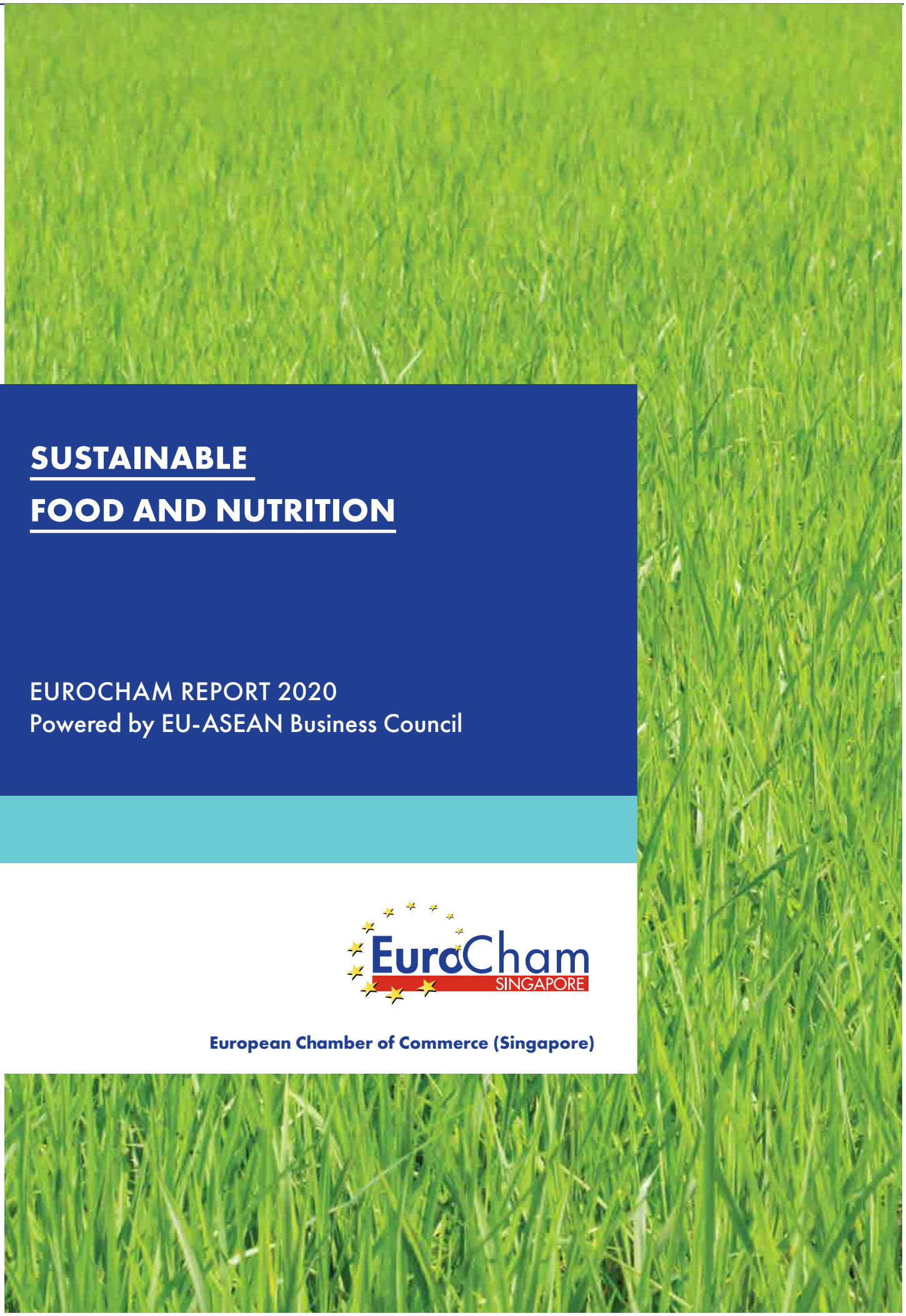
LIST OF ACRONYMS

BCA	Building Construction Authority
BREEF	Building Retrofit Energy Financing
ECP	Energy Performance Certificates
EMA	Energy Market Authority
EPBD	Energy Performance of Buildings Directive
EPBD	Energy Performance of Buildings Directive
EU	European Union
GBIC	Green Buildings Innovation Cluster
GBIC	Green Buildings Innovation Cluster
GHG	Greenhouse gas
GWp	Gigawatt peak
HDB	Housing Development Board
ITRE	Industry, Research and Energy
MRV	Measurement, Reporting and Verification
MWp	Megawatt peak
NRF	National Research Foundation
NTU	Nanyang Technological University
NZEB	Nearly-zero energy buildings
PDD	Punggol Digital District
SEAS	Sustainable Energy Association of Singapore
SEAS	Sustainable Energy Association of Singapore
SERIS	Energy Research Institute of
SGBC	Singapore Green Building Council
SGBMP	Singapore Green Building Master Plan
SGBMP	Singapore Green Building Master Plan
SLE	Super Low Energy
UN	United Nations
WGBC	World Green Building Council





SUSTAINABLE FOOD AND NUTRITION

EUROCHAM REPORT 2020
Powered by EU-ASEAN Business Council

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

FEEDING A REGION

ENSURING SAFE & NUTRITIOUS FOOD FOR ASEAN

WRITTEN BY EU ASEAN BUSINESS COUNCIL

ASEAN is a region of close to 650 million people (around half of whom live in urban centres; with, pre-COVID-19, some of the fastest economic growth rates in the world, averaging just above 5% in GDP growth terms annually over the last few years. Exceptionally high rates of urbanisation, primarily in second and third tier cities, and a growing middle class have put pressure on food supplies and agricultural output. COVID-19, and the associated lockdowns of economies that resulted in the first part of 2020, has served to highlight how fragile supply chains and food security in the region were.

"Whether it ends on a fork, between chopsticks, or between fingertips, food starts on a farm. And it takes a lot of people, time, and energy to get it from one place to another. But what if everyone tasked with growing, transporting, packaging, and selling food worked together for the sake of our planet and its people?"

https://www.cropscience.bayer.com/people-planet/food-journey/a/building-a-stronger-food-system

The second of the UN's Sustainable Development Goals is "Zero Hunger" by 2030. The world is a long way from achieving that aim, with some 800 million people globally still suffering hunger or being undernourished[1]. One of several key issues facing the ASEAN region today is how to feed its growing population in a sustainable way, ensuring that sufficient nutrition is being provided and the food produced and delivered to tables is safe to eat. Many European businesses are at the forefront of work in this area, be it in helping to boost production at the farm, through working to improve efficiency in the processing of foods, and then working to ensure adequate measures are in place to promote improved information for consumers on the food products before them.

"Farming today is more complex than ever before. The unpredictability of the weather, control of pest and weeds, market price development, scarcity of natural resources. To rise to this challenge, farmers need new technologies and solutions."

https://agriculture.basf.com/global/en/business-areas/crop-protection-and-seeds.html

In ASEAN today, around 96.5 million people are employed in the Agriculture, Fishery and Forestry sector, with the largest levels being in Indonesia and Vietnam (35.7 million and 20.5 million respectively) and with about 31% of the land in the region being used for agriculture[2]. Agricultural production accounts for around US$243 billion of ASEAN's total trade in goods, or about 9% of total trade in goods[3], which means it is not an insignificant part of the region's economy. And it is a sector that needs to become more efficient in terms of production volumes and delivery to the end user, as well as increasing the nutritional value of the food that we eat. Doing so would foster more equitable economic development, help alleviate rural poverty levels, and improve food security.

In short, ASEAN, collectively, needs to be promoting the concept of "sustainable food systems". This is a farm to fork concept as it encompasses sustainable food production on the one hand, and sustainable diets and consumption (such as through the reduction of food waste) on the other. Measures for reducing food loss and waste have to be environmentally sustainable and should foster food and nutrition security, allowing people to live healthier and longer lives.

THE CASE FOR BOOSTING AGRICULTURAL PRODUCTION: USING TECHNOLOGY AND SMARTER USE OF AGRI-CHEMICALS

As the population of ASEAN continues to grow, and more people move to urban settings and those urban areas themselves grow, the issue of how to produce more food with fewer natural resources (land) becomes more paramount. According

1 *https://www.worldgovernmentsummit.org/api/publications/document?id=95df8ac4-e97c-6578-b2f8-ff0000a7ddb6*
2 *ASEAN Statistical Yearbook 2019*
3 *Ibid*

to the UN FAO, farmers globally will need to produce 70% more food by 2050 than they do today to feed the world's growing population. And they will need to do that in the face of reducing land availability and the impact of climate change.

At its most basic, food production begins with the seed. One way to increase production is utilise better and smarter crop types, ones that are higher yielding per hectare. Developing higher yielding more disease resistant crops is the first step in boosting agricultural output. In the Philippines, Bayer has been deploying a new variant of a corn crop that is producing yields up to 14 times greater per hectare that traditional corn crops used locally[4]. As noted by CropLife Asia[5], plant biotechnology is being more widely adopted by the farming community as it delivers significant and tangible benefits, all the way from farm to fork helping increase crop production, conserve biodiversity, reducing CO^2 emissions and alleviating poverty and hunger.

Promoting education and training to farmers and local communities is also a key part of the equation. Teaching farmers how to use agri-chemicals correctly and safely, utilising technology to know when and where to use them most effectively and efficiently is a key task for agri-science industry. For example, in Indonesia BASF are running Farmer Field Schools to teach effective rice growing practices[6]. BASF is also developing and rolling out technology services to assist farmers in identifying problems with their crops, using scouting technology to identify pests, diseases and requirements for boosting the use of fertilisers where nitrogen levels might be low[7]. Other leading agri-science firms are also developing similar tools.

At the forefront of today's agricultural innovation is digitalisation. Farmers are increasingly relying on digital technologies that can analyse and transform millions of bytes of data into meaningful insights that help them make real-time decisions. Goldman Sachs has predicted that the farming sector will soon become the second largest user of drone technology in the world as their use for crop monitoring increases[8]. Such technology will help farmers not only to better protect their crops and boost yields, but also to ensure that pesticides, herbicides and fertilisers are only used where they are truly needed, rather than applied in blanket fashion across the entire crop, thus saving both time and money and reducing the use of chemicals.

Using science and technology, and utilising the significant research and development resources that leading agri-science firms have, is the future of farming globally and in Southeast Asia. It should ensure increased production, reduced food loss, and reduced impact on the general environment.

THE ISSUE OF FOOD LOSS

Food loss, as opposed to wastage, relates to the reduction of food products available during production, post-harvesting (handling, storage, and transportation) and processing stages of the food supply chain. Food waste is generated by retailers' activities and consumers' behaviour. The latter can be minimised by changes in attitudes and education, for instance by not rejecting some fruits and vegetables due to minor bruising or perceived imperfections when the food is still entirely edible and fit for human consumption. The former requires a higher degree of intervention through employing more advanced storage and transportation techniques, and processing facilities that result in less wastage.

The Food and Agriculture Organisation of the United Nations estimates that about a third of the food the world produces annually is lost or wasted before it reaches the market, due to problems ranging from the lack of proper post-harvest storage, processing or transportation facilities. In stark financial terms it amounts to US$ 1 trillion per annum[9]. In Vietnam it is estimated that food loss rates between the farm and processing or distribution centres are almost 25%[10], or around 8.8 million tonnes. This represents not only an economic loss, but also a significant social and environmental impact on the country. As the UN Food and Agriculture

4 *https://www.cropscience.bayer.com/people-planet/food-journey/a/building-a-stronger-food-system*
5 *http://www.croplifeasia.org/2017/07/biotechnology/#/*
6 *https://agriculture.basf.com/global/en/business-areas/crop-protection-and-seeds/use-areas/crops/rice.html*
7 *https://agriculture.basf.com/global/en/business-areas/digital-farming.html*
8 *https://www.goldmansachs.com/insights/technology-driving-innovation/drones/*
9 *ttp://www.fao.org/3/a-i4068e.pdf*
10 *https://www.cel-consulting.com/single-post/2018/08/10/Food-Losses-in-Vietnam-the-shocking-reality#:~:text=Total%20losses%20are%20estimated%20at,is%209%25%20of%20total%20Vietnam.*



Organisation states "Food loss and waste have negative environmental impacts because of the water, land, energy and other natural resources used to produce food that no one consumes[11]. Reducing loss levels should be seen as being as critical as boosting production levels in the first place.

Unfortunately, tackling the issue of food loss is not simple, due mainly to the number of actors involved – from the farmer, to transportation companies, storage facilities, handlers, packers, and processors. It is critical therefore that a multi-disciplinary private-public sector approach is taken to the issue. From the planning of production (i.e. types of crops, sowing and harvesting times, proximity to markets), through ensuring the right infrastructure is in place to allow for speedy transportation, correct storage and processing is in place, to ultimately how the raw produce is then processed – all stages represent points where food loss can happen and, therefore, an opportunity to improve efficiency.

By some estimates 20% of food loss is at the farm itself, perhaps through crops being over-ripe and not being harvested early enough, or through disease or rot. A further 20% during storage, with a lack of suitable storage facilities or infestation by rodents or pests being primary causes. Transportation issues can account for up to another 15% of the loss, with the remainder being the result of overly stringent requirements on quality by processors and consumers[12]. Shortening supply chains, ensuring better storage (e.g. more airtight bags), and utilising different processing techniques and requirements can all help to reduce losses.

THE CASE FOR BETTER NUTRITION

The saying goes "we are what we eat". To large extent it is true. The quality of the food that we consume, and its nutritional value is one of the most singularly important factors in overall health. A poor diet has been proven as a cause of conditions such as hypertension, heart and blood vessels diseases, obesity, and diabetes.

Not having the right levels of nutrition in our food, getting the right mix of proteins, fats, vitamins, minerals etc. can adversely affect our health and, in early years, physical and mental development. A 2018 WHO report found that in ASEAN 25.7 per cent of children were stunted. In the same report the WHO pointed out that "Children suffering from stunting may never attain their full possible height and their brains may never develop to their full cognitive potential[13] a situation which will then impact them for the rest of their lives as they face learning difficulties in school, earn less as adults, and face barriers to participation in their communities.

Bringing a child into this world is a miracle — a precious journey that begins well before pregnancy and continues through early life. In all phases it is critical that optimum nutrition is available.

https://www.frieslandcampinaingredients.com/segment/early-life-nutrition/

It is vitally important, therefore, that we all, and especially our children, receive food that is both of the right nutritional value and content. As Rickett & Benckiser have noted "the right nutrition during the first 1,000 days has a critical impact on a child's ability to learn and thrive and provides the essential building blocks for brain development, healthy growth and a strong immune system[14]. Ensuring the availability of supplements for breast-feeding mothers where they themselves are not receiving the right levels of nutrients in their own diet, or allowing for the availability of formula milk when breast-feeding is not an option or for children older than babes-in-arms is critical in the fight against stunting.

11 *http://www.fao.org/3/a-i4068e.pdf*
12 *https://www.yara.com/knowledge-grows/how-to-reduce-food-waste/*
13 *https://www.who.int/nutgrowthdb/2018-jme-brochure.pdf?ua=1*
14 *https://www.rb.com/sustainability/sustainable-business/infant-and-child-nutrition/*

Nutrition is fundamental for good health and development during the early years of life. If children do not eat the right amounts of macronutrients like protein, fat, and carbohydrates and micronutrients like vitamin A, iodine, iron and zinc, they may become ill, have delayed mental and motor development that can have enduring adverse effects beyond childhood, or die.

https://www.who.int/topics/early-child-development/child-nutrition/en/

But ensuring a nutritious and balanced diet is also important we age or are sick. Malnutrition is something that can affect adults too. Danone have noted that 1 in 3 adults in care homes are malnourished[15], highlighting the need for better quality of food and the availability of supplements.

For those of lucky enough to have regular meals, ensuring that the food that reaches our tables is of the right nutritional quality is not an easy task. Much can be lost in terms of nutritional value and content from the point of harvesting or slaughter to the time it reaches our dinner plates. Poor storage, processing, or cooking techniques will diminish the quality of the food. For many supplementing diets with vitamins or other products becomes a necessity, and it is an option that should be made available to parents, families and individuals to help them lead healthier lives.

KNOWING WHAT YOU EAT: USING TECHNOLOGY TO PROVIDE BETTER INSIGHTS

It follows from the previous section that improving our understanding of what we are eating is important to ensuring that we are getting the right levels of nutrition for our bodies. Nutritional labelling of products is not new, though it is an area that has been fraught with difficulty for regulators and producers. Different countries have different requirements for what is shown on labels, both in format and information required, and also on which products such labels are mandatory and which are voluntary. Despite their ambition to reach a harmonised approach on this issue, the ten ASEAN member states presently operate several different systems within the region, adding cost and complexity to manufacturers, and confusion for consumers.

As the ASEAN Food & Beverage Alliance noted in their 2018 report on the subject "Variances in nutrition labelling (requirements and format) within the region will indeed pose difficulties to exporters. It represents increased compliance costs to firms as they have to pay multiple product adoption costs that are related to many national standards[16]. Adopting a standardised approach across the region, as is called for under the AEC Blueprint 2025, will reduce those costs, and make it easier for consumers across the region to better understand the information presented to them. But making progress on a harmonised approach within ASEAN is proving to be difficult.

Among consumers today, there is a desire for more knowledge about what is contained in the food that they are eating, and also where it has come from. Fortunately, technological solutions are close at hand that can solve not only the desire for more information for consumers, but also the regulatory issues over standardisation and harmonisation, and also the cost and compliance concerns of producers.

The advent of QR codes and the widespread use of smartphones, means that possibilities now exist for multiple levels of information to be stored and accessed by consumers. A single QR code on, say a packet of rice, can be scanned and then consumer can then see instantly all of the nutritional information on the product (and this can be displayed in a variety of formats to meet all the needs of the regulators in the region), as well information on where the rice was grown, processed, and packaged and which market it was intended for sale in. And all of this can be done in the base language on the user's phone. This technology, which is being developed by GS1 (a global, neutral, non-profit standards organisation that developed the first bar codes), is available today and can not only support the desire of consumers for more information, but also be useful for track and tracing of producing thus enhancing food safety. A simple solution, but yet not one that the regulators of the region seem ready to embrace or accept.

15 *https://www.danone.com/brands/specialized-nutrition.html*
16 *https://foodindustry.asia/documentdownload.axd?documentresourceid=30656*

TO END

ASEAN has a rich diversity of cultures and foods. One factor that unites all of the region is the love of food. How to produce more of it, maintain the nutritional value of the food, ensure that the people of the region get the right levels of nutrition, and can understand more about the food that they are eating, is becoming more and more important. Doing all of that in sustainable way is also important.

From farm to fork, there are solutions out there. Improved farming techniques; embracing technology to make smarter use of agri-chemicals or using plant technology to grow higher yielding or disease resistant plants; better transportations, storage or processing techniques to reduce wastage; improving availability of nutrition and vitamin supplements; and using technology to give consumers more understanding, are all readily available solutions that can and should be used to help alleviate hunger and poverty in ASEAN.

CONTRIBUTORS

EuroCham is grateful for EU-ASEAN Business Council for writing this report. A special thanks is to be extended to Chris Humphrey, Executive Director at EU-Asean Business Council.

EUROPEAN SUSTAINABILITY IN SINGAPORE/ASEAN REPORT 2020

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

EXECUTIVE SUMMARY

This survey conducted by the European Chamber of Commerce (Singapore) surveyed one hundred senior leaders in European organisations based in Singapore to assess their initiatives in the sustainability area and to have a better understanding of their sustainability strategies.

The report highlights the impact of these initiatives and strategies in Singapore and in the region, and exposes some of the key challenges that were encountered. Opportunities are also clearly identified in this report.

The intention of this survey is to to raise awareness in the sustainability area and to close the gap between companies' needs and government support programmes.

The most pressing elements driving sustainability in the organisations were identified as reputation along with competitive advantage and new trends. However, organisations are experiencing a clear barrier as costumers seem less willing to pay a premium for sustainable items. It is apparent how quickly corporate actions and policies have shifted. Still, too many other business priorities are roadblocks for a swifter evolution.

When it comes to sustainability in Singapore, almost all respondents pointed out a need for an elevated education system to upgrade the understanding and awareness of sustainability practices. They also indicated a demand for more government incentives as well as the establishment of a ecosystem of sustainability to simplify the way forward in this journey. This ecosystem should embed collaborations between companies and stakeholders to create a platform for sharing ideas and best practices to stimulate the creation of successful solutions.

INTRODUCTION

A rapidly changing climate represents a potent, unprecedented, and irreversible threat to habitats, societies, and economies around the globe. In 2015, almost 200 leaders signed the Paris Climate Agreement, committing countries to transition to a lower carbon economy and limit the global average temperature rise to 2 degrees Celsius above pre-industrial times.

The European Green Deal, established by the European Commission in 2020, as well as Singapore's Sustainability Concept Plan show the importance of the topic of Sustainability for both jurisdictions. The European Chamber of Commerce (Singapore) has similarly embraced the topic of Sustainability as the main focus of its activities.

It is an ambitious project in line with the commitments and aspirations of Singapore, towards the 2015 Paris Agreement. It also has the goal of showing the degree of involvement of European companies in the Sustainability area.

The focus is on 5 key strategic topics mutually shared by the EU Commission and Singapore's Sustainability Concept Plan, which are: Circular Economy, Clean Energy, Smart Mobility, Green Finance, Sustainable Food.

Through the conducting of this survey, the European Chamber of Commerce (Singapore) has the ambition of highlighting the sustainability initiatives, challenges, and opportunities in Singapore and the region.

All respondents to this survey have our deep appreciation and gratitude for their valuable contributions and inputs in this survey: we cannot neglect to mention the openness and transparency of the respondents of this survey, made up of more than a hundred senior managers of European companies ranging from SME to MNCs who have shared their views with us and identified potential challenges for the future.

