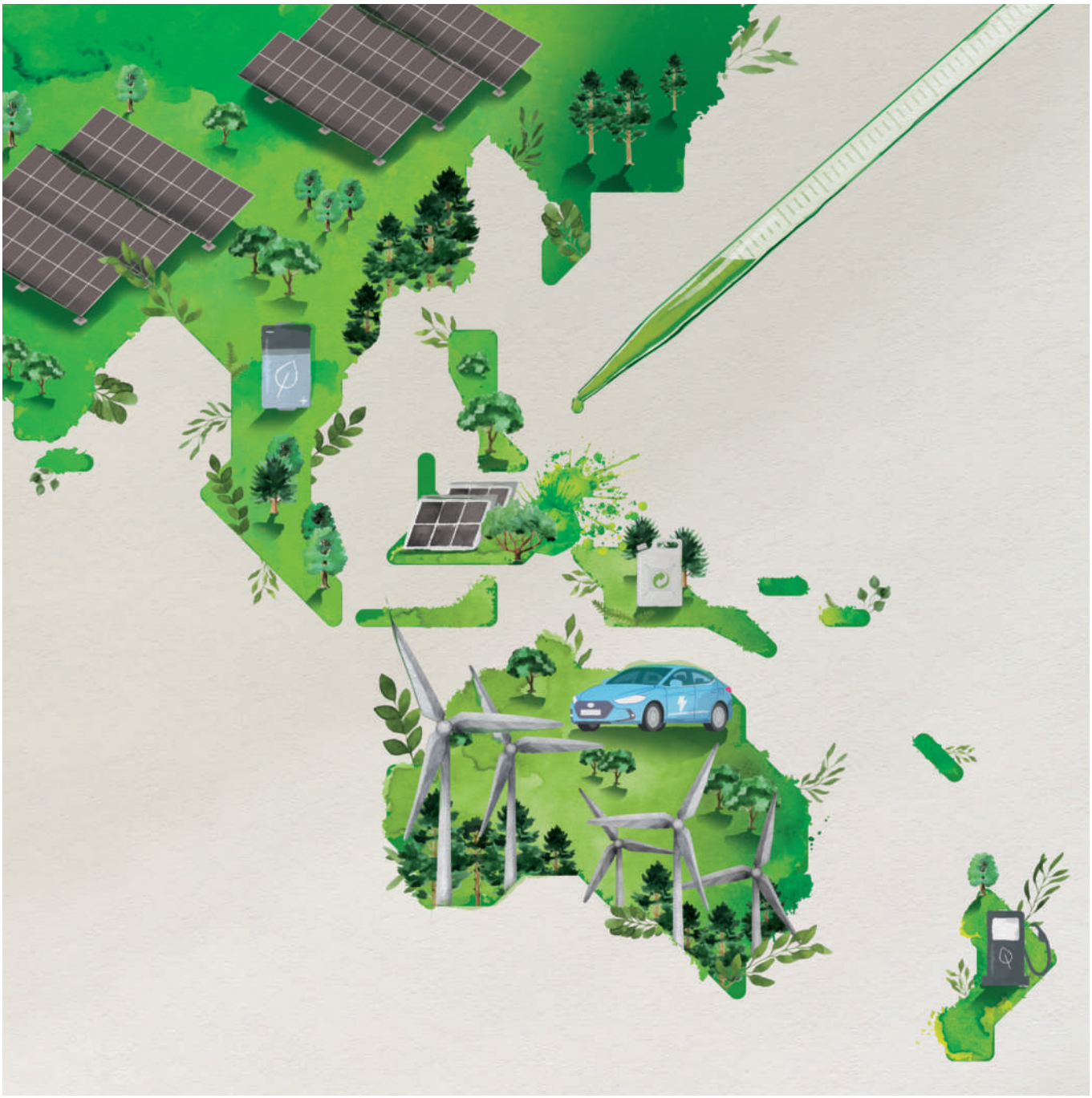
SUSTAINABILITY WHITEBOOK 2022-2023

EuroCham SINGAPORE



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EuroCham SINGAPORE

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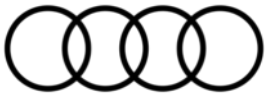


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MESSAGE

from the Minister for Sustainability and the Environment, Grace Fu

The COVID-19 pandemic and geopolitical events in recent times have dramatically changed our global landscape. Countries around the world will increasingly have to deal with higher energy and food prices due to disrupted global supply chains. At the same time, the increased occurrences of extreme weather events around the world have underscored climate change as a grave threat to mankind.

Amidst this turbulence and uncertainty, how we steward our resources is crucial in ensuring a sustainable and climate-resilient future for our current generation and many more generations to come. We must transform how we work, trade and travel to be more sustainable, and accelerate our progress towards net zero emissions. International collaborations between nations, companies and communities will be vital.

Singapore and the European Union (EU) are strong partners in many areas such as trade and environmental sustainability. This year, we commemorate the third anniversary of the entry-into-force of the EU-Singapore Free Trade Agreement (EUSFTA), which is a progressive and forward-looking agreement that benefits businesses. The EUSFTA Chapter on Trade and Sustainable Development provides a solid framework to advance our joint sustainability and development agenda, including addressing contemporary challenges and opportunities.

Over the last three years, Singapore and the EU have continued to deepen our cooperation in areas ranging from low-carbon energy technologies, carbon services and solutions, to exploring opportunities presented by the circular economy. For example, in 2020, we worked with the EU delegation in Singapore on the "Rethinking Plastics – Circular Economy Solutions to Marine Litter" project, and exchanged many valuable ideas and best practices in advancing the circular economy. Singapore and the EU have also worked together to enhance regional cooperation through the launch of the ASEAN-EU High-Level Dialogue on Environment and Climate Change, which is now in its fourth year.

I am confident that the partnership between Singapore and the EU will continue to grow from strength to strength. Our partnership is rooted in our similar ambitions towards a greener and more sustainable future, as evident by the EU Commission's European Green Deal and the Singapore Green Plan 2030. I hope we will continue to actively collaborate, and build on each other's strengths and experiences in dealing with climate change.

I congratulate the European Chamber of Commerce (EuroCham) on its second edition of the Sustainability Whitebook. I also applaud EuroCham's continuous good work in bringing sustainability issues to the forefront, through profiling the successes and best practices of European and Singaporean companies, and fostering partnerships between them.

Let us continue to explore new opportunities and partnerships, to secure a sustainable and climate-resilient future for all.

MESSAGE

from the Ambassador of the European Union to Singapore, Iwona Piórko

The European Union (EU) and Singapore are well-established partners in the development of sustainable policies. The EU-Singapore Free Trade Agreement (EUSFTA) includes a chapter on Trade and Sustainable Development to ensure that our trading relations support environmental protection.

The EU and Singapore have taken significant steps in recent years to achieve net-zero greenhouse gas emissions, support sustainable business innovation, strengthen supply chain resilience, develop a circular economy and accelerate transitions towards green and digital societies.

With the adoption of the European Green Deal, the EU has put forward a clear roadmap with the ambition to become the world's first climate-neutral continent by 2050. The Green Deal is now the new growth strategy for Europe developing initiatives and investments to make the economy greener, fairer and digital.

One of the main objectives of the Green Deal is to ensure a transition to a circular economy that reduces pressure on natural resources and will create sustainable growth and jobs. EU's policies also focus on greening the most polluting sectors as illustrated by the development of sustainable travel and transportation. Transport currently accounts for a quarter of the EU's greenhouse gas emissions and we seek a 90% reduction in these emissions by 2050.

Since 1st June 2021, the EU has entered the implementation stage for Next Generation EU. The Commission seeks to raise up to 30% of the NextGenerationEU funds through the issuance of green bonds and uses the proceeds to finance green policies. We will support sustainable business innovation in the EU by investing in environmentally friendly technologies, rolling out greener vehicles and public transport, and making our buildings and public spaces more energy efficient.

Singapore, with its Green Plan 2030 and strong push on sustainability shares a similar vision and is a key ally for us in moving this crucial agenda forward. Singapore and the EU are committed to achieving our mutual goals. By continuing to work closely together and build on our synergies, we can have a bigger collective impact.

We are also cooperating to accelerate the digital transition, which is essential to make our economies greener. Bilaterally, we are currently negotiating a Digital Partnership to enhance digital connectivity and interoperability between our digital markets.

Finally, the shift to a more resilient, digital and sustainable society will not be possible without engaging with the private sector. To build future-proof economies and strengthen the resilience of our supply chain, we need to continue our dynamic and open interaction with businesses, big and small.

In this context, the EuroCham Whitebook on Sustainability is an essential part of the dialogue. It will help promote partnerships between European and Singaporean stakeholders that need to cooperate even more to achieve a sustainable and digital future.

MESSAGE

from the President of EuroCham, Federico Donato

I am delighted to present the second edition of the Sustainability Whitebook by EuroCham Singapore— a key component of EuroCham's Sustainability Programme 2022.

After the global pandemic in 2020 and 2021, and while even 2022 is also proving to be an extremely difficult year given the multiple challenges in energy, geopolitics and supply chain among others, opportunities for deepening collaborations and sharing projects between Europe and Singapore remain vast and extremely meaningful.

In 2022, the chamber continues to prioritise and select sustainability as the main topic as we seek to address a top priority for many global companies. Sustainability is also a key driver of the European Commission agenda. Since the launch of the European Green Deal in 2019, the European Commission has introduced new and improved initiatives to guide the EU in attaining their sustainability targets. These targets include controlling emissions and decarbonisation, creating digital and green innovations and ensuring sustainable travel and transportation to name a few amongst many others. All of these sustainability targets are complementary to the plans of the Singapore government since the launch of the Singapore Green Plan 2030 in 2021. The Green Plan marks Singapore's commitment to sustainability and strengthens Singapore's pledge to the UN's 2030 Sustainable Development Agenda and Paris Climate Agreement.

For these reasons, the Chamber seeks to lead by hosting the Sustainability Awards which recognizes leaders and innovators for the third consecutive year, as well as running our yearly showcase of European Excellence in Sustainability through Best Practice Sessions where companies share their initiatives and plans. This second edition of the Sustainability Whitebook contains position papers and a survey report to give a more incisive depth to the knowledge shared during these sessions.

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, without compromising economic growth and in this respect, Europe truly qualifies as Singapore's best partner.

The second edition of the EuroCham Whitebook not only presents the several successful partnerships between Europe and Singapore and the lessons that can be learnt from both parties to overcome the borderless challenges in a post-pandemic world, but also of successful collaboration between the public and private sectors to realise opportunities for growth.

Through the Sustainability Programme, supported by our knowledge partner, Accenture, our Chamber focuses its efforts around five topics that are high on the agenda for both Singapore and Europe. This year, the topics are Sustainable Business Innovation, The Road to Net Zero, Responsible Supply Chain & Circular Economy, Digital for Sustainability, and Sustainable Travel & Transport: areas which are rapidly transforming under the technological support of European companies and governmental guidance in Singapore. Given the similar challenges we face, Europe and Singapore are well placed to share insights with each other and become leaders in the sustainability effort.

EuroCham's second Sustainability Whitebook offers a continuation of the relentless effort by leading European companies to build a more resilient world and the sustainability practices that help us overcome challenges not only in Europe but also in Singapore, and now increasingly, around the globe.

Allow me to underline that our initiatives under the Sustainability Programme and the Sustainability Awards could not have been accomplished without the crucial support of Accenture, Airbus, Lombard Odier, PMI and Evonik as well as BNP Paribas and Booking.com 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, all Singapore government agencies 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 a hopeful 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 began to realise the fruits of reinvention and recovery in a post-pandemic world.

Europe has been a leading partner to Singapore in the area of sustainability and given EuroCham's commitment to sustainability, this was an obvious choice of topic for this year's main programme at EuroCham Singapore. The choice of topic was made even more compelling by the overwhelming success of the previous two iterations of this programme as well as by our observation that many of EuroCham's members and stakeholders continue to pursue sustainability as a priority, now more aligned with the European Green Deal and Singapore Green Plan 2030.

With our Diamond member Accenture's continued support as the knowledge partner for our programme, EuroCham's vision for 2022's flagship event has evolved to become even better. As is our modus operandi, under the title of "European Excellence in Sustainability" we executed a series of sharing sessions. In previous years due to the pandemic, these were conducted as webinars. However, in 2022, EuroCham has embraced the spirit of new normal, and these sessions have been in-person, hybrid and/or in webinar format to reach as wide an audience as possible on the topic of sustainability. Beyond these sharing sessions, the "European Excellence in Sustainability" includes a survey report, a Whitebook and the Sustainability Awards. We were keen to collaborate with our members in five different areas: Sustainable Business Innovation, The Road to Net Zero, Responsible Supply Chain & Circular Economy, Digital for Sustainability, and Sustainable Travel & Transport.

Given the relevance of the topics and the evolving nature of our programme to meet the needs of our members and stakeholders, the programme continues to trigger a lot of interest from our members. The initiatives have been warmly welcomed by both the European Commission, the Singapore government and other key stakeholders.

On 26th of April, the programme kicked off with the in-person, double sharing session on "ESG Communication Strategies" focusing on the area of Sustainable Business Innovation. It was the first of a series of monthly events where we not only successfully collaborated with National Business Groups, but also with universities and business schools as well as peers in the region such as other European Chambers of Commerce in the ASEAN region.

Acknowledging the need to compile knowledge and industry insights from our members and stakeholders, EuroCham leverages on the programme to drive content through the position papers and reports covering the five sustainability focus areas of the programme. I am most appreciative of the strong support extended by our content partners Accenture, Deloitte Singapore, EY-Parthenon and Frost & Sullivan in the preparation of these position papers, as well as that of our skilled intern See Ee Teng who helped us with writing one of the 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 organisational views, strategies and sustainability initiatives appear in this White Book under the chapter "European Excellence in Sustainability".

The EuroCham Sustainability Whitebook 2022-2023 offers real insight into the strategies pursued by companies and leaders in Europe and in Singapore, the capabilities and smart solutions developed for decades as well as the innovative responses to immediate challenges 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 both enduring and upcoming issues 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.

Supporting Asia's transition to net zero

For the world to meet the targets of the Paris Agreement, Southeast Asia has a critical role to play in the global energy transition. Strong economic growth in the region over the past three decades has resulted in rising disposable incomes, a rapidly growing middle class and shifting aspirations—this cocktail of factors has gone hand-in-hand with rapidly increasing energy demand, **which is expected to continue at a growth rate of 3% per year through 2030**.[1]

Worryingly, three quarters of the increased demand in Southeast Asia is being met by fossil fuels, namely coal, oil and natural gas, according to IEA.[2] This is a chief concern for many stakeholders in the region, for growing CO_2 emissions and the impacts of climate change are resulting in growing vulnerabilities relating to natural weather events, food insecurity and water scarcity.

Southeast Asia's reliance on fossil fuels for power—given the context of growing energy demand—make it **imperative for the region to focus its work on energy transition**. Indeed, 8 in 10 countries in the region have committed to net zero targets in the past two years, while companies have invested US$11 billion in renewables and the built environment.

The role of companies—and financial institutions—in fighting climate change is clear. Headquartered in Singapore, DBS has a strong Asian footprint, particularly in the three axes of growth: Greater China, Southeast Asia and South Asia. The bank has sharp focus on digitalisation and sustainability; and its commitment to the region is seeing it lead the region's push towards a low-carbon future.

At the forefront of the transition to a low-carbon economy

As the largest lender in Southeast Asia, DBS can play a role in helping achieve sustainable and inclusive growth in the region. The bank also has a responsibility to provide support to its corporate clients' decarbonisation efforts.

In keeping with this, DBS—which became the **first Singapore bank to join the Net-Zero Banking Alliance (NZBA)** in October 2021—has committed S$52.7[3] billion (US$36.39 billion) in sustainable financing deals, well ahead of its target of S$50 billion (US$34.52 billion) by 2024.

Targeted by 2024	S$50 billion
Committed	**S$52.7 billion**[3]

In April 2019, the bank ceased financing new thermal coal assets. Since then, it has continued to progressively phase down its thermal coal exposure and, at the same time, ramp up support for the renewables sector.

Comprehensive decarbonisation targets

DBS recently outlined its decarbonisation targets as part of its net-zero pledge. It has established different sets of targets for different industries. The first is emissions intensity reduction, covering sectors such as **power**, **automotive**, **steel**, **aviation**, **real estate** and **shipping**. The second is absolute emission reduction for the **oil & gas** sector. And the third is comprised of data coverage targets for the **chemicals** and **food & agribusiness** sectors.

[1] https://www.iea.org/reports/southeast-asia-energy-outlook-2022/key-findings

[2] Ibid.

[3] As of 30 June 2022.

This endeavour of the bank is built on three pillars:

Societal responsibility
Banks play a critical role in reallocating capital to facilitate the transition to a lower carbon society and doing so in a just manner.

Risk imperative
We need to manage physical and transition risks arising from the transition.

Business opportunity
There will be significant investment and financing needs triggered by this shift.

While the bank is targeting net zero by 2050, it has also set interim targets for 2030 as its first checkpoint. Many of the key decarbonisation levers to achieve its interim targets focus on allocating more financing towards low-carbon activities. The bank is of the view that the interconnectedness of the economy requires a cross-sector solution to decarbonisation. DBS will discuss these opportunities with its clients and explore how it can support their transition.

The bank's decarbonisation targets are among the most comprehensive in the global banking industry and cover emissions of Scope 1, Scope 2 and Scope 3 categories; and it is the **first bank in Southeast Asia to make public a concrete and comprehensive set of targets for Scope 3 financed emissions**. While Scope 1 comprises direct emissions, indirect emissions from purchased energy make up Scope 2. Scope 3, meanwhile, includes all indirect emissions seen across the value chain—both upstream and downstream.

Sector	Emission scopes included
Power	Scope 1 (generation) Scope 3 (equipment)
Oil & Gas	Scope 1-3
Automotive	Scope 3 (tailpipe emissions)
Steel	Scope 1-2
Aviation	Scope 1
Real Estate	Scope 1-2 (operating emissions)
Shipping	Scope 1

DBS' targets will enable it to strategically channel financing away from high-emitting activities toward low-carbon alternatives. In doing so, the bank expects to both accelerate the energy transition, as well as support sustainable and inclusive growth and prosperity. As importantly, the targets also help the bank's clients mitigate risks associated with not being able to transition swiftly enough.

An exciting journey ahead

The bank's net zero journey is premised on climate change awareness, a recognition of the risks and opportunities, and driving organisational and behavioural change. The bank wants to build partnerships with its clients on the transition journey.

Momentum for decarbonisation and an energy transition is building across the region, but there's a long way to go yet. For instance, Southeast Asia will need to invest $3 trillion dollars over the next eight years just to meet the 1.5 °C target of the Paris Agreement. This means funding will need to be mobilised by banks, investors and companies together, so the region's governments and its people get the support required to achieve long-term, sustainable economic growth.

Download DBS' whitepaper "Our Path to Net Zero – Supporting Asia's Transition to a Low-carbon Economy" at go.dbs.com/3UI2YtK or scan this QR code.

DBS has been named 'World's Best Bank' for 5 consecutive years since 2018 with 7 accolades from Global Finance, Euromoney and The Banker, and has been accorded the 'Safest Bank in Asia' award by Global Finance for 14 consecutive years starting 2009.

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.

Through a wide range of events such as closed-door discussions with the Singapore Government, prestigious gala dinners attended by the local and European business community, the diplomatic circle and key partners across ASEAN, we connect you with business leaders from a variety of business industries through flagship events like the Europe Business Summit, Sustainability Awards Gala Dinner, and stimulating year-round panel discussions with expert speakers. We welcome you to participate to provide your company with 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 12 committees we carry out advocacy work and publish position papers to put forward our recommendations.

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

INTRODUCTION

In recent years, sustainability has been a topic of focus for many governments, private companies, and communities as climate risks heighten, endangering the lives of societies, people, our natural habitat, wildlife and economies worldwide. For the European Chamber of Commerce, Singapore, we understand our strategic position in supporting the sustainable movement by serving as the bridge between businesses, governments and communities. For us in 2022, sustainability continues to be the driver of our advocacy programmes and activities.

Singapore has presented its stance on sustainability and climate change with its COP 26 Nationally Determined Contributions to reach net zero emissions by the second half of the century, and the release of the Singapore Green Plan 2030. Akin to Singapore, the EU has reinforced its commitment to sustainability by meeting some of its previous commitments within the European Green Deal, and by introducing their latest "Fit for 55" Package to further hone in on its climate and social commitments. Considering these global promises and the abundance of opportunities the COVID-19 pandemic has brought for the sustainability movement, we have crafted five specific topics of focus for our "European Excellence in Sustainability" Programme 2022-23 to which this Whitebook belongs.

The "European Excellence in Sustainability" Programme 2022-2023 covers these five topics:

1. Sustainable Business Innovation
2. The Road to Net Zero
3. Responsible Supply Chain and Circular Economy
4. Digital for Sustainability
5. Sustainable Travel and Transportation

The programme, consists of a series of webinars, sharing sessions, panel discussions, and the publication of this Sustainability Whitebook 2022-2023. In order to reach the discussion of plausible solutions, the Whitebook will first present an outlook of the Singapore and EU sustainability scenes to set the context and understand where each entity is in their journey to sustainability. Moving from the previous Sustainability Whitebook 2020-2021, this year's edition will present updates on the plans for sustainability by the two entities, successes, and areas for collaboration.

Serving as a bridge between EU businesses and the Singapore government, EuroCham's advocacy approach is twofold.

Firstly, the Whitebook will include a compilation of a set of results from our Sustainability Survey 2022 conducted by EuroCham over the course of 2 months. With over 50 respondents from different industries, the survey results serves as a quantitative basis for the Whitebook. Moreover, the survey also provides companies with a better understanding of what other firms' views on sustainability are, how they perceive themselves within Singapore government policies, and how collaboration can strengthen.

The Whitebook then moves into its position papers. Written mostly in conjunction with content partners such as Deloitte Singapore, Accenture, Frost & Sullivan, and EY-Parthenon, the position papers focus on the five specially curated pillars and explicate a cohesive landscape of the opportunities and challenges faced by EU companies and Singapore in working towards greater sustainability partnership.

1. The first position paper on 'Sustainable Business Innovation' is written in collaboration with Deloitte Singapore and focuses on highlighting changing consumer preferences and expectations as a result of growing ESG awareness.

2. The second position paper 'On the Road to Net Zero' is written in collaboration with Accenture and explores the utility of Jurong Island, and the companies in the area, in empowering Singapore in attaining its route to net zero.

3. The third position paper on 'Responsible Supply Chain' is written by EuroCham focusing on the different stages of a supply chain for European businesses in relation to Singapore government policies to draw out opportunities for further collaboration.

4. The fourth position paper on 'Digital for Sustainability' is written in collaboration with EY-Parthenon and discusses technology and its place in optimising sustainability practices.

5. The fifth position paper on 'Sustainable Travel & Transportation' is written in collaboration with Frost & Sullivan and seeks to explore the development in the private sector to foster sustainable travelling via both land and air.

Collectively, these papers serve to raise awareness and share insights into company and government perspectives to facilitate a better understanding of the needs of different stakeholders.

It is EuroCham's ambition, as it is for European Companies, to have this Whitebook serve as a platform for knowledge sharing and a gateway to open doors for more innovative and transformative collaborations for the health of our environment.

Finally, the Whitebook displays a series of Company Profile Articles featuring the best sustainability practices and expertise of each participating member. These articles reflect EuroCham's member companies' continuous efforts in incorporating sustainability into business practices, contextualised mainly to Singapore.

In tracing the EU-Singapore nexus on Sustainability, this Whitebook promotes a continued exchange of views between Singapore and Europe to push the sustainability agenda forward in the years to come.

EUROCHAM SUSTAINABILITY AWARDS GALA DINNER 2021

19 NOVEMBER 2021, FRIDAY (SINGAPORE)

The European Chamber of Commerce, Singapore hosted the Minister for Trade and Industry, Mr Gan Kim Yong at the EuroCham Sustainability Awards 2021. He was joined by the Guest-Of-Honour, Her Excellency Iwona Piórko, Ambassador of the European Union to Singapore and Mr Federico Donato, President of the European Chamber of Commerce, Singapore, as well as members of EuroCham, European National Business Groups, and the public.

The evening began with opening remarks from Mr Donato and H.E. Piórko, followed by Minister Gan's Keynote Speech. Through the course of the gala dinner, there were two panel discussions, the first of which brought insights from our Guests Judges, Mr Lam Yi Young and Ms Goh Swee Chen and was moderated by Mr Corrado Forcellati, Chair of the EuroCham Sustainability Committee. The second panel discussion featured representatives of award winners Singtel and Lomabrd Odier and was moderated by Ms Alison Kennedy from Accenture, which is the strategic knowledge partner of EuroCham for the Sustainability Programme & Awards.

This marked the second year EuroCham hosted the Sustainability Awards and, with the support of esteemed judges, gave recognition to six exceptional organisations for their efforts in sustainability.

JUDGES

Lam Yi Young
Chief Executive Officer
Singapore Business Federation

Gianfranco Casati
Chairman
Growth Markets Accenture

Achal Agarwal
Chairman of the Board
World Wide Fund for Nature (WWF), Singapore

Tan Chong Meng
Group CEO
PSA International Pte Ltd

Goh Swee Chen
President
Global Compact Network Singapore (GCNS)

Federico Donato
President
EuroCham Singapore

Front row from left to right:
H&M, Winner of Green Consumer Award
Mr Frederico Donato, President of EuroCham Singapore
Mr Gan Kim Yong, Minister for Trade & Industry
H.E. Iwona Piórko, Ambassador of the European Union to Singapore
Mrs Nele Cornelis, Executive Director of EuroCham Singapore

Back row from left to right:
Lombard Odier, Winner of Green Finance Award
CMA CGM, Winner of Judges' Choice Award
Engie, Winner of Smart Mobility Award
Sodexo, Winner of Biodiversity & Agriculture Award
Singtel, Winner of Sustainable Workforce Award

THE EUROPEAN SUSTAINABILITY ROADMAP AHEAD

Since the release of the European Green Deal, the European Commission introduced the "Fit for 55 package" 2021 to guide the EU in attaining their sustainability targets under the European Green Deal. The package assists the EU in reducing carbon emissions by 55% by 2030, before reaching net zero emissions by 2050. The aim of the "Fit for 55 package" was to ensure that the journey towards climate and environmental change occurs in a just and socially fair manner. Additionally, the revision was enacted to maintain and ensure that the EU remains competitive in the global fight against climate change.

CONTROLLING EMISSIONS AND DECARBONISATION

The EU Emission Trading System (ETS) is the first and the biggest carbon market worldwide that limits emissions from various power sources and manufacturing industries which are required to pay to pollute. Under the "fit for 55 package", the EU ETS was amended to include the maritime sector and reach an emissions reduction in these sectors by 61% by 2030. New self-standing emissions trading systems for buildings and road transport will also be created to support member states in meeting cost-efficient national targets. These revisions were designed to trigger a shift towards alternative fuel sources in automotive and carbon-intensive sectors.

Green buildings have also been a priority and goal for many European businesses in achieving climate neutrality. Since buildings are responsible for around 40% of energy consumption and 36% of carbon emissions in the EU, energy efficiency of buildings is crucial to emissions control. Under the "Fit for 55 package", the revised directive on energy performance on buildings was implemented to improve general energy efficiency. Buildings should increase renewable energy usage in heating and cooling by +1.1 percentage points per year until 2030, to reach a benchmark of 49% renewables by 2030.

CREATING DIGITAL AND GREEN INNOVATIONS

The consensus across the EU has been to explore and develop green and digital technologies especially with the digital transformation of societies influenced by COVID-19. Under the United Nations Environment Programme, the EU Commission assisted in the launching of the International Methane Emissions Observatory which uses satellites to measure overall methane emissions from carbon-emitting infrastructures. Digital tools increase resource efficiency and help researchers better understand the conditions of our climate as they build technology solutions for the climate.

Beyond the "Fit for 55 package", DIGITALEUROPE has also collaborated with various stakeholders to spearhead digital tools to drive green efforts. To tend to the needs of recyclers, DIGITALEUROPE has partnered with APPLia (representatives of the home appliance industry in Europe) to create an online platform called the Information for Recyclers Platform (I4R) where recycling enthusiasts can access detailed recycling information. Through this platform, information flows are streamlined as businesses and consumers are incorporated into digital platforms to partake in sustainability efforts.

ENSURING SUSTAINABLE TRAVEL AND TRANSPORTATION

Announced in the package are modified emission targets for the automotive sector. By 2030, at least 30 million zero-emission cars should be in operation on European roads, and by 2035, only zero-emission cars may be registered for use. The new regulation is binding for all member states within the EU and the progress of the member states will be monitored to ensure adherence to the latest regulation.

The package has also hastened the development of alternative fuel infrastructures. Countries are expected to develop National Policy Frameworks to acquire alternative fuels and implement public recharging points for electric vehicles. This shift will support the growth of the clean automobile ecosystem and the sale of clean energy vehicles across Europe. Sustainable aviation fuels such as advanced biofuels and electrofuels have also been tapped on under the ReFuelEU Aviation proposal. Green fuel has also been promoted as an alternative for ships as they were given the directive to reduce greenhouse gas emissions and harmful pollutants by 75% by 2050.

SINGAPORE'S SUSTAINABILITY ROADMAP AHEAD

The release of the Singapore Green Plan 2030 (The Green Plan) in 2021 marks Singapore's commitment to sustainability and strengthens Singapore's pledge to the UN's 2030 Sustainable Development Agenda and Paris Climate Agreement.