RESPONDENT DEMOGRAPHICS

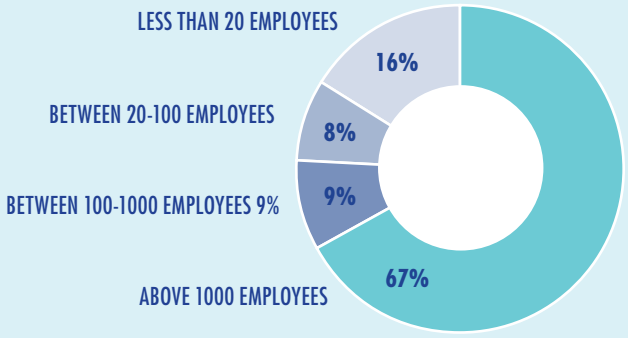
For this study, 100 European companies in the Singapore region were surveyed.

Large organisations dominated the sample with 67% of those surveyed working at companies with more than 1000 employees.

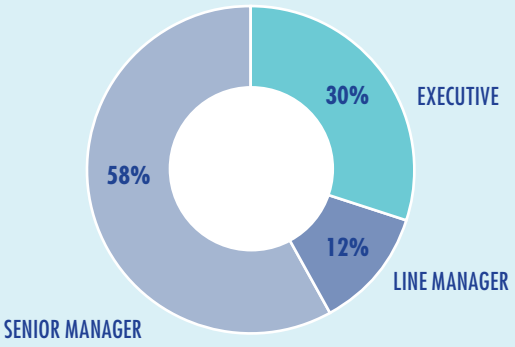
16% of the companies reported having fewer than 20 employees, 8% having between 20-100 employees, 9% from 100 up to 1000 employees.

The majority of respondents hold positions within senior management, with 58% senior managers, 30% executives, and the smallest group being line managers at 12% of the respondents. This provides an indication of credibility of our respondents as experienced professionals.

COMPANY SIZE



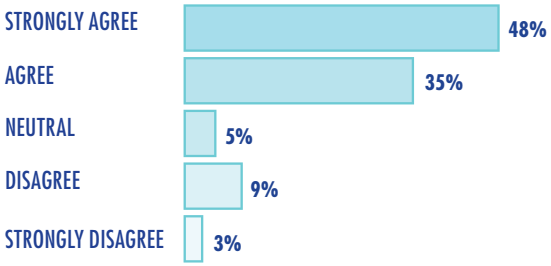
POSITION IN THE COMPANY



How much do you agree with the statement "My organisation has a coherent plan on sustainability"?

83% of our participants agree that their organisations have coherent plans on sustainability, showing that most companies do have some level of plan towards their sustainability actions.

Only 12% saw their companies as not having a coherent plan.

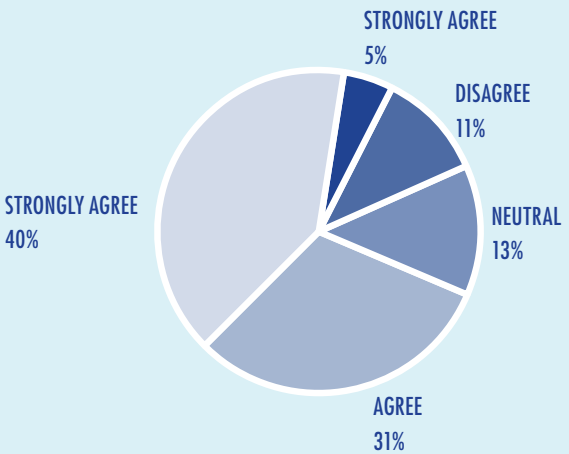


How much do you agree with the statement "My organisation has implemented sustainability reporting"?

A large majority of 71% agree that their organisation has implemented sustainability.

reporting. This shows convergence towards organisations adopting sustainability reporting practices in the region.

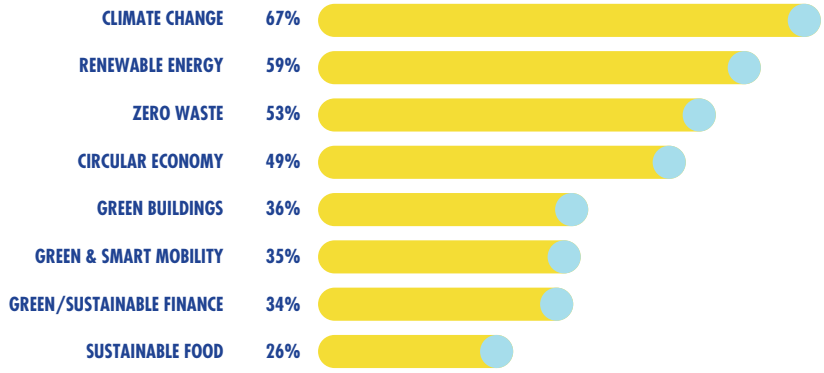
16% disagreed with the statement, so some organisations have not yet moved towards reporting on their sustainability.



SUSTAINABILITY IMPACT

In your opinion, which sustainability areas are significant for your industry/business?

Climate change has shown to be the area influencing most industries/businesses, with 67% reporting it as a significant area. Renewable energy and zero waste are clearly significant for over half of the businesses surveyed, with more specific areas such as sustainable finance and sustainable food only being of significance for only 34% and 26% of the respondents respectively.

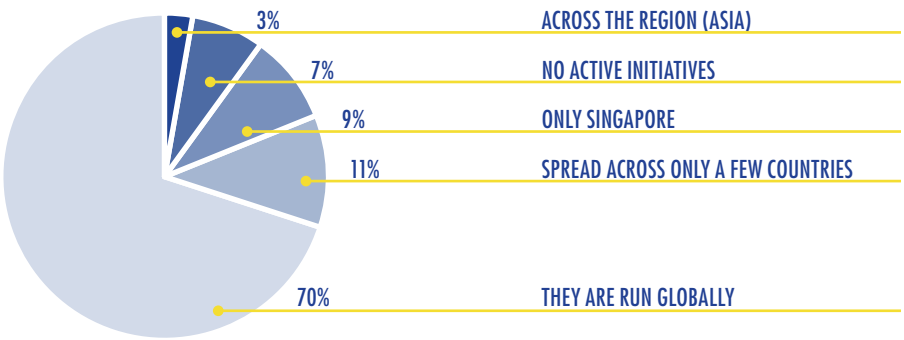


How much do you agree with the statement "My organisation is a recognised global leader in sustainability practices"?

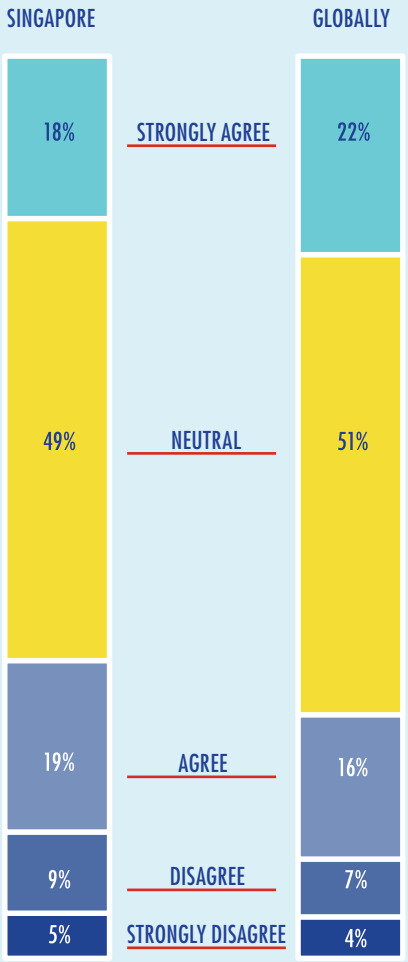
50% recognised their companies as global leaders within sustainability practices, exhibiting a strong positivity towards their employer's sustainability efforts. 1/3 of respondents neither agreed nor disagreed, and 1/5 actively disagreed with the statement that their organisations are global leaders within sustainability practices.

What is the span of sustainability initiatives in your company?

The majority of the organisations surveyed run their sustainability initiatives on a global scale. 11% having sustainability initiatives in selected countries and another 11% either in Asia or Singapore. 7% showed to have no sustainability initiatives.



How much do you agree with the statement "My organisation has successfully implemented sustainable initiatives and practices"?



Despite not all of the companies having sustainability initiatives on a global scale, 73% of the respondents agreed or strongly agreed that their company successfully implementing sustainability practices on a global scale. This is compared to 67% in Singapore, showing an overlaying sense of positivity concerning the successfulness of implemented sustainability initiatives.

Almost 20% were neutral towards the sustainability initiatives their company has implemented in Singapore, not seeing them as successful or unsuccessful, with 16% being neutral on the global initiatives.

On a Singaporean level, 14% saw the initiatives as unsuccessful, and 11% of the sustainability initiatives implemented on a global scale were seen as ineffective.

KEY CHALLENGES & SUCCESS FACTORS

What are the key drivers of sustainable business in your organisation?

An overwhelming 74% of respondents saw reputation as a key driver of sustainable business in their organisation. Other major drivers included competitive advantage, branding and new trends.

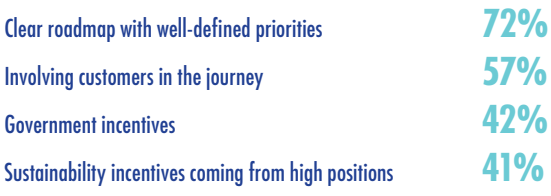
Fewer than 30% saw pressure from customers, governments or their own competition as a driver of sustainability. Hence, many did not see the pressure as extrinsically, but rather coming from inside the organisation.

Only 9% of respondents added that sustainability was not an option but rather an essential and had become a core value or mission within the organisation.

In line with many companies not seeing customer pressure as a primary driver of sustainability, a major barrier to sustainability is the belief that customers are not ready to pay a premium for products and services that are more sustainable.

Companies also face too many business priorities like budget pressure that hinder their sustainability developments along with a lack of knowledge about sustainability and how to go about it.

Which of the following elements will be key drivers in meeting sustainability goals in your organisation?



ADDITIONAL ELEMENTS

Profitability of green initiatives
The right quantitative targets and KPI's
Collaborations with stakeholders

A clear plan on how to become more sustainable and reach goals along with explicit priorities is seen as a key driver in meeting sustainability goals in the future for 72% of respondents.

57% also saw customers as key to meeting sustainability goals.

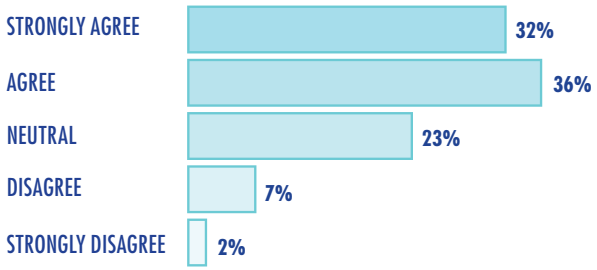
Just over 40% highlighted the importance of incentives from both within and outside the firm to achieve sustainability goals from now on.

SUSTAINABLE BUSINESS ETHICS & CULTURE

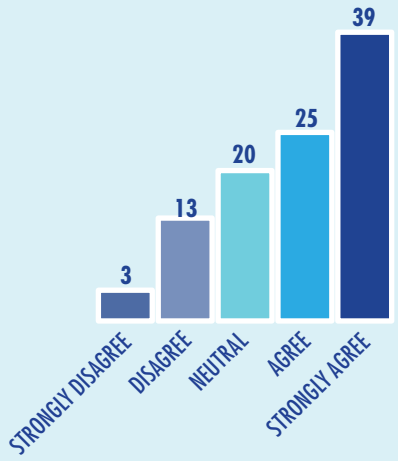
How much do you agree with the statement "My organisation has policies to minimise energy and resource consumption in our internal operations"?

Roughly 70% agreed or strongly agreed the their organisation has policies in place to minimise the consumption of resources within its internal operations.

Fewer than 10% disagreed, seeing their companies as not having initiatives in place to actively discourage energy and resource consumption within its operations.



How much do you agree with the statement "My organisation has aligned our Corporate Social Responsibility business targets with the UN Sustainable Development Goals"



39% strongly agreed that their organisation has aligned CSR targets with the UN sustainable development goals, and 1/4 of respondents agreed, presumably that the UN development goals were taken into account to some degree.

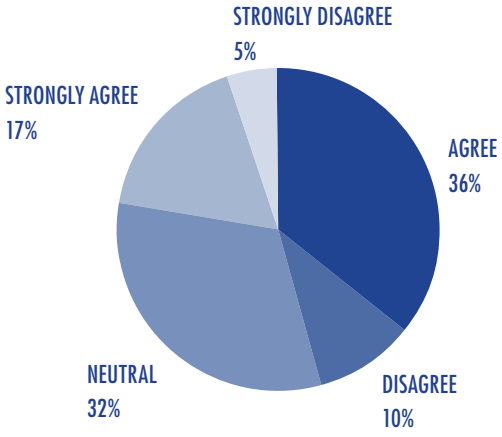
16% actively disagreed or strongly disagreed, showing almost 1/5 of organisations not considering the UN sustainable development goals when developing their corporate responsibility business targets.

How much do you agree with the statement "My organisation requires our suppliers to have sustainable business practices"?

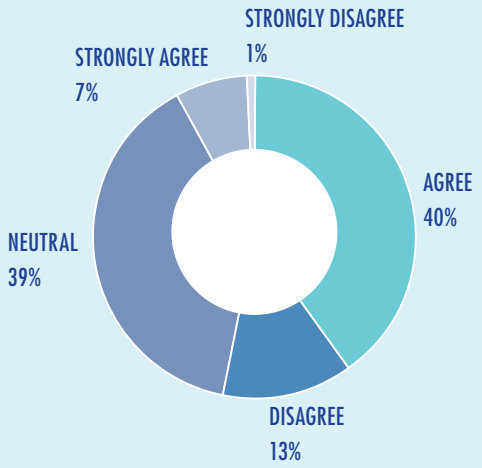
17% of companies strongly agree that their organisation requires suppliers to have sustainable business practice. A further 36% agreed with the statement of having sustainable business requirements for their suppliers.

This shows over half of companies having an active pursuit of equitable suppliers.

15% of respondents indicated that their companies do not require their suppliers to have sustainable business practices.



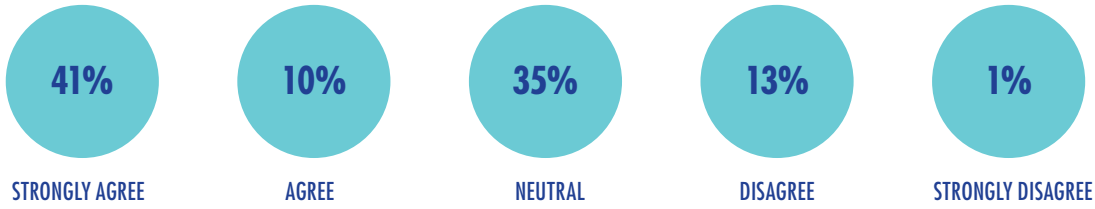
How much do you agree with the statement "Customers of my organisation demand that we have a sustainability policy"?



40% agree that their customers do have a demand for the company to have a sustainability policy, with 39% being neutral.

8% disagree, indicating that their customers do not demand a sustainability policy from the organisation.

How much do you agree with the statement "Employees in my organisation ask that we have a sustainability policy"?

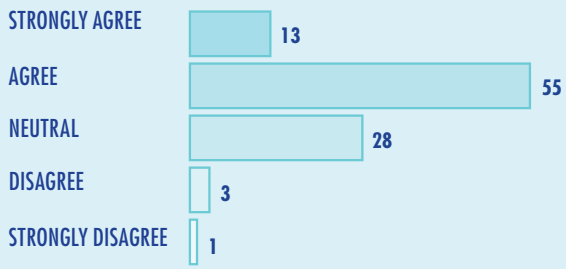


Roughly 1/2 of respondents agree that the employees within the organisation want the firm to have a policy on sustainability.

35% were neutral towards the statement, showing no opinion towards whether the employees actively ask the organisation to have a sustainability policy.

14% of those surveyed disagree, claiming that those working at the firm do not ask the company to take a stance with a sustainability policy.

To what extent do you agree with the following statement "Singapore provides better basis to engage in sustainability than its regional counterparts in APAC".



The prevailing opinion is that Singapore provides a better basis to engage in sustainability compared with other countries in APAC, with 68% agreeing or strongly agreeing with the statement.

4% disagree or strongly disagree with the statement.

SUSTAINABILITY IN SINGAPORE

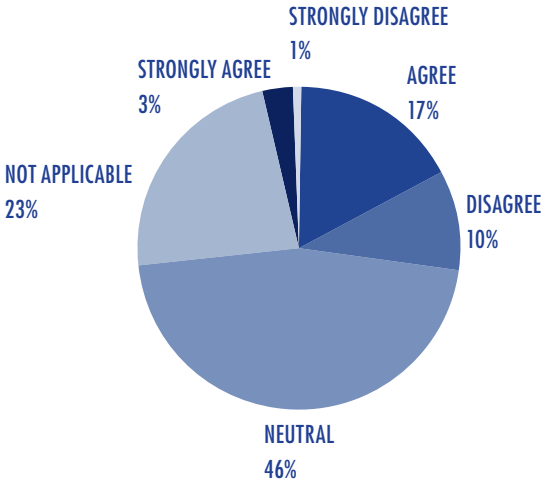
In your opinion, how helpful has the development of regulatory structure for Sustainability in Singapore been?

While 46% finds the regulatory structure in Singapore for sustainability very helpful and somewhat helpful, the rest of the respondents are either neutral or found dissatisfaction in the development of regulatory structure for sustainability. This shows potential improvement possibilities and deserves further attention.

To what extent do you agree with the following statement "The Singapore Exchange (SGX) mandatory sustainability reporting helped to track the adoption of sustainability initiatives in my company in Singapore"?

Only 20% of respondents agree that the mandatory sustainability reporting in place by the SGX helps track sustainability in their company.

Almost half, 46% are neutral towards the initiative, and a further 23% claim the mandatory sustainability reporting does not apply for their organisation



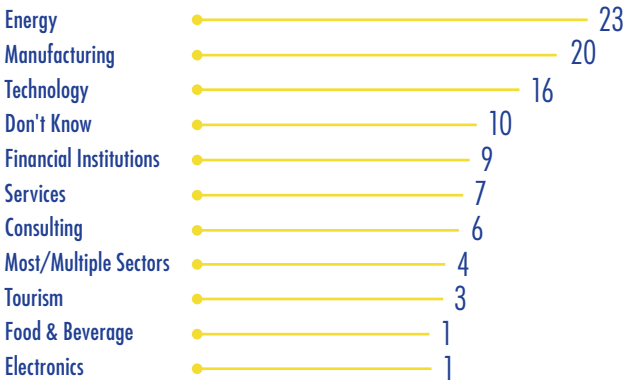
How much do you agree with the statement, "The European Green Deal" will create new business models and opportunities in Singapore & South East Asia?

The European Green Deal is seen to be creating new business models and opportunities in Singapore and South East Asia by 56% of respondents.

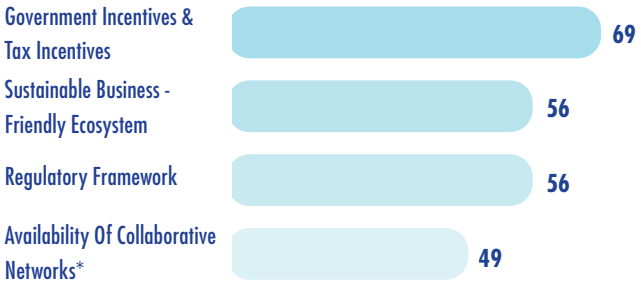
Only 3% does not see opportunities arising in the region from the European Green Deal.

In which sector will "The European Green Deal" create new business models and opportunities?

The largest opportunities arising from the European Green Deal are seen within Energy, Manufacturing and Technology, but with 10% of respondents being unsure to where the new business models and opportunities will arise.



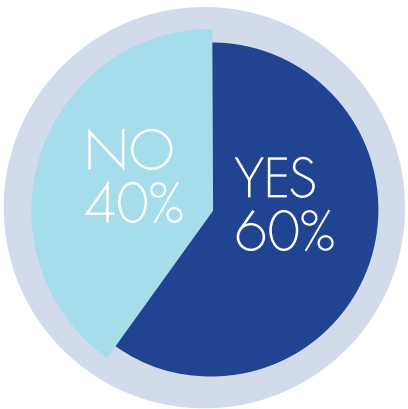
Of the following aspects, which ones could be improved to induce companies to engage in more sustainability projects in Singapore?



To encourage an increase in sustainability projects in Singapore, the largest group of 69% is in favour of increased incentives in terms of taxes and government initiatives.

56% also sees a need for an improved regulatory framework, as well as an entire ecosystem that is friendly towards sustainable business.

Have you heard about the Singapore Zero Waste Masterplan?



If yes, how relevant is the Singapore Zero Waste Masterplan to you?

Over 50% of those who had heard of the Zero Waste Masterplan see it as relevant or very relevant to their organisation.

12% does not see the Zero Waste Masterplan as applicable to them.

The remainder argue limited relevance.

Comments and suggestions from those aware of the Zero Waste masterplan included reservations against the functionality and feasibility of the plan.

"Low awareness will hinder adoption"

"Will require a long time to achieve"

"Needs to become more relevant for corporations"

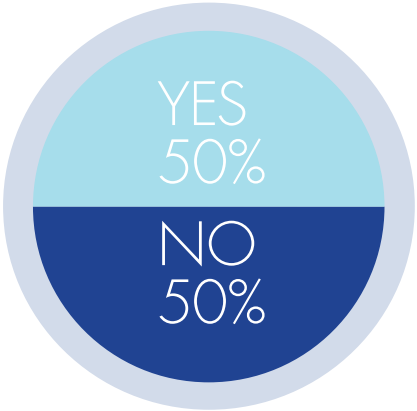
"Needs to become more concrete and practical"

"Good intentions, although there have not been enough concrete actions"

"Seen as less relevant to organisations, but more geared towards individuals on a personal, consumer level"

Have you heard about the "Singapore Carbon Pricing Act"?

Awareness of the Singapore Carbon Pricing Act is lower than that of the Zero Waste Masterplan, with a clear 50/50 split between respondents.



If yes, how has your company reacted to the introduction of the "Singapore Carbon Pricing Act"?

54%	Out of those who had heard of the Singapore Carbon Pricing act, more than half does either not see it as applicable to their organisation/industry or have not reacted to the act so far.
18%	18% of those aware, are very supportive and see the act as a good initiative. It is, however, unclear if there had been any action from the organisations in response to the act.
16%	Relatively few of the respondents reported company reactions, for example, in the form of increased demand, new product offerings brought to market and/or new business opportunities

Some respondents express uncertainty as to how the carbon pricing act will affect them, and whether the associated measures are enough to make a difference, rather than just push the costs forward.

EUROPEAN EXCELLENCE IN SUSTAINABILITY

Best practices in sustainability - what our respondents are doing to be more sustainable?

At the end of our survey, we asked companies to share some of the most frequent sustainability practices that have been implemented in their companies.

Most of the companies have already implemented initiatives such as:

Going Paperless	LED Lights & Motion Sensors
Energy Saving	Limiting Waste
Solar Panels	Ban of Single Use Plastics
Water Treatment	Recycling

For others, who are already on the next phase of sustainability, they have committed globally through:

UN Sustainable Development Goals	Flight Reduction
Annual Reporting on Sustainability Targets	Green Investments
Sustainability Scorecards	Working Mostly With Companies Who Are Carbon Neutral

Only 15 out of the 100 companies that have participated in the survey shared that there are still no sustainability practices implemented, but there are plans to do so.

These are very encouraging numbers, which are showing that even if not all companies are on the same stage of sustainability development, almost all of them are integrating sustainability in their current or future plans.

BUSINESS RECOMMENDATIONS TO SINGAPORE

SUSTAINABILITY RECOMMENDATIONS FROM THE EUROPEAN BUSINESS COMMUNITY TO SINGAPORE

INCENTIVISE

Our respondents underline the importance of having the right incentives to encourage companies and individuals to behave more sustainably, ensure sustainability measures are adhered to and make it more meaningful for companies operating in Singapore to act sustainably.

Recommendation

- Provide tax incentives for environmentally friendly companies

AWARENESS & EDUCATION

The public mindset and awareness regarding sustainability and what to do about it, is crucial for its success. The firms highlight that information about sustainability and its importance needs to be spread wider in Singapore, both to the public and towards businesses.

Recommendation

- Educate the young in school about climate change
- Create awareness for the general public on topics like usage of electricity and packing material waste

RESOURCES, PLASTICS & WASTE MANAGEMENT

Many of the respondents are disappointed in regards to the high levels of plastic usage in Singapore, paired with a lack of recycling for all materials and an overall waste management system that is lagging behind. A more responsible and holistic attitude towards resource consumption and wastage is needed in Singapore, whether that is packaging materials, energy, fuels or other resources.

Recommendation

- Remove single plastic usage
- Promote hybrid and electric vehicles
- Implement clean energy buildings, e.g. solar panels

REGULATE

Our respondents believe regulation is key to promote and enforce sustainable behaviour. They suggest a better regulatory framework with clear policies and road maps to make sustainability initiatives more meaningful, rather than just "talk". Sustainability needs to be a priority, with the government leading by example. Legislation will not only ensure compliance, but also contribute to a wider sustainability-friendly business ecosystem, making it easier for companies to adhere.

Recommendation

- Regulatory structure could be better to help sustainability
- Tighten regulatory framework around circular economy and zero waste

COLLABORATION & COORDINATION

Stronger collaboration between governmental entities and organisations is seen as needed to accelerate and streamline the sustainability shift.

By coordinating the initiatives across areas, platforms and authorities firms can more easily work towards a common goal. Together with a sound regulatory framework, collaboration and coordination between entities will enable a sustainable business ecosystem for all.

Recommendation

- Create a sustainability-friendly ecosystem involving multiple actors

These are the focus areas where the companies feel the need to reinforce action from the government side. There are still a few takeaways that all of them have highlighted: there is an urgency; climate change and the environment damage will not adapt to our corporate or governmental agenda and we should act immediately and decisively.

If we want to tackle this enormous challenge, we have to work together. This is one of the most important elements; it does not start only with individuals, the government, the private entities, or the non-profits. It is all of us, together and that is why most of them have mentioned the need to create a sustainability-friendly ecosystem, where every actor contributes in a meaningful way.

PHILIPS

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Doing business **responsibly and sustainably**

"As a purpose-driven health technology company, we are very conscious of our responsibility towards society and of the need to continue to embed sustainability ever deeper in the way we do business – in our own operations and beyond, together with our partners."

Frans van Houten, CEO Philips

At Philips, we strive to make the world healthier and more sustainable through innovation. This is reflected in our commitment to the United Nations Sustainable Development Goals. Our goal is to improve the lives of 2.5 billion people a year by 2030.

Improving people's health and wellbeing, and expanding access to care for underserved communities

Ensuring sustainable use of materials and driving the transition to a circular economy

Ensuring sustainable use of energy, reducing emissions, and operating carbon-neutral

- Designing our products and services in line with EcoDesign requirements
- Embedding sustainable practices in our ways of working

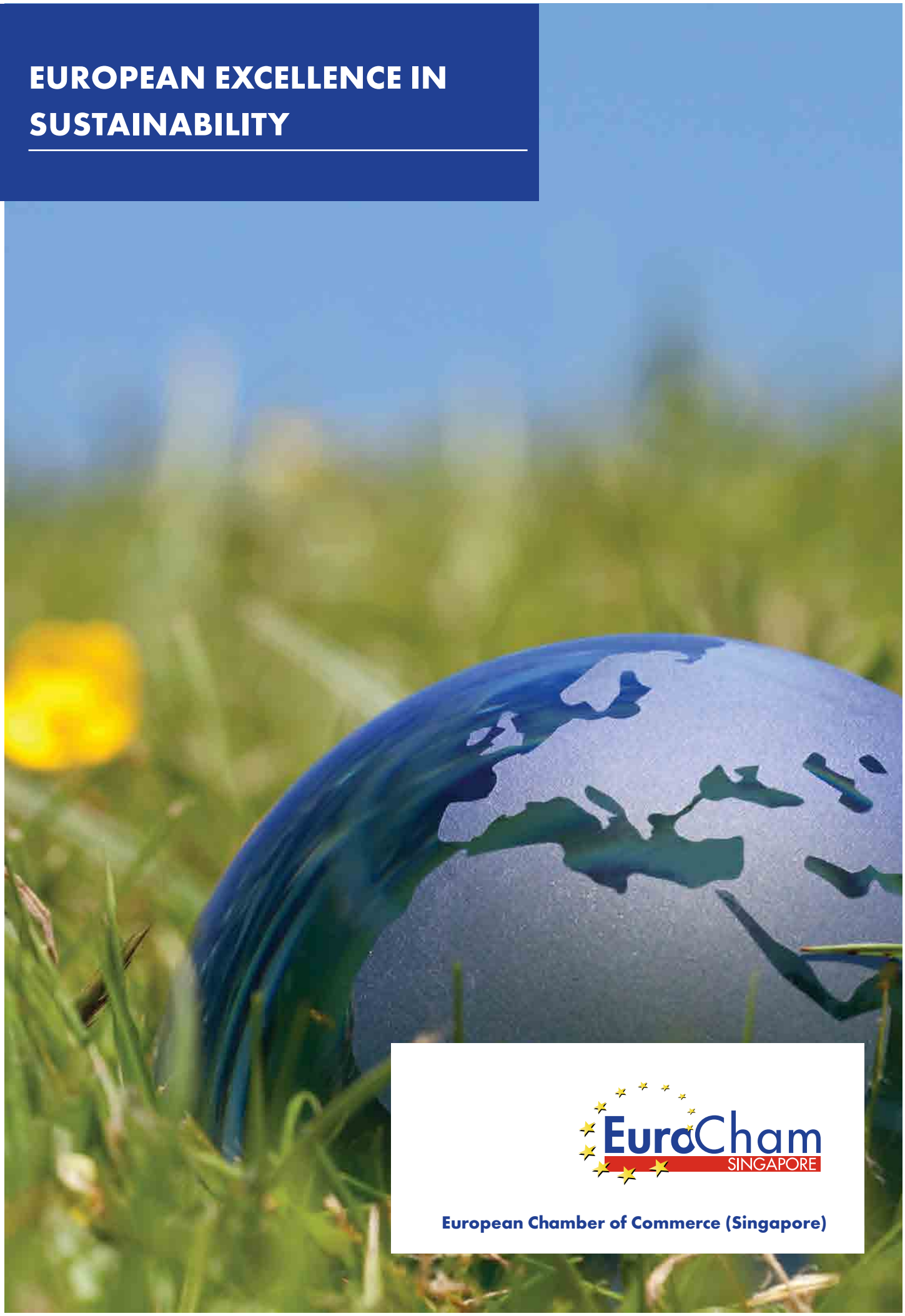
ENABLERS

- Teaming up with our suppliers to increase social and environmental impact throughout our supply chain
- Building strong coalitions to drive global change

innovation you

For more information, please contact: philips.sustainability@philips.com

EUROPEAN EXCELLENCE IN SUSTAINABILITY



EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

ACCENTURE

DRIVING SUSTAINABLE VALUE FOR BUSINESS AND SOCIETY AS A WHOLE

Accenture is a global professional services company with leading capabilities in digital, cloud and security. Combining unmatched experience and specialized skills across more than 40 industries, we offer Strategy and Consulting, Interactive, Technology and Operations services—all powered by the world's largest network of Advanced Technology and Intelligent Operations centers. Our 506,000 people deliver on the promise of technology and human ingenuity every day, serving clients in more than 120 countries. We embrace the power of change to create value and shared success for our clients, people, shareholders, partners and communities.

In Singapore, Accenture employs close to 3,000 employees, providing strategic advice and technology partnership to corporates and governments alike.

CATALYST THROUGH CONSULTANCY

As a strategic advisor & technology partner for corporates and governments globally, Accenture helps its clients to design and execute their sustainability strategies, powered by new technologies, with the aim to deliver tangible business benefits at scale & speed.

This is especially important today, as organizations must be purposeful in defining ethical standards and operating across a responsible supply chain that minimizes the consequences of a complex global system. In helping clients to integrate sustainability into their strategy, operating model, processes and technologies, Accenture empowers them to answer a new competitive imperative: to drive sustainable value for business and society as whole.

Technology is crucial to this work, and Accenture is a leader in implementing new technologies within its clients' operations and driving sustainability progress. Using AI, Blockchain and Digital technology solutions, Accenture helps clients meet their resource and energy efficiency targets, achieve supply chain transparency and traceability targets, and launch new sustainable and circular business models.

WALKING THE TALK

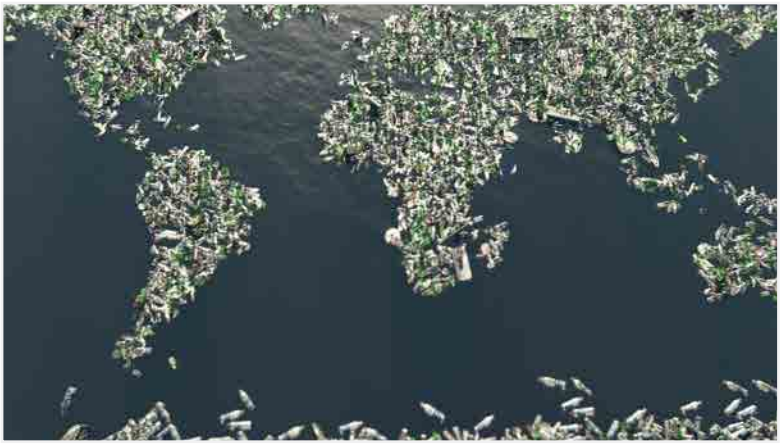
Accenture has itself been a signatory to the 10 principles of the United Nations (UN) Global Compact since 2008. It is also continuously tracking progress towards its Sustainability and Corporate Social Responsibility Goals as part of its annual Corporate Citizenship report.

Having more than 100 Sustainability practitioners globally, Accenture's with broad and deep functional and industry knowledge has been applied to more than 350 sustainability projects in the last 24 months.

ECOSYSTEMS

Accenture is uniquely positioned to engage with a wide corporate, government and non-government ecosystem of organizations.

It is a strategic partner of the World Economic Forum and for the past 18 years it has worked closely with this and other strategic partner organizations to advance the Forum's goal of driving positive change and improv-



ing the state of the world. As part of this collaboration, Accenture released the Circular Economy Handbook during the 2020 WEF annual meeting in Davos.

In 2003, Accenture launched a social-impact business unit called Accenture Development Partnerships (ADP). Accenture Development Partnerships helps organizations in this sector dramatically increase their impact in areas such as global healthcare, education, financial inclusion and energy access. Together with our clients, we are building momentum to change the world and bringing us closer to achieving the United Nations' Sustainable Development Goals.

Since launching in 2003, we have completed more than 1,600 projects across 90 countries. By tapping into the best of Accenture's ecosystem and alliance partners—global reach, extensive capabilities, cross-industry perspectives and a skilled workforce—we can provide end-to-end solutions. As part of Accenture Development Partnerships, Accenture collaborates with numerous NGOs and development agencies globally (including the World Bank, the Asian Development Bank, Greenpeace, WWF, Ocean Conservancy etc.)

IMPACT

In 2019, Accenture equipped 3.6 million people to get a job and build a business, cut greenhouse gas emissions by more than 19% against its 2016 baseline and used 26% renewable energy in its locations globally.

In South East Asia, Accenture was commissioned by Ocean Conservancy to explore pathways to remove plastics from the ocean, with a focus on improving the financing of waste collection across Southeast Asia.

As a result of that project, Ocean Conservancy published the Plastics Policy Playbook, a report which explores public-private strategies to prevent ocean plastic waste and highlights 20 high priority action across the value chain, with a focus on reducing the supply of problematic plastics, circular design, financing the collection and developing recycling and treatment markets.

Another example of Accenture work in the region is project CORaiL. Project CORaiL leverages the power of Artificial Intelligence to support Coral Reservation and Preservation. The initiative started as a collaboration between Accenture, Intel and the Philippines-based Sulubaaï Environmental Foundation, to develop a solution using artificial intelligence (AI) to monitor, characterise and analyse coral reef resiliency. This solution has collected roughly 40,000 images now used to gauge reef health in real time.

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ASIA PACIFIC BREWERIES SINGAPORE (APB SINGAPORE)

BREWING PRIDE FOR A BETTER SINGAPORE

THE JOURNEY OF A LOCAL BREWER

Established as a joint venture between Fraser & Neave and The HEINEKEN Company in 1931 and fully acquired by HEINEKEN in 2012, Asia Pacific Breweries Singapore (APB Singapore) now has over 800 employees and is a leading brewer in Southeast Asia with a rich long history of success in developing premium beer and cider brands. Its flagship product, the world-acclaimed Tiger Beer, has been born and brewed on local soil since 1932 and is now available in more than 50 countries around the world.

BREWING A BETTER WORLD

APB Singapore is highly committed to achieving a positive environmental and social impact through its "Brewing a Better World" sustainability strategy, which focuses on six key areas – protecting water resources, reducing carbon emissions, sourcing sustainability, driving responsible consumptions, promoting health and safety, and growing with communities. The brewer is currently leading the charge in lowering carbon emissions, protecting water resources and reducing waste in its initiatives.

APB's sustainability strategy is embedded within every level of the organization and its operations. Its zero-waste approach entails the set-up of an extensive reverse logistics system where glass bottles and kegs are collected from consumers and partner outlets for reuse. The brewery also collaborates with third parties to support a system where spent grains from the production process are upcycled for use as animal feed.

- APB has a plan to achieve its ambitions and is making progress: it has successfully achieved the concrete targets for 2020 defined in APB's sustainability strategy.The reduction of CO2 use in production by 40% by 2020 (compared with 2008 levels)
- The achievement of 95% compliance with supplier code procedure by 2020
- Purchasing 100% green fridges, which have 50% less carbon emissions than conventional fridges

ONE COMPANY, ONE SPIRIT

The employees of APB support the company's sustainability strategy and participate in educational activities, volunteer events and online content engagement. For instance, on World Water Day 2019, APB organized internal activations for its employees to gain a better understanding of the importance of water and water saving. Furthermore, employees participate regularly in coastal clean-ups, and the company also distributed reusable food containers among its staff to avoid the use of disposables for takeaway meals.

The APB Foundation (APBF), the humanitarian arm of the company is engaged in philanthropic work to support human excellence, creativity development, and humanitarian causes. One of its most notable initiatives is the APB Foundation Scholarship for Persons with Disabilities.

In addition, APBF also works with various NGOs to support community initiatives and to give back to the society that it operates in. The Founda-

tion's latest initiative was a $75,000 donation during the COVID-19 pandemic to the Migrant Workers' Assistance Fund, the humanitarian charity arm of the Migrant Workers' Centre. The money was used to provide relief to migrant workers impacted by COVID-19. Home Shelter for Trafficked Victims (HOME) and Very Special Arts (VSA) are some of the other NGOs that the Foundation has been working with as well. In 2019, APB Singapore's corporate giving totalled SGD 564,000 in donations.

Lastly, the company joined the Singapore Packaging Agreement, a joint initiative by government, industry, and NGOs. The Agreement has over 200 signatories who adopt and share best practices in reducing packaging waste.

TECHNOLOGY IN THE HEART OF SUSTAINABILITY

In 2017, a joint development project with Public Utilities Board (PUB) Singapore's national water agency, and National University of Singapore (NUS) was initiated to build a water reuse treatment plant. The goal was to develop a solution to promote water circularity for companies in water-scarce Singapore.

The operational launch of the project was in 2019 and is expected to reduce the brewery's water intake by more than 10%, which is equivalent to the annual water consumption of 3,160 four-bedroom HDB flats. The upcycled water is used for cooling towers, as well as for general cleaning and landscaping. This project of building an on-site water reuse treatment plant to conserve water is also one of the first in Asia.

In addition, the company has an on-site rainwater harvesting system that collects approximately 15,000 m3 of rainwater annually, which is the equivalent to the annual consumption of more than 800 four-bedroom HDB flats.

APB also aims to significantly reduce its carbon footprint through investment in renewable energy. With 8,038 solar panels on its rooftop, the company is among the top 5 solar-powered breweries in the world, generating 1,940MWh of electricity a year. This reduces the brewery's carbon footprint by 20 per cent – brewing every pint of Tiger Beer consumed in Singapore by sunlight.

SUSTAINABILITY IS A TEAM SPORT

The brewery understands that if everyone is moving forward together, then success takes care of itself.

APB is supportive of all stakeholders in its supply chain. To start with its suppliers, APB helps them comply with the company's supplier code procedure, which covers areas such as environmental sustainability and social sustainability including human rights.

APB's clients are another important link in the chain: for example, bar owners are provided green fridges that have low energy consumption and low carbon emission standards.

The overall joint sustainability efforts pay off and show a positive impact on the environment and in the community. As a zero-waste company that produces less than 1% waste, APB has prevented more than 20,000 tonnes of waste going to the landfill through the retrieval of more than 25 million glass bottles from the on-premise sector and repurposing its spent grains as animal feed. Its pledge to utilise clean solar energy has also powered it to reduce its carbon footprint by 15,000 tonnes annually. Lastly, its drive to be water efficient through its water reuse treatment plant and rainwater harvesting system has allowed it to reduce its water intake by the equivalent of almost 4,000 four-bedroom HDB flats in Singapore.

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IMPROVING LIFE, DAY BY DAY

Evonik is a world leader in specialty chemicals, headquartered in Germany and active in more than 100 countries around the world. Its innovative, profitable and sustainable solutions for customers make tires more fuel-efficient, mattresses more elastic, medications more effective, and animal feed healthier.

Evonik's Singapore office was first set up in 1969. Five decades later, the city state serves as full-fledged regional headquarters for the Asia Pacific region. Evonik has more than 700 employees in Singapore, across three manufacturing sites, innovation and technical service centers, and a research hub. Singapore is home to Evonik's largest production complex for essential amino acid DL-methionine, an oil additives production site on Jurong Island, as well as a manufacturing facility in Tuas. Evonik's innovation and technical service centers specialise in coatings, animal feed, polyurethane additives and beauty & care solutions. Since 2018, the company's first Asia Research Hub has focused on resource efficiency, particularly with respect to functional surfaces, additive manufacturing and tissue engineering. In March 2020, an extended laboratory facility was completed to further the research and development activities undertaken at the Asia Research Hub, progressing even more into biotechnology.

MAKING SUSTAINABILITY PROFITABLE

Evonik is increasingly called upon to support the development of resource-saving applications that will help customers achieve their sustainability goals. Having observed this growing demand for products that demonstrate a good balance of economic, ecological, and social factors, Evonik pursues a broad spectrum of future-oriented business opportunities in attractive markets.

In Singapore, this has led to the inking of a strategic partnership to develop building materials that keep the heat out of Housing & Development Board (HDB) constructions. Evonik has also been a supporter of aquaculture nutrition & health, working closely with institutions and agencies like Singapore Food Agency (SFA) and Economic Development Board (EDB).

Innovation activities are spearheaded through its research, development & innovation (RD&I) division. Serving as an internal incubator for Evonik, RD&I supports the Group's growth and sustainability strategy and opens up new business options.

The company's research & development goal is aligned with six growth fields, with which Evonik aims to generate additional sales of over € 1 billion (about SGD 1,6 billion) by 2025: Sustainable Nutrition, Healthcare Solutions, Advanced Food Ingredients, Membranes, Cosmetic Solutions, and Additive Manufacturing.

MEASURING IMPACT

Evonik uses impact valuation analysis to regularly measure and analyse the direct and indirect impacts of its business activities from economic, ecological, and social perspectives. This provides insights into the scale of the impacts of Evonik's corporate activities, its benefits for society, and key levers to reduce unwanted impacts as well as maximize desirable impacts along the value chain.

In 2019, Evonik published its twelfth full Global Reporting Initiative (GRI)-compliant sustainability report. Since 2017, Evonik has given prominence to non-financial indicators in its conventional risk reporting. The company has been systematically identifying, monitoring, and reporting sustainability opportunities and risks—as of 2019, this includes opportunities and risks related to the climate. 2019 also marked the first-ever report by Evonik to contain climate-related information on governance, strategy, risk management, and metrics and targets, in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). This was in addition to the facts and figures published in connection with Evonik's participation in the Carbon Disclosure Project.