COVID-19 disruptions have accelerated the need for digital business innovations and sustainability. Since the pandemic moved businesses and consumers online, opportunities were created to facilitate advancement towards sustainability through the development of digital tools and technological innovations. Digital innovation allows businesses to capture "first-mover advantage" in creating low-carbon technologies and green infrastructures as Singapore transitions to a low-carbon economy.

THE SINGAPORE GREEN PLAN 2030

The Green Plan consists of five pillars. City in Nature discusses the creation of more green spaces to allow harmonious human-wildlife coexistence. Energy Reset emphasises energy efficiency by exploring alternative energy sources such as solar energy. Green Economy focuses on creating support programmes to develop enterprise capacities for sustainability, and green jobs. Resilient Future ensures that Singapore is equipped with the necessary food and structural assets to combat its natural resource limitations. Sustainable Living encourages consumers to develop environmentally-friendly habits such as recycling and reducing water consumption.

SUPPORTING BUSINESSES IN THEIR JOURNEY TO NET ZERO

To cater to small and medium enterprises (SMEs), the National Environment Agency's (NEA) Energy Efficient Fund was also enhanced to increase grant support for energy efficient technologies by raising the support cap from 50% to 70% of qualifying costs per project. This enhancement lowers barriers for businesses to reduce carbon emissions and energy costs. Singapore also launched the Enterprise Sustainability Programme in 2022 to encourage partnerships between businesses, government entities and industry leaders to better integrate sustainability into business models, grow their capacity to adopt sustainable practices, enhance resource efficiency and reduce carbon emissions. The programme encompasses sustainability courses conducted in partnership with relevant partners such as PwC Singapore and the Singapore Environment Council. SMEs can also apply for the Enterprise Development Grants companies for their sustainability projects upon meeting specific criteria. The Programme also connects SMEs to larger MNCs such as TUV SUD under the Sustainability-as-a-Service Programme to help SMEs analyse their digital gaps, receive training and relevant certifications.

Slated to be ready in early 2023, the Ministry of Transport (MOT) and the Civil Aviation Authority of Singapore (CAAS) are developing a Singapore Sustainable Air Hub Blueprint to incorporate sustainability into the Singapore aviation sector. Leading up to this, Singapore engages businesses such as Airbus to discuss decarbonisation methods and implement energy-efficient systems. For instance, CAAS has agreed to launch a technical feasibility study of an airport hydrogen hub with Airbus to support the creation of future hydrogen-powered aircraft operations. The Green Plan echoes this as it aims for Singapore to become a carbon services hub for all enterprises by 2030 in order to spearhead the development of new sustainability solutions for a more resilient future.

EXPLORING SUSTAINABILITY THROUGH DIGITALISATION

The Singapore government has been exploring the possibility of using digital tools as a gateway into cutting-edge sustainable-tech solutions. In the Green Plan, the government has implemented short-term 5 year targets to cease new registrations of diesel cars and taxis, and has 7 electric vehicle towns with chargers ready by 2025. By 2030, it aims to only have clean energy vehicle models and electric vehicle charging stations country-wide.

The Infocomm Media Development Authority (IMDA) has also launched a Playbook: Digital Tech for Sustainability in Building Management, for businesses to learn about greening buildings through digital technology since buildings contributed to 20% of Singapore's carbon emissions. A self-diagnostic Toolkit for businesses was created for businesses to self-assess their sustainability and technological readiness and gaps to optimise outcomes.

CONSISTENT HUMAN RESOURCE UPSKILLING FOR SUSTAINABILITY

As sectors undergo green transformations, the Singapore government introduced a partnership with Workforce Singapore to explore a Career Conversion Programme that develops sustainability experts and support firms in transitioning affected workers out of "greened" jobs. The Monetary Authority of Singapore (MAS) has set up the Singapore Green Finance Centre in 2020 for worker training and research to acquire relevant knowledge and skills in green financing.

Furthermore in March 2022, Enterprise Singapore has rolled out sustainability courses for businesses that cover trends, risks, opportunities and concepts such as circular economy, and carbon management. These courses are directed at business leaders to raise awareness on sustainability and to also equip them with the tools and resources to assess their company's sustainability progress.

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EUROPEAN NATIONAL BUSINESS GROUPS IN SINGAPORE AND THEIR ENGAGEMENT IN SUSTAINABILITY

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

IN THE BELGIUM LUXEMBOURG CHAMBER OF COMMERCE (BLCC) WE HAVE A WEALTH OF EXPERTISE IN THE AREA OF SUSTAINABILITY AMONG OUR MEMBERS

This year, BLCC introduced a new series of events focusing on climate change in an effort to leverage this expertise and to create a platform for sharing and learning.

At each event, we focus on a specific topic and include different players, who provide diverse perspectives.

The BLCC Climate Change Series zooms in on concrete and recent initiatives that our members have implemented within APAC. We put the emphasis on completed projects and their positive impact on the carbon footprint, rather than future strategies, frameworks and pledges. This approach allows sustainability champions to showcase relevant actions in various industries and across the value chain. It further creates synergies and inspires other business leaders to do their part in mitigating the adverse impact of climate change.

In March 2022, the first event focused on Energy.

Our Belgian Embassy hosted the event, where three member companies shared their experience in their respective sector.

- John Cockerill, famous for building the first Belgian steam locomotive in 1835, has its primary business in metal mechanical engineering. In recent years, the company has been developing energy solutions, like heat recovery steam generators and solar receiver systems. John Cockerill has also become a major player in the field of green hydrogen.
- Solvay is a global science company, whose technologies contribute to safer, cleaner and more sustainable products found in homes, food and consumer goods. Among its applications are water and air purification systems. For its regional factories Solvay invests in solar roof solutions.
- Vyncke, a fourth generation family business, designs and builds steam energy plants to burn biomass and waste into thermal energy and electrical power. The energy is delivered in any combination of steam, hot water, thermal oil, hot gas or electricity, depending on the industrial process.

The second event held in June focused on Finance and was hosted by ING, a global player in sustainable finance.

- ING established sustainability as one of its main strategic pillars. The bank aims to achieve net zero in its own operations and to meet global climate goals through its loans, bonds and derivatives. The structuring of sustainable finance solutions helps reduce the carbon footprint and supports different actors in the value chain in mitigating the effects of Climate Change.
- Engie accelerates the energy transition towards a carbon neutral economy by focusing on energy efficiency and renewable energy. As an electricity generator and supplier, Engie offers businesses and local authorities the necessary instruments to finance, implement and manage energy solutions that increase their clients' energy efficiency and harness energy savings.

As a chamber we are constantly driving new initiatives:

We are continuing to involve ALL our members in promoting awareness for climate change and in sharing best practices. For example, we are conducting a workshop in collaboration with Climate Fresk to raise awareness for the scope and urgency of climate change and enable our members to bring this hands-on workshop to their organisations.

Additional events are planned with a focus on other specific sectors, like textile and retail (eg. Second Love Fashion Show); Transportation & Logistics; Chemicals; Construction & Architecture. Also, to set the example we will strive to improve the carbon footprint of our own events.

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DENMARK, A SMALL COUNTRY THAT KNOWS HOW TO INSPIRE THE WORLD TO EMBRACE SUSTAINABILITY

The Danes have a tiny country and some strange green ideas! As a country, Denmark is a laboratory for green solutions addressing climate challenges worldwide and embracing the circular economy model, thus continuously pushing the boundaries for sustainability.

The green transition in Denmark began with the oil crisis back in the 70s, and decades of development have made Denmark a frontrunner when it comes to wind and solar power.

Today, Denmark is setting the example on the global stage in terms of embracing sustainability in all aspects, being a front runner internationally, and exporting solutions, knowledge, and know-how to help their fellow global citizens propelling their way of living from the old economy towards a viable and sustainable future.

Sustainable development goes hand in hand with economic growth. Over the past four decades, Denmark's economy has grown almost 80%, while energy consumption remains largely unchanged. Consequently, Denmark's booming clean-tech industry brings sustainable growth to benefit the planet and future generations, creating significant wealth for their country.

To the Danes, sustainability is a holistic approach that includes renewable energy, water management, waste recycling, and green transportation, including the bicycling culture.

For decades, Denmark has embraced green cities, sustainable buildings, and energy efficiency, with world leaders such as Rockwool (insulation), Velux (windows), Danfoss (heating applications), and Grundfos (careful use of water). Denmark is also on the front foot in environmental engineering consultancies, with COWI having recently entered Singapore and South East Asia.

Denmark pioneered wind energy back in the late 70'ties (Vestas et al.). In 2008, our oil major (now called Orsted) defined a vision to diversify away from oil and gas and into renewable energy, a strategy that other global oil majors have copied.

Today, 50% of the electricity in Denmark is supplied by wind and solar power; if biomass is introduced into the calculations, Denmark got two-thirds of its electricity covered by renewable energy.

Most recently, the Danish government and a majority of Parliament passed one of the most ambitious acts on reducing greenhouse emissions globally. The Climate Act legally commits future governments to reduce greenhouse emissions by 70 % by 2030 compared to 1990 levels and towards net-zero by 2050.

Another field in which Denmark is setting the course for sustainability is shipping. Maersk Group is the world's largest container shipping company and one of the largest companies in Denmark. Maersk has made it a priority to address the CO2 impact of shipping, which is expected to grow up to 250 percent by 2050 without intervention. Maersk is committed to accelerating the decarbonization of the maritime industry and is a part of the Global Centre for Maritime Decarbonisation located in Singapore.

As Danes in Singapore, the community is proud to share many values with fellow Singaporeans. Both are small nations when it comes to the size of the populations. Still, both countries punch way above their respective weight classes and push the boundaries of what can be achieved as a role model society, inspiring the world to embrace sustainability and the circular economy.

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SUSTAINABLE AND INCLUSIVE ENTREPRENEURSHIP WITHIN THE NETHERLANDS AND GLOBALLY

Committed to the goals of the Paris Climate Agreement and the UN Sustainable Development Goals, the Netherlands strives to become a climate neutral society while maintaining its strong, open, and inclusive economy. Similarly, the Dutch international agenda also focuses on sustainable and inclusive growth worldwide. With its strong track record in sustainable development, corporate social responsibility and public-private cooperation, Dutch companies play a key role in sustainable growth domestically and internationally. In Singapore, they contribute to fighting climate change, creating circular economies, building sustainable agriculture, and sustainable finance.

Water and climate adaptation

With a quarter of the country below sea level, the constant threat of water-related challenges has led the Netherlands to excel in climate adaptation against flooding and polluted water, with water-efficient agriculture, technology, and urban water solutions to future-proof cities. The Dutch companies Deltares and Boskalis for example, work closely together with Singapore in building the Pulau Tekong Polder. Moreover, Royal HaskoningDHV and Hydroinformatics Institute (H2i) has performed site-specific studies along Singapore's City-East Coast, looking into solutions to protect it from the threat of rising sea levels.

Circular economy

The Netherlands aims to become 100% circular by 2050 (and 50% by 2030). To achieve such a transition, especially along global supply chains, international collaboration across the board is essential. Therefore, the Dutch government, companies, knowledge institutes and NGOs work together with partners all over the world to exchange ideas and best practices. Collaboration methods include sharing insights and tools on topics like circular agriculture, water and waste management, chemical recycling, and innovative packaging. Collaboration also includes international initiatives like Holland Circular Hotspot and the PACE (Platform for Accelerating the Circular Economy) Action Hub facilitated by the Dutch Chamber.

Sustainable agriculture

Sustainable agriculture is not only about reducing greenhouse gas emissions; it is instrumental in restoring natural resources and biodiversity to establish a healthy consumer-nature relationship. Over the past few decades, the Netherlands has established an international reputation of a highly innovative agricultural producer. In collaboration with Urban Farming Partners Singapore (UFPSG) a 650 sq m urban farm, about four times more productive than conventional indoor farms, was built to produce 70kg of leafy greens per sq m.

Sustainable finance

Aligned to the Paris Agreement and the UN Sustainable Development Goals, the Dutch Chamber has also agreed to play a part in sustainable finance. Dutch financial institutions such as ING, Rabobank and ASR are leaders in sustainable finance. ING for example has adopted the Terra Approach, steering its lending towards its ambition of a net zero portfolio by 2050.

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THE FRENCH BUSINESS COMMUNITY TOWARDS SUSTAINABLE BUSINESS

The climate situation has never been so urgent and worrying. Acting now and towards a net zero carbon is one of the French Chamber of Commerce in Singapore's priorities.

The French Chamber is determined to take part and engage our business community towards more sustainable business; to find, share, promote solutions and act together to make a tangible change. One of our roles is consequently to encourage businesses to become champions in sustainability through collective commitments and actions.

Last year, FCCS conducted several actions and focused on different sustainability related themes and levers:

- From a government roundtable with Grace Fu, Minister for Sustainability and the Environment focusing on the Singapore Green Plan 2030.
- From a leading company in sustainability with Mr. Olivier Blum, Group Chief Strategy & Sustainability Officer at Schneider Electric.
- Specific dedicated workshops organised for our members on Climate Fresk, how to calculate your carbon footprint, or how to identify an impactful and meaningful 3R (Reduce, Reuse, Recycle) plan and many more.
- The launch of "CEO's Sustainability Series" interviewing leaders on their sustainability journey so far, their challenges, and opportunities.
- Providing sustainability-related information and knowledge through a series of webinars, committee meetings, roundtable sharing sessions and dedicated articles.
- Promoting the expertise of our members and foster collaborations with Singaporean entities.

The French Chamber is a member of Global Compact Network Singapore (United Nations Global Compact) - the leading voice on corporate sustainability.

The French Chamber is delighted to share details of its efforts to review and implement tangible actions:

- Organised sustainability themed events and workshops (+30% sustainable themed events vs last year).
- Conducted a Sustainability Survey to our members in November 2021 which helped the chamber to understand members' current sustainability practices, identify their key drivers, and ensure that the chamber can help meet their future needs towards sustainability.
- Strengthened a dynamic Sustainability & Responsibility Committee and Club in terms of member numbers and thematics.
- Invited CEOs from large Singaporean companies to share more about their sustainability strategy in Singapore and beyond and we have linked them up with our member experts in the field for business opportunities.
- We relay every week in our business news and Weekly Link, the sustainable initiatives of our members showcasing their case studies and actions.

We are looking forward to going further by involving ALL our members in this challenging but essential journey, by providing them with knowledge and connecting them even more with the Singaporean business community to implement the necessary actions for a sustainable future.

As an organisation, FCCS will:

- Pursue sustainability as part of the journey to more than 30% of our events.
- Promote members excellency towards the local ecosystem and accompany French adept companies to implement their activity in Singapore.
- Continue to gather and share best practice from our members and provide sustainability-related resources on our communication channels.
- Analysing and improving the carbon footprint of our events.

Towards Sustainable Business

French Chamber Singapore

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IRISH COMPANIES IMPLEMENTING SUSTAINABILITY ACTION PLANS IN SINGAPORE

The Irish government together with businesses in Ireland are mobilising efforts to achieve the UN Sustainable Development Goals by 2030.

IDA Ireland, the Government agency responsible for attracting FDI, has sustainability as a major component of its corporate strategy and focuses on winning FDI from leading companies across all areas of the Green Economy.

Enterprise Ireland (EI) is the Government agency responsible for developing Irish enterprises globally. EI support innovative Irish companies that are leading the way in providing cutting-edge climate solutions to their industries' biggest challenges. Sustainability is a central pillar of its 2022-2024 strategy, *'Leading in a Changing World'*. In line with Ireland's national Climate Action Plan and the EU Green Deal, EI are committed to helping Irish businesses to reduce emissions by 29-41% before 2030, investing in digitalisation, lean supply chains and continuous innovation.

The Irish Chamber of Commerce Singapore is proud to have corporate members, supported by Enterprise Ireland, that have developed and implemented sustainability action plans:

Kerry

Kerry's vision is to create a world of sustainable nutrition. Their sustainability strategy, 'Beyond the Horizon', supports its ambition to:

- Reach over two billion people with sustainable nutrition solutions by 2030
- Reduce operational emissions by 55% by 2030, reaching net zero before 2050
- Reduce supply chain emission intensity by 30% by 2030
- Halving food waste by 2030 and diverting all waste from landfill

More than 80% of Kerry's portfolio delivers balanced positive nutrition to one billion consumers globally. Kerry works closely with its customers regionally, through its Singapore innovation centre, to create products that advance their Sustainable Nutrition vision. Kerry is proud to support the local community through its MyCommunity initiative, which empowers employees to volunteer with locally-led initiatives that support nutrition and health.

Kingspan

Carbon reduction is at the heart of the products Kingspan makes for the building industry with its advanced insulation, generating significant energy savings. *'Planet Passionate'* is Kingspan's 2030 global sustainability programme targeting:

- 0% company waste to landfill
- 100% Net Zero Carbon Manufacturing
- 20% On-site generation of renewable energy

Kingspan's certified products are supplied to vital infrastructure sectors in Singapore such as cold chain and data centres, directly contributing to Singapore's Green Plan 2030 targets.

PM Group

PM Group is an employee-owned Irish company, with 3,500 employees across 17 global offices, managing the design, construction and commissioning of high-tech facilities for leading pharmaceutical, food and medical technology organisations. With over 30 certified sustainability experts across their operations, they support the delivery of sustainable design solutions, and have completed significant award-winning green building designs across sectors.

Cure Concepts

CURE's Nua Irish Cuisine, highlights Owner Andrew Walsh's Irish heritage and showcases sustainability with minimisation of food waste in his creations through employing a root-to-steam philosophy. CURE sources only from Irish producers, suppliers and artisans that have received a Gold Standard certification from Origin Green, Ireland's national sustainability programme for food and drink.

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ITALY, PRIORITISING ECO-INNOVATION AND CIRCULAR ECONOMY

According to the 2021 Eco-Innovation Index, Italy ranks 10th in its eco-innovation performance across the EU Member States. The overall good performance of the country on eco-innovation reflects the efforts made to develop and implement policies dedicated to circular economy and new business approaches which promote sustainability throughout the entire life cycle of products. Circular economy and eco-innovation developments in Italy largely relate to eco-labelling, waste management, bioeconomy and green industry.

Currently, Italy has one of the highest levels of eco-labels and EMAS in the EU. Certification under the European Union's (EU) Eco-management and Audit Scheme (EMAS) increases the environmental performance of a company, while improving its 'green' image with transparent and validated reporting. According to the 2019 Report on circular economy in Italy, the country ranked first on waste management performance. Italy is also a leader in bioeconomy, especially in the food and beverage sector.

The country is also witnessing increasing digitalisation of the economy, thereby leading to the creation of modern business value propositions for Italian industries and new opportunities for the green and circular economy.

In 2017, The Italian Ministry of Economic Development launched the Industria 4.0 National Plan (I4.0), seeking to encourage and attract foreign and domestic investment, particularly from SMEs, towards industrial sectors and raise funding for companies investing in research and development with a focus on smart machinery. Since then, opportunities have been seized, with the number of greenfield investment sites established by foreign direct investment reaching 222 in 2021, up from 170 in 2020r, and achieving $6,951 million in value.

Italy is committed to raising the share of renewable energy to 30 per cent of the national gross final energy use and to steadily reducing overall energy consumption by 2030.

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A NORWEGIAN FOCUS ON GREEN MARITIME AND OFFSHORE RENEWABLES

Norway has a strong sustainability focus. This year, Norwegian export reform has green maritime and offshore renewables as its two top priority areas. The strong Norwegian maritime industry in Singapore is innovative and leading in the industry's efforts to become greener. Some of the leading companies are DNV, Kongsberg, Thome and Wilhelmsen. The latter companies' innovative work and collaborative approach to additive manufacturing (3D-printing) is a prominent example. Outside shipping, the energy sector's transformation from Oil and Gas to renewables, illustrated, for instance, by Equinors investment in offshore wind, is essential.

Members of the NBAS have been rolling out their sustainability initiatives in recent years in Singapore. In 2022, ship-owner Odfjell has already met the decarbonization goals set by the International Maritime Organization for 2030 with a combination of fleet renewal, operational improvements, and technical improvements. As a role model for the "action over talk" approach, Odfjell openly shares its pathway to net zero with its competitors. Yara is at the forefront of developing green ammonia as a basis for a greener bunker fuel. Yinson Green Technologies intends to deploy and commercialize a fully electric cargo vessel for the Port of Singapore. TECO 2030 has a scheme for developing and testing onboard carbon capture solutions for the shipping industry. Within the circular economy, Tomra, the world's leading company for automated reverse vending machines for recycling beverage containers, has started up in Singapore, cooperating closely with the National Environment Agency.

NBAS shares the visions in The Singapore Green Plan 2030. Singapore and Norway are innovation partners and work closely on G2G and B2B levels. Since 2020 NBAS, The Norwegian Embassy, and Innovation Norway have hosted the annual Singapore Norway Innovation Conference (SNIC), stimulating innovation within the green shift. The conference has been hosted with its close partners, Maritime and Port Authority of Singapore and Enterprise Singapore. NBAS and its members continuously seek to find and develop new green solutions. For instance, venture companies and incubators Antler, Cocoon, and Investigate foster entrepreneurs, to a large degree, focusing on delivering greener solutions across sectors.

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FOSTERING COLLABORATION BETWEEN GERMAN AND SINGAPOREAN BUSINESSES TO FURTHER "GREEN THE ECONOMY IN SINGAPORE"

In Germany and Singapore, climate change and environmental protection have high priority. Both countries have enjoyed long and extensive cooperation in trade and share common interest in sustainable development. Realizing this, the Singaporean-German Chamber of Industry and Commerce (SGC) stepped up and took on the role as a facilitator of collaboration for sustainability.

Mr. Jens Ruebbert, President SGC handing over the Gruen book to Minister Grace Fu, Minister for Sustainability and the Environment.

PRAS Launch with Minister Grace Fu, Minister for Sustainability and the Environment, at SEAS Academy

PRAS aims to assist with establishing communication channels between Singapore and other regions like Europe (especially Germany) to share knowledge on regulations, processes, expertise, and other aspects of plastics recycling. PRAS is establishing a Plastics Recycling Centre of Excellence (PRCOE) in Singapore with operational expertise, technical know-how about plastic recycling as well as to create benefits and opportunities for local SMEs and the workforce.

Not stopping at this initiative, the SGC, has also embarked on several efforts to promote environmental causes in the past year, including hosting business delegations in the areas of Energy Efficiency and participating in the Germany Singapore Business Forum (GSBF) Connect 2021 focusing particularly on the topic of plastic waste.

SGC's latest publication on the topic of sustainability that was released in 2021 addressed the Singapore Green Plan 2030. It outlines the opportunities available to German businesses who bring cutting-edge technologies in the areas of Recycling, Energy Efficiency, Water and Wastewater Management, Smart and E-Mobility. Furthermore, the publication highlights the work and efforts of various SGC member companies that are specialists in each target sector of the Plan. It additionally lists the services that the SGC offers to German companies looking to enter the Singapore market.

German Energy Efficiency Delegation with Symposium Speakers

AHK Singaporean-German Chamber of Industry and Commerce
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TOWARDS A MORE SUSTAINABLE SPANISH ECONOMY

In 2021, Spain ranked 20th out of 193 countries in terms of implementation of the Sustainable Development Goals (SDG) set by the United Nations in its 2030 agenda.

In Spain, the best performers are SDG 1 (zero poverty), SDG 3 (health and well-being) and SDG 4 (quality education). In addition, thanks to its efforts to promote renewable energies and access and management of drinking water and sanitation, Spain stands out in SDG 6 (water and sanitation) and SDG 7 (affordable and clean energy).

There are undeniable similarities between Spain and Singapore, in their approach to achieving the SGD, such as their strong investment in greener energies and their measures for a more sustainable economy. Moreover, Spanish companies that contribute to the improvement of sustainability are present in Singapore or have carried out important projects of this type in the country.

Firstly, regarding renewable energies, Spain was the first country in the EU in adapting national plans to combat climate change. In 2021, Spain ranks ninth in photovoltaic capacity and large solar panel projects will be completed in the near future. Due to its natural traits, 20% of global investment in hydrogen will take place in Spain. Overseas, Spanish leading companies such as IBERDROLA and ACCIONA are making a change in Singapore.

Secondly, one of Spain's government plans aims to accelerate the transition towards a more efficient and sustainable production system in all productive sectors, as well as to consumption and waste management. Some leading companies are not only providing solutions for Spain but also for Singapore. In this regard, the Spanish company CONTENUR supplies waste containers to Singapore. Furthermore, one of the main Spanish companies in the water treatment sector, TEDAGUA, will play a significant role in the construction for Singapore's Tuas Desalination Plant 3. COSENTINO, leading company in architectural surfaces, with 10 years presence in Singapore, has the largest photovoltaic plant for self-consumption in Europe and produces his architectural surfaces with 99% recycle water.

Thirdly, in order to respond to the new sustainable and connected mobility, Spain is making big efforts in the development of the electric vehicle. As a result, world leading companies have emerged and are even present in Singapore. In particular, WALLBOX which supplies smart charging systems for electric vehicles.

Fourthly, the drive for a more sustainable economy also affects the agri-food sector. The Spanish government's objective is to promote the integrated development of the entire agri-food chain through the digitalisation of processes and the incorporation of knowledge and innovation. According to data from the Research Institute of Organic, Spain ranks fourth in the world and first in the EU with the largest amount of organic agricultural surface area.

Finally, according to the World Economic Forum, Spain is considered the world leader in competitiveness for the third consecutive year. In order to further improve its efforts in this area, it has launched a Sustainable Tourism Strategy for 2030.

In conclusion, it is important to stress Spain's role as one of the leading economies in the European Union in terms of sustainability.

Regarding Singapore and Spain, both countries share similar goals and similar ways to achieve them. In this regard, they both have strong companies that play a key role in achieving those roles, with several Spanish firms contributing to the Singaporean effort towards a more sustainable economy.

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THE SWEDISH COMPANY HEXAGON ACCELERATES THE WORLD'S TRANSITION TO SUSTAINABILITY

Sustainability thinking permeates both consumers' attitudes and the Swedish business community and has for many years been an important competitive advantage for Swedish companies globally. Sweden leads the way in showing that it is possible to combine economic growth with sustainability, e.g. by promoting innovation and new clean and environmentally friendly technology. SwedCham Singapore supports the sustainability agenda of its members in every way. At the heart of the organisation, its aim is to, through member companies and in collaboration with local stakeholders, be at the forefront of supporting Singapore in its implementation of the SG Green Plan 2030 in the coming years. Sweden's fleet of large corporates, SMEs, scale-ups and start-ups help build a better future, both in Singapore and the region. Below is a case study of one Swedish company which has decided to make sustainability the key to future growth.

For over 20 years, Hexagon has been helping businesses become more sustainable by increasing efficiency, reducing emissions, supporting safety, and strengthening preparedness. By leveraging its broad product portfolio and competencies, Hexagon generates sustainable value in almost all industries and regions worldwide. In addition, Hexagon addresses environmental and human rights issues throughout its entire value chain. As the production of Hexagon is formed of software development and assembly of components, its greatest sustainability impact lies within its supply chain and the customer use of its products.

In its quest to uphold the high standards of environmental sustainability processes, Hexagon supports activities that aim to reduce its environmental footprint, better meet customer requests, attract and retain talent, generate savings, mitigate environmental risks, and fuel innovation. Hexagon's holistic approach to sustainability also includes its environmental, social and governance impacts (ESG) in the whole value chain.

In addition, Hexagon has been working closely with customers helping them build more sustainable businesses. Some case studies for reference:

R-evolution accelerating the sustainability transition

Hexagon launched the strategic business venture R-evolution in 2021. Within this venture, the company is running profit-driven investments in green tech projects, by applying Hexagon and partner technologies on business opportunities. R-evolution aims to increase efficiency and profitability of each initiative to enable technical blueprints for greater impact and scale globally.

Protecting coastal blue carbon ecosystems

In collaboration with Beneath The Waves – a leading, global non-profit organisation dedicated to protecting marine environments – R-evolution is leveraging Hexagon's airborne bathymetric LiDAR technologies. In just a few days, the solution can accurately map thousands of square kilometres of seabed habitat up to a depth of 30 metres.

Precise positioning for lower emissions and decreased use of chemicals in agriculture

SwarmFarm Robotics, a developer of autonomous agriculture robots, is using precise positioning and autonomous mobility technology from Hexagon Autonomy & Positioning for navigation of their robots. Over the past 3 years, the robots have farmed over 274,000 hectares, resulting in 431,000 fewer litres of herbicide being applied.

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INGRAINED SWISS SUSTAINABILITY CULTURE

Beyond Switzerland's CO2-free domestic power supply, the nation's robust and innovative cleantech sector continues to produce impressive climate start ups; such as ARVE Swiss, Energy Vault, South Pole , Climeworks. These two factors provide a strong foundation for the nation to achieve net-zero targets. Thus, in 2021, the Swiss Federal Council adopted the 2030 Sustainable Development Strategy with the 2021-2023 Action Plan outlining how stakeholders of civil society can be drivers of sustainable development. Through the "Long-Term Climate Strategy", which outlines up to 2050 the strategic development goals for multiple sectors, Switzerland pledges to reduce greenhouse gas emissions to half of the 1990's level by 2030, and achieve net zero by 2050.

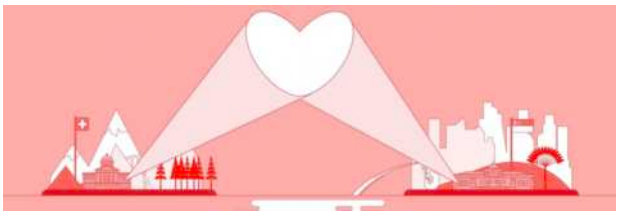
The Swiss are also proud of their pristine nature that represents Switzerland's tourism. To preserve this for many generations to come, the Swiss Tourism Board launched the label "Swissstainable" (DE / FR) back in 2021 to encourage sustainable tourism. This will help guests identify environmentally friendly destinations and transportation methods.