Evonik has received various awards, including the 2018 gold award and the 2019 platinum award from the League of American Communications Professionals (LACP), for its continuous improvement in sustainability reporting.

BRINGING STAKEHOLDERS ON BOARD

Sustainable business activities and responsible conduct are cornerstones of Evonik's business model and preconditions for Evonik's future viability. Beyond its own production processes, the company also drives sustainability along the value chain through intensive dialogue with stakeholders.

In Singapore, Evonik works with stakeholder groups including the Ministry of Trade and Industry, Ministry of Manpower, Ministry of Sustainability and the Environment, Ministry of National Development, EDB, JTC, EnterpriseSG, Singapore Food Agency, A*STAR, NUS, NTU, SUTD and Willing Hearts. For example, in September 2019, Evonik hosted its regular format "Evonik meets Science" for the first time in Singapore, focusing on tissue engineering with guest speakers from these stakeholder groups. These dialogue events have been held regularly since 2001 in Germany, China, Japan, and the USA; focusing on bio-renewables, functional polymers, nanotechnology, catalysts, and biotechnology.

AIMING FOR GLOBAL IMPACT

Evonik is a member of the UN Global Compact, the World Business Council for Sustainable Development (WBCSD), and a founding member of "Together for Sustainability", an initiative of chemical companies that promotes sustainability and transparency in the supply chain. In Germany, it is part of econsense, an association of leading global German companies, and in Chemie3, the sustainability initiative of the German chemical industry.

SUSTAINABILITY STRATEGY 2020+

Sustainability is part of Evonik's market proposition and its purpose: "Leading beyond chemistry to improve life, today and tomorrow". Evonik's Sustainability Strategy 2020+ is an expression of its aspiration to become a best-in-class specialty chemicals company, while translating sustainability into profitability. The strategy sets out ambitious environmental targets.

Since the Executive Board adopted the Sustainability Strategy 2020+ in February 2019, Evonik's focus has been on implementing the five elements of its Strategy:

1. Ambitious targets regarding reduction of CO2 emissions and global water management
2. Integrating sustainability into strategic management processes
3. Systematic focus on the impact of business activities along the value chain (impact valuation) and on contribution to the UN Sustainable Development Goals
4. Continuous improvement of sustainability reporting
5. Giving sustainability a firm place in Evonik's market proposition and purpose.

THE LEGO GROUP

BRINGING SUSTAINABILITY INTO PLAY

The name 'LEGO®' is an abbreviation of the two Danish words "leg godt", meaning "play well". The LEGO® Group is a privately held, family-owned company with headquarters in Billund, Denmark. The company was founded in 1932 by Ole Kirk Kristiansen, and based on the iconic LEGO® brick, it is still one of the world's leading manufacturers of play materials.

True to the company's spirit, 'Only the best is good enough', the LEGO® Group has been emphasising the importance of high-quality play materials since 1932, when the founder Ole Kirk Kristiansen began making wooden toys. Developing high quality and safe products that help children to play well remains the focus of the business today.

PRESENT IN SINGAPORE SINCE 1979

LEGO® Singapore was incorporated in 1979. Today, LEGO® Singapore is one of the LEGO Group's five global operating hubs (the others being in Billund, Enfield, London and Shanghai), with more than 300 employees based in Singapore.

BECAUSE SUSTAINABILITY MATTERS

True to Ole Kirk Kristiansen's motto, the company continues to strive for the very best in all it does, ensuring the business is constantly innovating and never compromising when it comes to doing the very best for children globally. One of the values that the company has committed to is its Planet Promise.

Through its Planet Promise activities, the LEGO Group strives to help build a sustainable future and make a positive impact on society and the planet that children today will inherit.

As part of this promise, in 2003 the LEGO Group became the first toy company to join the United Nations Global Compact – the world's largest corporate social responsibility initiative – and remains committed to it. Today, the UN Global Compact and the 17 Sustainable Development Goals continue to guide the development of the LEGO® Group's strategies and approaches to sustainability.

SUSTAINABLE MATERIALS, PACKAGING AND WASTE

By 2030, the LEGO Group has committed to only use sustainable materials in all core products and hopes to do the same with its packaging by 2025.

As a step towards achieving this goal, the LEGO Group launched their first elements made from sustainably sourced plant-based plastics in 2018. 80 different types of LEGO® ® elements are now made from sustainable materials, which represents about 2% of the 3,600 elements available to designers.

In 2019, the LEGO Group launched the LEGO® Ideas Treehouse that contains 185 of these botanical elements, making it the most sustainably sourced LEGO® set to date.

That same year LEGO® retail stores began to phase out plastic carrier bags and switch to paper bags. They will continue to eliminate single use plastic on an on-going basis to keep with the goal of Sustainable Packaging by 2025.

Back in 2018, the LEGO Group also joined the How2Recycle initiative. LEGO® boxes in the US and Canada now feature the How2Recycle label promoting packaging recycling and providing US and Canadian consumers with clear guidance to responsibly recycle their LEGO® packaging

Approximately 75% of cardboard used to make LEGO® boxes comes from recycled material.

All paper and cardboard used in LEGO® products and product packaging is recyclable, sustainably sourced and certified by the Forest Stewardship Council.

Lastly, the LEGO Group recycles 100% of all in-factory element waste, to prevent it from ending up in landfill. This means that when LEGO® bricks are manufactured, any excess materials that comes out from this process will be re-injected into the manufacturing process to create new LEGO® Bricks, to ensure a circular process in production.

ZERO IMPACT OPERATIONS

In addition to the LEGO Group 's material and packaging ambitions, climate change impact continues to be a focus in its operations and supply chain. Global energy consumption is 100% balanced by renewable energy from onsite production of solar energy and investments in offshore wind power by the LEGO Group's parent company, KIRKBI A/S.

In 2016, the LEGO Group set a target to improve the carbon efficiency of a LEGO® brick by 10% over 2017-20 in partnership with WWF. To meet the 2020 emissions reduction target, LEGO® will continue to invest in energy efficiency projects across their operations and roll out solar panels at factories in China and Hungary. In addition, they will invest in green gas supplies and purchase some accredited renewable energy certificates.

FEATURED PROJECTS

Billund, Denmark: The company installed an innovative new cooling system at their Danish factory that pulls in outside ambient air and uses it to cool the production process of molding LEGO® bricks. This system minimizes the need for a refriger-

ant-based system and provides a significant energy reduction of more than 538,000 kWh annually, the equivalent of a yearly CO2 emission reduction of 111 tonnes.

Kladno, Czech Republic: In 2019, 3,570 solar panels were installed on the roof of the second facility after the LEGO® Campus in Billund, Denmark to be partially powered by solar energy. These panels cover six production halls and mean a reduction of CO2 emissions by more than 500 tonnes annually.

All paper and cardboard used in LEGO® products and product packaging is recyclable, sustainably sourced and certified by the Forest Stewardship Council.

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SOCIÉTÉ DES MATIÈRES PREMIÈRES TROPICALES PTE LTD (MICHELIN)

SUSTAINABLE MOBILITY STARTS WITH SUSTAINABLE SUPPLY CHAINS

Société Des Matières Premieres Tropicales Pte Ltd (SMPT) is the sole natural rubber buyer for the Michelin Group. SMPT serves as a procurement hub for the Group: purchasing natural rubber (amounting to approximately eight percent of the world natural rubber market); managing supply chain logistics; performing quality audits; control and claims management to guarantee the quality of natural rubber shipped; and promoting and implementing the Michelin Sustainable Natural Rubber Policy.

Found in almost every tire, natural rubber is key to the future of sustainable mobility—unique for characteristics that synthetic alternatives cannot replicate, the renewable material has great potential in a climate-smart future. By ensuring that sourcing of this important material is ethical and sustainable, SMPT hopes to offer everyone a better way forward.

THE MICHELIN OF TOMORROW

In the Michelin of tomorrow, everything will be sustainable, says Florent Menegaux, CEO Michelin Group. Michelin cares about offering everyone a better way forward and innovates to make human mobility safer, more efficient and more environmentally friendly. It is guided by three inseparable criteria: the growth and development of people, financial and operational performance, and positive contribution to planet and inhabitants. At SMPT, these values translate to a commitment to respect people, protect the environment, improve farming practices and adopt transparent practices throughout its natural rubber value chain.

LEVERAGING DIGITAL INNOVATION TO SOLVE COMPLEX PROBLEMS: RISK MAPPING WITH RUBBERWAY®

The natural rubber industry is unique in that 85% of producers are smallholder farmers. While this means that the industry supports a huge number of livelihoods, it also results in very complex supply chains. This makes understanding ESG risks a difficult endeavour for purchasers and downstream manufacturers (like tire makers). Developed to help tackle these difficulties, Rubberway® is an innovative risk mapping and supplier engagement solution that combines a field-ready data collection platform with robust data analysis tools.

Central to the integrated solution is the Rubberway® mobile application, which leverages a device that even the most remote smallholders have: a mobile phone. Through a unique URL link that can be sent through typical messaging platforms, farmers and smallholders can access a web-based application that surveys them on business, social and environment practices. This can be done by the farmers themselves or deployed at scale by primary natural rubber processing factories.

From there, data points are then aggregated on a web-based dashboard, which generates ESG risk scores from groups of data for statistical analysis. Data can be visualized at multiple scales, from a single factory's supply shed, to an interactive world map that can identify risks at jurisdictional levels. The analysis provides useful insights that can be used to prioritize specific interventions for each supplier factory or geographic region.

To date, more than 32,000 questionnaires, deployed by 53 natural rubber processing factories supplying SMPT, have been completed. The responses cover farms in Thailand, In-

donesia, Cote d'Ivoire, Ghana, Nigeria and Brazil, and make up more than 1.5 million data points.

While initially developed in partnership with Smag—a leading French software developer for agriculture—for deployment among SMPT's suppliers, the solution has since been shared with the wider industry in a pre-competitive manner. The goal is for Rubberway® to play a role in catalysing lasting transparency and risk mitigation in the global natural rubber value chain.

SUPPORTING SUSTAINABILITY JOURNEYS: A GLOBAL EFFORT

In addition to Rubberway®, SMPT is heavily involved in multi-stakeholder partnerships to forge inclusive and sustainable development throughout the natural rubber value chain. This includes an eight-year partnership with the Worldwide Fund for Nature (WWF), as well as long-standing engagements with The French Agricultural Research Centre for International Development (CIRAD) and the International Rubber Research Development Board. The health and wellness of rubber farmers is also a key concern, and to that end, the Michelin Group is financing an Institut Pasteur research and education program in Laos and Ivory Coast on mosquito borne diseases in rubber plantations.

With the Livelihoods Carbon Funds (LCF), Michelin works on leveraging the carbon economy to finance ecosystem restoration, agroforestry and rural energy projects to improve food security for rural communities and increase farmers' revenues. Michelin Group provides field training on agricultural practices and health & safety to about 100,000 rubber farmers household per year in West-Africa, Indonesia, Sri Lanka & Brazil. In West Africa, the Group and its Joint Venture have built and/or renovated 47 schools receiving 12,000 students per year. It also built and/or renovated 37 clinics that provide more than 120,000 free medical consultations annually.

The Group and its Joint Ventures are protecting and preserving more than 36,000 ha of forest representing close to 25% of the rubber concessions landbank. About 10% of those protected areas is the Michelin Ecological Reserve (REM) in Brazil. In this reserve, Michelin has restored a large patch of forest by planting 105,000 trees spanning 275 species and sponsored more than 110 research projects on various species of animals and plants resulting in the discovery of 16 new species.

DEMONSTRATING PROGRESS

At Group level, Michelin undergoes regular third-party non-financial ESG assessments. With SMPT specifically, progress on the implementation of the Sustainable Natural Rubber Policy is reported through the Sustainable Natural Rubber Dashboard on the Michelin purchasing website. In 2013, SMPT was the first to adopt the EcoVadis assessment system for use in the natural rubber supply chain, and today uses the platform to regularly assess the ESG performance of its suppliers. A majority of suppliers assessed improve their scores with each assessment.

In 2016, SMPT/Michelin became the first tire manufacture company to publish a Sustainable Natural Rubber Policy, committing to sustainability across its supply chain. This commitment has driven other industry players to publish their own sustainable natural rubber policies. More recently, in 2019, SMPT/Michelin became a founding member of the GPSNR (Global Platform for Sustainable Natural Rubber): a multi-stakeholder, voluntary membership organization with a mission to lead improvements in the socioeconomic and environmental performance of the natural rubber value chain.

TOWARD A SUSTAINABLE NATURAL RUBBER VALUE CHAIN

Michelin envisions sustainable natural rubber as a means to uphold human rights, protect forests and foster essential environmental services. Progress involves stakeholders in a participatory process and look to improve livelihoods for local communities, while ensuring that ecological and environmental values are appropriately protected. With more than two million rubber farmers in its supply chain, Michelin understands that it has an important responsibility to contribute to this vision.

Through SMPT, Michelin is leading the way toward a truly sustainable natural rubber value chain.

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BNP PARIBAS

POSITIVE IMPACT THROUGH SUSTAINABLE FINANCE

BNP Paribas offers products and services in Corporate and Institutional Banking (Advisory and Capital Markets, Financing Solutions and Securities Services), Wealth Management, Asset Management to large multinationals, local and regional corporations, financial institutions and high-net-worth individuals.

Having had a presence in Singapore since 1968, BNP Paribas now has around 2,200 employees in Singapore and is the Group's hub for Southeast Asia, where it has core banking licences in all five Southeast Asian markets in which it operates - Indonesia, Malaysia, Singapore, Thailand and Vietnam.

POSITIVE IMPACT

BNP Paribas' success is underpinned by an ethos of having a positive impact on stakeholders and society. The company attaches paramount importance to delivering sustainable finance solutions to clients that make a positive contribution to one or more of the three key foundations of sustainable development: economic, social and environmental.

As the bank for a changing world, the company remains committed to building a more sustainable future, where Corporate Social Responsibility (CSR) goes beyond altruism. A key driver of value, CSR is a strong conviction that guides everything the Bank does. It is a long-term business imperative that embodies BNP Paribas' business values and sits in line with the UN Sustainable Development Goals (SDGs).

At BNP Paribas, sustainable finance is the foundation for long-term growth. The business is moving forward with sustainability at the heart of the business agenda. In 2018, BNP Paribas was named "World's Best Bank for Sustainable Finance" by Euromoney.

Sustainable Finance and Investing (SF&I) practices, expertise and advocacy are embedded within business and other roles at BNP Paribas. While it has a small dedicated team heading SF&I efforts in APAC, the company's SF&I capabilities are largely integrated with other roles. There are also product experts on the topic sitting within product teams engaging with clients on a day to day basis on the topic with SF&I business development as a part of the overall mandate.

REPORTING

Since 2018, BNP Paribas has published an Integrated Report every year. The report is built around four chapters:

- Build sustainable performance by integrating the changes in the environment;
- Create value for clients through our integrated, diversified model, based on cooperation between business lines;
- Foster useful innovation and develop positive impact solutions, serving sustainable growth;
- Share a culture of ethics and responsibility in the day-to-day conduct of our businesses.

BNP Paribas aspires to meet the highest standards in reporting with the integrated report. The report expresses

the Group's aim to be a bank that supports the economy, serves its clients and is engaged with society. It also shows how the Group is creating short-, medium- and long-term value through collaboration with stakeholders.

INNOVATION

The top priority at BNP Paribas is to simplify and speed up banking operations by crafting unique and personalised experiences built on innovative services, digital applications, new payment methods and more, all while ensuring the security of every transaction and of every customer's data.

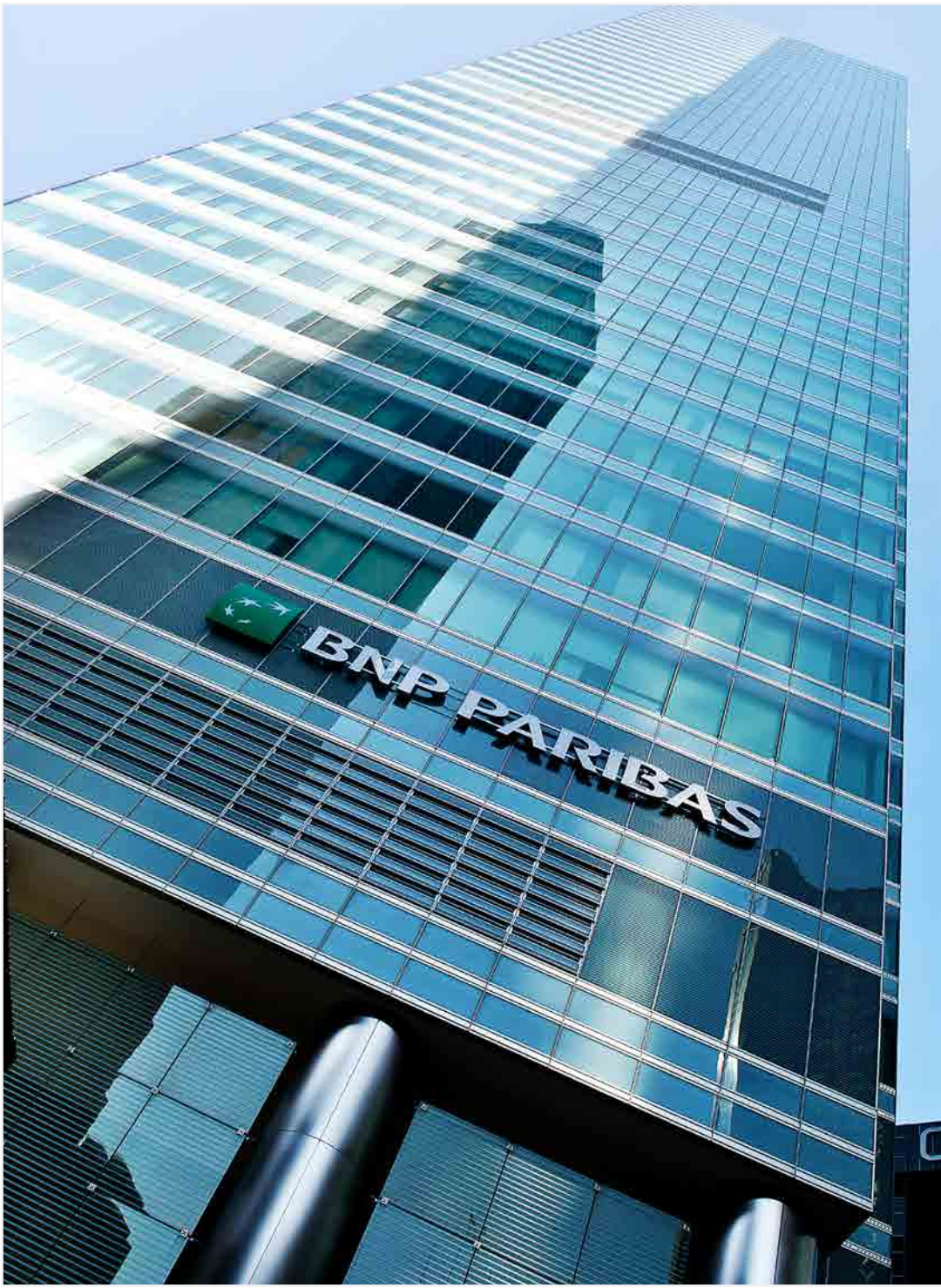
PARTNERSHIPS

The bank has training/academic partners, regulatory partners, and others. These are in addition to their work with regulators, clients, and other external organisations to create a positive impact on sustainability. With regulators, BNP Paribas is regularly engaged on work groups and other initiatives that drive positive change in the industry. With clients, efforts to engage them on SF&I topics have helped them along their transition journeys.

SUSTAINABILITY IN-HOUSE

BNP Paribas has been carbon neutral since 2017. Its direct impacts include reduction of carbon emissions in house and carbon offset projects. In addition, indirect impact in terms of assisting and incentivising clients to transition towards more sustainable business practices.

Its flagship initiative in Singapore is the Sustainable Future Forum. This and other efforts have helped BNP Paribas grow, capture opportunities, and offer innovative solutions with sustainability in mind.



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SWISS RE

MAKING THE WORLD MORE RESILIENT

The Swiss Re Group is one of the world's leading providers of reinsurance, insurance and other forms of insurance-based risk transfer. For more than 100 years, Swiss Re has served clients and partners across the APAC region.

This includes Australia, China, Hong Kong, India, Japan, Korea, Malaysia and Singapore. Swiss Re Asia, a wholly-owned subsidiary of the Group and regional headquarters for APAC, is strongly capitalised in line with regulatory requirements and shares the same financial strength rating as major Swiss Re Group's operating entities. Anticipating and managing risk – from natural catastrophes to climate change, from ageing populations to cyber crime, Swiss Re aims to enable society to thrive and progress, creating new opportunities and solutions for its clients.

COMMITMENT AND RESPONSIBILITY

Swiss Re defines sustainability as a strategic, long-term value driver and embeds this approach throughout its re/insurance value chain. Derived from Swiss Re's vision of making the world more resilient, the Group's Sustainability Strategy, which was enhanced in 2019, focuses on three key pillars of activity: embedding sustainability in all business activities, embracing opportunities by creating sustainability-linked solutions, and quantifying sustainability performance and impact.

Swiss Re tracks the effectiveness of its Group Sustainability Risk Management team's operations in several ways.

- The Chairman's Investment and Governance Committee provides overall monitoring of the Group's sustainability principles. This includes supervision of initiatives and actions specifically addressing climate change. The Investment Committee reviews Swiss Re's Asset Management related activities and is regularly updated on Group Asset Management's responsible investing approach.
- A Sustainable Business Risk Framework is established to identify, mitigate and eliminate social, environmental and ethical reputation risks in both underwriting and investing activities. Comprising umbrella policies on human rights and environmental protection, the framework also consists eight specific guidelines on sensitive sectors or issues including defence, oil and gas, mining, and dams. These policies and guidelines set the criteria and qualitative standards that determine whether a transaction presenting a sustainability risk may be considered. Each year, Swiss Re also compiles a list of companies, countries and industries with which it is prohibited from transacting for policy reasons.
- Utilising research from internal and external sources, as well as subject matter experts from different business areas, Swiss Re's Systematic Observation of Notions Associated with Risk (SONAR) serves as a formal process for looking into emerging sustainability risks. SONAR reports are published annually, which Swiss Re uses to engage peers within the re/insurance industry as well as those outside of the industry, on emerging environmental risks. The SONAR report for 2020 includes a special feature on the transition to a low carbon future, where it discusses how the re/insurance industry can help accelerate reductions in greenhouse gas emission reductions to achieve net zero targets by 2050. It also emphasises close collaboration among governments, supranational organisations and society to achieve sustainable development goals.
- Since 2016, Swiss Re has been implementing the recommendations of the Task Force on Climate-related Financial Disclosures in its financial reports, significantly expanding on them thereafter.
- Mitigating climate change risks is at the heart of Swiss Re's core re/insurance business. Swiss Re uses a carbon-footprint methodology developed as part of the CRO Forum to underwrite portfolios.

HARNESSING TECHNOLOGY

Embracing innovative technological solutions, Swiss Re has the capability to provide affordable products for more types of risks across broader income levels. Its combination of smart analytics and devices enhances risk knowledge and informs the Group's

advice on risk prevention, mitigation, and crisis management. This includes educational and behavioural change platforms offered to customers to improve wellbeing.

A notable use of Swiss Re's technological capabilities is the use of digital solutions and satellite imagery in the provision of insurance to farmers in Cambodia. Working closely with local partners Agribuddy and Forte Insurance, Swiss Re supports Cambodian rice farmers in 90 communes across several provinces through soil moisture index insurance. The development of this insurance solution entailed the use of satellite imagery to complement Swiss Re's reinsurance know-how, accurately identifying and addressing the needs of rice farmers in non-irrigated areas. The solution also provides Swiss Re's client, an insurance provider, with the ability to quickly compensate farmers for total or partial crop losses.

FORTIFYING THE ASEAN REGION AGAINST NATURAL AND MAN-MADE CRISES

In Singapore, Swiss Re has an ongoing sustainability initiative geared towards indemnifying local businesses against earnings volatility in a severe haze event. This covers all associated events such as reduced traffic, forced shut downs, and increases in operating costs.

In the Philippines, Swiss Re provided capacity to back the renewal of a natural disaster cover issued by the World Bank in November 2019. This was part of the Group's commitment to the UN to advise sovereigns on climate risk resilience and to provide reinsurance protection. The natural disaster cover became the first catastrophe bond to be sponsored by an Asian government and the first to be listed on the Singapore Exchange – a landmark transaction for the region.

Through a well-defined approach and clear strategy, Swiss Re sets out what sustainability means for the organisation and ensures that it takes meaningful action in its business and operations. To live its commitment to sustainability, Swiss Re continues to pursue a clear strategy, have a suitable governance framework in place, determine relevant topics, set targets, report on its progress and monitor its performance across the Group.

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ING BANK N.V. (SINGAPORE BRANCH)

SUSTAINABLE FINANCE SEEKS ENVIRONMENTAL AND SOCIAL RETURNS BEYOND FINANCIAL RETURNS

ING Group is an international bank serving around 38.4 million customers, corporate clients and financial institutions in over 40 countries. Its purpose is to empower people to stay a step ahead, in life and in business. ING began operating in Singapore in 1987 as the regional headquarters and in 2019 had 592 employees in Singapore.

ING Wholesale Banking Singapore is the largest of the group's branches in Asia to provide specialised lending, tailored corporate finance, debt and equity market solutions, payments and cash management and trade and treasury services.

CONTRIBUTING TO ENVIRONMENTAL, ECONOMIC AND SOCIAL PROGRESS

ING does not have an extensive carbon footprint or use much energy. Its business operations have been climate neutral since 2007, and the Group is expected to outperform its ambitious 2020 climate commitments. Its new, upgraded targets now include:

- Procuring 100% renewable electricity by 2020 for all buildings ING operates worldwide
- Remaining carbon neutral by offsetting carbon emissions
- Reducing CO2 emissions from buildings and data centers by 80% compared to 2014, by end-2022, and by 90% by end-2030
- Reducing CO2 emissions from business travel by airplane and car by 25% compared to 2014 by end-2022

Progress in sustainability is tracked and reported through internal reporting mechanisms, external rating agencies and sustainability indices.

But ING's ambitions do not end at reducing its already modest environmental footprint: the Group makes its biggest impact through a three-pronged approach to financing, which supports clients in transitioning to sustainable businesses and which facilitates and finances a societal shift towards sustainability.

THE THREE-PRONGED APPROACH TO FINANCING SUSTAINABILITY

a. ING finances flow more towards renewables, energy-efficiency equipment, and other green and sustainable projects

b. The Group does not lend to coal-fired power plants or borrowers or projects with unsatisfactory ESG standards

c. ING has made a commitment to steer its EUR 600 billion loan portfolio to align with the Paris Climate Agreement

MEETING THE GOALS OF THE PARIS AGREEMENT

To steer its lending portfolio towards the two-degrees goals of the Paris Agreement, ING with 2 Degrees Investing Initiative co-created the 'Terra Approach' to track its portfolio against these goals. Since its adoption, ING has focused on sectors in its loan book that are responsible for most greenhouse gas emissions to measure and benchmark whether its lending in those sectors contributes to climate resilience.

EMBEDDING SUSTAINABILITY THROUGHOUT THE ORGANISATION

ING Sustainable Finance teams in Singapore, the Netherlands, the United States and other strategically-important countries drive and support clients to adopt sustainable products and to further embed ESG improvements. In Asia Pacific, more than 100 colleagues are involved in these work streams and engagement, actively looking out for sustainable finance opportunities

Globally, ING's deal count for sustainable debt products is growing: in 2018, the number of ING's green, social and sustainable bond deals increased by 91%; in 2019, it grew by 130%. The Group's Sustainable Finance teams globally are a key differentiator for the bank, enabling it to support clients looking to future-proof their businesses.

ING LABS: 'THINK FORWARD' STRATEGY AT WORK

New banking services and business models are developed by ING Labs, an initiative that generates disruptive ideas to tackle emerging needs of clients and brings these ideas to market with minimum viable products.

Here, too, sustainability is a core focus. For instance, a tool produced by ING Labs in collaboration with Vattenfall allows individuals to quickly check the different energy measures available to make their homes more energy efficient and sustainable. Using data from public sources in providing these solutions, the tool also provides insights on costs associated with each measure and the financing options available to the user.

ING also shares its knowledge as sustainability coordinator for Singapore Management University's Advanced Certificate in Sustainability and Sustainable Businesses course.

PARTNERING FOR SUSTAINABILITY

ING provides guidance to the International Capital Markets Association (ICMA) on the development of market standards as well as in the mapping and aligning of different industry taxonomies. It engages in a similar capacity with the Loan Market Association/ Asia Pacific Loan Market Association (LMA/ALMA), the Asia Securities Industry & Financial Markets Association (ASIFMA) and government bodies such as Enterprise Singapore and regulators such as the Monetary Authority of Singapore

SUSTAINABILITY LINKED LOANS

In 2017, ING pioneered the first sustainability linked loan (SLL) with Royal Philips. These loans link interest rates to the sustainability performance (ratings or targets) of a company. ING has since been involved with more than 75 SLLs globally, contributing to the mainstreaming of the financing instrument to the extent that in 2019, SLLs totalled more than USD 130 billion globally.

With Quadria capital, a Singapore-based private equity sponsor, ING structured a world's first sustainability linked capital call facility, in which the interest was tagged to ESG performance of the portfolio companies of Quadria Capital Fund II. This incentivised Quadria Capital to influence ESG improvements in its portfolio companies

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AIR FRANCE-KLM

SUSTAINABILITY IN AVIATION

Air France-KLM is a major global air transport player with three authentic brands, Air France, KLM Royal Dutch Airlines, Transavia and other subsidiaries. Its main businesses are passenger transportation, cargo transportation and aeronautical maintenance.

For fifteen consecutive years, the Air France-KLM Group has ranked first in Europe and the world in the Dow Jones Sustainability Index (DJSI), the main international index assessing performance in terms of sustainable development, and regained the top spot in the rankings in 2019.

COMMITTED TO MAKE AVIATION MORE SUSTAINABLE

In 2008, Air France-KLM introduced its first Climate Action Plan to reduce its carbon footprint. In 2019, a tightened target for the year 2030 was set: increasing energy efficiency by 50% compared to 2005.

The approach consists of seven main priorities:

1. Fleet modernization and contributing to aeronautical research

2. Sustainable Aviation Fuel and participating in research into renewable energies

3. Operational measures

4. Supporting the implementation of the global climate agreement (CORSIA) with a fair contribution for aviation

5. Regulatory and proactive offsetting

6. Supporting environmental programs

7. Carbon offsetting for customers.

Each airline within the Air France-KLM group has its own clear roadmap of the Group strategy to more sustainable aviation and share best practices.

- Air France has set out its commitments towards sustainable aviation in the "Air France Horizon 2030" roadmap.
- Fly Responsibly is KLM's commitment to taking a leading role in creating a more sustainable future for aviation. It incorporates all of KLM's current and future efforts to improve the sustainability of its activities.

FLEET MODERNIZATION

With the Airbus A350-900, Air France is accelerating the change towards more sustainable air transport. A latest-generation aircraft, the A350 consumes 25% less fuel (i.e. 2.5 litres per passenger per 100 kilometers) thanks to the use of 67% lighter materials: 53% composites and 14% titanium. Its noise footprint is reduced by 40%.

KLM was the first European airline to operate the Boeing 787-10 Dreamliner. The Boeing 787-10 has the same efficient engines as the 787-9, but the combination of these engines with the use of lighter materials in the 787-10 means it produces lower carbon emissions and less noise.

SUSTAINABLE AVIATION FUEL

The use of Sustainable Aviation Fuel (SAF) is a promising avenue for reducing the CO2 emissions from aviation. Such fuels are key to achieving Air France-KLM's CO2 emission reduction targets as well as those of the aviation industry as a whole.

It is important to stimulate the development of a sustainable fuel industry for aviation. Both Air France and KLM have established innovative partnerships with corporate customers, suppliers, airports and logistics partners. However, strong government support accompanied by incentives are required for more wide scale deployment and the creation of economically viable production facilities for producers and operators alike. KLM, SkyNRG and SHV Energy are developing Europe's first dedicated plant for the production of SAF in the Netherlands. The production facility will specialise in producing SAF, bioLPG and naphtha, primarily using regional waste and residue streams as feedstock. The plant will be the first of its kind in the world.

CONTRIBUTING TO THE SUSTAINABLE DEVELOPMENT OF AVIATION

CARBON OFFSETTING

During the ticket booking process, Air France and KLM offer customers

"The DJSI is rewarding the hard work and concrete actions taken in recent years by all Air France, KLM and Transavia staff in all areas of activity by recognising Air France-KLM as the industry leader. The Air France-KLM Group's takes its social and environmental responsibility very seriously, and relentlessly pursues iterative improvement in this area so vital to our planet, our employees, our customers, and our future generations. We must remain engaged and unite our industry partners, as we have a shared responsibility to continuously improve the sustainability of the air transport industry." - Benjamin Smith, CEO of Air France-KLM

the opportunity to voluntarily offset their CO2 emissions via offsetting programs or by making a donation in favor of the planet to finance Gold standard reforestation projects selected by Air France and KLM. Gold standard certification ensures that projects do more to responsibly manage natural resources and bring life-changing benefits to local communities.

GROUND OPERATIONS

For its ground operations, Air France is committed to an ambitious plan to replace 90% of its fossil - fired ramp equipment (baggage trailers, boarding walkways, etc.) with electric equipment by 2025. Innovative solutions are being implemented with startups like Carwatt, implanting batteries recycled from the automotive industry in baggage conveyor belts.

WASTE

Air France-KLM aims to minimize waste generation and to recycle and reprocess whenever possible throughout the supply chain. These actions follow the 4R principle: Redesign, Reduce, Re-use, and Recycle.

Onboard catering produces about 70% of all non-hazardous waste. The key to managing this onboard waste sustainably is through preventing waste by redesign and by separating the waste correctly.

At Air France, a significant proportion of reusable equipment, like trays, drawers, blankets and trolleys, is recycled every year. Items designed with eco-design approaches, which take the entire life cycle of products into account, are favored.

On all KLM European flights, onboard waste is separated with cup-collecting compartments in trolleys. Glass, cans, aluminum lids and PET bottles are also separated when collected, and recycled. KLM is the first airline in the world to recycle PET bottles to make tools for repairing and maintaining its aircraft. Empty bottles are collected at the end of every flight and transformed into filament, the material used in 3D printers. This process means an empty water bottle can end up as part of a 3D-printed piece of equipment that saves Engineering & Maintenance time and money.

ENVIRONMENTALLY RELEVANT INNOVATIONS

Air France and KLM are actively involved in research and innovation aimed at finding environmental and economic viable alternatives.

Since 2014, in collaboration with the Lab Line for the Future program, Air France has been actively experimenting with biofuel, using 10% biofuel on its Toulouse-Paris and Nice-Paris flights. Air France has also been partnering with Bertrand Piccard's Foundation Solar Impulse to find solutions to sustainable aviation. These are aimed mostly at reducing the impact of emissions, waste and noise.

In 2019, KLM and TU Delft announced their collaboration of the design of the Flying-V a design for a very energy-efficient long haul aircraft. The design of the aircraft integrates the passenger cabin, cargo hold and fuel tanks in the wings, creating a spectacular V-shape. Computer calculations have predicted that the improved aerodynamic shape and reduced weight of the aircraft will reduce fuel consumption by 20% compared to today's most advanced aircraft. During the summer of 2020, a test flight of the scale model of the Flying-V took place.

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ALSTOM

LEADING THE WAY TO GREENER AND SMARTER MOBILITY WORLDWIDE

Alstom develops and markets integrated systems that provide a sustainable foundation for the future of transportation: from high-speed trains, metros, trams and e-buses to integrated systems, customised services, infrastructure, signalling and digital mobility solutions. Headquartered in France, Alstom is present in over 60 countries and employs 38,900 people.

POWERING PASSENGER JOURNEYS IN SINGAPORE

Alstom has been actively present in Singapore for over 20 years.

Alstom has been a major supplier of integrated metro system, signalling, rolling stock, infrastructure and services for all MRT lines. The North East Line – the world's first driverless heavy-capacity metro line – is currently powered by Alstom's signalling system, while the Circle Line was designed and built by the company.

To date, Alstom has been providing signalling solutions for a total of over 100 kilometres of MRT lines, including the Thomson-East Coast Line which will be Singapore's most advanced driverless metro line. In addition, Alstom has successfully delivered over 100 Metropolis trains (450 metro cars), serving the North East Line and Circle Line. The Company is also on track to supply 29 additional trains for the extensions of both lines.

DRIVING SOCIALLY-RESPONSIBLE MOBILITY SOLUTIONS

Alstom aspires to support the transition towards global sustainable transport systems that are inclusive, environmentally friendly, safe and efficient while implementing a socially responsible business model. The Company's ambition (unveiled in June 2019) is to become the leading global innovative player for a sustainable and smart mobility.

Of the United Nations' (UN) 17 Sustainable Development Goals, three in particular are at the heart of Alstom's mission: Industry, innovation and infrastructure; Sustainable cities and communities; and Climate action. In addition, the Company's activities contribute to a further nine objectives: Good health and well-being; Quality education; Gender equality; Affordable and clean energy; Decent work and economic growth; Reduced inequalities; Responsible consumption and production; Peace, justice and strong institutions; and Partnership for the goals.

DEPLOYING TECHNOLOGY FOR ENERGY EFFICIENCY

As one of the three pillars of the Alstom in Motion (AIM) strategy, the Company's innovations lead to smarter and greener mobility solutions.

The "Green mobility" pillar of Alstom's new innovation strategy focuses on ecodesign and eco-manufacturing solutions, green traction and road electromobility. Green mobility is translated into three axes, namely Green Traction, Ecodesign and Manufacturing, as well as Road Electromobility.

These initiatives support Alstom in reducing energy consumption of its portfolio by 25% by 2025 and reach 100% renewable energy in operations by 2025.

Alstom is also ready to accompany clients in the transition out of diesel by offering efficient alternatives. Today, electrical rail solutions and systems represent most of the Company's orders – these include:

- providing the electrification system for a 343 km-long Eastern portion of the dedicated freight Corridor in India.
- developing the world's largest fleet of in-service hybrid locomotives in Germany and Switzerland.
- pioneering regional trains powered by hydrogen fuel cells.

COLLABORATION IN MOTION

The efficiency of Alstom's sustainable development actions depends on the integration of the expectations of main stakeholders: customers, employees, public authorities, shareholders and potential investors, and civil society.

As a global Company working for public authorities, Alstom has the responsibility to develop and anchor its projects in the local economies where it operates. It intends to become a Good Corporate Citizen, and reached out to 129,000 local community beneficiaries in the 2019/20 fiscal year. Its social programmes within the region include:

- In Hong Kong, Alstom is a two-time recipient of the "Caring Company" award by the Hong Kong Council of Social Service (HKCSS). An ongoing project in Hong Kong is helping vulnerable workers access training and job opportunities.
- In Singapore, it has been participating in annual beach clean-up to conserve the country's marine and coastal wildlife and champion environmental awareness.
- Alstom Foundation is currently financing a project in the Philippines to protect street kids and facilitate their social integration.

The Company is currently "Top Employer"-certified in six countries, and aims to become a Global Top Employer in 2025.

FIGHTING CLIMATE CHANGE

Alstom is primarily in the rail sector which is by far the least polluting means of motorised mass transport. Nevertheless, the Company wishes to be at the forefront of the fight against climate change.

Alstom is part of the UN Global Compact, signatory to the Sustainable Development Charter of the International Association of Public Transport (UITP), supporter of the International Union of Railways (UIC) Low Carbon Rail Transport Challenge, member of the Paris Process on Mobility and Climate (PPMC), participant in the UN Climate Change Conference, member of the SLoCaT Partnership on Sustainable Transport and founding member of the Transport Decarbonisation Alliance (TDA).

RECOGNITION FOR BEST GREEN PRACTICES

The Dow Jones Sustainability Index (DJSI) gave Alstom an overall score of 79 out of 100 in September 2019, placing it among the top four percent of companies assessed.

In early 2020, Alstom received an "A-" from CDP (formerly the Carbon Disclosure Project), which manages the global disclosure system that enables businesses, cities, states and regions to measure and manage their environmental impacts: a rating awarded to just six percent of companies from the industrial, electrical equipment and machinery sectors.

Also in 2020, Corporate Knights included Alstom in the Carbon Clean 200 list of publicly traded companies that are leading the way with solutions for the transition to a clean energy future.

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BMW GROUP ASIA

LEADING THE WAY IN SUSTAINABILITY

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group has more than 126,000 employees and is the world's leading premium manufacturer of automobiles and motorcycles. The BMW Group also provides premium financial and mobility services, operates 31 production and assembly facilities in 15 countries, and has a global sales network in more than 140 countries.

The BMW Group sets trends in production technology and sustainability as an innovation leader with an intelligent material mix, a technological shift towards digitalisation and resource-efficient production. At the same time, flexibility and continuous optimisation of value chains ensure competitiveness.

The BMW Group celebrated its centenary in 2016 and continues to focus first and foremost on the future, exploring the question of what individual mobility will look like over the coming decades.

BMW Group Asia celebrated its 35th anniversary in 2020, and the regional office in Singapore overseeing 13 markets across East Asia for both BMW and MINI brands. Markets include Singapore, Vietnam, Philippines, Indonesia, Brunei, Bangladesh, Sri Lanka, Tahiti, Guam, New Caledonia, Laos, Cambodia and Myanmar.

It plays the role of a business incubator for the importer markets and introduces product and technology that best caters to customers' needs in this part of the world. BMW Group Asia is also a regional hub providing strategic corporate functions, such as the BMW Group Treasury Centre and Information Management Services, which support the BMW Group across the Asia Pacific region.

In 2014, BMW Group Asia became the first brand to introduce a purely electric vehicle in Singapore with the BMW i3. BMW has since launched new variants of the BMW i3, a comprehensive range of plug-in-hybrid vehicles, and an open-top hybrid sports car. The company most recently introduced the first fully electric MINI in August 2020.

While the BMW Group provides a wide range of drive train technologies (petrol, diesel, plug-in hybrid, fully electric) to meet the diverse individual mobility needs of today's society, regulatory requirements and infrastructure also play an important role in shaping individual mobility needs. Therefore, the company believes in offering customers the "Power of Choice", not only when it comes to the wide range of models they are offered, but more importantly when it comes to technologies that address different individual mobility demands

The move to offer customers more sustainable vehicles is part of the Group's product strategy, which incorporates a number of new sustainability targets against which the BMW board of management and executive management will be measured. The science-based targets aim for major CO2 reductions, with more than seven million electrified vehicles to be on the road by 2030. BMW also aims to reduce carbon emissions from production and sites by 80% per vehicle, to have the most sustainable supply chain in the industry, a circular approach to resource management, and sustainability-linked premiums.

As reflected by these targets, the BMW Group is making sustainability and resource efficiency central to its strategic direction. In doing so, it builds on a strong foundation laid over past years and decades, when the company has repeatedly set standards in terms of sustainability. Continuous improvement lies at the heart of the strategy to reduce CO2 emissions and increase resource efficiency.

> "I firmly believe the fight against climate change and how we use resources will decide the future of our society – and of the BMW Group. As a premium car company, it is our ambition to lead the way in sustainability. That is why we are taking responsibility here and now and making these issues central to our future strategic direction," said Oliver Zipse, Chairman of the Board of

Management, BMW AG "This new strategic direction will be anchored in all divisions – from administration and purchasing to development and production, all the way to sales. We are taking sustainability to the next level."