Swiss companies in Singapore driving positive impact on the planet

- SwissPro - is a leading local market player in premium drinking water systems for both businesses and homes. This contributes to the elimination of single-use drinking bottles.

- +Pavillon - is a public, modular installation developed in collaboration with Affordable Abodes, Deloitte Centre for the Edge, EHL Campus (Singapore), Häring Timber Technology, Hilti, and Studio SKLIM. Featuring eco-friendly materials such as Glued-laminated Timber (Glulam), Kenaf plant biocomposite and boards made of recycled coffee, +Pavillion proves architecture can be sustainable and integrated within a circular economy. The installation was unveiled by the Swiss Embassy and will be at the Marina Barrage until the end of July 2022 before moving to the EHL Campus (Singapore) for permanent display.

- SGProtein - is a Singapore-based contract manufacturer for plant-based meat and seafood. SGProtein meets the demand of flexitarian diets for alternative protein sources by producing the latest generation of meat analogues, using the latest high-moisture extrusion technology from Buhler Group. SGProtein handles production and delivery, removing the need for substantial investment in local infrastructure. Thus enabling businesses regardless of size to focus on innovation and marketing. SGProtein believes that innovation can only grow with the right infrastructure.



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- Solar Impulse Foundation - Bertrand Piccard and the Solar Impulse Foundation have identified 1000+ solutions that tackle climate change profitably. Their "Guide to Solutions" provide roadmaps for politicians and businessmen to adopt more ambitious carbon neutrality goals

- SWISS Airlines - had pledged to reach carbon neutrality in 2050. To do so, they are pioneering sustainable aviation fuel for corporate customers, expanded intermodality with the Swiss Federal Railways, as well as investing in more efficient aircraft technology.

SwissCham leads the way with their Climate Tech Subcommittee

In 2022, the SwissCham launched their Climate Tech Subcommittee to provide Swiss companies a platform to showcase their regional work while fostering collaboration between MNCs and SMEs. The committee seeks to inspire new initiatives, disseminate ideas and experiences utilising tech to fight climate change, and raise awareness on the business potential in Climate Tech. The group thus far has attracted interest from a wide range of industries and is committed to collaborate on concrete climate tech projects.

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SUSTAINABLE INNOVATION:

UNLOCKING OPPORTUNITIES TO MEET CHANGING CONSUMER PREFERENCES

EUROCHAM POSITION PAPER 2022–2023

Deloitte.

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

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1. INTRODUCTION

Climate change is a pressing issue and many of us have already experienced its adverse effects first-hand. A 2022 survey by Deloitte covering 23 countries and 23,000 people found that nearly half of all respondents (49%) had experienced a climate-related event – drought, wildfire, extreme heat, severe storms etc. – in the past six months[1]. The impact is not only felt on the individual level but also on the corporate level. A second 2022 survey by Deloitte of more than 2,000 C-suite executives across the world found that 97% companies had already experienced negative effects from climate change. For the business community, the risks are real – be it from acute physical risks such as increased severity of extreme weather events leading to disrupted supply chains or damaged assets – to transitional risks such as failure to keep up with the changing regulatory, technological, or market landscapes. Recent research by the Deloitte Economics Institute modelled data from 15 geographies worldwide and estimated that the potential negative impact on the global economy could reach as high as US$ 178 trillion by 2071 if we are unable to prevent global temperatures from rising 3°C by the end of the century[2].

More and more companies are taking action to support the transition to a low-carbon economy and gain a competitive advantage by adapting to the changing business environment. For these companies, the potential opportunities are tremendous. By aligning corporate strategy with a low-carbon future, companies not only mitigate risks, but also position themselves to unlock new market opportunities.

In this paper, we explore one of these opportunities, namely changing consumer preferences as a result of growing awareness of climate-related issues. We explore how innovation through the lens of sustainability can help companies meet these changing demands and unlock opportunities while also supporting the transition to a low-carbon economy. We review the history of global

1 *Irena Pichola & Derek M. Pankratz, "The world is ready for climate action," Deloitte, September 2021, https://www2.deloitte.com/global/en/pages/public-sector/articles/the-world-is-ready-for-climate-action.html*
2 *Jennifer Steinmann & Prof. Dr. Bernhard Lorentz, "The Turning Point: A Global Summary" Deloitte, May 2022, https://www2.deloitte.com/content/dam/Deloitte/global/Documents/gx-global-turning-point-report.pdf*

efforts to combat climate change and the corresponding impact on the corporate sector. We also discuss the state of play today and provide recommendations for what companies can do to realise climate-related opportunities by innovating its products and services through the lens of sustainability. Lastly, we explore some of the cultural and geographical differences that multinational corporations should consider in regard to consumer preferences and awareness of climate-related issues.

1.1 METHODOLOGY

In the corporate context, *sustainability* is constantly evolving and covers topics relating to environmental, social, and governance (ESG) issues. In this paper, we will primarily focus on the 'environmental'-dimension of ESG to explore how companies can build a competitive advantage by adapting to changing consumer preferences while supporting the goals of the Paris Agreement to limit global warming from exceeding 1.5°C as compared to pre-industrial levels.

This paper is based on desktop research, internal analysis, as well as interviews with members of the European Chamber of Commerce, Singapore.

2. A HISTORY OF CLIMATE AMBITIONS

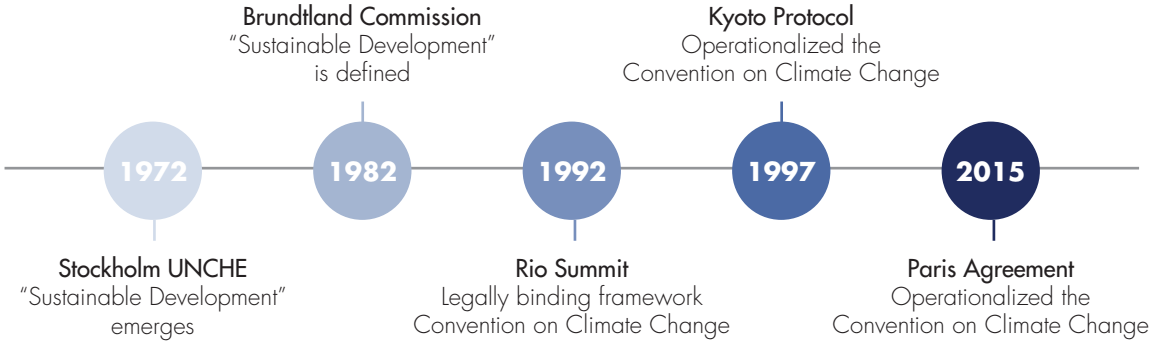

Figure 1: Key milestones in the global effort to combat adverse impacts of climate change.

To understand the current state of play with regard to corporate climate action, we must first understand some of the key milestones that led us here.

Although it may not seem like it, the global fight to combat climate change is not a recent one. The scientific literature on corporate environmental, social, and governance issues (ESG) goes back to the early 1900's, but Howard Bowen is by many considered the father of modern corporate responsibility, following his 1953 publication 'Social responsibility of the businessman', in which he coined the term 'Corporate Social Responsibility', or CSR. Bowen argued that the business community had an obligation to pursue policies and decisions that not only focused on maximisation of profits, but also considered the objectives and values of our broader society[3].

A decade later, in 1962, Rachel Carson published 'Silent Spring', a scientific book documenting the environmental harm caused by indiscriminate use of pesticides in the United States[4]. The book ignited widespread public concern in the United States and started a public revolution in environmental awareness that spread across the world. Silent Spring is considered by many the launching point for today's environmental movement and public awareness of environmental issues.

On the global political stage, climate action has been on the agenda for five decades. The 1972 United Nations Conference on the Environment in Stockholm became the first world conference to make the environment a major issue. At the conference, the participants placed environmental issues at the forefront of international concerns and marked the start of a dialogue between industrialised and developing countries on the link between economic growth, the pollution of the air, water, and oceans that is still continuing today[5].

3 *Howard R. Bowen, "Social Responsibility of the Businessman", 2nd ed. (Iowa City: University of Iowa Press, 2013)*
4 *Cate Lineberry, "How Rachel Carson's 'Silent Spring' Awakened the World to Environmental Peril" History, April 2022, https://www.history.com/news/rachel-carson-silent-spring-impact-environmental-movement*
5 *United Nations, "Conference on the Human Environment" United Nation, June 1972, https://www.un.org/en/conferences/environment/stockholm1972#:~:text=The%20Stockholm%20Declaration%2C%20which%20contained,and%20the%20well%2Dbeing%20of*

Another important milestone occurred in 1982 when the Brundtland Commission coined the term 'sustainable development' as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'[6]. This definition was widely adopted and provided a global common language for approaching the concept of sustainability. For the corporate sector, this was also an important definition for understanding the sustainability of its operations, products, and services.

Another decade went past, until the UN Rio Summit, also known as the Earth Summit, was hosted in 1992. The summit marked an important milestone for sustainability as it was where the United Nations Framework Convention on Climate Change was passed, a legally binding framework on climate change. The ultimate objective of the Convention was to stabilise greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system"[7].

A few years later, in 1997, the Kyoto Protocol was adopted, which operationalised the United Nations Framework Convention on Climate Change by committing industrialised countries and economies to limit and reduce greenhouse gas emissions in accordance with agreed individual targets[8]. However, the protocol lacked binding commitments, accountability, and responsibility.

Then, in 2015, the Paris Agreement was adopted by 196 UN members at COP 21 in Paris. The Paris Agreement is a legally binding international treaty on climate change and its goal is to limit global warming to well below 2°C and pursuing efforts to limit it to 1.5°C, as compared to pre-industrial levels[9]. Member countries submit Nationally Determined Contributions, or NDC's, that communicate the actions they will take to reduce greenhouse gas emissions in order to reach the goals of the Paris Agreement. The adoption of the Paris Agreement has spurred much of the climate-action and momentum we are seeing from regulators, investors, and corporates today.

3. STATE OF PLAY

3.1 FALLING BEHIND

Despite five decades of global climate ambitions and an increasing momentum in recent years, the latest report published by the Intergovernmental Panel on Climate Change (IPCC) in 2022 shows that we are no longer running out of time – time's up[10]. At its current trajectory, the global temperature rise is expected to surpass the 1.5°C target - considered the upper limit to avoid the worst fallout from climate change. This, despite the nationally-determined contributions committed by the 196 signatories of the Paris Agreement. We must take collective and drastic action now to reduce atmospheric emissions from anthropogenic activities if we are to avoid the most catastrophic impacts of climate change and meet the goals of the Paris Agreement. While there is a strong emphasis and awareness of climate action in all domains of our society – from the public, to regulators, to capital markets, and corporates – we must pivot from awareness to action.

According to the 2022 Global Risk Report published by the World Economic Forum, environmental risks including "climate action failure", "extreme weather", and "biodiversity loss", were ranked as the top three most severe risks on a global scale over the next ten years[11].

This is supported by recent research by the Deloitte Economics Institute, which modelled region-level data from 15 geographies across Asia Pacific, Europe, and the Americas, to estimate the potential impact on the global economy if climate change goes un-

6 *United Nations, "Report of the World Commission on Environment and Development: Our Common Future" United Nation, May 1986, https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf*
7 *United Nations, "Conference on Environment and Development, Rio de Janeiro, Brazil" United Nation, June 1992, https://www.un.org/en/conferences/environment/rio1992*
8 *United Nation Climate Change, "What is the Kyoto Protocol?" UNFCCC, December 1997, https://unfccc.int/kyoto_protocol*
9 *United Nation Climate Change, "The Paris Agreement – What is the Paris Agreement?" UNFCCC, December 2015 https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement*
10 *IPCC, "IPCC Sixth Assessment Report – Impact, Adaptation and Vulnerability" IPCC, February 28 https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FullReport.pdf*
11 *Emilio Granados Franco, Melinda Kuritzky & Saadia Zahidi, "The Global Risk Report 2022 – 17th Edition" World Economic Forum, 2022, https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf*

checked. The results showed a potential negative impact on the global economy as high as US$ 178 trillion between 2021-2071. Of all regions, the Asia Pacific economy was expected to be the most vulnerable and adversely impacted by climate change. The human costs would be far greater: a lack of food and water, loss of jobs, worsening health and well-being, and reduced standard of living[12].

If, on the other hand, the world acts now to rapidly achieve net-zero emissions by mid-century, the transformation of the economy could set the world up for strong economic growth, according to the same analysis. Such a transformation could increase the size of the world economy by as much as US$ 43 trillion in net present value by 2070.

The corporate sector is a significant contributor to our warming planet with one study suggesting that a mere 100 companies are responsible for 71% of all industrial greenhouse gas emissions since 1988[13]. The private sector therefore plays a crucial role in achieving the increasingly difficult task of limiting global warming to avoid the most catastrophic impacts of climate change.

3.2 THE GOOD NEWS - THERE ARE SUBSTANTIAL CLIMATE-RELATED OPPORTUNITIES FOR COMPANIES WHICH TAKE ACTION

While climate change poses daunting challenges and risks, there are also tremendous opportunities presented to the private sector relating to climate action.

Resource efficiency, resilience, expanding markets for low carbon products and services, new technologies, public sector incentives, and ability to raise capital are just some of the climate-related opportunities companies are starting to capitalise on. Recent research by CDP, a global corporate environmental disclosure platform, analysed the environmental disclosures by nearly 4,000 companies in Asia Pacific in 2021, representing 14% of global market capitalisation[14]. The research found that more than half of companies (55%) had already identified climate-related opportunities with the potential to have a significant strategic or financial impact on their business. The majority of reported opportunities were related to products and services, such as development and/or expansion of low emissions goods and services, as well as development of new products or services through R&D. This finding is supported by more than 2,000 C-suite executives surveyed by Deloitte in 2022, who quoted the top benefits from their sustainability efforts as being enhanced brand recognition and reputation, followed by customer satisfaction (e.g., meeting customer expectations)[15].

Changing consumer preferences are driving climate-related market opportunities, and companies which are not already doing so, should take action to unlock these opportunities, strengthen their competitive advantage, and avoid falling behind the curve.

4. INNOVATING THROUGH THE LENS OF SUSTAINABILITY TO MEET CHANGING CONSUMER PREFERENCES

In the following section, we explore how consumer preferences are changing with regard to climate-related issues and sustainability, and steps companies can take to create opportunities from these changes while improving environmental performance.

A 2022 survey by Deloitte examining consumer attitudes and behaviours around sustainability found that consumers are increasingly making conscious decisions with sustainability and the environment in mind[16]. The survey found that 38% of respondents reported having paid extra for more durable and longer-lasting products. This is supported by a 2020 study by the Capgemini Research Institute,

12 *Irena Pichola & Derek M. Pankratz, "The world is ready for climate action" Deloitte, September 2021, https://www2.deloitte.com/global/en/pages/public-sector/articles/the-world-is-ready-for-climate-action.html*
13 *Dr. Paul Griffin, "The Carbon Majors Database – CDP Carbon Majors Report 2017" CDP, July 2017, https://cdn.cdp.net/cdp-production/cms/reports/documents/000/002/327/original/Carbon-Majors-Report-2017.pdf?1501833772*
14 *CDP, "Rising to the Challenge: How companies in Asia Pacific are Preparing for the Net-Zero Economy" CDP, March 2022, https://cdn.cdp.net/cdp-production/cms/reports/documents/000/006/179/original/How_companies_in_Asia_Pacific_are_preparing_for_the_net-zero_economy_EN.pdf?1650445441, 2022*
15 *Jennifer Steinmann & Derek Pankratz, "Deloitte 2022 CxO Sustainability Report – The disconnect between ambition and impact" Deloitte, 2022 https://www2.deloitte.com/content/dam/Deloitte/global/Documents/2022-deloitte-global-cxo-sustainability-report.pdf*
16 *Tim Archer, Emily Cromwell & Céline Fenech, "How consumers are embracing sustainability – Adoption of sustainable lifestyles is on the rise, but consumers need more help" Deloitte, 2022, https://www2.deloitte.com/uk/en/pages/consumer-business/articles/sustainable-consumer.html,*

which surveyed over 7,500 consumers worldwide and found that 79% of respondents signalled changing consumer preferences based on sustainability. 42% of the respondents reported having already changed their purchasing behaviour based on sustainability, and an additional 37% were planning to do so[17].

4.1 WHY ARE CONSUMER PREFERENCES CHANGING?

4.1.1 Increased awareness

Global research by Pew Research Center in 2019 showed that concerns about climate change have risen significantly in many countries over the past few years. It found that respondents across 23 countries who considered climate change to be a major threat had increased from 56% in 2013 to 67% in 2019[18]. Further research in 2021 found that 72% of respondents across 17 countries expressed concern that they would be personally harmed by climate change in their lifetimes[19].

This stark new reality is driving more and more consumers to take action and make more conscious purchasing decisions. A 2021 survey by the European Commission found that 96% of Europeans have taken at least one action to tackle climate change, including reconsidering their purchasing decisions[20]. For example, nearly half (42%) of the surveyed respondents listed lower energy consumption as an important factor when buying a new household appliance (e.g., washing machine or TV), and a third of respondents reported buying and eating more organic food (32%), as well as buying and eating less meat (31%). Findings like these suggest that the changing consumer behaviour is widespread and likely to be felt across all sectors and industries.

4.1.2 Covid-19 Pandemic

While consumer awareness of climate-related issues has been growing steadily for years, the Covid-19 pandemic accelerated its pace. The past few years have shown the interdependency of human and natural systems, how fragile they can be, and how rapidly risks can emerge and evolve.

Among 7,500 consumers surveyed worldwide, 67% reported that they would be more cautious about the scarcity of natural resources due to the COVID-19 crisis, and 65% indicated that they would be more mindful about the impact of their overall consumption in the "new normal"[21]. This is supported by a 2021 study by the IBM Institute for Business Value (IBV), which found that nearly all (93%) of 14,000 global consumers reported that the pandemic had influenced their views on sustainability[22]. Most respondents now considered sustainability to be very, or extremely, important. A continuation of this trend was indicated in a similar survey conducted by IBV in 2022, where more than half (51%) of 16,000 global consumers reported that environmental sustainability was more important to them today than it was 12 months ago[23]. The study also found that consumers' actions are increasingly starting to match their intent.

The Covid-19 pandemic has had devastating impacts on all aspects of our societies – the business community included. The World Bank estimated that one in every four companies globally saw their sales drop by as much as 50% between October 2020 and January 2021[24].

The dramatic impacts of the Covid-19 pandemic on business and consumer behaviour may present a silver lining for companies around the world to "build back better" and adapt their products and services to be more sustainable and align with changing consumer preferences. Creating new products or services or adapting existing ones to be more environmentally friendly makes sound business sense: It can help retain and attract new customers and employees alike; reduce material costs and increase efficiency across the value chain; as well as mitigating risks such as increased stakeholder concern, reputational damage, or increased costs of raw materials.

17 *Kees Jacobs, et. al, "Consumer Products and Retail – How Sustainability is Fundamentally Changing Consumer Preferences" Capgemini Research Institute, 2022, https://www.capgemini.com/wp-content/uploads/2021/02/20-06_9880_Sustainability-in-CPR_Final_Web-1-2.pdf*
18 *Moira Fagan & Christine Huang. "A look at how people around the world view climate change" Pew Research Centre, April 2019, https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/*
19 *James Bell, Jacob Poushter, Moira Fagan & Christine Huang, "In Response to Climate Change, Citizens in Advanced Economies are Willing to Alter How They Live and Work" Pew Research Centre, September 2021, https://www.pewresearch.org/global/2021/09/14/in-response-to-climate-change-citizens-in-advanced-economies-are-willing-to-alter-how-they-live-and-work/*
20 *European Commission, "Citizen Support for Climate Action" European Commission, 2021, https://ec.europa.eu/clima/citizens/citizen-support-climate-action_en*
21 *Kees Jacobs, et. al., "Consumer Products and Retail – How Sustainability is Fundamentally Changing Consumer Preferences" Capgemini Research Institute, 2020, https://www.capgemini.com/wp-content/uploads/2021/02/20-06_9880_Sustainability-in-CPR_Final_Web-1-2.pdf*
22 *IBM Institute for Business Value, "Sustainability at a turning point – Consumers are pushing companies to pivot" IBMIBV, May 2021, https://www.ibm.com/downloads/cas/WVJ7LVP4*
23 *Jane Cheung, et. al., "Balancing sustainability and profitability" IBMIBV, April 2022, https://www.ibm.com/downloads/cas/5NGR8ZW2*
24 *The World Bank, "Tracking an Unprecedented Year for Businesses, Everywhere" The World Bank, February 2021, https://www.worldbank.org/en/news/feature/2021/02/17/tracking-an-unprecedented-year-for-businesses-everywhere*

4.1.3 Increased transparency

Companies are facing increased scrutiny of their ESG performance and there is nowhere to hide in the digital age. In the past, companies created products for consumers who often had little to no knowledge of how the business operated or how its products were manufactured. Today, companies are expected to disclose their ESG impact and performance to a wide range of stakeholders - from customers and local communities to employees and interest groups.

However, the most significant driving forces in recent years for environmental transparency come from regulators and investors who are increasingly integrating ESG factors and assessments into their investment decision making. Recent research by Deloitte found that, at their current growth rate, ESG-mandated assets are on track to represent half of all professionally managed assets globally by 2024[25]. Governments and regulators around the world have mandated ESG disclosures through channels such as annual sustainability reports, and additional mandates on climate-related financial disclosures are also becoming increasingly normal. For example, in 2022 the Singapore Stock Exchange, who already require its listed companies to produce annual sustainability report, initiated a 3-year phased approach to introduce additional mandated climate-related disclosures based on the Task force on Climate-related Financial Disclosures (TCFD)[26]. Combined, these driving forces have led to high expectations and demand for comprehensive disclosures and transparency, especially from publicly listed companies, on environmental, social, and governance issues.

4.1.4 Changing demographics

As we have seen, consumers are increasingly prioritising sustainability-factors in their purchasing behaviour and are willing to pay more for 'green products'. The changing global demographics is a key reason for this.

There are currently four consumption cohorts, or generations, active in today's consumer culture[27]:

- Baby Boomers (born 1946-1964)
- Generation X (born 1965-1981)
- Generation Y, or Millennials (born 1982-1997)
- Generation Z (born 1998 – present day)

As millennials and generation Z entered the consumer culture, a noticeable increased preference toward sustainable products and services emerged. Deloitte's global 2019 Millennial Survey found that 42% of millennials reported having purchased a company's products or services due to its perceived positive impact on society or the environment[28]. Furthermore, according to the latest Global 2022 Gen Z and Millennial Survey by Deloitte, protecting the environment remains a top priority for the younger demographics. About three quarters of respondents believed the world is at a tipping point in responding to climate change, but less than half are optimistic that efforts to protect the planet will be successful. Despite this pessimistic view, the vast majority of generation Z and millennials (90%) are making at least some effort to reduce their own impact on the environment, and many are willing to pay more to make sustainable choices. According to the survey, 64% of generation Z reported that they would pay more for an environmentally sustainable product[29].

The rise of the millennial and generation Z cohorts are being felt differently across the world, something multinational companies must consider when adapting its products and services to meet changing consumer preferences. According to the World Economic Forum, 1.8 billion people, or 23% of the global population, are now from the millennial cohort. The Asia Pacific region is unmatched when it comes to millennials, with 46% residing in the region. This is more than double as compared to Europe, where millennials make up only 20% of the population[30]. According to the Asian Development Bank, millennials and generation Z are

25 *Tania Lynn Taylor & Sean Collins, "Ingraining sustainability in the next era of ESG investing" Deloitte, April 2022, https://www2.deloitte.com/us/en/insights/industry/financial-services/esg-investing-and-sustainability.html*
26 *SGX, "Sustainability Reporting" SGX, 2022, https://www.sgx.com/regulation/sustainability-reporting*
27 *Adrea Niosi, "Introduction to Consumer Behaviour" BCcampus, 2021, 251, https://opentextbc.ca/introconsumerbehaviour*
28 *Michele Parmelee, "A generation disrupted" Deloitte, May 2019, https://www2.deloitte.com/us/en/insights/topics/talent/deloitte-millennial-survey-2019.html*
29 *Deloitte, "The Deloitte Global 2022 Gen Z and Millennial Survey" Deloitte, 2022, https://www2.deloitte.com/content/dam/Deloitte/global/Documents/deloitte-2022-genz-millennial-survey.pdf*
30 *Dorothy Neufeld, "There are 1.8 billion millennials on earth. Here's where they live" World Economic Forum, November 2021, https://www.weforum.org/agenda/2021/11/millennials-world-regional-breakdown/*

projected to make up as much as 75% of the Association of Southeast Asian Nations (ASEAN) consumers by 2030[31]. The same report also estimates that the Asia Pacific region will make up 43% of global consumer spending (US$32.9 trillion) by the same year.

These growing regional differences will be an increasingly important factor for multinational corporations to consider, when engaging markets in Asia and Europe and adapting its products and services to meet changing consumer preferences. For companies which get it right, the market opportunities are immense.

4.2 INNOVATING THROUGH THE LENS OF SUSTAINABILITY TO MEET CHANGING CONSUMER PREFERENCES

4.2.1 What is innovation?

Innovation is not 'anything new'. Innovation in business is when companies introduce new processes, services, or products, to affect positive change in their business[32]. This can include improving existing methods or practices or starting from scratch. Ultimately the goal is to reinvigorate a business, creating new value and boosting growth and/or productivity.

4.2.2 Sustainable innovation

Traditional innovation originates from a business environment that paid less attention to the concept of sustainability, and where profits were the sole focus[33]. Innovation is fundamental to how companies can develop products and services that meet changing consumer needs. If we want an innovation point that comes from improved environmental performance, we must change the way we approach innovation and inject sustainability measures into the innovation process. For sustainability to reach its full potential, it should be integrated throughout the product life cycle.

As more and more companies adapt to capitalise on the growing opportunities relating to climate-related issues, sustainability is assuming greater relevancy in the context of innovation. Differentiation of products and services will play a greater role in shaping a company's prospects in the market, and increasingly, that differentiation will be the product of sustainability-driven innovation[34].

In many cases, sustainability can be a game changer. Sustainability can drive innovation by introducing new design constraints that shape how key resources— e.g., energy, carbon, water, materials and waste—are used in products and processes. It can also suggest areas where innovation can pay off especially well. These five resources are ubiquitous throughout an organisation's supply chain, and the potential to boost efficiency and cut costs across these resources is significant.

Examples of areas where sustainability can be considered in strategy to support product innovation:

- **Raw materials:** How are environmental issues affecting raw goods and vice versa? Are non-renewable resources being depleted too quickly and are there alternatives to substitute or reduce its usage? Are we working with suppliers who are addressing similar ESG concerns?
- **Energy consumption and cost:** Can we use energy more efficiently while still maintaining or increasing production?
- **Waste:** Waste equals wasted profits and greater environmental impact. How can we reduce the amount of materials we waste in our processes? How will new taxes on packaging or waste disposal affect our business?
- **Water availability and quality:** How might increasing water scarcity affect our manufacturing process and revenue continuity? Will we have to rethink production as we face stricter regulations?
- **Demand for sustainable products:** What do consumers want? How much are they willing to pay for "greener" products and services?

31 *Asian Development Bank, "Key indicators for Asia and the Pacific", 41st ed. (Mandaluyong City, Philippines: Asian Development Bank, 2010), 3-57, https://www.adb.org/sites/default/files/publication/27726/ki2010-special-chapter.pdf*
32 *Indeed Editorial Team, "What is business innovation?" Indeed, January 2022, https://uk.indeed.com/career-advice/career-development/business-innovation#:~:text=Business%20innovation%20is%20the%20process%20of%20introducing%20new,internally%2C%20for%20example%2C%20to%20increase%20that%20company%27s%20revenue.*
33 *Chris Sherwin, "Five Ways Sustainable Innovation is Different from Normal Innovation" Innovation Management, 2017, https://innovationmanagement.se/2017/04/18/five-ways-sustainable-innovation-is-different-from-normal-innovation/*
34 *Peter Capozucca, "Sustainability 2.0 – Using sustainability to drive business innovation and growth" Deloitte, January 20212, https://www2.deloitte.com/us/en/insights/deloitte-review/issue-10/sustainability-2-0-innovation-and-growth-through-sustainability.html*

Sustainability-driven innovation goes beyond designing green products and packaging solely on their inherent virtue. It entails improving business operations and processes to become more efficient, with a goal of reducing costs and waste. It is also about insulating a business from the risk of resource price shocks, shortages, disrupted supply chains, and so forth. Taken together these enhancements can deliver business benefits that go far beyond the bottom line—whether it's improving your overall carbon footprint, enhancing your brand image, or engaging both your customers and employees in a more profound way.

Many organisations focus their sustainability efforts on internal operations to cut costs, but this alone may not address one of the most significant savings opportunities: the supply chain. While many organisations recognise they could save money by asking suppliers to cut their operational costs, many leaders are going a step further to realise even more savings, closely examining their supply chain from end to end to reduce inefficiencies and identify areas for collaboration and improvements.

Suppliers that use too much energy, water, or materials, or produce more waste and carbon than necessary, are spending too much and passing those costs along. Initiatives to reduce energy, water, materials, and waste, typically have rapid payback periods and may be among the lowest risk projects an organisation can undertake[35]. Some leading procurers are now demanding environmental targets, such as waste or emissions reductions targets, from their key suppliers.