GLOBAL SUSTAINABILITY MANAGEMENT

The Group's global sustainability management efforts are spearheaded by BMW's Sustainability and Mobility Department, which is under the direct organisational supervision of the Chairman of the Board of Management and situated within the Corporate Strategy division.

- The Sustainability and Mobility Department:
- Identifies challenges and opportunities for sustainable operations,
- Develops and monitors sustainability goals,
- Specifies and integrates sustainability into individual divisions taking the entire value chain into account,
- Ensures the cooperation of all departments in the company involved in sustainability, and
- Helps to deliver a sustainable mobility system, especially in urban areas.

These efforts are part of the balanced scorecards for BMW's management.

ENGAGING WITH STAKEHOLDERS

BMW recognises that, as a global corporation with a complex value chain, its operations and products have impacts that extend beyond employees and customers. The Group's stakeholders include business partners, suppliers, community interest groups, media, political and academic leaders, industry associations, NGOs, investors, and other stakeholder groups—all of whom have different viewpoints and expectations related to the business. Responding to their needs can positively influence BMW's license to operate, competitive advantage, and long-term success.

The Group has a comprehensive Stakeholder Engagement Policy and its sustainability experts conduct stakeholder dialogues and student fora in different cities around the world several times a year to discuss concrete challenges and solutions with them. In addition, BMW communicates comprehensive information about the company's sustainability strategy and its progress in integrating sustainability into corporate processes to stakeholders through the Group's annual Sustainable Value Report. The Report's Key Sustainability Indicators track, among other factors, the energy and water consumption per vehicle produced, process waste water, CO2 emissions, Volatile organic compounds (VOC) and waste generated per vehicle produced: reflecting the contributions of its state of the art technologies to improving the company's sustainability efforts.

The Group considers its long-term involvement in the UN's climate change conferences (COPs) as an important platform for interaction with stakeholders. The most recent of these events was held in Madrid in 2019.

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FINNAIR

SUSTAINABILITY IN AVIATION

Finnair is a network airline specialised in flying passengers and cargo between Asia and Europe. Its network of 19 destinations in Asia, seven in the Americas, and over 100 destinations in Europe offers the best possible flight connections between Finland and the world. Operating via Helsinki, the airline offers passengers travelling between Asian megacities and Europe the smoothest and fastest connections in the Northern hemisphere.

In 2008, Finnair communicated its sustainability concerns under the Global Reporting Initiative framework, becoming one of the first airlines in the world to do so.

DECOUPLING AIR TRAFFIC AND EMISSIONS

Recognising that the most complex challenge facing aviation is its environmental impact, Finnair seeks to decouple its traffic growth from increases in emissions. The airline aspires to make its operations carbon neutral by the end of 2045; tthe first major milestone is halving net emissions by the end of 2025.

To reduce the CO2 emissions of flight operations, Finnair invests in new aircraft technology and flies fuel efficiently by decreasing aircraft weight and increasing the use of sustainable aviation fuel. Its biggest investment to date has been the incorporation of new Airbus A350 aircraft to Finnair's existing fleet. The new aircraft are on average 20 to 25% more fuel-efficient than the previous model.

Also emissions from non-flight operations are reduced by using renewable energy to heat facilities and fuel vehicles at the airport.

Furthermore Finnair encourages its customers to make sustainable choices through integrated offsetting and biofuel options when purchasing flight tickets. Meanwhile, suppliers are encouraged to decrease their carbon emissions and are required to comply with similar ethical standards as Finnair does.

PROGRESS FROM MULTIPLE FRONTS

Finnair's dedicated team of sustainability professionals collaborate transparently with the company's partners, customers and employees to find solutions that will bring the airline even closer to achieving its targets. This is underscored by the company's commitment to UN Sustainable Development Goal (SDG) 9: 'Industry, Innovation and Infrastructure', and its willingness to venture outside its traditional business to find solutions for core sustainability issues. Elsewhere, cross-industry collaborations such as those with the Nordic Network for Electric Aviation and the Lappeenranta University of Technology align with SDG 17: 'Partnerships for the Goals'. The latter partnership has led to a feasibility study on synthetic carbon-neutral fuels.

In 2008, Finnair communicated its sustainability concerns under the Global Reporting Initiative framework, becoming one of the first airlines in the world to do so. It has since kept close track on the effectiveness of the airline's sustainability efforts, measuring and reporting impact on a regular basis. This includes an evaluation of its supply chain from start to finish.

> In March 2020, Finnair introduced a strategy for sustainable, profitable growth, covering each of the three pillars of sustainability: environment, society and finance. The strategy aims to improve on Finnair's performance as a leading airline in terms of sustainability performance.

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BP

REIMAGINING ENERGY FOR PEOPLE AND PLANET

bp is one of the world's leading oil and gas companies, providing customers with fuel for transportation, energy for heat and light, lubricants, and petrochemicals. It is an integrated energy business with operations spanning Europe, North and South America, Australasia, Asia and Africa.

In Singapore, bp's main business activities include an oil, gas, chemicals, carbon and finance trading business for the Eastern Hemisphere—covering the Middle East, Southern & East Africa, India, China, South East Asia and Australasia. The operation is also the regional headquarters for Shipping, Lubricants, Marine and Aviation fuels.

PEOPLE

LOCAL COMMUNITIES

bp engages with communities to manage the impacts of its presence, works to identify opportunities for communities to benefit from its activities and invests in initiatives focusing on economic development, education, the environment and arts and culture.

bp supports local communities in Indonesia, in the areas of education, community income, health and governance, receiving local and international recognition. The bp-sponsored Tangguh Health Programs include a Healthcare Program, a Mother-Child Program and a Malaria Eradication Program. Introduced in 2006 by bp and local health agencies, the program won a 2018 United Nations Public Service Award.

PEOPLE AT THE FORE

bp's workforce represents diverse communities, and bp is building a culture that understands intersectionality and values every individual's unique and complex identity.

As fewer young people choose careers in science, technology, engineering and maths (STEM) fields, bp supports initiatives to encourage students, especially women and girls, to study STEM subjects and choose related careers.

PLANET

NET ZERO BY 2050 OR SOONER

In February 2020 bp announced its ambition to become a net zero company by 2050 or sooner, setting out five aims:

1. Net zero operations – net zero across entire operation on an absolute basis by 2050 or sooner;
2. Net zero oil and gas – net zero on an absolute basis across the carbon in upstream oil and gas production by 2050 or sooner;
3. Halving intensity – cut carbon intensity of the products sold by 50% by 2050 or sooner;
4. Reducing methane – install methane measurement at all existing major oil and gas processing sites by 2023, publish the data, and then drive a 50% reduction in the methane intensity of operations; and
5. More investment for new energies – increase the proportion of investment into non-oil and gas businesses.

In 2020, bp piloted technology to measure methane emissions from remote offshore platforms in the North Sea, using a drone that has its origins in the hunt for life on Mars. Drones are used routinely to perform visual inspection tasks, reducing the need for people to work at heights, and operating in confined spaces.

In 2019, bp efforts to reduce operational methane emissions led to the adoption of solar pumps instead of gas pneumatic pumps in the U.S. onshore business.

Advanced imaging cameras continuously monitor bp facilities and identify leaks earlier than routine inspections. Together with the Oil and Gas Climate Initiative (OGCI), bp is exploring the potential of satellite technology to measure GHG emissions from our facilities.

At the Pangbourne technology centre in the UK, bp experts collaborate with car makers and original equipment manufacturers to co-engineer

advanced lubricants, e-fluids and special fuels, while also improving performance and efficiency of cars, trucks and transmissions already in the market.

bp is helping to commercialize Fulcrum technology that converts household rubbish, which would otherwise be sent to landfill, into fuel for transport, and will continue investing in wind energy building on the experience developed through its United States' wind energy projects. Other alternative energy products are also in development, with increased emphasis on renewable energy as part of the new strategy.

bp is expanding its digital energy portfolio by investing in the use of artificial intelligence to help businesses and other organizations use energy more efficiently by predicting, controlling and optimizing their buildings' energy profiles.

Supporting the development of a new transport system – including electric vehicles and their charging infrastructure – is a focus area. In China, UK and Germany, bp aims to build the fastest, most convenient networks for EV customers. Its 7,500 charging points across the UK makes up the country's largest public electric charging network and fast-charge services in China are accessed by around 550 million users and serves one million EVs.

bp has also set out five aims to help the world meet net zero:

1. Advocating - stop corporate reputation advertising and redirect resources to active advocacy for climate policies that support net zero;

2. Incentivizing Employees - incentivize employees to deliver on our aims and advocate for net zero by increasing climate element in annual bonus for leadership and 37,000 employees;

3. Aligning Associations - reframe relationships with trade associations and exit when appropriate;

4. Transparency Reporting Leader - become a recognised leader for our sector, support Task Force on Climate-related Financial Disclosures (TCFD) recommendations and work to implement them; and

5. Clean Cities - create a team dedicated to helping countries, cities and corporations around the world decarbonize.

SUSTAINABLE DEVELOPMENT GOALS

bp business activities touch directly or indirectly on many sustainable development goals (SDGs), but its efforts focus specifically on affordable and clean energy, decent work and economic growth, and climate action.

bp is working with the World Business Council for Sustainable Development on the development of an SDG Sector Roadmap, due for publication in 2020, which aims to accelerate and optimize the sector's contribution to the delivery of the SDGs. It also supports the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), established by the Financial Stability Board with the aim of improving the reporting of climate-related risks and opportunities.

ENVIRONMENTAL, SOCIAL AND GOVERNANCE ISSUES

bp aims to be increasingly transparent about the ways we manage environmental, social and governance issues across the business. Having the right leadership and governance structure in place is crucial to delivering strategy, purpose, net zero ambition and aims; this structure includes the board and its committees and extends through the organization via executive leadership and senior leaders.

In managing environmental, social and economic impacts throughout supply chains, bp communicates standards, encourages improved ethical and sustainability performance, and standard procurement

contracts address sustainability and human rights in their supply chains.

Since 2018, around 37,000 bp employees have been incentivized and rewarded for their contribution to reducing carbon emissions in bp through the annual cash bonus.

As part of our ambition and aims, bp also plans to advocate for well-designed policies on carbon pricing and to pursue carbon capture, use and storage (CCUS), and Natural Climate Solutions (NCS).

For 14 years bp has helped customers take action on their emissions through a carbon reduction and offsetting programme, BP Target Neutral. BP Target Neutral has helped customers offset over 5 million tonnes of greenhouse gas emissions since 2006, generating around $20 million to support carbon offsetting projects worldwide.

bp is committed to managing its portfolio for value, and investing with discipline in flexible and resilient options, which together support the goals of the Paris Agreement.

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DEME

CLIMATE AND ENERGY IN ACTION

DEME is a world leader in the highly specialized fields of dredging and land reclamation, solutions for the offshore energy market, environmental and infra marine works. With more than 140 years of experience and 5,200 highly skilled professionals, DEME brings tailor-made solutions, innovation, and new technologies to customer projects, ensuring that they are performed safely, efficiently, and cost-effectively.

While their roots are in Belgium, DEME has built a strong presence all around the world's seas and continents. They have a versatile and modern fleet of more than 100 vessels, supported by a broad range of auxiliary equipment. In 2019, DEME had a turnover of 2.62 billion euros.

ROOTS IN ASIA

In May 1996, Dredging International Asia Pacific Pte Ltd (DIAP) was incorporated in Singapore as part of the DEME Group. Since then, it has served as the APAC headquarters of Dredging International, performing dredging and land reclamation activities in multiple countries in the region: namely Singapore, China, Hong Kong, Malaysia, Myanmar, Indonesia, Philippines, Taiwan and Vietnam. DIAP currently employs 343 people in Singapore.

LOOKING AHEAD

DEME's vision is to work towards a sustainable future by offering solutions to global challenges: a rising sea level, a growing population, reduction of CO2 emissions, polluted rivers, seas and soils, and the scarcity of natural resources. Although the group's innovative solutions have been making a significant contribution to achieving these goals over many years, it continues to step up its efforts, aligning their sustainability strategy with the United Nations Agenda 2030 and its 17 Sustainable Development Goals.

DEME Group has developed a two-dimensional strategy for sustainable performance: to explore sustainable business solutions and build partnerships that drive change towards a low carbon, circular and resilient society, and to excel in their own operations: by reducing DEME's carbon and environmental footprint.

Eight key themes support DEME's creation and delivery of sustainable value: climate & energy, natural capital, sustainable innovation, waste & resource management, health, safety & well-being, diversity & opportunity, ethical business and local communities.

USING TECHNOLOGY TO DRIVE SUSTAINABILITY INITIATIVES

DEME's future-proof fleet has set the group apart from other industry players. A multi-year fleet investment programme allowed DEME to acquire new vessels which can run on both marine diesel oil and LNG and they are ready to run on climate-neutral fuels like biodiesel and liquified green methane. DEME is the first company in the sector to switch to dual fuel engines and around 10% of their fleet can already operate on LNG. DEME's new vessels are also equipped with innovative energy efficiency technologies, like a waste heat recovery system that converts heat from exhaust gases into electrical power, which can generate fuel savings.

Addressing global challenges is a top priority within the group. A clear example is the strong rise in turnover of their solutions for offshore wind parks in relation to total group turnover (from 10% in 2009 to more than 40% in 2019). More recently they have invested in feasibility studies and innovation projects on the multi-use of oceans and seas (offshore wind and aquaculture), new concepts for commercial marine floating photovoltaics (MFPV) and the production, transport, and storage of green hydrogen.

ENGAGEMENT BEYOND THE COMPANY

The DEME4Life programme works with local communities and NGOs: in Singapore, this includes support extended to the Public Utilities Board (PUB) annual Friends of Water Program, the Singapore Children Society and the Red Pencil.

In Vietnam, staff undertake visits to remote areas to be with people in

need and engage in local social programs.

When working on specific projects, DEME strives for a sustained impact beyond the project scope. For example, the Jurong Island Westward Extension (JIWE project) allowed for employees and stakeholders at all tiers to propose improvement initiatives. The program won the outstanding WSH SHARP Safety Award from Singapore's Ministry of Manpower as well as the Project Management Institute Singapore Chapter's Project of the Year for 2018. The concept has since been embraced across DEME.

HIGHLIGHTS OF 2018 AND 2019

In 2018 & 2019, DEME assessed 33 medium-to-large projects, together representing almost half of their business revenue and covering all of the group's activities. Almost all of the projects in which they participated were enablers of economic development, creating local job opportunities and building local capacity; these were also closely aligned with the UN Sustainable Development Goals (SDGs). More than 80% of the assessed projects contributed to local economic growth (Goal 8: Decent Work and Economic Growth). Additionally, 75% of the projects contributed to the development of future-proof infrastructure to enhance security, prosperity and well-being (Goal 9: Industry, Innovation and Infrastructure), and almost half of the assessed projects helped combat climate change (Goal 13: Climate Action). With their offshore wind projects covering a substantial part of revenues DEME is at the forefront of the energy transition.

As demonstrated above, sustainable value creation is key for DEME. Although their experience over 140 years of history has enabled them to develop solutions tackling some of the world's most pressing issues, the group continually strives to explore new possibilities, new solutions and new technologies. It is dedicated to creating sustainable value through green investments and solutions that mitigate impacts on climate and marine ecosystems.

LYS ENERGY GROUP

SUPPORTING THE ENERGY TRANSITION IN ASIA

LYS Energy Group (LYS) is the leading Singapore home-grown Solar Independent Power Producer (IPP) that finances, builds, owns, and operates solar PV systems for commercial, industrial, and public sites in the Asia region. Since its incorporation in 2013, LYS has deployed over 50MWp of high-performance solar PV systems, with a pipeline of over 500MWp in Singapore and across the region in Vietnam, Indonesia, Malaysia, Thailand, and the Philippines. With a unique capability to offer a holistic renewable energy (RE) experience, LYS helps companies to make a clear stand against climate change.

Aligned with the Group's commitment to contributing to the achievement of the Sustainable Development Goals (SDGs), the company is resolute in its willingness to support Asia's sustainability ambitions to driving a great reliance on cleaner energy.

Now, more important than ever, from its solar energy generation platform to its energy consultancy practice, LYS Energy Group turns to all corporations, governments and climate enthusiast individuals, with utmost humility in the face of the present tremendous task, to tackle global warming challenges and achieve the low-carbon economy.

GIVING COMPANIES THE EDGE IN THEIR PATH TOWARDS THE CLEAN ENERGY TRANSITION

Through module efficiency-boosting innovations guaranteeing a positive impact on Levelized Cost Of Electricity (LCOE) over the past decade, the industry has enabled solar energy to decrease markedly to become affordable, while optimizing the overall power generation at the PV system level.

This industry dynamic catalysed LYS to tailor hassle-free end-to-end clean energy solutions for businesses. Through a Power Purchase Agreement (PPA) and without expending any resources or no hidden costs, businesses can benefit -- from installing solar PV systems on their unused rooftops and site spaces -- 70% lower tariffs from their conventional electricity, and predictable utility costs (up to 25 years). With a set of newly developed innovative solutions, future adopters can adopt solar energy easier, safer, and faster; and have the flexibility in the way they want to generate and consume green electricity while lowering their conventional energy consumption and strengthen their sustainability branding.

While direct (on-site) clean electricity consumption is the main contributor to greenhouse gas emissions reduction, yet this is still for the many, not enough, or practicable. This is where the Renewables Energy Certificates (RECs) come on the scene providing corporations an instrument to support RE generation and meet clean energy targets. LYS Offset Solutions (subsidiary of the Group) has developed since 2016, sophisticated solutions to integrate offsetting instruments into companies' energy transition strategy. LYS provides and manages stand-alone RECs that match businesses' electricity consumption and needs, generated from its owned facilities in Asia. By purchasing RECs, companies are enabled to claim the environmental benefits related to RE generation. Today, corporations are choosing RECs as the cost-effective, direct, fast, and most reliable and flexible solution to meet their energy transition goals.

This umbrella of solutions — that integrate financing, design, best-in-class service of Engineering Procurement Construction (EPC), top quality operations & maintenance (O&M) services, carbon management and offsetting solutions — are paving the way for corporations to transition towards low-carbon activities.

Its robust business solutions, combined with solid technical expertise to innovate and deploy high-quality solar PV systems, LYS Energy Group ought to sustainably ensure that corporates will meet their clean energy targets, as well as to stay nimble in accelerating Renewable Energy's adoption across the region.

LYS Energy aims at being a vector of the Energy Transition towards a more distributed, autonomous, and smart model. Incorporating distributed generating facilities, energy storage systems and smart grid, the company is re-inventing the energy industry towards a customer-centric prosumer era.

A SUSTAINED AND PROVEN RECORD OF ACHIEVEMENT

Since its establishment, LYS Energy Group has been a pioneer in rolling-out distributed solar solutions and is recognized today as a key figure of renewables across the region and has demonstrated its robust capability to successfully develop its expansion in Asia through its strong understanding of local regulations and stakeholders of the industry.

The Group's holistic approach to sustainable development, through GHG emissions measuring and reporting, carbon emissions reduction, and offsetting, has granted the company the praise of the businesses, supportive of the innovative solutions that have been tailored for them.

LYS has been supporting the region's solar deployment, especially Singapore to achieve the 2020 solar deployment target of 350 MWp within the first quarter this year. The Group has contributed to the production of over 100GWh of green and clean electricity for corporate buyers in Singapore. This contribution has helped to offset approximately 41,880 tonnes of carbon dioxide, equivalent to 3,669, 668 trees or 22,347 four-room public housing units.

The Group is one of the fastest-growing regional clean energy producers and end-to-end solutions providers, with a five-star portfolio of commercial and industrial projects and customers across diversified and multiple industries. These comprise energy-intensive industries such as aerospace, electronics, food and beverage, logistics, manufacturing, pharmaceutical, and real estate.

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NESTE

NESTE - IN THE BUSINESS OF COMBATING CLIMATE CHANGE AND DRIVING CIRCULAR ECONOMY

Neste helps transport and cities, as well as customers in the aviation, polymers and chemicals sectors make their business more sustainable. Among many international recognitions, in 2020, Neste was ranked among the top three most sustainable companies in the world for the third consecutive time on the Global 100 list by Corporate Knights.

The originally Finnish company is today the world's largest producer of renewable diesel and renewable aviation fuel refined from waste and residues. Neste is also a technologically advanced refiner of high-quality oil products. It is also a forerunner in developing renewable and recycled alternatives to fossil feedstock for the production of polymers and chemicals.

In 2019, Neste's global revenue reached 15.8 billion euros, with the majority profit from renewable solutions.

COMPANY PURPOSE: CREATING A HEALTHIER PLANET FOR OUR CHILDREN

Neste's business is driven by its company purpose: creating a healthier planet for our children. The clarity of this purpose attracts and motivates people who are passionate about what the company is doing: fighting climate change and driving circular economy. At Neste, everyone works towards this joint purpose.

NESTE KEEPS INVESTING IN RENEWABLE AND CIRCULAR SOLUTIONS

Neste generates improvements and breakthroughs that support the company's target of becoming a global leader in renewable and circular solutions.

Neste MY Renewable Diesel™ is a low-emission biofuel, produced 100% from renewable raw materials. Its usage results in up to 90% less greenhouse gas (GHG) emissions over the fuel's life cycle when compared to similar emissions from fossil diesel use (calculation method: EU RED).

In recent years, Neste has commercialized Neste MY Renewable Jet Fuel™ , which is a sustainable aviation fuel that helps airlines reduce their GHG emissions by up to 80% compared to fossil jet fuel in neat form over the fuel's life cycle. Various aviation companies, such as Finnair, Air BP, Lufthansa and KLM use or distribute Neste MY Renewable Jet Fuel in their operations.

On top of these two top-quality products, Neste has built new business around renewable polymers and chemicals. Together with polymers producing partners, the company has already produced the world's first industrial scale volumes of bio-based polypropylene and polyethylene for uses in several plastics applications. With several plastics value chain partners, Neste is developing technologies and capacity to chemically recycle plastic waste into drop-in raw material for high-quality new plastics and chemicals. This will complement conventional mechanical recycling of plastic and enable recycling of those plastic waste streams that cannot currently be recycled, such as colored and multi material plastic packaging.

NESTE AIMS TO ACHIEVE ITS VISION IN CLOSE COLLABORATION WITH VARIOUS STAKEHOLDERS

Neste's vision is leading the way towards a sustainable future together. The company believes in collaboration and wants to be actively engaged in developing a more sustainable future. For example in Asia Pacific, Neste, along with several global brands such as Unilever, Pepsico, Danone, Cargill, and L'Oréal have started collaboration with palm oil companies Golden Agri (GAR) and Musim Mas, as well as non-governmental organisations to make a positive sustainability impact in the Siak and Pelalawan regions in Indonesia. The project takes on a regional landscape approach and aims at sustainability improvements in the production of multiple commodities, such as palm oil, pineapple, and rubber. The regional project involves the local government and other local key actors with the aim to establish strong local regulations to push for sustainable transformation.

This five-year project will set an implementation schedule for improving the region's performance related to the environmental (e.g. conservation, protected area) and social issues (e.g. smallholders). Progress will be evaluated on a regular basis to track transformation based on the interventions identified.

SUSTAINABILITY IS AT THE CORE OF NESTE'S BUSINESS

In 2019, Neste's renewable products helped customers in several geographic markets to reduce green-

house gas emissions by 9.6 million tons altogether. This amount equals the annual carbon footprint of 1.5 million average EU citizens (source: World Bank) or the removal of 3.5 million passenger cars from the roads for a full year.

The company has set two climate commitments: to help customers to reduce greenhouse gas emissions by 20 million tons annually by 2030, and for the company itself to make its production carbon neutral by 2035.

Neste is currently strengthening its leading position in renewable products globally with a major investment in Singapore. The investment worth approximately EUR 1.4 billion, and it will extend Neste's overall capacity to produce renewable solutions in Singapore by up to 1.3 million tons per annum, bringing the total global renewable products' production capacity close to 4.5 million tons annually in 2022. The Singapore expansion is targeted to be completed by 2022. Currently, Neste has over 300 employees in Singapore.

Neste generates improvements and breakthroughs that support the company's target of becoming a global leader in renewable and circular solutions.

NESTE
The only way is forward

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SIEMENS

RESPONSIBLE, EXCELLENT, INNOVATIVE

Siemens focuses on power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, automation and digitalization in the process and manufacturing industries, smart mobility solutions for rail and road transport, as well as medical technology and digital healthcare services. The company begun its Singapore operations in 1908, and currently employs over 1,400 personnel, In fiscal 2019 (1 October 2018 – 30 September 2019), it generated sales of EUR 296 million and new orders totalling EUR 344 million.

Siemens' understanding of sustainability is based on the company values 'responsible, excellent, innovative'. Sustainability is at the heart of the Siemens Strategy Program Vision 2020+. At Siemens, sustainable development is the means to achieving profitable and long-term growth. The company is aligned with the UN's 2030 Agenda for Sustainable Development, and is committed to contribute to the 17 UN Sustainable Development Goals (SDGs) through its products and solutions, responsible business practices in about 200 countries, through strategic partnerships and targeted community activities. It strives to balance people, environment and profit.

TOWARDS CARBON NEUTRALITY

In September 2015, Siemens was the first global industrial company to commit towards carbon neutrality by 2030. By setting this goal, Siemens is expressing its firm belief that companies play a pioneering role in the fight against climate change. It aims to have all its production facilities and buildings worldwide achieve a net zero carbon footprint by 2030.

To-date, the company has managed to reduce its CO2 emission by 41%. Its investments in energy efficiency projects led to 15% reduced energy costs, and globally 60% of the electricity consumption of its sites is covered by renewables.

ENVIRONMENTAL PORTFOLIO

Approximately 50% of Siemens' annual revenue is generated through its Environmental Portfolio, which bundles products, solutions and services that contribute to environmental and climate protection. The company aims to achieve a threefold benefit: for customers to improve their competitiveness through lower energy costs and higher productivity, for future generations, and for Siemens to develop attractive markets and grow

profitably. in 2019, the Portfolio generated EUR 38.4 billion in revenue globally.

Solutions in the environmental portfolio allow Siemens to support sustainability efforts beyond its own company. Siemens' customers saved 637 Mt of CO2 in the 2019 fiscal year: equivalent to over 80% of Germany's annual emissions.

These solutions also set new standards for the market. For example, in early 2020, Siemens implemented a suite of integrated artificial intelligence and video analytics systems in a smart floating fish farm that detects if fish are sick and tracks their growth rate. This impact goes from farm to fork: impacting the consumers of sustainably farmed fish.

This impact grows as the company engages with external stakeholders and partners: this includes the Building & Construction Authority, Berkeley Energy Commercial Industrial Solutions, Energy Market Authority, Land Transport Authority, Shell, Singapore Aquaculture Technologies, Singapore Food Authority, Singapore

Power, ST Engineering, and YTL PowerSeraya, etc.

RECEPTION

For years now, Siemens' comprehensive commitment to sustainability has been well-received around the world. The company was listed in the DJSI World Index by RobecoSAM/ Dow Jones For the 20th consecutive time: confirming its standing as one of the most sustainable companies in the industry; the Carbon Disclosure Project recognized Siemens' performance in mitigating climate change by putting the company on its annual "A List" of the best companies driving decarbonization worldwide. Siemens ranked first in the Corporate Knight's "2019 Global 100 Most Sustainable Corporations in the World" and was named "the most admired company" in its industry for the fourth year in a row by Fortune magazine in the US.

> In September 2015, Siemens was the first global industrial company to commit towards carbon neutrality by 2030..

TOTAL SOLAR DISTRIBUTED GENERATION, ASIA PACIFIC

SOLAR ENERGY FOR CLEANER FUTURE

Total lubricants plant in Singapore solarised by Total Solar DG Southeast Asia

CUTTING CARBON EMISSIONS AND DRIVING A MORE SUSTAINABLE ENERGY FUTURE

Total Solar Distributed Generation (DG) is a wholly owned subsidiary of Total, one of the leading energy majors worldwide with operations in 130 countries in the world and active in Singapore since 1982.

Dedicated to distributed solar energy and active since 2018 in Southeast Asia, Total Solar DG is one of the major international providers of fully integrated solar solutions for the commercial and industrial sectors. The subsidiary offers cleaner, cheaper power via power purchase agreements. It designs, builds, finances, operates, and maintains solar systems on customers' sites.

Total employs around 600 people in the island-state and nearly 5000 in Southeast Asia, while the Total Solar Distributed Generation subsidiary consists of around 40 people across Southeast Asia.

LOOKING AHEAD

> Total's mission: to be the responsible energy major with a target of 20 per cent of the group business portfolio coming from low carbon businesses by 2035.

To meet the growing demand for power sustainability while reducing the emissions related to its generation, Total is stepping up on its low-carbon electricity activities – generating power from gas and renewable energies. The subsidiary of Total is an example of these ambitions: With Total Solar DG having a business model centred on sustainability, the company helps customers reduce their carbon footprint and be more self-reliant in their power generation needs. It also supports governments' renewable energy targets.

Besides Total Solar Distributed Generation, the company owns: Total Eren, dedicated to solar, hydro and wind energy, Total Envision, a 50/50 joint-venture between Total and Envision Group, dedicated to solar, hydro and wind energy and SAFT, a wholly owned subsidiary of Total dedicated to advance battery and energy storage systems (ESS).

FOCUS AREAS & AREAS OF INTEREST

The group also has an incubator – Total Carbon Neutrality Ventures, the venture capital arm of Total focused on funding and fostering high-potential start-ups which will contribute to creating a low carbon future.

Current areas of interest include Renewables, Distributed Energy, New Mobility, Energy Access, Energy Storage, Bio-Plastics & Recycling, Artificial Intelligence, and IoT.

Apart from its internal initiatives and external funding, the group has completed some of the largest solar plant projects in the world, with over 11 GW of solar installed. Total has also solarised 5,500 of its own sites across the globe, an investment of $350M. With a total installed capacity of 375 MW, this means a reduction of 100,000 tons of carbon dioxide emissions per year.

Dedicated to distributed solar energy and active since 2018 in Southeast Asia, Total Solar DG is one of the major international providers of fully integrated solar solutions for the commercial and industrial sectors.

PROJECT REFERENCES IN SINGAPORE:

Carros Center

Bollore Logistics Green Hub

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BAYER SOUTH EAST ASIA

LIFE SCIENCES WITH A COMMITMENT TO SUSTAINABILITY

Bayer is a global enterprise with core competencies in the life science fields of health care and nutrition. The company's products and services support efforts to overcome the challenges presented by a growing and aging global population.

In Singapore, Bayer Southeast Asia Pte Ltd hosts the regional commercial operations of Crop Science and Pharmaceuticals businesses for Asia Pacific, the marketing and sales operations for the local Pharmaceuticals and Consumer Health businesses as well as the country platform enabling functions for the ASEAN Country Group. Bayer began its operations in Singapore in 1971. Given its strategic location in the region as one of the major trading hubs, Singapore has proven ideal for Bayer to fulfil its purpose—"Science for a Better Life"—particularly in the Asia Pacific. Bayer strives to prevent and cure disease, improve everyday health and help feed a growing population by focusing on the vision "Health for All, Hunger for None".

A strategic focus on sustainability helps ensure that Bayer's vision becomes reality. Sustainability is a core element of corporate strategy and enjoys equal status to the company's financial indicators.

VISION FOR 2030

By 2030, Bayer aims to support 100 million small-holder farmers by giving them access to innovations, knowledge and partnerships; enable responsible family planning for 100 million women in low- and medium-income countries; give 100 million people in underserved communities improved access to everyday health care products; help reduce both the greenhouse gas emissions in large agricultural markets and the environmental impact of crop protection by 30 percent; become climate-neutral and help reduce greenhouse gas emissions along the value chain.

As Bayer focuses on providing more people in all regions of the world with access to healthcare and food as well as on devising solutions to challenges presented by climate change and the need to protect the environment, the company has aligned its sustainability targets to the United Nations' Sustainable Development Goals (SDGs). Bayer has an influence on many of the 17 SDGs, with the greatest impact on SDG 1: No Poverty, SDG 2: Zero Hunger, SDG 3: Good Health and Well-being, SDG 5: Gender Equality, SDG 13: Climate Action and SDG 15: Life on Land.

RESEARCH AND DEVELOPMENT

Bayer maintains a global network of research and development locations, employing approximately 16,000 scientists. They have developed new molecules and technologies in medicine and modern agriculture: projects in which Bayer continues to invest. The company's holistic approach to innovation is rooted in four strategic levers that drive employee innovation, research & development, open innovation and social innovation.

In healthcare, Bayer is addressing unmet medical needs through its portfolio of innovative medicines across therapeutic areas. The company also leads the effort to alleviate the rising burden of difficult-to-treat diseases such as cancer, cardiovascular diseases and eye diseases on aging populations.

STRENGTHENING WOMEN'S ROLE IN FAMILY PLANNING

Bayer also works to strengthen the role of women in modern family planning. Bayer has partnered with population commissions and health ministries to empower women to have increased access to family planning and education and to reduce unplanned pregnancies. Its goal to reduce unplanned pregnancies, particularly among teens, is achieved by empowering young people with correct information about different methods of contraception. Various activities have been rolled out to increase awareness and promote knowledge sharing to the targeted population

including oral contraceptives counselling toolkit for pharmacists, educational activities, and awareness initiatives.

DIGITAL FARMING

In agriculture, Bayer's pioneering innovations span digital technology, biology and chemistry. The company devises digital farming solutions for challenges facing farmers sustainably increasing productivity. Digital farming paves the way for a new agricultural revolution that makes farming quicker, more precise, efficient and sustainable.

Bayer signed a strategic partnership with XAG, one of the world's leading Unmanned Aerial System and R&D manufacturers to bring, promote and commercialize digital farming technology in Southeast Asia & Pakistan (SEAP). Under the collaboration, the two companies commit to working together on optimum spraying solutions that combine the unmanned aerial system with innovative formulation technology. Bayer and XAG also do joint promotion and market development efforts including establishing channel service providers with local business partners in the countries.

CREATING AWARENESS ON SUSTAINABLE AGRICULTURE

Elsewhere, Rice Safe aims to provide farmers with appropriate knowledge in the process of growing rice safely and use of crop protection tools. Farmers will then play an important role in passing on the knowledge to their communities, which will help to maximize yield and productivity to improve community livelihoods and support sustainable agriculture in Thailand.

SUPPORTING SMALLHOLDER FARMERS

A sustainability initiative for smallholder farmers (SHFs) focuses on improving access to agronomic expertise, products and services through

collaborations and partnerships with research institutions, start-ups, companies and NGOs. Bayer promotes farmers' adoption of digital farming not only for them to learn about drone technology but also to learn about the importance of using data and precision farming for sustainable agriculture.

In the wake of the COVID-19 crisis, Bayer as part of its Better Farm, Better Life initiative put in place an immediate response plan to help two million smallholder farmers affected by the pandemic. The plan aims to provide SHFs in Indonesia, Thailand and Vietnam with access to seeds and crop protection inputs. Bayer will additionally provide support to ensure that smallholder farmer output is safe and of global standards—thus contributing to food safety and sustainable agriculture.

Bayer supports bee-keeping in Thailand through the first Bee Learning Center in Asia, improves living conditions of rural communities in the Mekong Delta, and supports urban communities to grow vegetable crops. It also supports science education for primary schools in Vietnam and Thailand.

Consistent with the Bayer Group Sustainable Development Policy, the company supports the Global Charter of Responsible Care and Quality Management which is aligned to the principle of Sustainable Development. It therefore strives for continuous improvement in the fields of health, safety, environment and quality (HSEQ). In the ASEAN, Bayer also has a strong commitment to aligning production sites with this initiative.

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SODEXO

LEADING FACILITIES MANAGEMENT AND FOOD SERVICES SINCE 1982

Sodexo has been one of Singapore's leading facilities management and food services companies since 1982. Sodexo in Singapore has 1,500 employees across 70 client locations, delivering a wide spectrum of services from managing kitchen operations and keeping your facilities running in top class condition to everything in between.

Doing business in a good way is at the heart of Sodexo's mission. Since its founding, the company has contributed to the economic, environmental and social development of communities, regions, and countries where it operates and has been supporting the fight against hunger and malnutrition for over twenty years.

ANCHORING CORPORATE RESPONSIBILITY

Sodexo's sustainability strategy builds on its long track record of corporate responsibility (CR) leadership. In 2018, the company integrated 'anchoring corporate responsibility' as one of the four key pillars of its growth strategy. Furthermore, sustainability KPIs are captured and reported in the same way and with the same frequency as the traditional business KPIs. That implies that both financial and non-financial data have been integrated in the company's reporting for many years. In Singapore and the APAC region, Sodexo has a dedicated team focusing on sustainability.

USING TECHNOLOGY TO REDUCE FOOD WASTE

Across 13 different restaurant and kitchen operations in Singapore, Sodexo has reduced pre-consumer and post-consumer food waste by forty five percent (i.e 183,934 kg of food waste reduction, equivalent to 408,744 meals saved from being wasted, with a carbon footprint reduction of- 1,281 metric tons). The company's WasteWatch program powered by machine-learning captures food waste in nine different categories. The goal is to halve food waste by 2025.

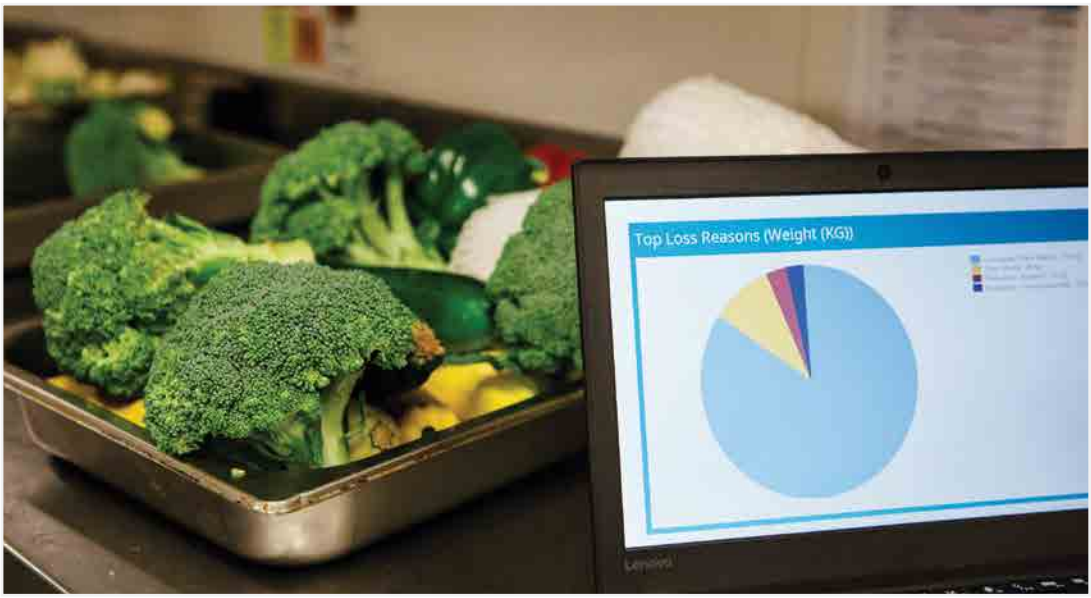
ENGAGEMENT WITH EXTERNAL STAKEHOLDERS

SUPPLIERS

Sodexo partners with diverse and inclusive suppliers (SMEs, women owned businesses) – more than twenty five percent of purchasing spend in Singapore supports diverse and inclusive businesses. The company also has a strong sense of responsible purchasing of palm oil; buying only from certified and sustainable providers. The same principles hold for fish and seafood, as more than seventy percent is sourced from certified providers, including the elimination of red listed species from its catalogue.

NGOS

Sodexo values its partnerships with NGOs on a local as well on a global scale. These cover a wide range of topics like carbon, plastics, sustainable sourcing and food waste. For example they have been partnering for a decade with WWF and have



been participating for the past 6 years in the United Nations World Food Programme to support a hunger and food and humanitarian response.

GOVERNMENT

In 2017 and 2018, Sodexo Singapore was recognised as a 'Champion of Good' by the Singaporean National Volunteer and Philanthropy Centre (NVPC) in acknowledgment of its contribution to addressing food insecurity in Singapore.

FINANCIAL INSTITUTIONS

Sodexo inked an agreement with nine banks to get a better revolving credit facility based on food waste reduction achievements.

COMMUNITIES

In elementary and secondary schools in Singapore, Sodexo conducted various programs on environmental issues and has been active in mentoring students. The National Environmental Agency of Singapore has awarded the company for these contributions to the local school community.

In addition, the food services company committed in a three year engagement supporting a women empowerment program to train underprivileged women in Singapore.

SODEXO'S ACHIEVEMENTS IN SUSTAINABILITY IN FIGURES

- Food waste in Singapore reduced by forty five percent
- 1,750+ beneficiaries impacted in Singapore on food insecurity issues in fighting hunger and malnutrition
- 100% certified sustainable palm oil in Singapore
- 100% of the Sodexo operations in Singapore do not use single use plastic straws or stirrers
- €5.5 billion of business value benefiting small, local, and diverse businesses in 2019
- Sodexo was the first food service company that connects its financing to action to prevent food waste
- €1.3 billion revolving credit facility (RCF) which now incorporates a pricing adjustment based on Sodexo's performance towards its goal to prevent 50% of the food waste and food losses from its operations by 2025

The company's WasteWatch program powered by machine-learning captures food waste in nine different categories. The goal is to halve food waste by 2025.

GLOBAL AGRIBUSINESS ALLIANCE

STRENGTHENING SUPPLY-SIDE AGRIBUSINESS PERFORMANCE AND COLLECTIVE CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS

The Global Agribusiness Alliance (GAA) is an international, CEO-led, private sector platform of supply-side companies committed to harnessing their collective strengths to tackle shared environmental, social and sustainability challenges. GAA is the first global sustainability alliance to have private sector companies across a range of commodities. Its members are highly diverse and span the globe: they are growers and producers, traders, fertilizer and agro-chemicals manufacturers, seed suppliers, primary processors, and agritech suppliers.

Embedded within the World Business Council for Sustainable Development (WBCSD), GAA initiative has amongst its membership multiple Singapore-based companies as well a Singapore-based Secretariat representative.

GOOD PRACTICES THROUGH PEER LEARNING

GAA is committed to fostering greater agribusiness engagement and action to find and scale solutions to sustainability challenges. Many of these challenges and opportunities are shared across commodities and geographies, and are reflected in GAA's four areas of focus: sustainable landscapes, rural livelihoods, water stewardship, and tackling food loss and waste. Through its collaborative approach, GAA members have the opportunity to problem-solve jointly through:

1. In-person knowledge - sharing. Over ten in-person presentations and discussions have been facilitated during biannual member meetings since GAA was launched. Members have reported the value of these in strengthening their understanding as well as informing and shaping their work moving forward.

2. Development of bespoke tools to support member company sustainability journeys. For example, the Action Learning Projects developed in collaboration with the Alliance for Water Stewardship: one completed in rice production schemes in Karnal, India and another at a rubber processing site in Jambi, Indonesia. GAA also developed an Agribusiness Guide to Respecting Human Rights to help orient members around the United Nations Guiding Principles on Business and Human Rights and establish processes for identifying the most salient issues in their own supply chains and mitigating risk. In addition, GAA is launching an Agri-SME Digital Finance Platform for members and their suppliers to access in order to match finance providers to SMEs and in turn facilitate investment at this critical link in the agricultural supply chain.

3. Collating strong examples of agribusiness action has an important role to play in sharing and scaling positive outcomes on the ground. GAA has developed a 'portfolio of evidence' on agribusiness partnerships for sustainable landscapes, and on tackling food loss and waste.

CONTRIBUTION TO THOUGHT LEADERSHIP

GAA has built an informal network of independent thought leaders and practitioners to build on existing expertise on the challenges facing agribusiness. It work in partnership with academic institutions, non-profit organizations, and governments including Business for Development, Fauna and Flora International, School of Global Studies at the University of Sussex UK and the International Institute for Environment and Development.