Figure 2 below illustrates some ways companies can approach sustainability and innovation throughout the product life cycle[36].

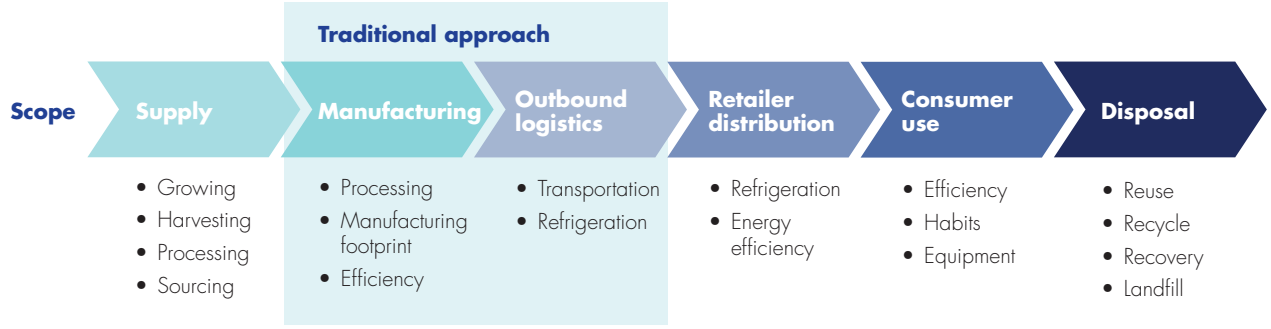

Figure 2: Product life cycle approach to sustainability (Source A.T. Kearney Analysis)

5. CASE STUDY EXAMPLES

In the following section, we explore how some members of the European Chamber of Commerce, Singapore from different industries are innovating through the lens of sustainability to adapt to changing consumer preferences and maintain its competitive advantage. The case studies were developed through desktop research of publicly available information, as well as interviews with the companies.

5.1. THE LEGO GROUP

The LEGO Group is a privately held company based in Billund, Denmark. Since it was founded nearly a century ago in 1932, the LEGO Group has grown to be become one of the worlds' leading manufacturers of play materials. Their mission is to 'inspire and develop the builders of tomorrow'.

The LEGO Group knows that children want them to be more sustainable. The company is therefore working hard to play its part in building a sustainable future and creating a better world for children to inherit. Children often write to the LEGO Group asking about their sustainability progress and share their inspiring ideas.

35 *Peter Capozucca, "Sustainability 2.0 – Using sustainability to drive business innovation and growth" Deloitte, January 20212, https://www2.deloitte.com/us/en/insights/deloitte-review/issue-10/sustainability-2-0-innovation-and-growth-through-sustainability.html*
36 *Ibid*

To meet the expectations of customers and fans all over the world, the company is continuously exploring ways to make its business and products more sustainable and more circular. This impacts all stages of the product life cycle, from design to materials and packaging, to end of life use.

In December 2020, the LEGO Group became the first large toy company to announce a science-based target, committing the company to reduce its absolute carbon emissions by 37% by 2032 compared to a 2019 baseline. To achieve this target, the LEGO Group is investing in improving carbon efficiency throughout its operations and expand renewable energy production at factories. In 2021, the company installed a total of 20,682 new solar panels at factories in China, Hungary and Mexico.

The company is investing in sustainable materials, as well as research and development, to reduce the carbon footprint of LEGO products and packaging. Importantly, the company is also engaging with its suppliers through its 'Engage-to-Reduce programme' which aims to drive innovative ways to reduce carbon footprint in the value chain.

Packaging

Much of LEGO's packaging is made from paper and cardboard which, on a global level, is more likely to be recycled than other materials. Some of the company's product still contains single-use plastic packaging, which LEGO is aiming to remove entirely by 2025. For example, the company has begun the process of switching from single-use plastic bags to paper-based bags in its LEGO® boxes and over the next few years you might find a mix of plastic and paper-based bags instead.

Sustainable materials

In 2018, the company started producing LEGO® elements from bio-polyethylene (bio-PE) – a soft, durable and flexible plastic derived from sustainably sourced sugarcane. At the time of writing, more than 150 of LEGO® elements, mainly botanical elements and Minifigure accessories, come from bio-PE. Around 50% of new sets now contain at least one of these elements. In June 2021, the company revealed its first prototype LEGO® brick made from a recycled material: recycled PET from discarded drinks bottles.

More than 150 dedicated LEGO employees have been hard at work, testing over 250 variations of PET materials and hundreds of other plastic alternatives, to develop a prototype that meets strict quality and safety requirements. The prototype brick is promising with similar durability and safety qualities but is expected to remain in testing for at least another year before the company will assess whether to move into pilot or trial production. The company's ambition is to make LEGO bricks from more sustainable materials by 2030, without compromising quality or safety.

End of use life

One of the company's major challenges in adopting entirely new materials is ensuring they are sufficiently safe and strong to be passed down through generations. The company is experimenting with materials that can be moulded to an accuracy that ensures new LEGO® bricks produced today fit with those made over 60 years ago, while being durable and safe enough to be handled by children.

LEGO® bricks are known for being durable and of such quality that they are safely passed from one generation to the next instead of becoming waste. LEGO Group is striving to ensure this tradition is kept while adopting more sustainable raw materials for production.

5.2 BMW GROUP

BMW was founded in 1916 as an engine manufacturer. In 1923, the company announced its first motorcycle, and in 1951, BMW's first post-war automobile was built. Today, the BMW Group, which includes the BMW, MINI, Rolls-Royce, and BMW Motorrad brands, has a production network comprising over 30 production sites worldwide, with a global sales network in more than 140 countries. The BMW Group considers sustainability a guiding principle for all actions and is an integral part of the company's strategy. By 2030, at least one in every two cars sold by the BMW Group will be fully electric. In particular, the MINI and Rolls-Royce Motor Cars brands will only offer fully electric vehicles (EVs) from the early 2030s.

The BMW Group is keenly aware of the growing focus on sustainability among its consumers. A survey conducted by the BMW Group in Singapore, Indonesia, Malaysia, and Thailand in 2022 revealed that 78% of drivers in Southeast Asia believe an increase in EVs on the road will contribute to a more desirable and environmentally conscious world. For 65% of respondents, a key benefit of EVs was the overall reduction in their carbon footprint, tying back to the overall desire of drivers in Southeast Asia to go greener in their motoring. The BMW Group noted that while EV adoption is increasing across Asia Pacific as a whole, each market is doing so at a different pace.

According to figures from the Land Transport Authority in Singapore, registrations of electrified BMW vehicles more than doubled its monthly sales across January to March 2022, compared to the same period last year[37]. Worldwide, the BMW Group sold a total of 75,890 fully-electric vehicles in the first half of 2022 – more than doubling its all-electric sales compared to the same period last year.

With the ever-increasing demand from consumers for EVs, the BMW Group is further accelerating its model offensive and is expecting to release around 10 million fully-electric vehicles onto the roads in the coming decade.

The company highlights that sustainable innovation will play a key role in meeting its sustainability targets, and that a comprehensive approach to sustainability, from raw materials to recycling, is essential for achieving significant emissions reductions. As a result, the company is considering all stages of their product lifecycle and operations to identify new opportunities.

In the design stage, for example, "Design for Recycling" is applied as a guiding principle to ensure that reusability is considered from the very start. In production, the BMW Group is continuously looking for ways to increase the use of recycled and renewable raw materials. On average, 30% of BMW Group vehicles are now made from recycled and reused materials, and the company has set a target to increase this to 50%. Similarly, 20% of all plastics used in BMW Group vehicles are now from recycled materials, and certain components, like underside panelling, are made from 100% recycled plastics, including old fishing nets.

From 2023, the BMW Group plans to launch its first vehicles featuring completely vegan interiors for BMW and MINI models. This is made possible primarily through the development of innovative materials with leather-like properties, whilst maintaining the premium appearance and feel together with wear resistance. These leather-free surfaces offer the possibility to increase CO2 savings along the value chain by around 85% compared to traditional leather options.

The BMW Group also expects its suppliers to be involved in minimising the overall environmental footprint. CO2 savings in the supply chain are becoming enormously important as e-mobility ramps up and the BMW Group aims to reduce CO2 emissions in its supply chain by 20% by 2030, compared to a 2019 baseline. To achieve this, among other initiatives, the BMW Group will shift to CO2-reduced steel starting 2025. With this, the company will avoid fossil fuels such as coal and only use steel that is produced using natural gas, hydrogen, and renewable electricity. This initiative alone is expected to reduce CO2 emissions from steel production as much as 95% - equivalent to 400,000 tonnes per year.

Overall, the BMW Group aims reduce its CO2 emissions by 40% per vehicle by 2030 across its entire value chain from a 2019 baseline.

The BMW Group's holistic approach to sustainability demonstrates the multitude of climate-related opportunities available throughout the product lifecycle, for companies that innovate its products and services through the lens of sustainability.

5.3 BNP PARIBAS

BNP Paribas is one of Europe's leading providers of banking and financial services. It operates in 68 countries and has more than 193,000 employees supporting its customers – individuals, associations, entrepreneurs, SMEs and institutions – through financing, investment, savings, and protection solutions.

As the bank for a changing world, BNP Paribas recognises how the impacts of climate change is changing social and consumer expectations and transforming the global business environment.

37 *https://www.straitstimes.com/singapore/transport/ev-brands-close-in-on-tesla-as-interest-in-electric-cars-grows*

As a global organisation, the bank must consider regional, cultural, social, and economic differences across markets. When assessing European and Asian markets, the bank noted that awareness of climate-related issues and ESG trends are currently predominantly led by Europe and that a gap of several years – among consumers, financing, and corporate trends – exists in Asia Pacific. This is being driven by several reasons. For example, in Southeast Asia, a diverse region with countries in different stages of economic growth, several markets are still in a phase where consumers are only just getting access to sustainably sourced materials and other 'green' products. Nevertheless, the bank expects this trend to change in the next decade and expects that markets in Asia Pacific will reach the same level of consumer behaviour and awareness as currently observed in Europe.

In relation to climate-related issues and broader ESG matters, BNP Paribas noted that Asia is currently going through a transitional phase and that consumers are taking an increasingly holistic view on corporate sustainability issues and focusing on the product life cycle. Consumers in the region are not only looking at a company's direct operations, but its entire value chain (up and downstream). This trend is driven by millennials and generation Z and the bank expects the next two decades to see a push for organisations to 'green' their supply chains. BNP Paribas encourages companies to look for ways to improve manufacturing and sourcing techniques, as well as engaging their up and downstream suppliers to do the same.

BNP Paribas supports this value chain evolution through capex (investment spending) and project financing. In order to align with the changing demands of the end, BNP Paribas supports corporate clients in their transition from various shades of brown to green, by having a greater emphasis on sustainability solutions in its products and services.

For example, amid growing voluntary emissions reduction markets, the bank identified several new solutions to support these markets through supply chain financing that range from loans and bonds to transaction banking services, which includes supply chain financing and various carbon solutions. BNP Paribas also works with hard-to-abate sectors to support their decarbonisation roadmaps through financing and supports their transition to a low-carbon future.

6. RECOMMENDATIONS – STEPS YOU CAN TAKE AS AN ORGANISATION

As we have found, consumers across the world are increasingly adopting a more sustainable lifestyle and this is impacting their purchasing behaviour. Below are some steps a company can take to unlock these opportunities by innovating through the lens of sustainability:

- **Consider the product lifecycle:** As we have seen throughout this paper and case studies, there are opportunities for sustainability innovation at all stages of a product's life cycle. By identifying low-hanging fruits to improve environmental performance at various stages, companies can achieve significant improvements on aggregate. The benefits go beyond simply improving environmental performance, but also improving resource efficiency, cutting cost, and mitigating risks.

- **Learn from your peers:** There are countless companies across all industries and geographies with efforts in place to innovate through the lens of sustainability. Many of these companies produce sustainability reports and other public ESG disclosures detailing their ongoing sustainability efforts. These are excellent resources for companies to leverage insights from peers and identify opportunities for improvements.

- **Engage your value chain:** As we have seen, companies should take a holistic approach to innovation and consider the full product life cycle in the context of sustainability. For most industries, the majority of emissions are indirect and can be found in the value chain. Engage your suppliers to communicate your sustainability ambitions and expectations, as well as to identify areas for collaboration and improvements.

- **Collaborate with your stakeholders:** In addition to learning from your peers and engaging your suppliers, also consider active partnerships with these - and other- stakeholders. By joining forces and collaborating on initiatives to minimize environmental impacts, you may find synergies and opportunities to leverage other's established initiatives, networks, insights, etc. Through stakeholder engagement, you can also proactively work with your customers to prepare for changing consumer preferences – rather than reacting to them.

- **Continually innovate:** Sustainability standards and opportunities are constantly evolving, and companies should continually invest in research and development to identify new opportunities and avoid falling behind the curve.

- **Get senior management/board buy-in:** Top-down support is essential for the effective implementation of sustainability-initiatives. Before commencing a project, ensure that the Board and/or senior management level is supportive of your plans – this will reduce the likelihood of encountering barriers and roadblocks later on.

- **Communicate your efforts:** A 2021 survey by Deloitte on consumer attitudes and behaviours around sustainability identified availability of information as a key barrier for consumers to adopt a more sustainable lifestyle. Nearly half (48%) of the respondent reported not having adopted a more sustainable lifestyle due to lack of information[38]. These findings point to the importance of giving consumers greater access to information about your efforts, products, and services - a low hanging fruit for most companies. Ensuring transparent and proactive communication of your sustainability efforts is key. However, be careful to avoid greenwashing your communications as it can cause significant reputational backlash, and potential legal consequences. Consult all relevant teams (e.g., Communications, Sustainability, R&D) before any sustainability-claims are made.

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38 *Tim Archer & Céline Fenech, "How consumers are embracing sustainability" Deloitte, 2022, https://www2.deloitte.com/uk/en/pages/consumer-business/articles/sustainable-consumer.html,*

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THE ROLE OF INDUSTRIAL DECARBONISATION TOWARDS SINGAPORE'S NET ZERO AMBITION

EUROCHAM POSITION PAPER 2022–2023

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European Chamber of Commerce (Singapore)

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EXECUTIVE SUMMARY

The world is facing its biggest challenge yet: climate change. Around the world, governments and industry players are stepping up decarbonisation efforts to accelerate the move to net zero. There is increasing pressure for transformative change in our economies and society, to lay the foundations for a cleaner, better, more sustainable future.

In this transition, industry has an important role due to its immense value to the economy and contribution to carbon emissions, but there are also significant challenges to overcome. Singapore and Jurong Island have taken some initial steps with the launch of Sustainable Jurong Island Plan in 2021. However, more would need to be done for Jurong Island to maintain its future competitiveness as the region's leading sustainable chemicals and petrochemicals hub.

At present, Jurong Island accounts for more than half of Singapore's total carbon emissions. In terms of emissions intensity, Jurong island's contribution is disproportionately high when considering the GDP contribution is only about 3% to the total while contribution to Singapore's total manufacturing output is about 25%. On the other hand, Jurong Island is strategically important for Singapore's industrial policy and considerations around safeguarding the country's energy security given Jurong Island's regional role in petroleum refining.

With that in mind, we believe it is critical that Jurong Island urgently focus on more ambitious implementation of net zero technologies integrated at scale, to supercharge the next phase of Jurong Island's growth and maintain its long-term competitiveness and role in the economy.

Systemic efficiency and circularity and clean electrification can be rapidly deployed in the short term to drive meaningful carbon emissions reduction before 2030. For initiatives around improving systemic efficiency and circularity, digital infrastructure to support resource sharing would further enhance and build upon the foundation of the plug-and-play ecosystem and existing integration of industries on Jurong Island. With regards to clean electrification, the focus should be on maximising solar rooftop capacity and the use of imported electricity from renewable generation sources on Jurong Island.

Immediate efforts to attract investments in carbon capture utilisation and storage (CCUS) and hydrogen are needed to ensure these technologies are scalable in the medium and long term. For CCUS, partnerships with neighbouring countries to find ways to utilise and store carbon will be key to ensure it can be deployed at scale, due to Singapore's own storage constraints stemming from lack of suitable geological sites with potential.

For green hydrogen, Singapore has the potential to become a regional hydrogen trading hub. However, lack of clear certification and policy frameworks for hydrogen classification present a major market barrier for sustainable hydrogen. While constraints around land and key resources including access to low-cost, abundant renewable energy and water mean that local production of green hydrogen will be challenging, Singapore's geographical position and excellent port infrastructure make it an appealing centre for hydrogen trade across Asia Pacific.

To support Singapore's net zero ambitions, Jurong Island should leverage the power of partnerships and ecosystem collaboration amongst all its players to deliver on these net zero technologies, by sharing data, investment and risk to help achieve a fair and just transition for everyone.

INDUSTRIAL DECARBONISATION: CRITICAL TO SINGAPORE'S PATH TO NET ZERO

The net zero challenge

Around the world, nations are rallying to the call for greater reforms to tackle the adverse effects of climate change. Singapore, as one of the world's most advanced city-states, is no exception. It aims "to halve emissions from its peak to 33 MTCO2e by 2050, with a view to achieving net zero emissions as soon as viable in the second half of the century."[1]

In September 2022, the Singapore government announced intentions to achieve net zero by 2050 and at the time of this paper's publication, is in the process of conducting public consultations on the target.[2]

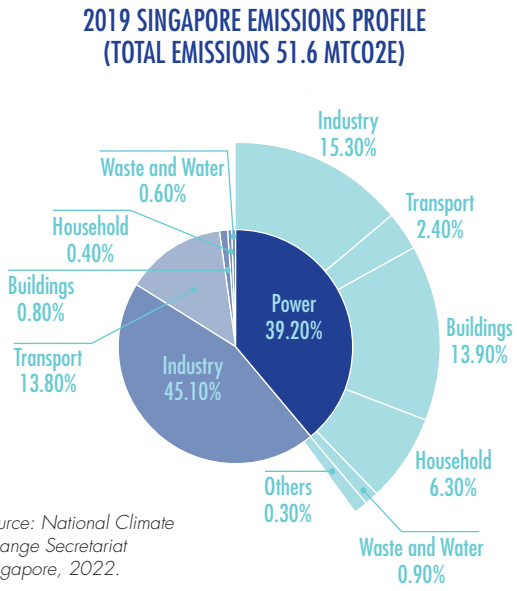
Achieving net zero means undertaking a fundamental transformation of the country's economy in key areas such as power, industry and transport while navigating the complex economical and societal challenges this entails.

Industrial clusters and its importance towards achieving net zero

Global industrial emissions account for an estimated 30% of total global CO2 emissions. Areas with industrial concentration, also known as industrial clusters, represent one of the most important focus areas for rapid, effective decarbonisation due to their significant carbon emissions contribution.[3]

In Singapore, the industrial sector is a major source of carbon emissions, accounting for 69% of total emissions, or about 35.9 MTCO2. Industry primary emissions contribute 54%, while secondary emissions contribute 15%.[4] Singapore's emissions profile by sector is presented in Figure 1.

Figure 1: Singapore's emissions profile.



Source: National Climate Change Secretariat Singapore, 2022.

1 *National Climate Change Secretariat Singapore. (2021, April 10). Singapore's Long-Term Low-Emissions Development Strategy. Retrieved from National Climate Change Secretariat Singapore: https://www.nccs.gov.sg/media/publications/singapores-long-term-low-emissions-development-strategy*
2 *Tan, A. (2022, September 6). Singapore aiming to have emissions reach net zero by 2050; public feedback sought. Retrieved from The Straits Times.*
3 *Ollagnier, J.-M., & Jurgens, J. (2022, June 21). Decarbonizing industry: if industrial clusters win, we all win. Retrieved from World Economic Forum Web Site: https://www.weforum.org/agenda/2022/06/if-industrial-clusters-win-we-all-win*
4 *National Climate Change Secretariat Singapore. (2022, September 12). Singapore's Emissions Profile. Retrieved from National Climate Change Secretariat Singapore: https://www.nccs.gov.sg/singapores-climate-action/singapore-emissions-profile/*

Jurong Island's decarbonisation is key to Singapore's industry net zero transformation

Efforts to decarbonise industrial activities on Jurong Island are critical for Singapore's net zero ambitions. According to a paper by the National University of Singapore (NUS), Jurong Island's carbon emissions is estimated at about 27 million tonnes or 54% of Singapore total carbon emissions in 2019.[5] This means the country's carbon emissions are highly concentrated in this area of about 30km^2. For context, Jurong Island accounts for 4% of Singapore's total land area, which measures around 728 km^2.

Jurong Island's high contribution to Singapore's carbon emissions is attributed to the concentration of industrial activities on the island, which includes petroleum refining and chemicals manufacturing. While these industries are typically considered difficult to abate, there are specific characteristics about Jurong Island and the wider Singapore ecosystem which supports the implementation and scaling of carbon abatement solutions.

This paper aims to explore the opportunities for Jurong Island to decarbonise, and to help Singapore achieve net zero.

1. JURONG ISLAND – THE KEY TO DELIVERING SINGAPORE'S NET ZERO AMBITION

1.1 JURONG ISLAND'S PRESENT AND FUTURE

Jurong Island is one of the world's leading Energy and Chemicals (E&C) hub. Located off the southwestern coast of Singapore, Jurong Island is formed through successive land reclamations and joining of smaller islands which were completed in stages over a 14-year period (1995-2009).

Jurong Island was envisioned as an integrated chemical hub with highly connected production chains. The concept of highly integrated infrastructure between plants, supported by common utilities and logistics, drove synergistic relationships that enabled savings for companies on capital outlay and transportation costs.

Today, Jurong Island is home to more than 100 leading global energy, petrochemical and specialty chemicals companies, with total assets invested worth over S$50 billion.[6] Singapore is the fifth-largest refinery export hub in the world and the eighth-largest chemical exporter by volume, with most of its E&C activities concentrated on Jurong Island, which has an important strategic role in ensuring Singapore's energy security.

In addition to refined petroleum products, Jurong Island produces a wide variety of chemicals used in essential consumer goods, such as alkoxylates, butyl rubber, ethylbenzene and many more. Industrial operations on the island are supported by many service providers including a liquified natural gas (LNG) terminal, underground oil storage facilities and power and utility companies which also supply around half of Singapore's total demand.[7]

Overall, Jurong Island's annual manufacturing output amounts to more than S$80 billion, contributing about a quarter of Singapore's total manufacturing output. Major industry players that have set up facilities on Jurong Island include the likes of BASF, Evonik, ExxonMobil, Singapore Refining Company, Solvay, Shell, Mitsui and Sumitomo.

Due to its general lack of natural resources and land scarcity, Singapore has had to strategise and develop a differentiated value proposition to attract global investments. Much of Jurong Island's current success is due to several key attributes, including world-class transport capabilities and a robust catalogue of supporting services which enables a plug-and-play model.

However, in a world focused on transitioning to net zero by 2050, what has worked well for Jurong Island so far will no longer be enough. It will be key for Jurong Island to start deploying and scaling net zero technologies from now on. This will enable it to continue playing a key role in the Southeast Asian industrial landscape, retain its competitiveness and become an example for others.

5 *Hon, C., & et al. (2021, August 31). A Decarbonization Roadmap for Singapore and Its Energy Policy Implications. Retrieved from MDPI: https://www.mdpi.com/1996-1073/14/20/6455*
6 *JTC Corporation. (2022, September 9). Find Land for Long Term Development Jurong Island. Retrieved from JTC: https://www.jtc.gov.sg/find-land/land-for-long-term-development/jurong-island*
7 *Singapore Economic Development Board. (2021, November). Sustainable Jurong Island Publication . Retrieved from Singapore Economic Development Board Web site: https://www.edb.gov.sg/en/business-insights/market-and-industry-reports/sustainable-jurong-island.html*

1.2 JURONG ISLAND – SUSTAINABILITY IN ACTION

Sustainable Jurong Island: Targets and aspirations

As Singapore aims to deliver its national carbon commitments, it has outlined initial plans to decarbonise Jurong Island. The Sustainable Jurong Island Plan will drive decarbonisation through improved circularity and higher carbon capture.[8] As government bodies implement new carbon regulatory policies, industry players are forming joint research efforts and piloting sustainability-themed technologies to futureproof their operations.

The current Sustainable Jurong Island Plan is centred around two key sustainability drivers: increased output of sustainable products and higher carbon abatement via renewable energy (RE) and carbon capture, storage and utilisation (CCUS).

Companies such as Neste, Shell and Evonik have already been deploying decarbonisation initiatives within Jurong Island; for example, in 2018 Neste made its biggest ever investment of €1.5 billion to expand renewable fuels production at its facilities on Jurong Island.[9] As part of Shell's goals to be carbon neutral by 2050, Shell Jurong Island production sites are focusing investments to deliver improved efficiencies for steam, water consumption and energy consumption under the 10-year plan it unveiled in 2021. Meanwhile, Evonik has adopted the use of an integrated digital platform to optimise production efficiency and material flows at its methionine production plant on Jurong Island.[10] The company is working towards their aim to reduce group Scope 1 and Scope 2 emissions by 25% and Scope 3 emissions by 11% by 2030.[11]

Foreseeable challenges to sustainable Jurong Island

Challenges to the implementation of sustainable initiatives vary depending on the project specifics. Due to the nature of Jurong Island's industries and Singapore's general characteristics, key challenges arise in three areas:

- **Space constraint** – Jurong Island, with a land area of 3,000 ha, already houses more than 100 companies and operating facilities. Projects will need to be selected carefully to ensure optimal use of its remaining land. Having said that, the clustering of industries also brings about opportunities for circularity and centralised hydrogen and CCUS services.
- **Inherent carbon-intensive processes of the industries** – Many of the processes and feedstocks used in the E&C sector are inherently carbon-intensive. Hard-to-abate sectors such as those on Jurong Island would potentially require CCS solutions for effective decarbonisation.
- **Existing energy mix that is predominantly natural gas** – 95% of Singapore's electricity is generated from natural gas, with the remaining 3% and 2% supplied by renewable sources (solar and waste-to-energy [WTE]) and carbon-based fuel (coal and petroleum products) respectively.[12] While lower in emission intensity in comparison to other carbon-based fuels, emissions from natural gas remain significant.

8 *Singapore Economic Development Board. (2021, November). Sustainable Jurong Island Publication. Retrieved from Singapore Economic Development Board Web site: https://www.edb.gov.sg/en/business-insights/market-and-industry-reports/sustainable-jurong-island.html*
9 *Neste Corporation. (n.d.). Neste Singapore Expansion Project Information Page. Retrieved from Neste Singapore Web Site: https://www.neste.sg/neste-in-singapore-and-asia-pacific/journeytozerostories/singapore-expansion-project*
10 *Evonik. (2020, November 18). Press Release, Evonik Wins EuroCham's First Sustainability Award. Retrieved from Evonik Web Site: https://seaanz.evonik.com/en/evonik-wins-eurochams-first-sustainability-award-148088.html*
11 *Accenture conducted interview with Evonik, August 2022*
12 *Energy Market Authority Singapore. (2021). Singapore Energy Statistics, Chapter 02 Energy Transformation. Retrieved from Energy Market Authority Singapore's Web Site: https://www.ema.gov.sg/singapore-energy-statistics/Ch02/index2#:~:text=Fuel%20Mix%20for%20Electricity%20Generation,and%20Fuel%20Oil%20(0.6%25)*

Despite its challenges, there remains a viable pathway for Singapore and Jurong Island to achieve net zero emissions. Several decarbonisation solutions have appeared in the past decade and are being explored as potential responses by industry for a sustainable future. These solutions, and how they can be applied for Singapore and Jurong Island, will be discussed in the next section.

Figure 2: Sustainable Jurong Island Targets and Aspirations.

By 2030	By 2050
Increase sustainable products output by 1.5 times from 2019 levels	Increase sustainable products output by 4 times from 2019 levels
Improve energy efficiency in refineries and crackers to be in the top quartile globally	Achieve more than 6 million tonnes of annual carbon abatement from low-carbon solutions
Achieve at least 2 million tonnes of carbon capture	

Source: Economic Development Board, 2021, Sustainable Jurong Island.

Figure 3: Key initiatives on Jurong Island.

Sustainable products	Sustainable production
High-value speciality chemicals and materials	Capturing carbon
Bio-based fuels and chemicals	Increasing renewables deployment on Jurong Island
Pyrolysis oil from plastics recycling	Improving industrial energy efficiency
Carbonated aggregates	Recycling chemicals and utilities

Source: Economic Development Board, 2021, Sustainable Jurong Island.

2. JURONG ISLAND INDUSTRIAL CLUSTER AND THE CRITICAL ENABLERS FOR A SUCCESSFUL LOW-CARBON TRANSITION

2.1 KEY CONSIDERATIONS

In our view, Jurong Island has established a good foundation that has worked well to support its impressive development for the past two decades. However, to maintain Jurong Island's position as a leading petrochemicals and chemicals hub into future decades, which contributes positively to Singapore and its people, significant challenges around sustainable transformation would need to be carefully navigated and decisive action taken to achieve net zero.

On the path to net zero, we see three key solution areas that should be given priority by stakeholders on Jurong Island:

1. Maximise efficiency in all aspects and invest in the digital infrastructure and storage that will scale the benefits of efficiency technologies that reduce waste, improve system efficiency and optimise demand.
2. Maximise the use of renewable energy through rooftop solar, green electricity imports and invest in the supporting grid and storage infrastructure.
3. Establishment of a CCS hub on Jurong Island.