INPUT INTO EMERGING POLICY

GAA is committed to engaging in relevant and impactful policy discourse, and to this end, it is in dialogue with groups such as the Consumer Goods Forum and Tropical Forest Alliance 2020 as well as World Wildlife Fund (WWF), World Resources Institute (WRI) and the International Union for Conservation of Nature (IUCN).

GAA Global Agribusiness Alliance

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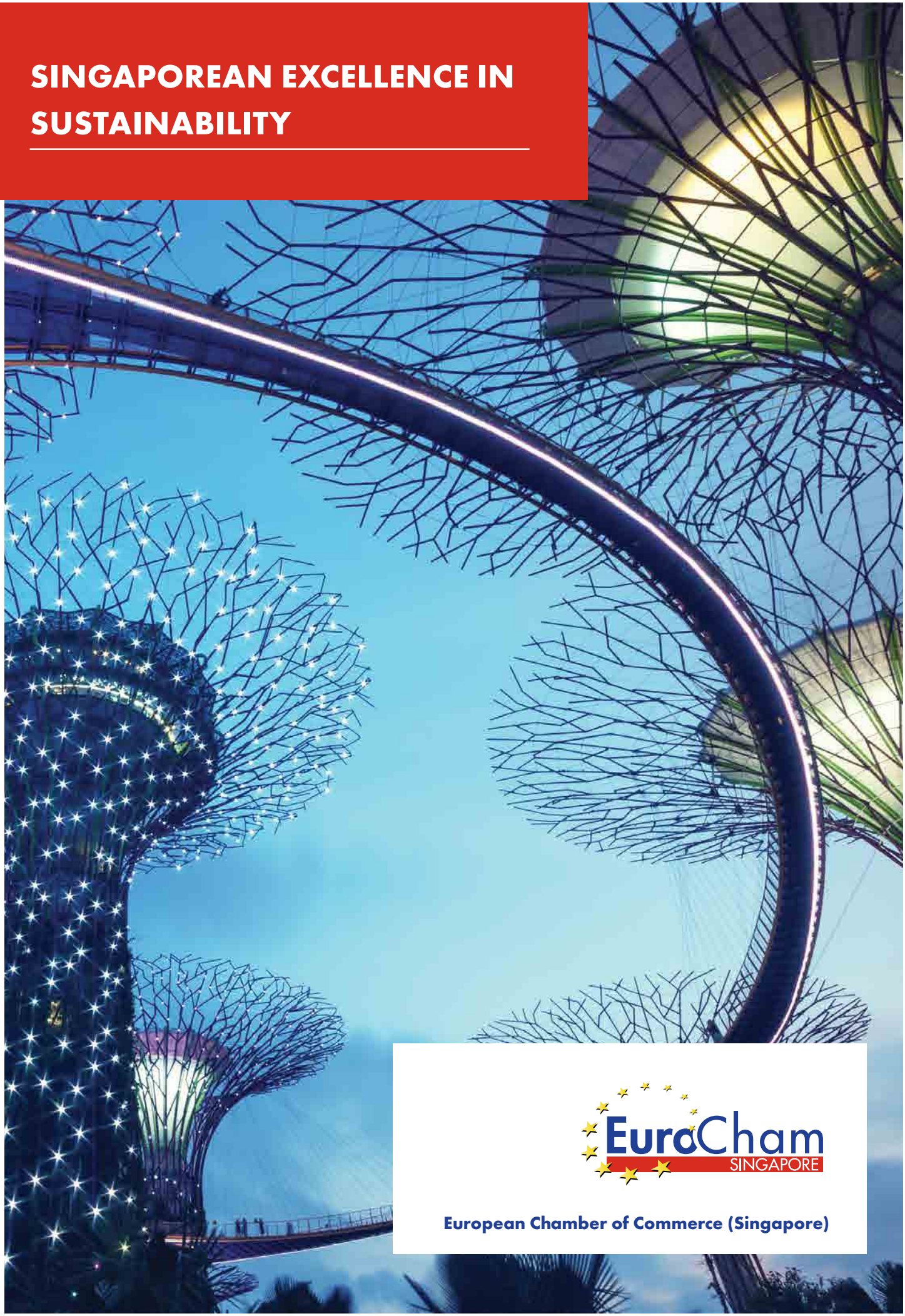
SINGAPOREAN EXCELLENCE IN SUSTAINABILITY



EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

CITY DEVELOPMENTS LIMITED

CHANGING THE CLIMATE FOR A MORE RESILIENT FUTURE

FOUR PILLARS OF STRATEGIC ESG INTEGRATION

City Developments Limited (CDL) is a leading global real estate company with a network spanning 106 locations in 29 countries and regions. It is one of the largest companies on the Singapore Exchange in terms of market capitalisation. Its income-stable and geographically-diverse portfolio comprises residences, offices, hotels, serviced apartments, shopping malls and integrated developments.

In the face of both climate and health crises, companies must rethink their priorities to build long-term business resiliency. CDL's longstanding commitment to strategic ESG integration for over 25 years has proven that its continual efforts in driving sustainable practices is not just the right thing to do, but also as good business.

The company has remained committed to fighting the climate emergency in good or challenging times. The four pillars – **Integration, Innovation, Investment and Impact** – that have underpinned its ESG strategy put it in a better position to recover stronger.

INTEGRATION: CREATING ENDURING VALUE THROUGH ITS ETHOS OF "CONSERVING AS WE CONSTRUCT" SINCE 1995

Founded on its ethos of "Conserving as we Construct" since 1995, CDL's value creation model has guided the company in creating sustained value for its business and stakeholders.

Over the years, its sustainability report has evolved from being performance-focused into a strategic planning and communication tool. CDL was the first Singapore company to publish a sustainability report using the Global Reporting Initiative (GRI) framework in 2008. It adopted the International Integrated Reporting Council (IIRC) approach in 2015, which helped CDL to connect ESG practices with financial and business performances.

CDL was the first Singapore company to embrace the SDGs in its sustainability report since 2016, and has aligned its ESG efforts with 14 out of 17 relevant UN Sustainable Development Goals (SDGs).

In 2017, it set long-term ESG goals and targets towards 2030, as mapped out in its CDL Future Value Creation 2030 Sustainability Blueprint. In the same year, it set up a dedicated sustainability website and started voluntarily publishing an online quarterly sustainability report that tracks and updates stakeholders of its progress towards key goals and targets set under its Sustainability Blueprint.

CDL aligns its reporting with global leading sustainability benchmarks to help it make stronger business sense of ESG integration and impact. The company has created a unique sustainability reporting framework that is aligned with relevant global guidelines and frameworks including GRI, IIRC, Taskforce for Climate-related Financial Disclosures (TCFD), SDGs, and Sustainability Accounting Standards Board's (SASB) real estate sector standards.

INNOVATION: ADOPTING A PROACTIVE APPROACH TO RISK MITIGATION AND ADAPTATION

Since 2017, innovation has been CDL's top material ESG issue based on multi-stakeholder materiality studies conducted biennially. Innovative technologies and solutions have not only helped CDL raise productivity, it has boosted the environmental, health and safety performance of CDL's projects.

Continued research and development are crucial to help CDL stay ahead of the curve. One such example is its partnership with the National University of Singapore (NUS) to establish the NUS-CDL Tropical Technologies Lab and Smart Green Home, which opened in 2018 and 2019 respectively. Both labs conduct studies on smart features, green building technologies, and designs for sustainable living.

In addition, CDL partnered with the Solar Energy Research Institute of Singapore in 2018 to develop and integrate high efficiency Building Integrated Photovoltaics modules with Prefabricated, Prefinished Volumetric Construction, using The Tapestry, one of CDL's latest residential development in Singapore, as a testbed.

INVESTMENT: SUPPORTING LOW-CARBON ECONOMY, INNOVATION AND NEW TECHNOLOGY

To make a real push towards a low-carbon economy, innovation and new technology must be supported by sustainable investments. CDL's strong ESG track record has reduced its long-term borrowing cost and expanded its pool of ESG-centric investors and lenders.

Since its pioneering green bond in 2017, which raised S$100m, CDL has continued to tap into sustainable financing. In April 2019, CDL secured S$500m in two green loans, which allowed it to finance new green developments both domestically and abroad. In September last year, it also secured a first-of-its-kind S$250m SDG Innovation Loan, which aims to accelerate innovative solutions that embrace the SDGs in the built environment.

To keep a pulse on the latest innovation trends and leverage new technologies, CDL also invested in PropTech Venture Capital funds, such as US-based Fifth Wall and China-based Dragonrise Capital.

Building a sustainable future requires the collaboration of a larger ecosystem. The Singapore Sustainability Academy (SSA), designed and

Deputy Prime Minister and Minister for Finance Mr Heng Swee Keat (left) touring the NUS-CDL Smart Green Home on 30 January 2019 at the official opening of the NUS School of Design and Environment Building 4.

built by CDL, is the first ground-up initiative involving six government agencies and 15 founding industry and not-for-profit organisations. The zero-energy facility in Singapore is dedicated to advancing advocacy and thought leadership for climate action and the SDGs.

Furthering its community investment, CDL founded the "Incubator For SDGs" in September 2019 in partnership with the UN Development Programme and Singapore Centre for Social Enterprise. "Incubator For SDGs" provides networking opportunities and rent-free co-working space at Republic Plaza to selected social enterprises that embrace the SDGs.

IMPACT: DRIVING POSITIVE IMPACT FOR THE BUSINESS AND COMMUNITIES

Through robust resource management and regular asset upgrading and enhancement efforts, more than S$28m in cost savings were achieved between 2012 and 2019 as a result of energy-efficient initiatives implemented across eight of CDL's commercial buildings.

Its low-carbon programmes have also resulted in a 38% reduction in the intensity of carbon emissions in 2019 against 2007 levels. This puts CDL on track to achieving its Science Based Targets initiative-validated target of 59% by 2030 and its commitment towards UN Global Compact's Business Ambition for 1.5°C.

As a forerunner in sustainability reporting since 2007, CDL is firmly committed to aligning with the global call for prompt and transparent climate-related financial disclosures. This will enable financial markets to recognise and reward its sustainable performance, thus creating long-term value for its business and stakeholders.

CDL's track record of effective ESG integration has been widely recognised by 12 leading global sustainability ratings, including the 2020 Global 100 Most Sustainable Corporations in the World ranking, which saw CDL ranked top among listed real estate firms globally. CDL was also the only company in Southeast Asia and Hong Kong to score double 'A's in the 2019 CDP A List for corporate climate action and water security, as well as to secure 'AAA' rating by MSCI ESG Research since 2010.

As awareness of climate change and sustainability continues to grow, the demand for sustainable business practices has never been more prevalent. Given the disruptions caused by the pandemic, the world needs to take greater action to build a larger ecosystem that is committed to changing the climate, for a more resilient future.

Since its establishment in June 2017, the SSA has engaged over 14,500 attendees through over 370 outreach events.

Since its completion in 1996, Republic Plaza – CDL's flagship office building – has maintained its Green Mark Platinum status via regular tracking and enhancements, including major retrofitting of chiller plants and installation of energy efficient lighting with motion sensors to maintain and improve

CAPITALAND

CAPITALAND TAKES THE LEAD IN ADVANCING SUSTAINABILITY GLOBALLY

CapitaLand, one of Asia's largest diversified real estate groups and a global sustainability leader, remains committed to drive positive change by advancing its environment, social and governance (ESG) efforts worldwide.

Headquartered and listed in Singapore, the Group owns and manages a global portfolio worth about S$134.7 billion as at 30 June 2020. CapitaLand's portfolio spans across diversified real estate classes which includes commercial, retail; business park, industrial and logistics; integrated development, urban development; as well as lodging and residential. With a presence across more than 220 cities in over 30 countries, the Group focuses on Singapore and China as its core markets, while it continues to expand in markets such as India, Vietnam, Australia, Europe and the USA.

CapitaLand has one of the largest real estate investment management businesses globally. It manages seven listed real estate investment trusts (REITs) and business trusts as well as over 20 private funds.

SUSTAINABILITY-FOCUSED BUSINESS

As a responsible real estate company, CapitaLand places sustainability at the core of what it does. The Group contributes to the environmental and social well-being of its communities as it delivers long-term economic value to its stakeholders. It embeds sustainability throughout its real estate lifecycle, from investment in properties to development and operations.

CapitaLand's ESG performance is integrated with its key performance indicators, demonstrating the Group's long-term focus on sustainability and responsible growth. It has continued to step up its ESG efforts and its subsequent achievements have allowed it to add resilience to its capital position. Particularly, CapitaLand's excellence in sustainability has enabled the company to dovetail its sustainability efforts with its cost of funding. CapitaLand's sustainability-linked loans are directly tied to its ESG performance rather than a specific property, allowing the Group flexibility to use the loans for general corporate purposes. In addition, CapitaLand's continued top-tier ESG performance allows it to obtain interest savings. To date, CapitaLand has raised over S$2.82 billion through sustainability financing – a mix of sustainability-linked loans, green loans and green bonds.

CapitaLand utilises a multipronged approach to track the Group's sustainability efforts. Its Environmental Tracking System (ETS) tracks critical sustainability progress indicators such as energy and water consumption, waste generation and carbon emissions across all operational properties that it owns and manages. The annual CapitaLand Global Sustainability Report (GSR) communicates sustainability performance and the level of integration of sustainability into business operations. Its sustainability targets and reporting methodologies are benchmarked against the latest international standards, frameworks, and principles such as the Global Reporting Initiative (GRI), International Integrated Reporting Council, ISO standards, Dow Jones Sustainability Indices, Global Real Estate Sustainability Benchmark and the United Nations Global Compact.

CapitaLand was one of the first companies in Singapore to voluntarily publish its Sustainability Reports according to the GRI Guidelines in 2009. CapitaLand's inclusion in well-regarded international sustainability indices also serves as a metric to track progress. It has been included on the Global 100 Most Sustainable Companies eight times, listed on the on the Dow Jones Sustainability World Index (DJSI) for eight consecutive years, and CapitaLand is the

longest standing company in Singapore to be listed on the Dow Jones Sustainability Asia Pacific Index for 11 consecutive years.

REDUCING ENVIRONMENTAL FOOTPRINT THROUGH INNOVATION

CapitaLand actively embraces innovation to manage its environmental footprint and encourages the use of innovative green features in its developments. CapitaGreen, a high-rise office tower in Singapore exhibits many innovative eco-friendly features. One of the key features is the petal structure that crowns the top of the building and serves as a wind scoop. The structure draws in cooler cleaner air from above the building and channels it into an inner duct called the "cool void". The cool void then supplies fresh cool air to the building's air conditioning system, resulting in less energy required to cool the building. This feature and many other aspects of the building's environmentally conscious design earned it Singapore's Building & Construction Authority (BCA) Green Mark Platinum Award. CapitaLand recently topped its over 130 Green Mark Awards with the highest recognition of Green Mark Platinum Champion Award by BCA.

CapitaLand further encourages the use of renewable sources of energy to reduce its greenhouse gas emissions. Solar panels are one of the primary innovative technologies available to accelerate the transition to a greater use of renewable energy. CapitaLand has leveraged this innovative technology across its properties in Singapore and India. In Singapore, over 21,000 solar panels have been installed atop CapitaLand's six industrial properties. It is the largest combined rooftop solar facility in Singapore by a real estate company. It will enable CapitaLand's corporate offices in Singapore to be 100% powered by renewable energy by end 2020 through the purchase of Renewable Energy Certificates (REC) generated from the use of solar panels, reducing its emissions further. Notably, the solar panels helped Singapore achieve its 2020 solar deployment target of 350MWP early this year.

ACTIVE COMMUNITY OUTREACH

Since 2008, CapitaLand has been participating in Earth Hour, a worldwide movement organised by the World Wide Fund for Nature, raising awareness on climate change and encouraging individual action to reduce environmental footprint for the past decade. In 2019, more than 260 CapitaLand properties worldwide participated in the Earth Hour campaign. Properties in Singapore organised educational awareness workshops for children to learn about leading more sustainable lifestyles. CapitaLand malls and offices in Singapore have partnered with the Public Utilities Board of Singapore (PUB) to host roadshows to encourage the public to make a commitment towards saving water.

CapitaLand furthers its community development commitment through CapitaLand Hope Foundation, the company's philanthropic arm. CapitaLand recognises that the long-term success of the company's business is closely intertwined with the health and prosperity of the communities in which it operates.

Every year, CapitaLand allocates up to 0.5% of its net operating profit to CapitaLand Hope Foundation. The Foundation promotes the social growth and development of vulnerable children with respect to their education, healthcare and shelter needs. It also strives to improve the quality of life for the vulnerable elderly through healthcare, deeper social integration and better living conditions. In 2019, CapitaLand Hope Foundation invested more than S$3.48 million to benefit underprivileged children and vulnerable elderly.

RETURNS ON ENVIRONMENT

Since 2008, CapitaLand has achieved a 29.4% reduction in carbon emissions intensity and has reduced its energy and water consumption intensity across the global property portfolio by 19.2% and 22.4% respectively. These environmental outcomes have resulted in significant returns, including a S$208 million in utilities cost avoidance since 2009.

LOOKING AHEAD

Despite CapitaLand's achievements in sustainability, the real estate group is not resting on its laurels. CapitaLand will continue to set the bar with more ambitious sustainability targets. The new CapitaLand Sustainability Masterplan to be launched 4Q 2020 will be a blueprint and strategic roadmap to direct and galvanise all of CapitaLand's sustainability efforts across the Group to maximise impact.

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BANYAN TREE HOTELS AND RESORTS

LUXURY TOURISM WITH A FOCUS ON SUSTAINABILITY

As of end 2019, Banyan Tree Hotels and Resorts employed 10,000 people worldwide, generating revenues of nearly USD200 million annually. Founded in 1994, the vision of this Singaporean brand was to use tourism as a powerful force for driving positive change in the world. Since those beginnings, a commitment to responsible travel and stewardship, along with the romance of travel, has remained at the core of our business today.

The company relies on a sustainable financing mechanism to support social and environmental projects that safeguard and enhance local culture and biodiversity in the countries where it operates.

INTEGRATING SUSTAINABILITY INTO STRATEGY AND OPERATIONS

Banyan Tree's sustainability ambition is to be a global leader in the hospitality industry and the sphere of sustainability. It works in partnership with local stakeholders and travellers to achieve the Sustainable Development Goals (SDGs), holistically integrating sustainability throughout the company's business strategy and operations. Furthermore, as a founding member and signatory of the United Nations Global Compact in Singapore in 2005, the company is committed to upholding the Ten Universal Principles on human rights, labour, the environment and anti-corruption.

In 2009, the company established the Banyan Tree Global Foundation. The Foundation develops and implements a global strategy aligned with SDGs and other agendas. This strategy is then adapted to local contexts by sustainability champions and committees active within each property. Each month, the effectiveness of sustainability efforts is reported to the Global Foundation on an individual project basis, relative to established metrics and baselines for progress measurement. This data is centrally collated and analysed. Impact is tracked throughout the year, with annual reporting to SGX.

Across all 47 properties, staff awareness and engagement is raised through annual training programmes run by the company's management academy. These in turn feed into the built-in awareness and participation aspects of the overall guest experience in each of the resorts. Workshops are held regularly to develop sustainability knowledge, capacity and leadership among property sustainability champions.

PUTTING SUSTAINABLE TECHNOLOGY TO WORK

The company uses novel technologies to meet the resource requirements of its properties and to maintain the ecological balance of the destinations in which it is present, from restoring and growing coral reefs through a technology that works on electro-accretion of minerals, to exploring novel approaches to food waste digestion and elimination, or alternative energy such as Ocean Thermal Energy Conversion.

Banyan Tree Hotels and Resorts has a long history of using such innovative technological solutions: for instance, its Ihuru resort in the Maldives was the first resort in the world to test and implement an electricity-driven calcium carbonate accretion solution—offered by Biorock—as part of its reef restoration efforts, back in 1996. In 2004 Banyan Tree built the first resort based conservation lab in the Maldives, with a second in 2007 in the Maldives and a third in Bintan, Indonesia.

CORE PROGRAMMES AND KEY PARTNERS

Banyan Tree's core programmes across the ASEAN region include resource conservation initiatives, tree-planting, forest conservation and restoration efforts, and mentorship and education programmes. The company also supports various projects active in the region.

Banyan Tree partners extensively with international and domestic government and non-government organisations, non-profits, community cooperatives, universities and suppliers to create shared value. The company's conservation centres in Maldives and Indonesia regularly collaborate with universities in the UK, Australia, New Zealand and Hong Kong, with data generated being reported to stakeholders to support local and regional management. Additionally, Banyan Tree's annual reef monitoring data is shared with local governments, such as the National Coral Reef Monitoring Framework in the Maldives and National COREMAP project in Indonesia, to support better management of these national assets and strengthen collaborative efforts.

The company has created and evangelised social enterprises, and supported conservation for over 25 years, ensuring long term impact by supporting sustainable local development. Its sustainability effort also extend to the wider hospitality industry, academia, and conservationists. Programmes established by Banyan Tree have been used by organisations including the Worldwide Fund for Nature (WWF) to showcase and promote industry best practice. They are also the subject of socio-ecological research and a retrospective publication on the company's 25-year journey.

The social aspect of Banyan Tree's sustainability initiatives include programmes such as Seedlings, which nurtures young people at risk of societal exclusion by providing them with vocational and life skills, as well as donations, fundraising events and disaster relief efforts to support local communities. The company also assists in the creation of learning environments in local communities by holding classes in schools and universities, donating equipment and supporting infrastructure maintenance.

SUSTAINABILITY AS A FOUNDATIONAL VALUE

The company's initiatives create shared value within local communities, supports business operations and reputation, and engages tourists to both respect local environments and cultures and to actively contribute to their preservation. These directly affect Banyan Tree's bottom line while supporting action against climate change and evangelising the company's sustainability efforts throughout the service chain and supply chain.

For Banyan Tree, the business of hospitality is built on the natural and cultural heritage of the destinations where the company's hotels and resorts are located, and stewardship of this heritage stewardship is decisive of its success.

The company has created and evangelised social enterprises, and supported conservation for over 25 years, ensuring long term impact by supporting sustainable local development.

BANYAN TREE

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