This section explores key topics which are crucial for Jurong Island's low-carbon transition, namely:

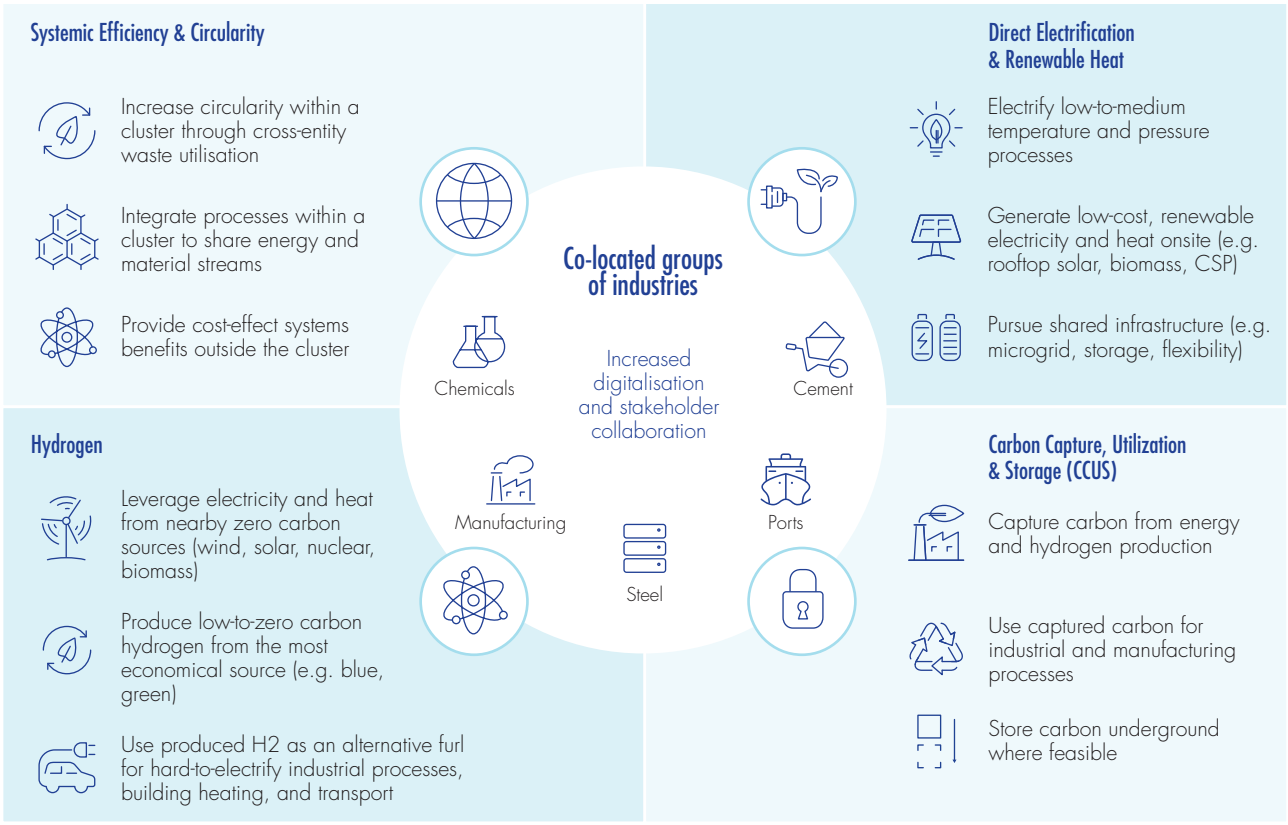
- **Integrated net zero solutions for Jurong Island** – Taking on an integrated approach allows parties on Jurong Island to achieve results greater than the sum of its parts. This approach is widely applicable in four solution areas, namely: systemic efficiency and circularity, direct electrification and renewable heat, CCUS and hydrogen.
- **Leveraging Singapore's strengths for net zero transition** – Singapore has made careful choices to set up Jurong Island for its success today. Many of these characteristics remain highly relevant in the decarbonisation discussion and tapping on these strengths can help organisations accelerate their net zero goals.

2.2 INTEGRATED NET ZERO SOLUTIONS FOR JURONG ISLAND

In identifying net zero solutions for Jurong Island, it is important to adopt a broader view that considers potential synergies for the entire cluster. This approach is well-aligned with Jurong Island's strategy emphasising synergistic opportunities for all stakeholders as seen in its network of shared essential services and utilities corridors.

To achieve the island's decarbonisation efforts, there is a menu of abatement opportunities that calls for a holistic approach towards optimising emissions solutions and creating an integrated industrial ecosystem. The World Economic Forum (WEF), in collaboration with Accenture, has proposed four key solution areas under its initiative "Transitioning Industrial Clusters towards Net Zero" Technology framework (see Figure 4) as also detailed in a WEF White Paper on Industrial Decarbonisation[13]. Accenture formulated the recommendations in this paper.

Figure 4: Net zero solutions area for industrial cluster.



Source: World Economic Forum and Accenture, 2022, Transitioning Industrial Clusters towards Net Zero: National Policy Enablement for Industrial Decarbonization.

Table 1 provides a summary of the net zero solutions and the decarbonisation opportunity it presents to Jurong Island.

13 *The World Economic Forum with support from Accenture developed this framework for the Net Zero Industrial Cluster Initiative. Retrieved from World Economic Forum White Papers Web Site: https://www.weforum.org/whitepapers/transitioning-industrial-clusters-towards-net-zero-national-policy-enablement-for-industrial-decarbonization/*

As previously mentioned, Jurong Island is already a model for integrated processes and co-products. There is an additional opportunity to convert Jurong Island's industrial process waste into feedstock for energy recovery or material input for manufacturing of sustainable products.

For CCUS, the proximity of industries and a well-integrated existing pipeline infrastructure present a foothold for organisations to accelerate carbon capture solutions.

While direct electrification technologies such as electric boilers and electric motor conversions are less applicable for the energy sector due to its higher operating temperatures, current electricity demand could be met with renewable generation. Hydrogen, though it is a highly promising decarbonisation solution, is less practical for Jurong Island since it lacks the availability of land and renewable energy sources to scale the solution and make it commercially viable.

The following sections provide a more detailed analysis of each net zero solution. The analysis explores each solution's unique applicability to Jurong Island and includes success stories from other industrial clusters including Humber, United Kingdom and Kalundborg, Denmark.

Table 1: Summary evaluation net zero industrial cluster solution areas (preliminary analysis by Accenture)

Solution area	Characteristics	Typical challenges	Opportunity for Jurong Island	Implementation time horizon
Systemic efficiency and circularity	Overall higher resource efficiency while introducing new revenue streams for companies.	Difficulty in matching supply and demand; process volumes will need to be modified to meet demand	**High** – Clustering of similar industries provide a steady supply of material for energy recovery and upcycling.	Short term
Direct electrification and renewable heat	Electrification enables industries to move away from carbon fuels and use renewable energy sources.	Electrification requires complex changes in technology and is limited to low- and medium- temperature processes.	**Medium** – E&C industries operate at higher temperatures which limit opportunities to introduce electrification. However, gas-fired electricity consumption makes up a significant portion of emissions and renewables can replace some of this generation.	Short - medium term
Carbon capture, utilization, and storage (CCUS)	Carbon capture presents a more straightforward solution for hard-to-abate heavy industries.	Cost for capturing carbon remains the highest barrier to CCUS adoption.	**High** – Proximity of industries helps lower logistics cost and existing pipeline infrastructures can be modified to enable CCUS.	Medium - long term
Hydrogen	Energy storage using hydrogen solves the intermittency of renewable energy sources.	Cheaper, abundant sources of renewable energy and water are integral to scaling green hydrogen.	**Low** – Singapore's land and water scarcity, and lack of renewable energy sources make it dependent on the import of green hydrogen.	Medium - long term

2.2.1 Systemic efficiency and circularity

Problem statement / opportunity for Jurong Island:

Singapore is an island city-state with limited arable land and freshwater sources. Jurong Island uses up to 40 million gallons of water daily, or 10% of Singapore's total water consumption, about 50% of which is imported.[14] Additionally, Singapore's sole waste landfill is expected to reach capacity by 2035.[15] As such, it is imperative for all stakeholders to make sure that natural resources are used efficiently to safeguard continuity of business operations on the island. One of the key focus areas for achieving resilience and continuity is improving waste and water circularity.

A key component to Jurong Island's net zero strategy is to improve industrial energy efficiency. As part of the Sustainable Jurong Island Plan, the cluster aims to ensure all refineries on the island are in the top global quartile in terms of energy efficiency. [16]

Proposed solution

Circularity and waste valorisation that entail combining or processing waste streams into useful products should be a focus area. On Jurong Island, this would include the direct use of captured flue gas to produce carbonated aggregates for land reclamation and road construction activities. To enable increased circularity, process integration across clusters including water recovery and recycling, treatment of chemical waste will require cluster symbiosis, the building of infrastructure for the recovery and shared utilisation of waste energy, water and materials streams that can reduce process input requirements and associated GHG emissions. Jurong Island's shared utilities infrastructure provides a good platform to enable further sharing of resources among companies.

Utilisation of waste heat can be implemented within individual facilities, supplying local heat demand, or across the industrial site to nearby plants via transfer of waste heat to other industries who could utilise the waste heat. Additionally, waste heat to power solutions could also be explored. On Jurong Island, companies can support similar initiatives by implementing flare gas recovery projects at existing facilities. In a separate project led by the Economic Development Board (EDB) and Singapore LNG (SLNG), the organisations' technologies were explored to harness cold energy released during LNG regasification and redirect it to local data centres for cooling purposes.[17]

Further, Singapore could consider utilising sustainable energy feedstock supplied from neighbouring major agricultural countries like Indonesia and Malaysia. In the long term, it can consider bringing in materials from agricultural and forestry residues or extend its waste-to-energy (WTE) capabilities to its neighbours which could help enable the manufacture of circular products.

The deployment of digital infrastructure to support the sharing of resources is a key enabler. A shared digital platform with a digital twin of the island's shared utilities/service corridors could allow various players on Jurong Island's manufacturing value chain to optimise energy use and production. Real-time data could allow players to access process by-products, steam or process heat and match supply to demand more precisely, opening opportunities for optimisation of the entire energy-chemicals industrial complex on Jurong Island in terms of production and energy use. The platform could provide accountability and transparency to users while helping suppliers reduce underutilisation and unlock hidden revenue in previously 'unwanted' process by-products.

Typical benefit

Enhanced integration between production facilities upstream and those downstream could scale-up efficiency gains and drive shared value across the cluster and the surrounding areas. Through symbiotic relationships with the support of digital technology, companies on Jurong Island could integrate their different production processes to realise optimisation and improve efficiency in the use of energy, water and materials.

Further, cross-company and cross-industry collaboration to utilise waste or by-products generated by plants upstream of a chemical value chain introduces ways to cut waste disposal costs and generate new revenue streams. This could effectively create additional new circular economies within Jurong Island itself and meet increasing demand for sustainable or circular chemicals in certain markets.

14 *Public Utilities Board Singapore. (2018, January). Our Water Our Future, Publication by PUB. Retrieved from https://www.pub.gov.sg/Documents/PUBOurWaterOurFuture.pdf*
15 *National Environment Agency Singapore (NEA). (2020). Envision Lite June-July 2020 publication by NEA. Retrieved from National Environment Agency Singapore Web Site: https://www.nea.gov.sg/corporate-functions/resources/publications/books-journals-and-magazines/envision-lite/june-july-2020/semakau-landfill-20th-anniversary#:~:text=Semakau%20Landfill's%20lifespan%20is%20getting,be%20fully%20filled%20by%202035.*
16 *Singapore Economic Development Board. (2021, November). Sustainable Jurong Island Publication . Retrieved from Singapore Economic Development Board Web Site: https://www.edb.gov.sg/en/business-insights/market-and-industry-reports/sustainable-jurong-island.html*
17 *Singapore LNG. (2019, October 21). Singapore LNG Press Release: NUS, Keppel And SLNG Join Forces To Develop New Energy-Efficient Cooling Technology For Data Centres. Retrieved from Singapore LNG Web Site: https://www.slng.com.sg/nus-keppel-and-slng-join-forces-develop-new-energy-efficient-cooling-technology-data-centres#:~:text=Cold%20energy%20generated%20from%20LNG,from%20the%20Singapore%20LNG%20Terminal.*

Challenges

The key to Jurong Island achieving island-wide circularity is close collaboration among players from different industry sectors. However, different interests and incentives among individual partners may impede the speed of joint decision-making process.

A multi-stakeholder scenario also presents difficulty when allocating capital cost due to differing financial positions. Adding to the complexity, companies on Jurong Island are mostly subsidiaries of multinationals which have limited ability to independently make major investment decisions.

There could also be technical challenges when integrating processes across the industrial cluster. Individual players may need to change production volume or production process to meet the volume obligations or desired output from receiving partners. This may disincentivise partners as it introduces process rigidity into their operations.

While Singapore could consider the use of bio-based or agricultural waste feedstock, there could be challenges in scaling up for wide adoption. Due to the large scale of the industry at Jurong Island, it could be necessary to import waste feedstock to meet the industries' production capacity. Availability and reliability of feedstock through imports from other markets is a factor that needs to be considered carefully when assessing the feasibility of scaling this solution.

Actions

Industry players could seek to formalise collaborations within the Jurong Island Industrial Cluster by establishing a clear pathway towards increased integration between facilities supported by a governance structure to facilitate the sharing of data and to find ways for waste streams to be valorised. When creating an island-wide consortium, partners need to agree on targets that align to individual interests. It is also critical to appoint decision-making groups with clear responsibilities.

The Singapore government could play an important role by leading and encouraging public-private partnerships for systemic efficiency projects on Jurong Island. The public-private partnership model has worked extremely well for Singapore in other sectors. The government could extend this to Jurong Island to reduce the capital outlay and de-risk investment.

Additionally, considering the business case for utilisation of waste or by-product stream and its potential implication on individual companies' processes and operations, commercial agreements on capacity for production and demand of waste streams should be put in place during the initial planning phase. Where possible, flexible arrangements should be developed to accommodate for demand variability and acceptable specifications of the waste or by-product stream.

Case study [18]

In Kalundborg, Denmark, partners from 25 different resource streams collaborated to create a close-loop system of material, water, and energy streams. From a holistic viewpoint, participants were able to minimise leakage and waste. In reducing resource consumption and waste disposal costs, players were able to effectively lower financial and environmental costs.

The cluster-wide initiative also promoted business model innovation. An example is Ørsted, a Danish power company that ran a biomass-fired cogeneration plant within the Kalundborg cluster. Instead of producing steam as a by-product of electricity generation, it has pivoted to supplying high-temperature steam to surrounding partners and has made it the primary product and revenue source of its operation.

18 *Accenture. (2021). Industrial clusters, Working together to achieve net zero. Retrieved from Accenture Web Site: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters.pdf*

A key success factor for the Kalundborg industrial model is a shared sense of value and how benefits to the local environment translate to benefits for all players. This has led to successful public-private partnerships which started as far back as 1961. Applying this to the Jurong Island context, Singapore can continue to build on its close collaboration with international companies on Jurong Island to introduce projects that benefit stakeholders island-wide.

It is estimated that the Kalundborg project annually achieved €24 million in bottom line savings, reduced freshwater consumption by 3.6 million m^3 and recycled over 87,000 tonnes of materials.

2.2.2 Direct electrification and renewable heat

Problem statement / opportunity for Jurong Island

Jurong Island is composed of heavy industry with high-temperature processes that are difficult to electrify. Additionally, electricity generation, a large part of the energy mix is virtually all gas-fired.

Another challenge is the space limitations for deployment of large-scale renewable electricity generation capacity in Singapore such as utility-scale solar PV. A 2020 study showed that the total usable space for solar PV panels in Singapore amounted to just under 37 sq. km, with 62% of all panels on buildings, roof space, and facades with the balance shared between temporary land-based installations, floating installations on reservoirs and unused near-shore sea areas, and panels installed above land, canals and roads.[19]

Proposed solution

Clean electrification for industry involves firstly, direct electrification of industrial process heating and renewable heat use and secondly, the substitution of electricity from natural gas combustion with electricity generated from renewable sources. The use of large-scale heating coils and easily chargeable battery systems are some of the ways the chemicals industry can achieve direct electrification. Taking an integrated view, industrial cluster electrification enablers such as microgrids, shared renewable generation and storage, and demand optimisation—further powered by digital, data and visualisation technologies—will further drive the commercial viability of direct electrification technologies over other low-carbon solutions such as natural gas with CCUS.

Local solar PV generation could be maximised in Singapore and on Jurong Island by employing innovative use of available space such as rooftop solar, vertical installation (serving as facades of high- and medium-rise buildings), integration with other assets such as water reservoirs where feasible. This would enhance the energy mix with higher renewable electricity generation and overcome the constraints on land area. In support of higher renewable capacity, energy storage systems, with a focus on fast-response systems, and the combination of electrical and thermal storage such as in district cooling plants could provide mitigation for the impact of variable solar generation.

The cross-border import of low-carbon electricity from generation assets in the region could be a potential gamechanger for reducing the emissions intensity of Singapore's electricity supply. In 2022, Keppel and Electricite du Laos signed as power purchase agreement (PPA), pioneering cross-border power trade of up to 100 megawatts of (MW) renewable energy into Singapore.[20]

Additionally, waste-to-energy facilities in Singapore are extensively converting waste into energy, and Jurong Island could advance the effort by bringing in players using other forms of biofuel such as biomass and syngas to provide both electricity and steam.

With the solar resource available, concentrated solar heat could be used as a carbon-free, ultra-high temperature heat that serves as an alternative to traditional fossil fuel burning for industrial process heat. However, land scarcity in Singapore may pose challenges to implement this solution.

19 *Consortium led by the Solar Energy Research Institute of Singapore. (2020). Update of the Solar Photovoltaic (PV) Roadmap for Singapore. Singapore: Solar Energy Research Institute of Singapore, National University of Singapore.*

20 *Ng, H. S. (2022, June 23). Singapore news, Singapore begins importing renewable energy from Laos through Thailand and Malaysia. Retrieved from Channel News Asia Web Site: https://www.channelnewsasia.com/singapore/singapore-import-hydropower-renewable-energy-laos-through-thailand-malaysia-2766251*

Typical benefit

With carbon pricing and falling costs of renewables, electrification provides a lower-cost, technologically mature and more cost-efficient solution for decarbonisation. The technology is well-proven, cost-competitive with conventionally generated electricity and could be deployed in a relatively short time frame which could help accelerate decarbonisation efforts.

The electrification of processes generally leads to lower operating temperatures, which translates into longer continuous plant operation instead of annual technical shutdowns. This could potentially improve the plant productivity and up time.

Challenges

Constraints on available land for development could hinder the scaling of local renewable generation such as solar PV, requiring both government and industry to consider innovative use of available space to maximise Singapore's solar PV potential.

The transition to electric technology requires significant financial outlay and may require early retirement of long-life, carbon-based assets.

Moreover, many electrifiable processes provide limited productivity gains, which are the main drivers of technology adoption. The electrification of industrial processes also introduces complexity into operations as upskilling of operators and secondary process changes are required to accommodate the new technology.

Actions

Currently, Singapore's carbon pricing policy provides clear price signals to reduce investment uncertainty on direct electrification and use of renewable electricity. However, to reduce the relative cost of renewable electricity over carbon-based fuel for industrial processes, the government could continue to enhance policies that would incentivise the adoption of renewable generation.

The reliability of electricity supply and safeguarding the grid are important issues to address when there are higher levels of renewable generation. There is a need to ensure that "non-solar" assets can handle any high-variability situations. In this respect, Singapore could consider a capacity-based market system that is adequately priced to incentivise substantial stand-by reserves.

It is important for the industry to take the first steps in retrofitting electrification equipment and the use of hybrid technologies. This would provide a gradual transition for Jurong Island players and allow them to minimise fuel costs by having the option to switch between different energy vectors, whether electricity or fossil fuel.

Case study

Japan saw exponential growth in its solar PV installed capacity over the past few years, from about 6 GW in 2012 to 74 GW in 2021.[21] Despite land and solar resource scarcity, the island country rapidly increased its installed solar PV capacity and looks to be on track to achieve 150 GW of installed capacity by 2030 or more should existing policies continue or are enhanced.[22] This growth is largely driven by Japan's feed-in tariff policy and supported by technological advancements such as floating solar and bifacial solar PV modules, which help improve the financial feasibility of large-scale solar PV in Japan.

In China's Suzhou Industrial Park, a distributed clean energy microgrid Distributed Clean Energy Microgrid was implemented where it supplies up to 10% of the industrial area's energy consumption. The project includes two clean energy centers, 10 microgrid systems, 100 distributed energy systems including 25MW photovoltaic generation, 50MW wind generation, 22MW storage capacity and 1,000 electric vehicles, forming a clean energy system that is over 1 GWh.[23]

2.2.3 Carbon capture, utilisation and storage (CCUS)

Problem statement / opportunity for Jurong Island

CCUS is an integral pillar to Jurong Island's strategy towards achieving net zero. As outlined in the Sustainable Jurong Island plan, the island aims to capture two million tonnes in captured carbon dioxide by 2030.

Solution

CCUS solutions that utilise storage of CO2 beneath the ocean floor provide promising opportunities for proliferation of CCUS technology on Jurong Island. CCUS would be key to decarbonising unavoidable carbon emissions; for example, residual carbon emissions from industrial processes and product use that could not be avoided, even with other decarbonisation methods in place, such as increasing systemic efficiency and circularity and clean electrification.

A network of dedicated pipelines that connect and transport industry carbon emissions across Jurong Island to CCUS facilities could be developed in the existing Jurong Island services corridor for utilities. The potential of repurposing of existing gas pipelines for CO2 should also be investigated.

Apart from long-term storage of the CO2, industry players should collaborate on efforts to explore utilisation of captured CO2 for energy processes. There are various ways in which captured CO2 gas could be used beneficially. One example: captured carbon is highly viable as a working fluid in CO2-based steam cycles. When pressurized into its supercritical state, it can transfer heat more readily and require less energy for compression. Both these properties help achieve high power cycle efficiency.[24] The captured CO2 could also be used to extract geothermal energy by injecting it into geothermal reservoirs where it is heated and subsequently extracted to drive a turbine for electricity production.[25] Another well-developed use of CO2 includes enhanced oil recovery (EOR), where it is injected into an existing oil or gas field to increase recovery of oil and natural gas. The gas displaces the oil and is permanently stored in minute pore spaces. In the case of Jurong Island, government-related bodies like EDB and A*STAR are piloting the production of carbonated aggregates using captured CO2. These aggregates can then be used for land reclamation, road construction and coastal adaptation for climate change.

Typical benefit

CCUS technologies enables direct reduction of carbon emissions from industrial activities. When deployed appropriately, CCUS offer a highly viable pathway to decarbonise hard-to-abate sectors such as the energy and chemicals (E&C) industry on Jurong Island where there are inherent challenges with abating carbon emissions associated with industrial processes and product use during manufacturing.

21 *Klein, C. (2022, May 23). Generation capacity of Solar Japan 2012-2021. Retrieved from Statista: https://www.statista.com/statistics/814161/japan-generating-capacity-solar-energy/#:~:text=In%202021%2C%20the%20generation%20capacity,6.6%20thousand%20megawatt%20in%202012*

22 *Rai-Roche, S. (2022, June 10). PV Tech Project News, Japan set to reach 150GW+ of installed solar by 2030, rises to 180GW when more ambitious scenario pursued. Retrieved from PV Tech Web Site: https://www.pv-tech.org/japan-set-to-reach-150gw-of-installed-solar-by-2030-rises-to-180gw-when-more-ambitious-scenario-pursued/*

23 *Accenture. (2021). Industrial clusters, Working together to acheive net zero. Retrieved from Accenture Web Site: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters.pdf*

24 *Patel, S. (2019, April 1). POWER Magazine article, April 2019, What Are Supercritical CO2 Power Cycles? Retrieved from POWER Magazine Web Site: https://www.powermag.com/what-are-supercritical-co2-power-cycles/*

25 *Richter, A. (2021, May 19). Think Geoenergy, Technology News. Retrieved from Think Geoenergy Web Site: https://www.thinkgeoenergy.com/cpg-systems-storing-co2-for-geothermal-energy-production/#:~:text=CO2%20plume%20geothermal%20CPG%20technology,in%20motion%20to%20produce%20electricity.*

While the technology is presently at a nascent stage, CCUS could also enhance industry circularity by the utilisation of captured CO2 to produce valuable products.

Challenges

One of the biggest barriers to CCUS adoption is the cost to capture CO2. The cost may vary depending on the industry and the average capture cost for the petroleum refining industry is more than $100 per tonne.[26] For comparison, the current price on carbon imposed by the government on facilities that emit beyond 250,000 tCO2e per year is S$5/tonne. The government plans to increase this over the years to reach S$50-S$-$80/tonne which could improve the financial viability of CCUS.[27]

As the technology is in its early stages, investors are wary of the financial risks involved. Additionally, organisations will need to mitigate the risk of stranded assets with other ongoing projects.

On the technical aspects, the transport of condensed carbon dioxide would require specialised pipelines to maintain pressure and keep it in the liquid state. Existing oil and gas pipelines on Jurong Island will need to be renovated to be usable for CO2 transportation and calls for investment in such foundational infrastructure to enable CCUS.

Singapore currently lacks a suitable geological site for carbon storage, hence collaboration with neighbouring countries such as Indonesia and Malaysia becomes important for access to suitable carbon storage sites in the region. Also, any reservoir that is identified should ideally be closely located to Jurong Island as complexity and cost will increase as the distance increases between generation source and storage location.

Action

Considering the challenges for CCUS, the Singapore government's support of CCUS development by implementing policies that drive demand for carbon sequestration is important. For example, Singapore's Carbon Pricing Act is setting the marginal cost of abatement for companies on Jurong Island. The carbon tax policy should be continuously enhanced so that companies continue to invest and adopt CCUS technology.

Jurong Island industrial cluster is an ideal location for implementing CCUS as costs across the value chain can be driven down due to scale. Since multiple sources of carbon dioxide emitters are located nearby, emissions can be captured via a single capture, transport and storage system. Not only are transportation and storage costs reduced, but the shared facility also allows companies to reduce investment risk.

Case study [28]

UK's Zero Carbon Humber is a coalition of 12 entities collaborating on joint CCS infrastructure projects. The project will capture CO2 at scale from industrial sites via pipelines, which is then transported to compressor stations where it is readied for permanent storage.

The project is complemented by the Northern Endurance partnership which focuses on the development of offshore transport and storage infrastructure for carbon dioxide emissions in the North Sea. The UK government's "levelling up" agenda which aims to attract industry growth by deploying low-carbon technology to industrial regions has been critical to Humber's CCS success. The effort is further augmented by implementing low-carbon technology based on the geological and geographical advantages of each region.

26 *Accenture. (2021). Industrial clusters, Working together to acheive net zero. Retrieved from Accenture Web Site: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters.pdf*

27 *CNA. (2022). Budget 2022: Singapore to progressively raise carbon tax to reach net-zero target 'by or around mid-century'. Retrieved from https://www.channelnewsasia.com/singapore/carbon-tax-net-zero-target-emissions-singapore-green-plan-2506496#:~:text=SINGAPORE%3A%20Singapore%27s%20carbon%20tax%20will,18)%20in%20his%20Budget%20speech*

28 *Accenture. (2021). Industrial clusters, Working together to acheive net zero. Retrieved from Accenture Web Site: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters.pdf*

Zero Carbon Humber is aiming to capture up to 44 MtCO2 by 2040, accounting for approximately 30% of UK's total committed carbon dioxide capture.

The HyNet North West project is another UK industrial decarbonisation project featuring the use of CCS to decarbonise world-class energy intensive industries in North West England and North Wales, including chemicals, glass, ceramics, oil refining, food, paper and automotive.[29] The HyNet North West CCS project would see the transportation of CO2 to depleted gas reservoirs in Liverpool Bay for long term storage, the potential is abatement of 10 million tonnes of per year by 2030, equivalent to 100% of the UK government's 2030 target for CCS.[30]

As of February 2022, HyNet North West has signed 19 Memorandum of Understanding (MOU) with companies for the capture of carbon emissions.[31]

2.2.4 Clean energy focus – Clean Hydrogen

Challenges due to resources scarcity in Singapore

Clean hydrogen, while holding substantial promise for decarbonisation of hard-to-abate industrial activities, is less appropriate for Singapore at the present time mainly due to challenges with lack of abundant and cheap renewable electricity as well as access to water to support production of green hydrogen.

The lack of accepted certification standards for hydrogen is also a significant hurdle. This makes it difficult for producers to substantiate their green or blue credentials claim for hydrogen supplied,[32] while users/buyers may have doubts on the sustainability of hydrogen procured, the use of blockchain and digital technology for traceability across the hydrogen supply value chain could be valuable towards solving the challenges around certification and trust.

In addition, there are other significant techno-commercial challenges with clean hydrogen solutions. The technology is still in its nascent stage for scaled-up deployment and integration with existing industrial infrastructure and manufacturing processes. As projects are still being developed and built, there is at present a lack of proven application in large-scale efforts. Relatedly, the cost of clean hydrogen solutions is less competitive compared to other decarbonisation technologies such as electrification with renewable generation sources.

Longer-term play for Singapore: Regional hydrogen hub

Despite the relative lack of opportunity to produce green hydrogen, we believe Singapore is well-placed to position itself as a regional clean hydrogen hub in the longer term when the regional trade market develops, especially in East Asia.

To support this area of new growth, there may be a need to repurpose currently existing bulk liquids, and LNG storage facilities and terminals, building on its established position as a regional logistics and transportation hub. Taking the development in Europe as a reference, the government is heavily incentivising the development of the hydrogen economy in meeting their industrial decarbonisation goals.

Case study [33]

The Port of Rotterdam is undergoing a transformation towards into an international hydrogen hub with key projects planned from now until 2030. The Rotterdam Port Authority is collaborating with Gasunie, a Dutch natural gas network operator, on a hydrogen backbone public infrastructure that connects production and import tankers in the port area.

This hydrogen backbone, which is expected to begin operations as early as 2023, would be connected to Gasunie's national infrastructure throughout the Netherlands and to corridors leading to industrial areas in Chemelot in Limburg, and North Rhine-Westphalia, enabling the transformation of the Port of Rotterdam into an international hydrogen hub.[34]

29 *HyNet North West. (n.d.). About Page. Retrieved from HyNet North West Project Web Site: https://hynet.co.uk/about/*
30 *HyNet North West. (n.d.). Carbon Capture Factsheet. Retrieved from HyNet North West Project Web Site: https://hynet.co.uk/wp-content/uploads/2021/06/HyNet-Factsheet-CCS.pdf*
31 *Eni UK. (2022, February 9). ENI UK: 19 AGREEMENTS SIGNED FOR CARBON, CAPTURE & STORAGE WITHIN HYNET. Retrieved from HyNet North West Project Web Site: https://hynet.co.uk/eni-uk-achieves-a-major-breakthrough-for-uks-decarbonisation-process-with-19-memorandums-of-understanding-mous-signed-for-carbon-capture-storage-within-the-hynet-north-west-project/*
32 *Hydrogen is categorised into various categories depending on its source. A breakdown of the categories, better known as the colours of hydrogen, is as follows. Green hydrogen: Uses renewable sources like wind and solar. Blue hydrogen: Produced from low-intensity processes e.g., natural gas where CO2 emissions are captured and stored.*
33 *Port of Rotterdam. (n.d.). Hydrogen in Rotterdam. Retrieved from Port of Rotterdam Web Site: https://www.portofrotterdam.com/en/port-future/energy-transition/ongoing-projects/hydrogen-rotterdam*
34 *Port of Rotterdam. (n.d.). Hydrogen Economy in Rotterdam. Retrieved from Port of Rotterdam Web Site: https://www.portofrotterdam.com/sites/default/files/2021-06/hydrogen-economy-in-rotterdam-handout.pdf*

In developing the planned hydrogen network, Gasunie has estimated that 85% of the hydrogen network would consist of recycled natural gas pipelines, contributing significant cost savings for the project. In comparison to the option of laying completely new pipelines, the repurposing of natural gas pipelines is estimated to bring cost savings of about 25%.[35]

2.3 LEVERAGING SINGAPORE'S STRENGTHS FOR SUCCESSFUL NET ZERO TRANSITION

Singapore has continued to transform itself to become a leader in high value, specialised industries. A large part of its current success can be attributed to several key factors, including a mature technology landscape, a wide pool of talent, access to financing, and a robust transport network. Even as Jurong Island moves towards net zero, these factors continue to play a significant role in ensuring its future success.

Mature technology landscape

Singapore hosts many of the research and development (R&D) centres for the world's leading companies including the likes of Solvay, etc. In addition, there is strong support from government through its various grants into sustainability-based research conducted in local universities like National University of Singapore (NUS) and Nanyang Technological University (NTU). As such, it has early access to the latest in net zero technologies.

The critical pathway to carbon abatement relies on a host of digital capabilities to provide visibility and measurement of key emissions metrics, besides enabling better control over industry parameters which improve resource efficiency. Singapore is an early adopter of key digital and communications technologies like artificial intelligence (AI), internet of things (IoT) devices and 5G network. These technologies in turn enable net zero solutions including digital twins and smart grid solutions.

Building on these characteristics, the government has positioned Jurong Island as the leading choice for companies as a testbed for sustainability-focused projects, having provided a supporting ecosystem which maximises potential for success.

Highly skilled and specialised workforce in the areas of science, technology, engineering and math (STEM)

One of the key factors to Singapore's modern success is its continued ability to attract the brightest talents in the world globally to bolster its workforce. The country ranks number 2 on INSEAD's Global Talent Competitiveness Index, just behind Switzerland and ahead of the United States of America.[36] Singapore boasts a large pool of STEM talent, comprising both local and international residents. In addition, the government continues to invest in its people, providing various educational grants to upskill and retrain its workforce to serve new industries and meet new global demands for specialties in sustainability technologies.

As such, companies are attracted to invest in Singapore as it provides the opportunity to tap into its vast talent pool of specialised workforce. This is especially important when investing into nascent technologies where deep expertise may be difficult to acquire and retain due to its high demand.

Access to green financing

Singapore is Southeast Asia's financial hub with total assets under management reaching S$4.7 trillion in 2020.[37] A strong banking sector and progressive legal and regulatory systems make Singapore an ideal choice of destination for high net-worth individuals and family offices. This feature is further augmented by Singapore's Green Bond framework, which provides a robust governance structure for the investment and issuance of green funds. Its strong financial structure inspires confidence in both investors and investees to commit to large-scale decarbonisation initiatives.[38]

35 *Gasunie. (2021, June 30). Press release, Gasunie decision on hydrogen infrastructure is milestone for energy transition. Retrieved from Gasunie Web Site: https://www.gasunie.nl/en/news/gasunie-decision-on-hydrogen-infrastructure-is-milestone-for-energy-transition*

36 *INSEAD. (2021, October 19). INSEAD Newsroom, 2021 Global Talent Competitiveness Index: Fostering green and digital jobs and skills crucial for talent competitiveness in times of COVID-19. Retrieved from INSEAD Web Site: https://www.insead.edu/newsroom/2021-global-talent-competitiveness-index-fostering-green-and-digital-jobs-and-skills-crucial-for-talent-competitiveness-in-times-of-covid-19*

37 *Koh, N. (2021, Jun 30). Assets under management in Singapore rises 17% to $3.5 trillion. Retrieved from Asian Investor Web Site: https://www.asianinvestor.net/article/assets-under-management-in-singapore-rises-17-to-3-5-trillion/470753*

38 *Ministry of Finance Singapore. (2022, August 29). Ministry of Finance Green, Fiscal Policies, Green Bonds Web Page. Retrieved from Ministry of Finance Singapore Web Site: https://www.mof.gov.sg/policies/fiscal/greenbon*

Globally connected transport network

As Singapore is highly dependent on the import of goods to meet local consumption, it is continually developing its transport network and is epitomised by Changi Airport and more recently, Tuas Port. Its port connectivity is especially important in the context of decarbonisation as it will be facilitating the trading of key sustainability-based materials such as hydrogen and bio-based chemicals.

The newly inaugurated Tuas Port is set to become the world's largest fully automated port. Its 66 berths effectively double its handling capacity compared to its predecessor Pasir Panjang Terminal. On this note, Singapore is well-placed to be a key player in the future market for sustainable products and green hydrogen.

3. CHARTING JURONG ISLAND'S TRANSFORMATION GROWTH JOURNEY TOWARDS NET ZERO

3.1 COLLABORATIVE APPROACH TOWARDS NET ZERO IMPLEMENTATION

Emerging technologies like hydrogen and CCUS solutions have yet to prove their financial viability on an industrial scale and pose a risk to early adopters. However, organisations could navigate these uncertainties and mitigate some risks by adopting a collaborative approach and shared value mindset towards implementation.

At first glance, industries like chemical, energy, or manufacturing on Jurong Island are seen as siloed. However, each of them contains an ecosystem of diverse players that are part of their value chain. Cross-industry collaboration requires the building of trust among cluster partners. This could be achieved by forming working groups with representatives from all stakeholders such as industrial partners, government representatives, financiers, etc. The players could assess the concentration of industry within the geographic region and understand the diverse set of needs (e.g., fuel requirements for industrial processes) within the group.

83% of digital ecosystems have partners involved from three sectors.[39] With a system of interconnected elements, the multi-party system could become the digital backbone that builds not just new ecosystems, but also new business models for emerging companies, joint ventures (JVs) and consortiums, uncovering value for all partners.

Partnership and collaboration can also address Singapore's limitation of geological storage resources for CO2. Regarding CCUS implementation, Singapore could consider regional collaborative initiatives for CO2 storage. Regional approaches to CCUS infrastructure in Southeast Asia would likely incorporate CO2 transport by ship, which could be a lower-cost option for longer distances and smaller quantities of CO2.[40]

Jurong Island players could develop commercial models and risk-sharing initiatives such as JV formations, public-private partnerships, long-term PPAs, and take-or-pay agreements that help accelerate implementation of roadmaps.

3.2 MITIGATING RISKS AND ADVANCING THE SUSTAINABILITY AGENDA WITH CONFIDENCE

With its strategic location, favourable policies, and resilient financial system, Singapore is well placed to catalyse Southeast Asia's net zero development. It is key that the transition within Singapore is fair and just for all its people and stakeholders. As the country navigates the complex challenges of transitioning to net zero, it is imperative that the needs of all segments of society are considered

39 *Accenture Research. (2021). Future of Partner Relationships. Retrieved from https://www.accenture.com/_acnmedia/PDF-150/Accenture-Future-of-Partner-Relationships.pdf*
40 *International Energy Agency (IEA). (2021). Carbon capture, utilisation and storage: The opportunity in Southeast Asia. Retrieved from https://iea.blob.core.windows.net/assets/2c510792-7de5-458c-bc5c-95c7e2560738/CarbonCaptureUtilisationandStorage_TheOpportunityinSoutheastAsia.pdf*

and the potentially negative impacts stemming from the transition are appropriately addressed, to ensure that benefits and value created could be shared equitably and inclusively among all stakeholders.

The implementation of low carbon and sustainability solutions to the E&C industry on Jurong Island could catalyse efforts in reskilling of the country's workforce for new technologies and businesses, ensuring the safeguarding of jobs for the people, maintaining employability as well as the creation of new jobs. Through Jurong Island, Singapore in collaboration with industry players, can train critical green skills not only for the nation but for the whole region, becoming Southeast Asia's centre of excellence for developing its own sustainability workforce.

An Accenture report on green skills in Singapore finds that equipping the workforce across all sectors with green skills is fundamental in accelerating the speed of the country's transition to a green economy, which is identified as a potential driver of growth in the future. Despite pioneering sustainability efforts such as NEWater and Green Mark Scheme, a large part of Singapore's businesses represented by Small Medium Enterprises (SMEs) is lagging in implementation of sustainability. While leaders are mainly multinationals and some local companies, accounting for over 40% for employment demand for green skills despite employing less than 30% of the country's workforce. The report calls for a mindset shift and upskilling of the workforce so that Singapore is well positioned to make the best out of the sustainable transition, leaving no one behind.

Besides building the talent pipeline, government and investors will need to relook into existing strategies and navigate the common risks associated with net zero transitions.

Policy risk

The risk concerns potential changes in government and/or specific policies toward climate targets and associated regulations, which destabilises investor confidence and introduces uncertainty for the long-term financial viability for low-carbon investments.

To mitigate such risks, Singapore Budget 2022 has outlined the mid-term plan, which progressively increases the carbon tax to reach S$50 to S$80 per tonne of emissions by 2030.[41] To accelerate the transition, integration of low-carbon technologies into national energy and climate strategies could serve as an important policy signal for investors and public companies as has been demonstrated by the Singapore Government. For example, Singapore provided early indication of its approach in its Long-Term Low Emissions Development Strategy (LEDS), notably specifying CCUS as an important advanced technology for enabling the low-carbon transition.[42]

Investment risk

The risk includes the lack of clarity or suitability of sustainable business models (e.g., regulated asset base, contract for differences payments) for low-carbon technologies which often require scale and significant upfront infrastructure investment. This ambiguity could deter interest from private companies and delay the achievement of net zero emissions.

As a mitigation, governments could work together with international finance entities to create strong business cases for low-carbon investment. Increased engagement between industrial cluster players and the climate-finance community will be crucial to developing a common understanding and support for future sustainability projects.[43]

Various types of green financing products are now available, including grants and loans from development and climate finance institutions, emissions credit mechanisms, and climate-related debt financing. Several investment funds in Southeast Asia could be potential sources of financing, including Singapore's Temasek investment fund and a low-carbon investment partnership called Decarbonisation Partners formed by BlackRock.[44]

Stranded assets risk

This risk concerns how rapid changes in company policy—as opposed to a phased-out approach for older carbon-based assets that lack carbon mitigation potentials—could lead to an accumulation of stranded assets, which has wider economic consequences on jobs and the health of private industries and financial institutions. In response, businesses could consider building shorter-term

41 *CNA. (2022). Budget 2022: Singapore to progressively raise carbon tax to reach net-zero target 'by or around mid-century'. Retrieved from https://www.channelnewsasia.com/singapore/carbon-tax-net-zero-target-emissions-singapore-green-plan-2506496#:~:text=SINGAPORE%3A%20Singapore%27s%20carbon%20tax%20will,18)%20in%20his%20Budget%20speech.*

42 *International Energy Agency (IEA). (2021). Carbon capture, utilisation and storage: The opportunity in Southeast Asia. Retrieved from https://iea.blob.core.windows.net/assets/2c510792-7de5-458c-bc5c-95c7e2560738/CarbonCaptureUtilisationandStorage_TheOpportunityinSoutheastAsia.pdf*

43 *International Energy Agency (IEA). (2021). Carbon capture, utilisation and storage: The opportunity in Southeast Asia. Retrieved from https://iea.blob.core.windows.net/assets/2c510792-7de5-458c-bc5c-95c7e2560738/CarbonCaptureUtilisationandStorage_TheOpportunityinSoutheastAsia.pdf*

44 *International Energy Agency (IEA). (2021). Carbon capture, utilisation and storage: The opportunity in Southeast Asia. Retrieved from https://iea.blob.core.windows.net/assets/2c510792-7de5-458c-bc5c-95c7e2560738/CarbonCaptureUtilisationandStorage_TheOpportunityinSoutheastAsia.pdf*

projects that are more convertible and modular as well as quantifying project returns under stranding scenarios. These steps enable a more gradual and calculated transition towards net zero.

CONCLUSION

The paper looks at what net zero emissions growth means for Singapore—a transformation that is driven by industrial decarbonisation with Jurong Island at the frontier. There will be opportunities, as well as implications to businesses and government in approaches, capital spending and jobs for the island that produces up to 54% of Singapore's total carbon emissions.

Jurong Island has taken first steps towards achieving net zero, with a target of two million tonnes of carbon capture by 2030 and six million tonnes of carbon abatement by 2050.

However, more urgent action would be needed to supercharge Jurong Island's next phase of growth, driven by clear elaboration of country's net zero transformation ambitions including government policies, initiatives and implementation timeframe. All ecosystem players including industry players, investors, and governments should double down on their commitment to Singapore's carbon abatement and sustainable product output, drawing on the strengths of their technology, workforce, financing, and connected network.

The areas that should be of immediate priority, in view of the challenges around space constraints and hard-to-abate industry processes, are integrated net zero solutions which focus on:

- **Systemic efficiency and circularity** with increased sharing of resources such as feedstock, process heat and steam enabled by digital infrastructure. Industry players would need to collaborate and find ways to valorise waste streams while government could introduce policies that incentivise the use of waste products.
- **Clean electrification** by maximising deployment of rooftop solar where possible and increase the import of low–carbon electricity due to land constraints as current energy mix is predominantly generated using natural gas.
- **CCUS** for its hard-to-abate E&C sector processes. Efforts to attract international investments in piloting CCUS infrastructure, to enable the transportation, storage and utilisation of stored carbon emissions should be started immediately so that Jurong Island is well-placed for scaling the deployment of CCUS in the longer term.

Direct electrification of industrial processes is less applicable for the energy sector since it operates at higher temperatures. Hydrogen, though promising, stands less favourably for Singapore since it lacks the land and renewable energy sources for scale-up and commercialisation. However, in the longer term when the regional clean hydrogen trade market matures, we see that Singapore could potentially position itself as a clean hydrogen hub by repurposing its LNG and bulk liquids storage and logistics facilities.

One company alone cannot deliver on the decarbonisation of Jurong Island. Partnerships and collaboration between organisations would be crucial to facilitate the sharing of data and insights, investments, and risks to unlock shared value towards achieving net zero.

A collaborative approach promotes new opportunities in digital ecosystem, business models, and regional government-to-government (G2G) partnerships. Policies and financial risks are better navigated by businesses and government together, through mitigations in supportive policies, available financing, and cost-competitive technologies. In advancing the net zero agenda and for enabling a fair and just transition, taking an integrated industrial cluster approach with strong partnerships between government and industry would position Singapore to be a regional leader in sustainable transformation of the E&C industry. What could be achieved together is greater than that of companies and organisations working individually.

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RESPONSIBLE SUPPLY CHAIN AND CIRCULAR ECONOMY

EUROCHAM POSITION PAPER 2022–2023

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

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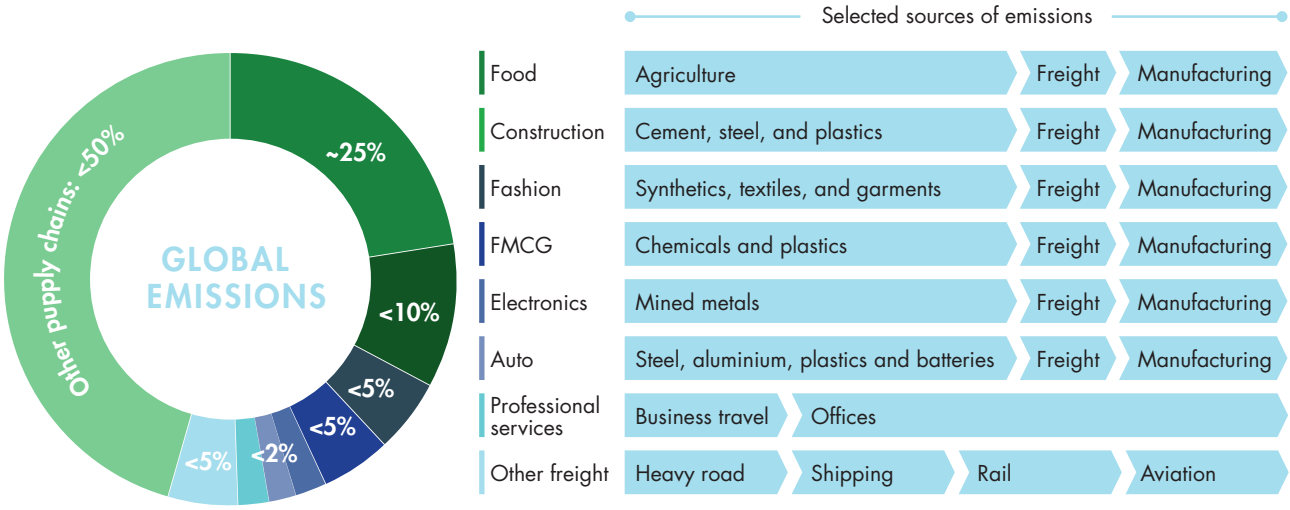
INTRODUCTION

A global move towards building responsible supply chains

According to a 2021 Boston Consulting Group study, end-to-end supply chain carbon emissions are higher than the direct emissions from a company's operations.[1] Eight global supply chains in food, construction, fashion, fast-moving consumer goods, electronics, automotive, professional services, and freight activities, account for more than 50% of annual greenhouse gas emissions (fig.1).[2] With these alarming numbers, organisations and governments worldwide have triggered a global move towards global sustainability through re-evaluating and generating new policies for sustainability. In Southeast Asia, governments have participated in pledges of carbon neutrality to push their country towards reducing overall carbon emissions whilst building green infrastructure such as sustainable air fuel to transition the country towards a more sustainable future. Singapore for example, has pushed out the Singapore Green Plan 2030 and in its latest Nationally Determined Contributions at COP 26, it has stated that Singapore aims to reach "net zero emissions as soon as viable in the second half of the century".[3]

1 *https://www.bcg.com/publications/2021/fighting-climate-change-with-supply-chain-decarbonization*
2 *Ibid.*
3 *https://www.channelnewsasia.com/singapore/cop26-singapore-climate-change-target-grace-fu-2312456*



Source: BCG analysis.
Note: Only selected value chain steps are shown in chevrons. The width of a chevron does not reflect the proportion of Co2 emissions.
FMCG = Fast-moving consumer goods

Figure 1. Breakdown of 8 global supply chains, taken from BCG Publication: Supply Chains as a Game-Changer in the Fight Against Climate Change

Due to the pollutive nature of supply chains, coupled with the global rise of online business and consumer activity with COVID-19, collaborations across organisations and governments worldwide have also surfaced to ensure that end-to-end supply chains are as sustainable as possible. However, with the complexity of supply chains, the number of involved entities, and the multitude of means to manage and transport goods, the effort to make supply chains more responsible remains an ongoing feat for many.

SCOPE AND OBJECTIVES

Intended to target both European companies and the Singapore government, this position paper on Responsible Supply Chain will showcase the unique nature of Singapore and Europe in relation to building and maintaining sustainable supply chains. More importantly, this paper synthesises challenges, opportunities, and differences between these two entities, to ultimately draw future recommendations for building more responsible supply chains. It is crucial to understand that organisations, governments, and countries are developing sustainable supply chains at their own pace and at the availability and mastery of knowledge and resources. Hence, this position paper is imperative as a guide for Europe and Singapore to find a way forward together.

The position paper will centre around these three main questions.

1. What are the differences between Europe and Singapore in building and maintaining sustainable supply chains?
2. How aligned are Europe and Singapore and what are the specific priorities of Singapore in relation to European businesses?
3. In what areas and with what means can greater collaboration be fostered between the two parties?

METHODOLOGY

The methodology utilised for this paper consists of mainly secondary research, and written, qualitative interviews with selected European Companies.

To understand the local government's (entity) perspective on responsible supply chain management, qualitative desk research was conducted to understand their attitudes, direction and most updated plans such as the Mandatory Reporting Scheme. On the side of Europe, EuroCham has also done research on European policies implemented by the European Commission to set guidelines on maintaining responsible supply chains.

Additionally, to obtain qualitative member data, and the perspective of businesses to the issue of responsible supply chain, EuroCham has approached Ipsen Pharma, Pernod Ricard, and CMA CGM for more information on how European Companies across different industries handle their supply chains. To do so, EuroCham has conducted written interviews coupled with follow-up in-depth questions on every aspect of the company's supply chain management - procurement, transportation, logistics, use of technology, packaging, reporting, waste management and social responsibility. Following this, the data obtained would be used as case stud-

ies to illustrate supply chain management practices in European Companies, and to also highlight the differences between supply chain management in Europe versus Singapore.

CHAPTER 1: SINGAPORE'S MOVE TOWARDS A SUSTAINABLE SUPPLY CHAIN

SINGAPORE'S ATTITUDE AND MOTIVATIONS

Amidst a global shift towards sustainability backed by consumer-induced pressure on companies to become green, Singapore is also seeing a gradual shift towards solution-generation and regulation for sustainable supply chain management. Furthermore, as the city state expands into a regional hub, and as more multinational companies such as DHL establish their distribution hubs and Asia Headquarters in Singapore, there is mounting pressure for the country to develop sustainably and serve as the focal point of supply chain sustainability not just for Singapore but also for the larger ASEAN region.

In Singapore, the transport and logistics sector within the local supply chains play a sizable role in contributing to Singapore's carbon emissions and yet, SMEs in Singapore especially, remain unfamiliar with possible supply chain management solutions.[4] Hence, as an import-oriented city state housing an array of MNCs and SMEs, Singapore's main areas of concern along the supply chain would be:

- Ensure sustainable and responsible procurement from suppliers locally and abroad
- Education and development of helpful solutions for companies that are new/looking to expand involvement in sustainability
- Sustainable transportation and last-mile delivery of products

With the development of COVID-19, Singapore, like the rest of the world, has sought digitalisation and sustainability as outlets for growth and development. The creation of Sustainable Aviation Hubs along with MNCs like Airbus is just an example of how the local government tries to incorporate digital solutions into ensuring that various nodes along the supply chain are optimised for sustainability.

Recognising that making supply chains sustainable and responsible occurs gradually and overtime, Singapore has been participating in global pledges to reduce carbon emissions and combat climate change. In 2021, Singapore enhanced its Nationally Determined Contributions (NDCs) under the United Nations Framework Convention on Climate Change (UNFCCC), aiming to halve peak emissions by 2050, and achieve net zero emissions 'as soon as viable' within the second half of the century. This is accompanied by additional pledges such as expanding the scope of its pledge to include a seventh greenhouse gas, Nitrogen Triflourite.[5]

Building responsible supply chains goes beyond a physical shift with viable solutions, it also necessitates a drastic mindset shift where individuals see the pressing need to change existing practices beyond sustainability as a passing trend. With the leadership of the government, and greater consumer pressure, there is optimism for Singapore to create more responsible supply chains.

EXISTING COMMITMENTS AND INITIATIVES

Procurement

In speeches made by Minister for Environment and Sustainability, Ms Grace Fu, she has highlighted some front-runners of sustainable procurement. For instance, the Mandai Wildlife Group was emphasised for its Sustainable Procurement Roadmap where it identifies 21 product categories that are detrimental to the environment and would be hence prioritised for sustainable sourcing.[6] In other cases, it has also managed to attain 100% sustainable sourcing for palm oil-based cooking oil.

Forming a responsible supply chain often begins with understanding the procurement practices of an entity. As Singapore moves towards its carbon commitments made during COP26, responsible and sustainable procurement has been of concern and focus in recent years. Spearheaded mainly by the government, initiatives such as the National Sustainable Procurement Roundtable (NSPR) has been implemented to assist companies in promoting sustainable procurement with the final goal of building more innovative and

4 *https://www.businesstimes.com.sg/hub-projects/switch-2021/green-tech-no-longer-a-good-to-have-but-a-must-in-supply-chains*
5 *https://www.channelnewsasia.com/singapore/singapore-targets-halve-peak-emissions-2050-achieve-net-zero-emissions-soon-viable-second-half-century-1338776*
6 *https://www.mse.gov.sg/resource-room/category/2021-12-06-keynote-address-at-sg-sustainable-procurement-forum-6dec/*

sustainable supply chains.[7] With a membership base of local companies, government entities and international corporations, the NSPR focuses on using group meetings, panel discussions and member based projects to discuss best procurement practices on topics such as circular economy and cutting carbon emissions, and to connect companies to drive sustainable procurement solutions.

Looking also at SMEs that wish to engage in sustainable procurement, ESG Singapore has also launched the $180m Enterprise Sustainability Programme to aim to support local enterprises to develop sustainable capabilities and to guide them in transitioning towards responsible procurement.[8]

Transportation and logistics

To accommodate a shift towards cleaner and renewable energy as part of sustainable procurement of resources along the supply chain, the Singapore government has also diversified to explore alternative energy to assist the country's shift to a low-carbon economy through energy vectors such as hydrogen, batteries, and solar panels. According to a Straits Times article, these new low-carbon technologies are also slated to be incorporated into various industries for powering vehicles and power generation.[9] In fact, at the Singapore International Energy Week 2021, the government has pledged to create a roadmap charting out its plans to have 30% of its electricity supply be from low-carbon electricity imports by 2035 via imports from ASEAN countries such as Malaysia, Indonesian and Laos.[10] Additionally, firms such as Sembcorp Industries have embarked on partnerships with Japan's Chiyoda Corporation and Mitsubishi Corporation to introduce a commercial-scale supply chain to deliver decarbonised hydrogen to Singapore via Liquid Organic Hydrogen Carriers (LOHC), organic compounds to chemically store hydrogen for transportation.[11] Pavilion Energy, a wholly-owned subsidiary of Temasek, has imported a carbon neutral LNG cargo in April of 2021 and has plans to build an emissions enterprise that is centred around carbon offsets for decarbonisation.[12]

Additionally, to maintain its reputation as a regional aviation and maritime hub, Singapore has also shown its commitments to green aviation and maritime fuels in transportations and logistical matters along global supply chains. Temasek is working with the Maritime and Port Authority of Singapore (MPA), as well as MNCs such as Neste to accelerate the adoption of green aviation fuel to cut carbon emissions.[13] To express this commitment, the Civil Aviation Authority of Singapore (CAAS) has successfully embarked on the next phase of its pilot project to blend Neste-supplied Sustainable Aviation Fuel (SAF) to Changi Airport's existing fuel hydrant system in July 2022, aiming to cut carbon emissions by 2,500 tonnes.[14] On the maritime aspect, Singapore has shown its commitment to decarbonising supply chains by presenting the Maritime Singapore Decarbonisation Blueprint 2050 that focuses on various aspects such as Marine Fuel, Research and Development, and International Maritime Organisation Standards to formulate a blueprint leading up to the eventual decarbonisation of the maritime industry in Singapore.[15]

Digitalisation for supply chain

Made more apparent by COVID-19, the Singapore government is of the stance that diversification of supply chains is insufficient. Rather, small states like Singapore must look to use technology to make supply chains more efficient. As such, the Supply Chain 4.0 Initiative was implemented in 2021 that brings together digital experts such as A*STAR, National University of Singapore (NUS), and National Technological University (NTU) to create digital and automation solutions to help SMEs especially become more sustainable and resilient to plausible future challenges.[16]

Emerging from COVID-19, Singapore's Emerging Stronger Taskforce (EST)[17], convened the Alliances for Action in 2020 to develop a digital tool, Singapore Trade Data Exchange (SGTraDex) to assist global firms in digitalising supply chains. Of its many functions, the tool serves to enhance the visibility of supply chain processes across logistic partners such as shippers, to then allow them to better optimise the movement of cargo and containers.[18] This allows companies to be more visionary as they are able to plan ahead with existing data, keeping their businesses more sustainable and cost-effective.[19]

7 *https://sustainableprocurement.sg/*
8 *https://www.mse.gov.sg/resource-room/category/2021-12-06-keynote-address-at-sg-sustainable-procurement-forum-6dec/*
9 *Read more about Green Hydrogen in this same article. https://www.straitstimes.com/singapore/low-carbon-hydrogen-fuel-tech-in-spore-could-be-fully-commercialised-in-2030*
10 *https://www.spglobal.com/commodityinsights/en/market-insights/blogs/energy-transition/111021-singapore-energy-transition-carbon-neutral-lng*
11 *https://www.straitstimes.com/singapore/low-carbon-hydrogen-fuel-tech-in-spore-could-be-fully-commercialised-in-2030*
12 *https://www.spglobal.com/commodityinsights/en/market-insights/blogs/energy-transition/111021-singapore-energy-transition-carbon-neutral-lng*
13 *https://www.straitstimes.com/singapore/greener-aviation-and-shipping-fuels-absolutely-critical-for-spore-sustainability*
14 *https://www.caas.gov.sg/who-we-are/newsroom/Detail/singapore-airlines-operates-its-first-flights-with-blended-sustainable-aviation-fuel-in-singapore*
15 *https://www.mpa.gov.sg/maritime-singapore/sustainability/maritime-singapore-decarbonisation-blueprint*
16 *https://www.straitstimes.com/business/18m-investment-in-tech-research-to-help-keep-supply-chains-agile-secure*
17 *The Emerging Stronger Taskforce (EST) was formed under the Future Economy Council (FEC) to review how Singapore can stay economically resilient and build new sources of dynamism to emerge stronger from COVID-19. For more information on the EST, visit www.emergingstronger.sg*
18 *https://sgtradex.com/images/pdf/Singapore%20Introduces%20SGTraDex.pdf*
19 *Ibid.*

Waste management methods

To outline its plans for future waste management, the National Environment Agency of Singapore (NEA) has implemented a complementary set of schemes to help the country's end-of-life product management. Under the Mandatory Packaging Reporting (MPR) scheme introduced in 2021, producers and suppliers of packaged products will have to submit packaging data and its 3R (reduce, reuse and recycle) plans to NEA.[20] 3R plans will include the company's initiatives, KPIs, and overall targets, plans for reducing, reusing, or recycling packaging, and development on making packaging life cycles more sustainable.[21] To complement this scheme, NEA has also recently rolled out a regulated E-waste management system to ensure the proper collection and management of E-waste, and the extraction of valuable materials from unwanted electronics. This system is based on an Extended Producer Responsibility approach that expects producers to bear the responsibility for the collection and treatment of their products as they reach end-of-life.[22] Producers can choose to do so either via 1-on-1 take back for regulated consumer products, in store collection of e-waste, or other NEA approved means of collection.[23]

CHAPTER 2: THE EUROPEAN APPROACH TO SUSTAINABLE SUPPLY CHAINS

EUROPE'S CORE OF SUSTAINABILITY

In 2019, the European Commission launched the European Green Deal (EGD) aimed at reducing overall Greenhouse gas emissions by at least 55% by 2030, and climate neutrality by 2050, whilst still achieving substantial economic growth.[24] Covering all sectors of the economy, all products sold, imported and made in the EU have to, hence meet higher sustainability standards. This means that for European companies who are producing in Europe, supplies shipped into a country would have to be sustainably sourced, making procurement more responsible.[25] Additional information is also expected of the producers and sellers of European products to explain to consumers how and where their goods are sourced from, its manufacturing processes, and its end-of-life treatment. [26]

In June and December of 2021, the European Commission continued to release more amendments and guidelines on sustainability under the "Fit for 55" Package to update and revise EU legislation to ensure that the EU is on track to reaching its climate goals under the EGD, and its policies are also aligned with the Council and the European Parliament.[27]

Ensuring Circularity for Some Product Groups

For the EU to remain on track to achieve its goals laid out in the EGD, it believes that building a circular economy is indispensable. Not only will the circular economy create opportunities in various industries, it will strengthen the industrial base of the EU and foster businesses, entrepreneurship, and collaboration amongst governments, SMEs, and MNCs.[28] For consumers, the creation of the circular economy across industries will allow them to ensure that the products and services they receive and opt for are high

20 *https://www.nea.gov.sg/our-services/waste-management/mandatory-packaging-reporting*
21 *Ibid.*
22 *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*
23 *Ibid.*
24 *Refer to EuroCham's 2020 Sustainability Whitebook on a breakdown of the European Green Deal.*
25 *https://www.cbi.eu/market-information/eu-green-deal-how-will-it-impact-my-business#what-extra-requirements-must-suppliers-to-the-eu-comply-with-at-what-time*
26 *Ibid.*
27 *https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/*
To read more about the Fit for 55 package, refer to page XXX of this Whitebook
28 *https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN*

quality, durable, and are created with the intention to maximise its lifespan.[29] To sum up the EU's plans, it has published the Circular Economy Action Plan (CEAP) which provides a set of guidelines and regulations from product design, production processes, to empowering consumers across a plethora of supply chains.[30]

Upon further analysis of the CEAP, the systematic construction of a region-wide plan aims to also be inclusive of some product groups. For starters, the plan ensures that there is a set of guidelines and regulations given to the businesses operating within the EU for aspects of manufacturing such as sustainable product design, where Ecolabels, the Ecodesign Directive, A Green Public Procurement Criteria (GPP) is introduced (albeit uptake by companies is on a voluntary basis).[31] While not mandatory to follow, these guidelines serve as a gauge for all companies to be better informed of what are the moving sustainability requirements and expectations within the region.[32] It also lends companies a platform to associate themselves to and showcase their commitment to sustainability. The CEAP also opens up gateways for future methods and aspects of the regulatory process under the purview of the EU Commission.[33]

Identified as having greater circularity potential, the CEAP has identified product groups such as textiles, electronics, steel, cement, and chemicals. Each group identified will be allocated to a different circular economy framework that is specific for the group type, and takes into account its unique characteristics. The framework will then contain a specific set of guidelines typically covering from procurement to end-of-life treatment of the product to guide businesses in ensuring that every node of the supply chain is properly considered.[34] As the EU mainly exports its wastes, the plan explores waste management methods, plausible ways in which companies can communicate their supply chain circularity initiatives to its consumers to ensure traceability and transparency, and how circularity can support the mitigation of climate change or bring about climate neutrality.[35]

Considering the environment and human rights

The EU has always considered the social aspect of supply chain management - broadly termed to be the consideration of the environment, social, and governance impacted as supply chains move globally. In 2022, the EU Commission has presented a proposal on the Directive on corporate sustainability due diligence to encourage sustainable and responsible corporate behaviour throughout global value chains.[36] Whenever possible, companies should ensure, prevent, and necessitate that their activities do not contribute to social problems such as child labour, worker exploitation, worker stagnation, exploitation of wildlife and nature spaces, etc.[37] These rules have been disseminated to different countries and are mainly targeting two types of EU companies - (a) EU limited liability companies of substantial size and economic power (500+ employees and EUR 150 mil in net turnover worldwide) and (b) other limited liability companies in high impact sectors (more than 250 employees, net turnover of EUR 40 Mil worldwide and more).[38] While SMEs are not directly targeted in this proposal due to their size and lack of financial ability, they are protected because they are eligible to receive financial support to guide and assist them in eventually being able to consider environmental and social factors in their operations.[39]

Within a company's operations and the entire extent of subsidiaries they deal with, they have to integrate considerations for the environment and human rights into policies upon identification of the risks, impacts and problem points when engaging in their own activities.[40] The state would be in charge of ensuring that these companies properly adhere to these requirements and may impose a fine for non-compliance. Additionally, individuals have the right to take legal action if they feel that in any way, the company has not been attentive to these regulations. Upon approval by the European Council, EU member states will be given 2 years to transpose this directive into a law, and report back to the commission.[41]

To provide a concrete presentation of the best supply chain management practices implemented by European companies, the paper will showcase some case studies from our member companies. Mainly, Ipsen Pharmaceuticals, Novartis, CMA CGM, Danone, and Pernod Ricard.

29 *https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN*
30 *Ibid.*
31 *Ibid.*
32 *Ibid.*
33 *Ibid.*
34 *Ibid.*
35 *Ibid.*
36 *https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1145*
37 *Ibid.*
38 *Ibid.*
39 *Ibid.*
40 *Ibid.*
41 *Ibid.*

INDUSTRY BASED CASE STUDIES

Pharmaceuticals: Ipsen Pharma

On digitalisation, Ipsen Pharmaceuticals has built comprehensive platforms to manage cloud and web services to deploy secure, robust and sustainable technical solutions, websites or applications to transform data into insights that support business decisions.

On packaging, Ipsen has set-up a rapid-packaging capability for the External Manufacturing Organisation (EMO) products to accelerate packaging and rework operations. This has enhanced Ipsen's reactivity to safety variations and secured the introduction of new products.

As a responsible member of the communities in which it lives and works in, Ipsen is committed to protecting the safety, health, and welfare of its people, the environment and the responsible use of natural resources.

It has recorded a 12% reduction of greenhouse gas emissions compared to 2019, 16% decrease in energy use since 2016, 8% reduction in carbon emissions in 2020 alone, 13 countries worldwide where Ipsen is recognized as an awarded employer, 97% of employees formalised a development plan with their manager in 2020. Furthermore, it has been implementing a global benefits standard that is applicable in every country where it has employees. This includes access to health insurance, maternity and paternity leave, life insurance and retirement.

Transportation and shipping: CMA CGM

As a global sea, land, air and logistics solutions provider, the CMA CGM Group provides agility that shippers need for end-to-end logistics solutions and a range of transportation modes to meet the varied requirements and speed to market. The group further enhances its capabilities and builds supply chain resilience through investments and assets.

Through CEVA Logistics, the Group's logistics subsidiary, together with the recent acquisitions of Ingram Micro, Colis Prive and GEFCO by the Group, its capabilities in end-to-end logistics solutions have been further strengthened. This includes e-commerce services like warehousing, fulfilment, reverse logistics, as well as last mile solutions. The Group has also invested in more than 50 port terminals in 33 countries. In 2021, CMA CGM expanded its investments in leading infrastructure to support the growth of its shipping lines and improve the quality of services offered to its customers.

Additionally, the importance of sustainability is growing among governments, businesses, and consumers in recent years. The CMA CGM Group is in the race to be a net zero carbon company by 2050 through energy transition. Today, it has 32 e-methane ready ships powered by LNG. By 2026, it will have 77 of them. By 2023, 10% of its fuel mix will be cleaner alternative fuels such as LNG, biofuel and biomethane, etc.

The CMA CGM Group enhanced its efforts to promote sustainable procurement by deploying a global evaluation system for its suppliers and intermediaries. CMA CGM has a group-wide sustainable procurement policy covering financing, corruption, sustainability, economic sanctions, competition laws, and personal data protection.

To identify and manage procurement risks, the Group implemented a five-step assessment tool.

1. Preliminary definition of the risk level
2. Risk assessment through an internal questionnaire by EcoVadis
3. Analysis
4. Supplier qualification
5. Monitoring over time

To further strengthen the monitoring of supplier risks and share best practices, CMA CGM published its responsible purchasing policy 'THE WAY TO BUY', applicable to all employees involved in any part of the procurement and supplier engagement process.

The CMA CGM Third Party Code of Conduct sets forth non-negotiable minimum standards that it expects from its partners, especially from suppliers, their employees and subcontractors. The principles in the document apply to all contractual relationships between CMA CGM and its business partners.

The Group implements a Responsible Procurement Strategy based on:

- **The Third-Party Code of Conduct:** all suppliers have to agree and to sign this Code of Conduct, which presents the involvement of CMA CGM regarding business ethics, social, societal and environmental axes. With this signature, suppliers and subcontractors agreed to respect CMA CGM's involvement.
- CMA CGM has done a suppliers/ subcontractors risk map that includes environmental and social criteria, per domain, geographical localisation.
- CMA CGM has developed a CSR assessment for a set of suppliers and has developed a Group Prequalification and qualification questionnaire for reinforcing the suppliers' screening before contracting and on a regular basis.

The Group accelerates shipping and logistics digitalisation by investing in IoT, artificial intelligence and blockchain solutions, to develop smarter and more secure service offerings.

To capitalise fully on the potential of digital technologies, the Group has developed a dedicated innovation ecosystem that focuses on three priority areas:

- **Customer:** updating customer relationships by creating new business models and developing new products and services.
- **Operational excellence:** simplifying processes to step up rate of development and improve decision-making in all areas.
- **Digital culture:** encourage innovation as a collaborative process between staff members, using agile working methods and a proactive approach.

Recently, the Group and the Maritime and Port Authority of Singapore (MPA) inked a Memorandum of Understanding (MOU) to initiate a collaboration on the development of capabilities and solutions across maritime decarbonisation, digitalisation and innovation. Some collaboration opportunities explored include maritime cybersecurity, just-in-time shipping, shipboard automation for more safety, efficiency and smarter solutions onboard vessels.

Since 2008, the Group has been committed to a green and exemplary approach to exceed the requirements of the MARPOL maritime regulations: the "Green Ship" programme. All vessels owned by the Group participated in this programme. For example, the quantities of waste produced are monitored, updated and reported, specific training sessions are conducted onboard and ashore, and sorting and recycling solutions are proposed whenever possible. The Group uses dismantling shipyards that meet and exceed the health, safety and environmental standards of the Hong Kong Convention. CMA CGM audits these sites directly and uses third-party organisations to monitor procedures on a daily basis during the dismantling process. In 2021, no vessels were sent for dismantling.

Many containers have been reused and converted into emergency shelters to support local communities following natural disasters, but also into cultural projects among others.

The Group actively drives stakeholder collaborations with partners across the ecosystem to build connected, resilient and sustainable supply chains. Here are some examples:

- To improve end-to-end visibility of supply chains, CMA CGM has integrated into TradeLens, an open and neutral industry platform underpinned by blockchain technology, supported by major stakeholders in the maritime ecosystem to promotes the efficient, transparent and secure exchange of information to foster greater collaboration and trust across the global supply chain.
- As a founding member of Digital Container Shipping Association (DCSA), CMA CGM paves the way for digitalization, standardisation, and interoperability in container shipping. DCSA establishes standards for a common technology foundation that enables global collaboration such as for smart containers, cybersecurity, eDocumentation, monitoring of on-board Reefers and just-in-time arrangements for port calls. This helps to ensure shipping services are flexible, reliable and environmentally friendly.
- Committed to accelerating maritime decarbonisation, the group is collaborating with MPA to explore the use of zero and low-carbon marine fuels such as e-methanol, e-methane and biofuels for commercial shipping while researching on technologies such as carbon capture solutions.
- CMA CGM will strengthen existing collaborations with MPA in attracting talent through maritime scholarships such as the Tripartite Maritime Scholarship. The Group and MPA will cooperate on new industry-wide initiatives to attract and empower the Singapore-based maritime workforce, tapping on the MPA Maritime Cluster Fund.

Wine and Spirits: Pernod Ricard

In 2019, Pernod Ricard launched its 2030 Sustainability and Responsibility (S&R) roadmap titled, "Good Times from a Good Place" outlining four (4) pillars covering all aspects of key material issues for the company. With its core business linked to nature and well-functioning ecosystems and within its Nurturing Terroir pillar, Pernod Ricard developed its Sustainable Agriculture Key Principles that is being implemented across the business to ensure that 100% of its key raw materials are eventually certified as sustainable. Pernod Ricard also works directly with farmers to champion and implement sustainable and regenerative agriculture practices within its own vineyards and beyond to increase carbon sequestration, protect and restore local biodiversity and empower local communities.

These include commitments by Pernod Ricard:

1. 100% of all raw materials mapped out and risk-assessed for sustainability by 2022;
2. Regenerative agriculture pilot schemes in 8 wine regions by 2025;
3. 100% of direct affiliates with a strategic biodiversity programme in place, linked to priority terroirs and supporting key brands;
4. Partner with 5,000 farmers on regenerative agriculture by 2030;
5. 50% reduction by intensity of Scope 3 carbon emissions by 2030;
6. 100% of key agricultural raw materials sourced according to selected sustainability standards by 2030.

Due to the wide range of its procurement and supplies, Pernod Ricard relies on many suppliers across its supply chain. From farming and manufacturing through distribution and merchandising, some of the Group's impact on society and the environment is managed by its suppliers. Pernod Ricard believes in building strong business relationships. Under it's Valuing People pillar and commitment towards responsible procurement, Pernod Ricard requires all suppliers (including raw material suppliers) and agencies to comply with the Responsible Procurement strategy by acknowledging and signing-on to Supplier Standards via an internal online platform, PartnerUp. This allows the group to have precise knowledge of the sustainability impacts and risks of supply chains and engage key suppliers through collaboration to reduce impacts and accelerate improvement towards ensuring no lack of mitigation plans for high or medium risks direct suppliers by 2025.

On sustainable packaging, the group's dedicated Sustainable Packaging Tool: "EcoPack Tool" and the creation of a multi expertise Sustainable Packaging Panel (marketing, sustainable performance, commercial, procurement and S&R) helps Pernod Ricard ensure compliance to their Sustainable Packaging Guidelines launched in 2019. These mandatory guidelines set out a list of eco-design principles to follow to achieve its Sustainable Packaging targets as part of the Circular Making pillar.

Pernod Ricard briefs and shares its Sustainable Packaging Guidelines and requirements with all suppliers and agencies to ensure materials used and design meet:

- Eco-design principles to reduce impact according to all New Product Developments by 2022.
- 100% certified cardboard by 2025.
- 50% recycled content of glass by 2025.
- 100% reusable, recyclable or compostable VAP/POS materials by 2025

This is with an aim to have all packaging evolutions managed according to circular design principles, ensuring each change is an improvement in the product life cycle and end waste is minimised or eliminated and circular design principles and mindset is adopted internally. As its primary packaging is glass bottles, Pernod Ricard and its brand companies are redesigning its glass packaging to increase the percentage of recycled content and light weighting while not compromising the quality and standards of its products. On secondary packaging, Pernod Ricard aims to remove giftboxes where possible, to reduce packaging waste, use of natural resources and overall environmental impact.

On point-of-sale (POS) products, the group has met commitments to completely eliminate all single use plastics POS items and is in the process of ensuring all remaining POS and new developments are fully reusable, recyclable or compostable.

Committed to minimising waste at every step by imagining, producing and distributing products and experiences in ways that optimise and help preserve natural resources, its strategy includes commitments around:

- Circular Design:
  - Packaging evolutions projects are managed according to circular design principles, ensuring each change is an improvement in the product life cycle and end waste is minimised or eliminated
  - Circular design principles and mindset is adopted by all teams
- Circular Packaging:
  - Ensure all primary packaging is 100% recyclable, compostable, reusable
  - Introduce recycled content in our glass (50% recycled content on average across the group) and plastic (25% recycled content)
  - 100% of cardboard packaging certified from sustainably managed forests standards (FSC / PEFC SFI)
  - No PET minis by 2025
- The creation of targeted projects to improve recycling rates in 10 key markets.
- Innovative circular distribution models to distribute products
- Water use reduction across all manufacturing sites and water replenishment programmes for manufacturing sites located in high water risk watersheds.

CHAPTER 3: ENCOURAGING GREATER EUROPEAN-SINGAPORE COLLABORATION

Harkening back to the objectives of this position paper - to trigger dialogue and explore further paths for collaboration on supply chain sustainability and responsibility between Europe and Singapore, the paper will now explore successful initiatives and existing gaps identified. Then, this chapter will explore further recommendations that may be implemented.

To consolidate, below are the main recommendations this paper will present:

1. Clearer Guidelines and Infrastructure to Follow up on Commitments
2. Expansion into EU-ASEAN-SG Digital Collaboration for Supply Chains
3. Increase Focus on ESG
4. Include SMEs and the Community in making Supply Chains Responsible
5. An Incentive-based Approach

WHAT HAS BEEN WORKING?

EU-SG Free Trade Agreements

In 2019, Singapore and the EU entered into the EU-Singapore Free Trade Agreement (EUSFTA). This partnership has allowed increased market access for EU Businesses in Singapore and vice versa. It also optimises import and export processes because the agreement entirely removes duplicate testing for certain products.[42] More importantly, this FTA opens up opportunities for new environmental services, green public tendering, and makes trading cheaper to allow more money to be invested into green technologies.[43]

Under the multitude of measures undertaken by this FTA, the Sanitary and Phytosanitary part aims to protect humans, animals, and plant life and health. This means that a level of transparency in information exchange is expected from both parties to recognise and ensure the quality of their goods as they trade. The agreement also protects the health and safety standards of each country, ensuring that trade does not compromise the standards of any party.[44] This means that the EU, which possesses a strict set of food and health safety rules, will not have their standards lowered to accommodate Singapore exports. All Singapore exports to the EU

42 *https://trade.ec.europa.eu/access-to-markets/en/content/eu-singapore-free-trade-agreement*
43 *Ibid.*
44 *Ibid.*

must fulfil the same/equivalent rules and regulations on environment, animal health and hygiene, consumer safety, and food safety regulations.[45] For Singapore, it will also only accept products that are deemed to be of low enough risks for its consumers and environment.[46] Hence, this FTA is effective because it not only heightens EU-SG trade, it also ensures that supply chains are optimised and yet ensures that processes and imported goods do not impede upon the health, safety, and well-being of external stakeholders such as consumers, animals, plants, and the natural environment.

Country-based digital partnerships

Aside from partnerships within the ASEAN bloc, Singapore has recently in March 2022, engaged France in a bilateral Digital and Green Partnership intended to provide a platform for the two countries to work on digital and green projects such as smart transportation, smart cities, cyber and financial innovation, as well as agri food technologies.[47] With the prioritisation of technological innovation undertaken by both countries, this partnership intends to bring the public and private sector closer by sharing sector-led green technologies to enhance the competitiveness of the Singapore and French economy and create more opportunities sustainably.[48]

GAPS ANALYSIS

Differences in the nature of supply chains between EU and SG

Since Singapore imports most of its goods, much of the supply chain procurement process at the manufacturing stage occurs outside of Singapore. In Singapore, the main focus is on transportation logistics, and end-of-life treatment. As Singapore is also land scarce, it does not possess sufficient space to ensure proper composting and decomposition of biodegradable matter. Instead, Singapore adopts the main method of incineration and dumping the incinerated ash into Semakau Landfill.

As highlighted by many of our EuroCham members as well, apparent differences in the way supply chains in Singapore and Europe can be further analysed. For instance, for pharmaceutical companies like Ipsen Pharma, that do not possess production facilities in Singapore or ASEAN, they will require extensive engagement with local distributors to provide warehousing and logistics services to ensure that their goods reach their designated customers.[49] This is the same for wine and spirits companies such as Pernod Ricard, whose production and sourcing footprint is based mainly in Europe, Americas, Australia, and New Zealand. Hence, operations in Singapore do not involve procurement, harvesting of food ingredients to make wine and spirits, and the wine and spirits manufacturing process itself. In Singapore, main operations and opportunities for sustainability along supply chains mainly revolve around ensuring compliance to the group's responsible procurement strategy, transportation and transhipment of goods to Singapore and the wider ASEAN region.[50]

Additionally, since it takes a significantly greater amount of time to transport goods from Europe to Singapore, it is expected that there will be a lot more packaging and technology to ship fragile items such as vaccines, medicines, and other perishable goods. Whereas in Europe, it is easier and takes less time to transport goods across various countries due to proximity and geographical similarities.

MNCs or SMEs?

More SME-oriented than many parts of Europe, Singapore has many programmes lined up in support of SMEs as they become more sustainable. As mentioned in the first chapter, Singapore has grants and programmes like the Energy Efficient Fund to encourage SME investment in low carbon technologies. Despite these efforts, there does not seem to be a concrete plan for SMEs of varying size, financial capacity, and scope to develop their sustainability agenda. More often than not, SMEs are local, meaning that they engage in procurement, sourcing, transport, and waste management themselves, either locally or abroad. Distinctively, they are not as established as MNCs to financially and physically ensure that their supply chain processes are sustainable. They may also not possess the technical expertise to create or engage digital tools to optimise supply chains, and track real time supply chain processes to ensure they remain sustainable. While cost is a pervasive problem for SMEs in comparison to MNCs, SMEs should still, in their own ways, ensure that their supply chains remain sustainable not at the expense of their own survival. This hence comes at the guidance and more detailed assistance of local governments.

45 *https://trade.ec.europa.eu/access-to-markets/en/content/eu-singapore-free-trade-agreement*
46 *Ibid.*
47 *https://www.mci.gov.sg/pressroom/news-and-stories/pressroom/2022/3/singapore-and-france-sign-partnership-on-digital-and-green-economy-cooperation*
48 *Ibid.*
49 *Written Interview with Ipsen Pharma*
50 *Written Interview with Pernod Ricard*

Over focus on optimisation

In order to ensure that supply chains become more optimal, efficient, and green, companies and the Singapore government have been focusing extensively on the topic of cutting carbon emissions. While cutting carbon emissions help correct global warming, certain carbon technologies and methods can be invasive to wildlife, nature, and even worker welfare. In order to build sustainable supply chains, it is also the responsibility of companies and governments to ensure the ethical aspect of its activities, and to always ensure that companies remain ethical and are aware of the ethical implications across the supply chain. To this aspect, Europe is significantly ahead of Singapore in terms of taking the ESG aspect into consideration when optimising and making responsible supply chain decisions.

Furthermore, this comes with understanding the industry-specific needs of stakeholders. For example, in a written interview, Ipsen Pharmaceuticals has noted a crucial point. Due to the nature of pharmaceutical products, it is difficult to reduce packaging (secondary and primary packaging are required for safety reasons). According to the current regulations for pharmaceutical products, the packaging is country-specific. If the electronic labelling system can be developed further, scanning the QR/bar code to download package inserts and instructions for use can save large amounts of paper and facilitate product flow tracking and anti-counterfeiting.

The need to expand partnerships

In recent years, Singapore has made significant progress in bilateral and regional FTAs or partnerships on trade and economic development. In the second phase of its efforts, it has also expanded to look at digital and sustainable Digital Economy Agreements (DEA) to expand and build more complex and efficient data systems.[51] Currently, Singapore is working on its Green Economy Agreements (GEAs) to serve as a strategic pathfinder that contributes to global capacities to address climate change.[52] Singapore has partnered with the EU to engage in free trade agreements, as well as country specific bilateral partnerships to expand upon green solutions. However, the existing partnerships can be expanded upon to look at every aspect of the supply chain to ensure that supply chains remain sustainable, because existing initiatives do not prioritise supply chain solutions in a bid to move supply chains from a linear to circular fashion.

RECOMMENDATIONS

Clearer guidelines and infrastructure follow-up on commitments

Currently, Singapore has many targets and plans to make supply chains more sustainable. However, what can be improved is the setting of clearer guidelines and specific checkpoints to keep organisations on track to reaching Singapore's sustainability goals. For instance, in an interview with Pernod Ricard, it was suggested that legislation or checkpoints could be implemented to track carbon emissions or the government could mandate ships to carry a minimum load to improve supply chain sustainability. Since factors may differ from industry to industry, these guidelines or requirements should be customised and clearly mandated and enforced to ensure that supply chains in different industries move to becoming more sustainable.

Furthermore, it is pertinent for the relevant infrastructure to accompany the government's policies. For example, if the government wishes to present a campaign for recycling of glass, but they do not possess adequate infrastructure such as glass recycling sites or a roadmap for the treatment of collected glass, then there is significant plausibility that individuals will ignore future government initiatives. Merely passing legislation to compel organisations to comply with waste management measures without getting the relevant understanding and buy-in of such organisations will mean that these strategies will inevitably fail. While the government is doing a good job with the implementation of logistical infrastructure like ports, airports, railways, roads, modernising border regulations,

51 *https://www.mti.gov.sg/Newsroom/Speeches/2022/03/Opening-Remarks-by-Minister-S-Iswaran-at-FTA-Day-2022*
52 *Ibid.*

sanitary inspections, the government can afford to take extra steps to develop infrastructure further by understand industry-specific circumstances, its needs and how to best support those needs as they align with the government's own plans to make supply chains more responsible.

With clearer guidelines and infrastructure implemented to follow-up on its sustainable supply chain commitments, Singapore can, as a result, increase transparency and traceability of supply chain processes. This also allows companies to know what happens to the data they are reporting or collecting to deepen trust between the private and public sectors. Having relevant infrastructure also allows European companies to better adapt their sustainability initiatives to suit Singapore's environment.

Expansion into EU-ASEAN-SG digital collaboration for supply chains

While partnership with the EU is a good step to take, Singapore can also afford to look into expanding partnerships bilaterally or involving states in ASEAN as well. This is because Singapore functions as a port or hub for supply chain shipments from Europe to many other states in ASEAN. This expands the existing supply chain to many other stakeholders who will contribute to the output of supply chains. States involved in this extensive supply chain need to have more avenues to connect and develop strategies to make supply chains more sustainable. Through having multinational collaborations, a discussion platform can be created to assist Europe, Singapore, and other stakeholders to be better informed of the physical challenges experienced by different states when it comes to supply chain management.

With greater knowledge sharing, more insight can be gained and solutions may be better optimised for more sustainable solutions.

Increase focus on the ESG

Hyper focused on optimisation of supply chains and reducing carbon emissions as its main objective, it is observable that Singapore lacks sufficient emphasis on the ESG aspect of supply chain management. Oftentimes, the ESG impacts of supply chain management is overlooked as countries or stakeholders find the most cost-effective and efficient solutions. Unlike in Europe where there are slightly more concrete laws to protect the environment, the social, and the governance aspect of supply chains, Singapore can do more on the ESG side to ensure that supply chain processes remain ethical. For example, local governments need to not only put in place roadmaps for MNCs, but also SMEs to ensure worker safety and well-being. Additionally, when using digital solutions to optimise supply chains, it is also important to ensure that companies maintain and protect the data they put online, as a way of maintaining data governance and security.

To assist SMEs and other stakeholders who may not be accustomed to engaging with ESG, the government should set clear, customised targets and timelines to keep companies on track. Moreover, the government may also choose to tap on existing knowledge stakeholders, NGOs, and even student groups, to understand how to best implement ESG within companies that will actually be of substantial benefit to the relevant stakeholders. Most importantly, as different companies experience different supply chains and are hence faced with a different set of supply chain problems, it is important that the government does not assist these companies into using boilerplate solutions that might cause more harm than good in the long run. In fact, education on supply chain sustainability should begin at a young age or at the tertiary level, and the government should try to tap into student groups to listen to them and understand how they envision supply chains to shift in the future.

As focus on ESG increases, the direct outcome is that as the physical and online environments are well safe-guarded, the immediate welfare of the individuals, wildlife, and communities would experience a greater boost. In the long run, increased focus on ESG will result in the normalisation of regard for more abstract concepts like individual rights, global governance, and protection of wildlife and our natural environment.

Include SMEs and the Community in making supply chains responsible

SMEs are a key player in the sustainability scene as well. The Singapore government has engaged many MNCs like Airbus and Neste in making more responsible supply chains. Another area that could be tapped on is the SMEs. Small and specialised to conduct only specific processes, SMEs also possess many innovative solutions that can optimise processes for supply chain. The government can serve as a link and bridge between SMEs who have good solutions for supply chain optimisation to EU companies, and the government's own projects on sustainable supply chain management. Including SMEs also gives the work they do more visibility, and allows them to explore additional pathways to ensure that their own business prospers and remains competitive. With more pathways for growth comes greater financial capacity for SMEs to be a part of the sustainability scene and contribute more extensively to Singapore's supply chains and economy.

It is important for the government to extend their support to promote relevant workshops and courses in the community, work with stakeholders from various sectors to explore sustainable technologies, develop new policies, invest in research and development, amongst others.

An incentive-based approach

To incentivise companies to abide by the government's plans and move towards greening their own supply chains, it is perhaps important to consider providing some incentives or benefits to support companies who are already actively playing a part in making their supply chains more responsible. For instance, with regard to the EPRS, the government can incentivise companies to promptly report and design their products sustainably whilst also sourcing ethically and responsibly by awarding them some certification as recognition for their efforts. Alternatively, the government can implement a benefits/ rewards scheme to encourage a more receptive approach from companies and also a more willing attitude to make small tweaks in their own supply chains for sustainability.

This approach can easily be extended to SMEs, to encourage them that they will be supported if they choose to move towards making their own supply chains more sustainable.

CONCLUSION

The collaboration between the EU and Singapore will need to contend with the new norm as there is a permanent shift in how companies conduct their supply chain operations with the onset of a green movement. The EU and Singapore have been doing extensively well in their own ways to make supply chains more responsible. However, there is still a long way to go to ensure that supply chains actually become sustainable in the long run.

To move forth from here, it is pertinent that the EU and Singapore continue to collaborate with relevant stakeholders to provide a secure and reliable environment where businesses can anchor themselves, amidst the shifts in supply chain. To facilitate this support, there could also be considerations to implement financial incentives and include smaller stakeholders such as SMEs and the communities that have a voice on supply chain sustainability. Additionally, it is also crucial to ensure that supply chain processes take good care of the ESG aspects.

Creating responsible supply chains is not an easy feat, it requires continuous collaboration, open discussion, solution trial and error, amongst many other plausible factors. Most importantly, it requires a collaborative and constructive effort for companies and governments to take the leap forward together, support each other, and push for the survival and health of our planet.

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LIST OF ACRONYMS

CAAS	Civil Aviation Authority of Singapore
CEAP	Circular Economy Action Plan
DCSA	Digital Container Shipping Association
DEA	Digital Economy Agreements
EGD	European Green Deal
EMO	External Manufacturing Organisation
EUSFTA	EU-Singapore Free Trade Agreement
GEAs	Green Economy Agreements
LNG	Liquified Natural Gas
LOHC	Liquid Organic Hydrogen Carriers
MARPOL	International Convention for the Prevention of Pollution from Ships
MOU	Memorandum of Understanding
MPA	Maritime and Port Authority of Singapore
NEA	National Environment Agency
NDCs	Nationally Determined Contributions
NSPR	National Sustainable Procurement Roundtable
UNFCCC	United Nations Framework Convention on Climate Change

DIGITAL FOR SUSTAINABILITY

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EXECUTIVE SUMMARY

Digital technologies and business models, when thoughtfully applied, are anticipated to accelerate the transition to a more sustainable and circular economy.

Digital technologies can support more sustainable decisions, as well as rapid execution of initiatives, through a bigger volume of higher quality, real-time data and analytics leading to better information and insights across three pillars: how we make things through Industry 4.0; how we fund things through capital markets; and how we live through our behaviors as consumers.

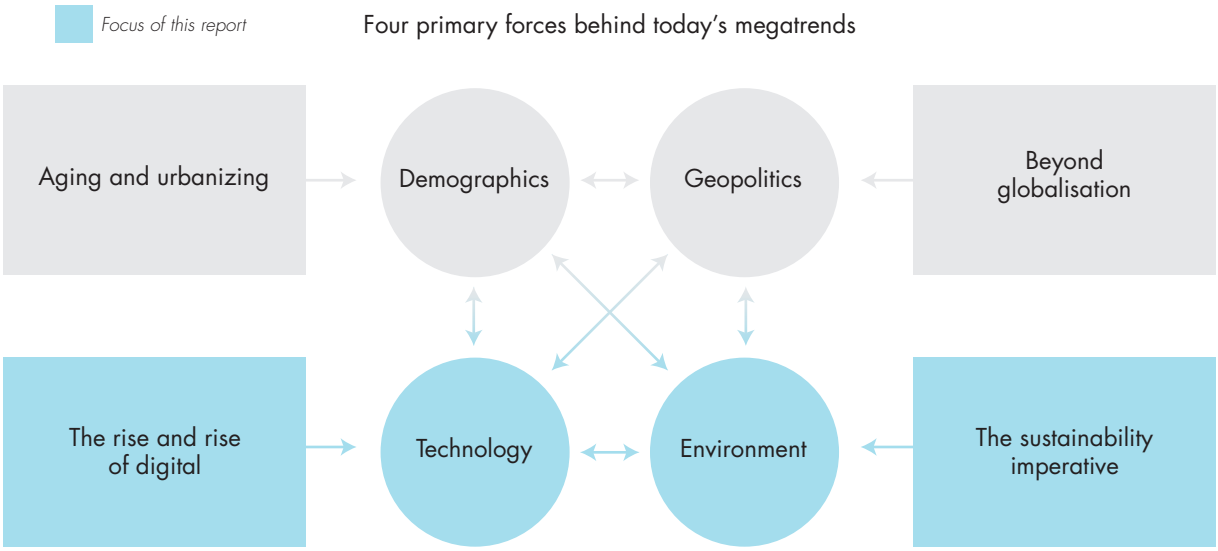
Despite early adoption across all these three pillars, many challenges still exist in the ability to accelerate the sustainability trend. These include unclear business cases, technical complexity and e-waste proliferation. Policymakers have a clear role to play in helping to address these barriers and mitigate their effects, primarily by internalizing environmental costs through initiatives such as the carbon markets, a mechanism that the European Union is pushing for globally.

Ultimately, sustainable development and the further application of digital technologies are intertwined. Business leaders and policymakers that ignore this relationship risk missing out on a large environmental and commercial opportunity.

INTRODUCTION

Both digital and sustainability are fundamental megatrends, i.e., secular long-term patterns of change affecting our economies and societies on a fundamental level, of our era. Despite short-term fluctuations or volatility in markets, megatrends are, over the long-run, resilient in time.

Figure 1.: Four primary forces behind today's megatrends



Source: Megatrends 2020 and beyond (3rd edition), EY-Parthenon Research and Analysis

Due to their nature as all-encompassing and extensive long-term global shifts across the economy and society, megatrends intertwine and interact with each other. That is also the case with digital and sustainability.

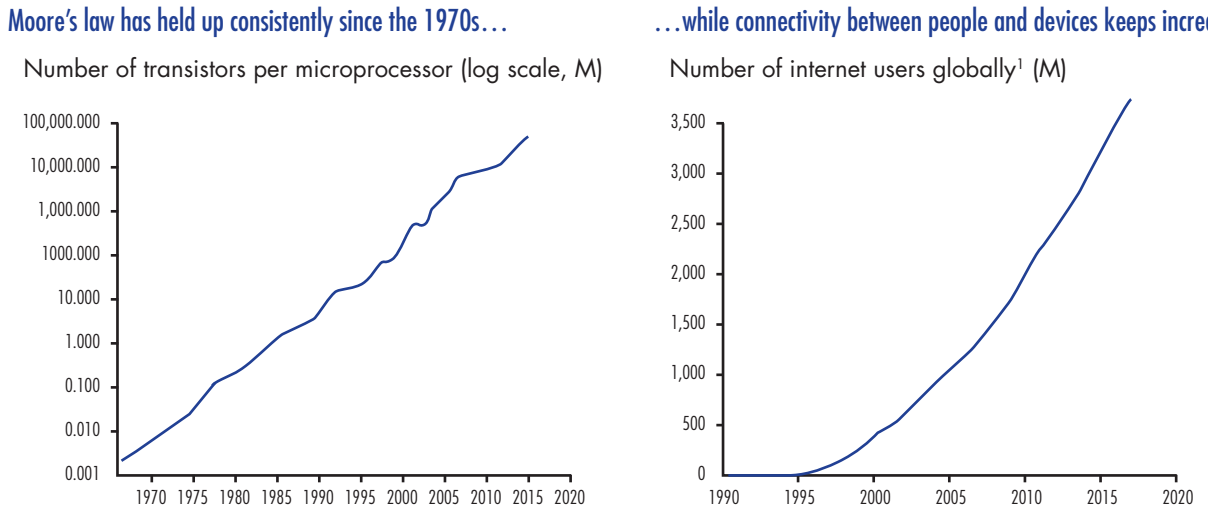
Digital technologies and business models, when thoughtfully applied, are anticipated to help accelerate the transition to a more sustainable and circular economy. Digital can support more sustainable decisions through a bigger volume of higher quality, real-time data and analytics. Further, once these decisions have been taken, digital technologies can help in executing the initiatives that help to drive sustainability outcomes. Corporates and governments around the world are demonstrating this by deploying and scaling up innovative digital solutions that help organizations and leaders make data driven decisions across three pillars of sustainability: how we make things in industry; how we enable new markets; and how we consume products and services in our daily lives.

THE DIGITAL REVOLUTION MEGATREND

Since the 1970s, the global economy and our societies have been undergoing a profound wave of change through information technology. Rapid, consecutive waves of innovation – such as the personal computer revolution of the 1980s, the internet revolution of the 1990s and the mobile internet in the 2000s – have led us to what today we call the digital economy, where the application of the culture, practices, economic models, and technology of the Internet era to meet the growing expectations of users[1].

1 *Greenway Andrew, Terett Ben, Bracken Mike, Loosemore Tom, Digital Transformation at Scale: Why the Strategy Is Delivery, 2018*

Figure 2.: The digital revolution continues unabated



Note: (1) Individuals who have used the Internet (from any location) in the last 3 months via a computer, mobile phone, personal digital assistant, games machine, digital TV, etc.
Source: Karl Rupp. 40 Years of Microprocessor Trend Data; Moore's Law: The number of transistors per microprocessor (ourworldindata.org); OWID based on World Bank & UN World Population Prospects (2017)

As entrepreneur, investor and software engineer Marc Andreessen wrote in an article in 2011 titled Why software is eating the world, the digital economy has completely transformed the ways in which we work and live[2].

On the work side, since the 1980s, organizations have become more geographically distributed and global travel and trade have become much more paperless, fast, and efficient, from offices to manufacturing floors. Almost all business processes and workflows today, to some or great extent, depend on affordable, networked computers and software.

The impact of digital is equally pronounced outside work, in how we live. Innovations from e-commerce to streaming have transformed consumption across all product and service categories. The impact of digital in the way society operates has been foundational, even down to the drivers of household formation: by 2017, the most frequent place where most couples in the US had met was online[3].

THE SUSTAINABILITY IMPERATIVE MEGATREND

Concurrently to the digital revolution, the shared imperative for a more sustainable global economic development model has been accelerating.

The 1987 United Nations (UN) Brundtland Commission defined sustainability as meeting the needs of the present without compromising the ability of future generations to meet their own needs[4]. The late 1980s was also concurrent with the publication of the first emerging scientific evidence of global warming.

Accelerating research scientific consensus on anthropogenic global warming since then has led to the realization that our current global economic model for growth, underpinned primarily by fossil fuel technologies, and linear supply chains where humans take, make and waste, is unsustainable[5]. As of 2022, the global carbon budget for achieving a limit to global warming at 1.5°C, in line with the Paris Agreement, at 50% probability is estimated at 500 Gigatons of Carbon (GtCO2). For comparison, global net anthropogenic greenhouse gas (GHG) emissions were approximately 59 GtCO2 just in 2019[6].

2 *Andreessen Marc, "Why Software is Eating The World", The Wall Street Journal, 20 August 2011 (accessed via, https://www.wsj.com/articles/SB10001424053111903480904576512250915629460, 29 September 2022)*
3 *Rosenfeld, Michael J., Thomas, Reuben J., and Hausen Sonia, "How Couples Meet and Stay Together 2017", Stanford, CA: Stanford University Libraries (accessed via, https://data.stanford.edu/hcmst2017, 29 September 2022)*
4 *United Nations, "Report of the World Commission on Environment and Development: Our Common Future (§27)", United Nations, 4 August 1987 (accessed via, https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf, 29 September 2022)*
5 *EY, "Megatrends 2020 and beyond – EYQ 3rd edition" (accessed via, https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/megatrends/ey-megatrends-2020.pdf, 29 September 2022)*
6 *Intergovernmental Panel of Climate Change (IPCC), "Climate Change 2022: Mitigation of Climate Change", Working Group III Contribution to the IPCC Sixth Assessment Report, 4 April 2022 (accessed via, https://www.ipcc.ch/report/ar6/wg3/, 29 September 2022)*

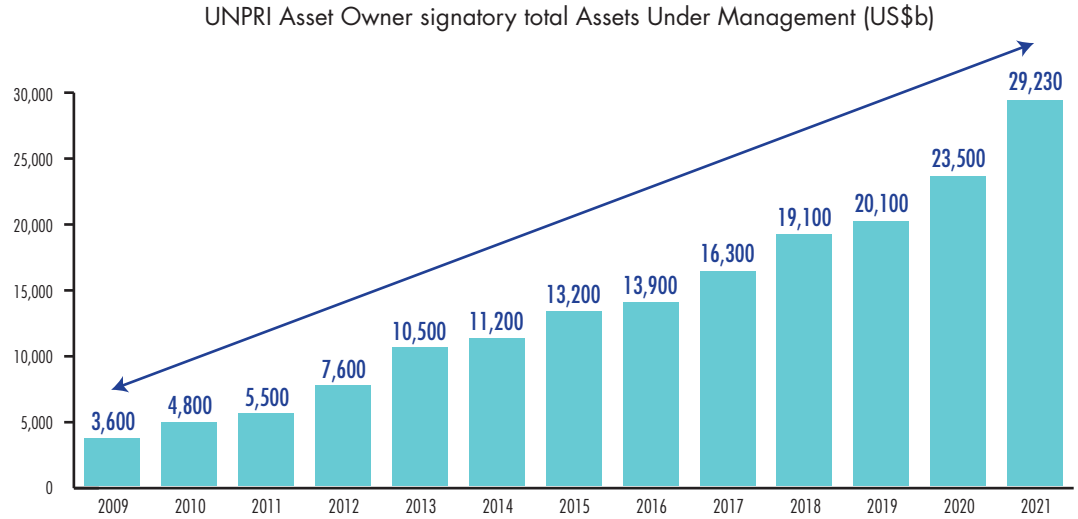
In response to these environmental and other sustainability issues, the UN established 17 Sustainable Development Goals (Figure 3) in 2015. These goals are associated with targets on a total of 231 unique indicators[7].

Figure 3.: The UN Sustainable Development Goals

The UN goals acknowledge the urgent need for change in our manufacturing, trade and consumption patterns as global warming increases the frequency and magnitude of climate-related natural disasters, intensifying social inequalities, global migration and unrest.

In the world of business, this has manifested itself as the environmental, social and governance (ESG) movement, with nearly US$29t of asset owner funds under management committed to the UN's Principles of Responsible Investment, incorporating hard ESG screening criteria into their investment processes.

Figure 4.: Nearly US$29 trillion of limited partner Assets Under Management (AUM) has committed to the UN Principles for Responsible Investment



Source: United Nations Principles for Responsible Investment (UNPRI); EY-Parthenon Research and Analysis

7 *UN Department of Economics and Social Affairs, Statistics Division, "Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development" (accessed via, https://unstats.un.org/sdgs/indicators/indicators-list/, 18 July 2022)*

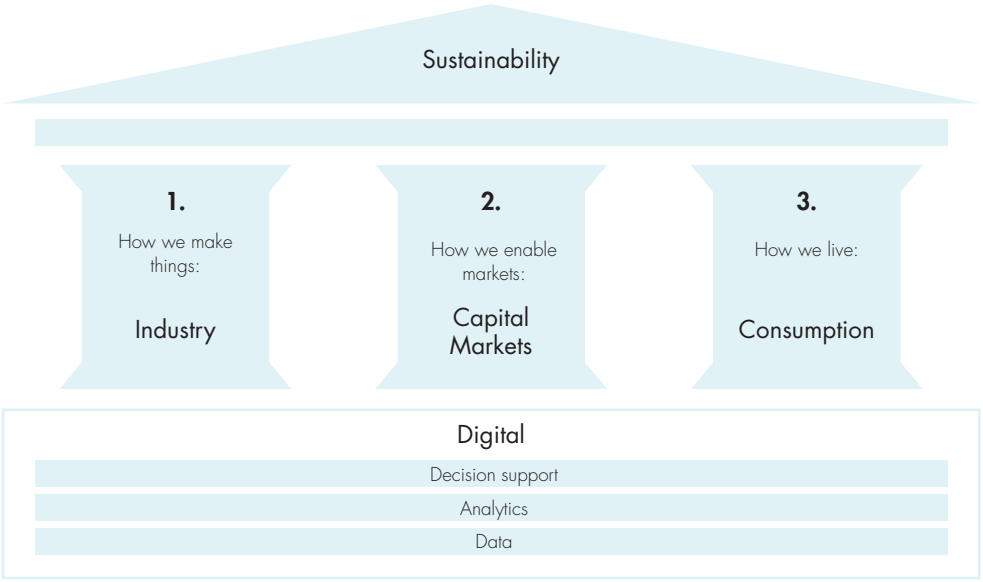
The result of the incorporation of the sustainability imperative into investment processes has resulted in the rise of ESG reporting. As ESG performance becomes a growing consideration in capital markets, capital allocators – be it a firm's leadership choosing key projects to invest in for the next five years, or investment portfolio managers deciding which companies to invest in – will increasingly rely on reliable ESG data to augment their decision-making.

DIGITAL AS AN ACCELERATOR TO SUSTAINABILITY: THE THREE PILLARS

At the intersection of digital and sustainability megatrends, multiple stakeholders are turning to technology to accelerate their sustainability journeys.

In this paper, we conduct a review of current trends in uses of digital solutions and concepts to solve sustainability issues, which we have organized in three pillars that span the full economy: industry, capital markets and consumption (Figure 5).

Figure 5.: The impact of digital toward sustainability – the three pillars



Source: EY-Parthenon Research and Analysis

Across each of these three pillars, the impact of digital is broadly based on the same mechanisms: increased use of internet-connected hardware, including sensors, gathering ever-growing volume of data across the economy; interconnected analytics and artificial intelligence or AI-powered software processing this vast volume of data to produce human-centered reports and visualizations; and humans using the reports to extract useful insights that lead to better – i.e., more profitable under the constraints of sustainability – decisions.

Across all three pillars, the impact of the digital revolution on sustainability is still in its early stages, potentially promising huge potential for productivity gains and value creation for leading, early adopters. In the following sections, the EY-Parthenon team presents the current trends for each pillar, along with case studies on some of the trailblazers among EuroCham's membership.

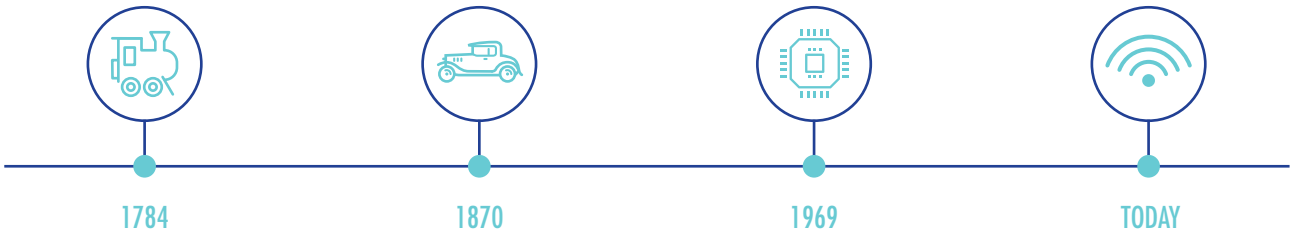
PILLAR 1 - HOW WE MAKE THINGS: INDUSTRY 4.0 AND THE CIRCULAR ECONOMY

THE IDEA

The term Industry 4.0 encapsulates the view that the dual trends of decreasing cost and increasing interconnectivity of hardware and software are precipitating a new, fourth, industrial revolution[8].

8 *Kagermann Henning, Wolf-Dieter Lukas, Wahlster Wolfgang, "Industrie 4.0: Mit dem Internet der Dinge auf dem Weg zur 4. industriellen Revolution", Ingenieur.De (accessed via, https://www.ingenieur.de/technik/fachbereiche/produktion/industrie-40-mit-internet-dinge-weg-4-industriellen-revolution/, 29 September 2022)*

Figure 6.: The four industrial revolutions



Industry 1.0

- Mechanisation
- Steam engines
- Water and steam power
- Iron production
- Textile industry
- Mining and metallurgy
- Machine tools
- Steam factories

Industry 2.0

- Electrification
- Production line
- Mass production
- Globalization
- Engines and turbines
- Broad adoption of telegraph, gas, water supply

Industry 3.0

- Computers
- Digital manufacturing
- Robotics
- IT and OT digitization
- Automation
- Analogue and digital electronics
- Networks and the internet
- Digital machines

Industry 4.0

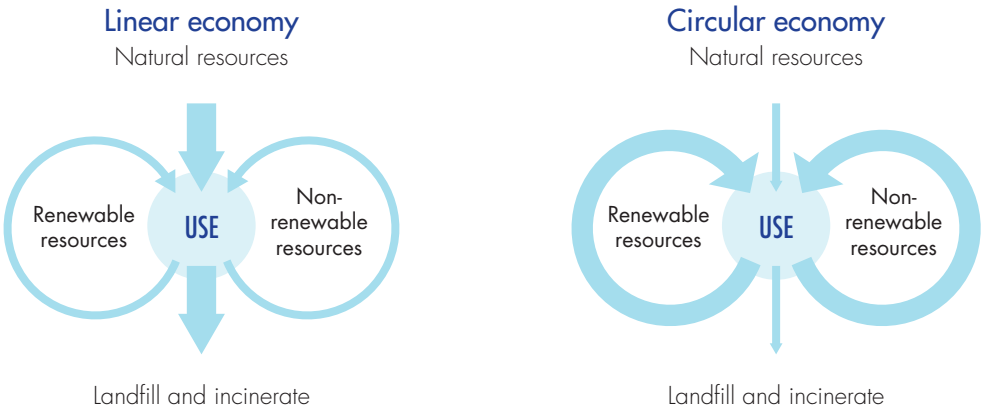
- Convergence IT
- Autonomous machines
- Advanced robotics
- Big data and analytics
- Internet of Things (IoT)
- Digital ubiquity and cloud
- Smart factory
- Machine learning and AI
- Cyber physical

Source: Circular Economy; Measuring Innovation in the Product Chain (2017); EY-Parthenon Research and Analysis

In Industry 4.0, physical production assets, products and manufacturing processes, enabled by sensors and the Internet of Things (IoT), generate a significant volume of data that are shared over networks and used in analytics and digital twins at the product, machine, line, plant and supply chain levels. This is used to optimize production, inform predictive maintenance analysis and improve product and production process design. The concept is broad, encompassing numerous innovations, including, but not limited to, smart factories, distributed power generation and smart buildings.

Most research and pilot facility work on Industry 4.0 has been on its potential for efficiency improvements and cost savings[9]. But, from a sustainability perspective, Industry 4.0 is also seen as a key enabler of the circular economy, where manufacturing and supply chains rely, in their overwhelming majority, on the reuse, repurposing and recycling, rather than new extraction, of resources[10] (Figure 7).

Figure 7.: From a linear to a circular economy



Source: Circular Economy; Measuring Innovation in the Product Chain (2017); EY-Parthenon Research and Analysis

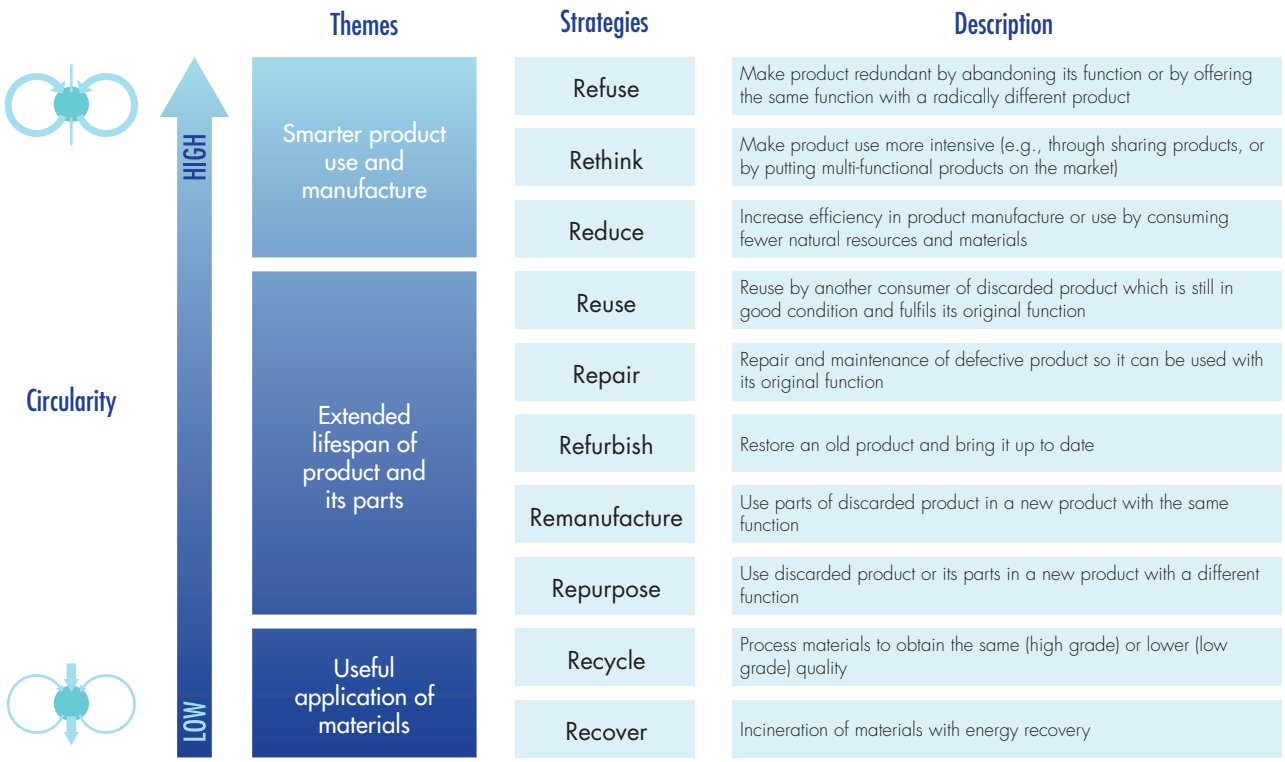
9 *Nayernia Hamed, "A systematic review of the implementation of industry 4.0 from the organisational perspective", International Journal of Production Research (DOI: 10.1080/00207543.2021.2002964), 22 October 2021 (accessed via, https://doi.org/10.1080/00207543.2021.2002964, 29 September 2022)*

10 *Berg Holger, Bendix Phillip, Jansen Maike, Le Blévennec Kévin, Bottermann Patrick, Magnus-Melgar Marianne, Pohjalainen Elina, Wahlström Margareta, "Unlocking the potential of Industry 4.0 to reduce the environmental impact of production", European Environmental Agency, Eionet Report (ETC/WMGE 2021/5), June 2021, (accessed via, https://www.semanticscholar.org/paper/Unlocking-the-potential-of-Industry-4.0-to-reduce-Berg-Jansen/991d1caaa9fa6c98db1f99cf6b68cf489a0ba78d, 29 September 2022)*

In fact, the circular economy is energy- and data-intensive. Just for the purposes of optimal high value recycling of, for instance, metals and plastics, we need not only specific information on parameters of the material composition of individual products and their components, but also market-related information such as availability and supply, which are important to reduce transaction costs[11]. Due to this data-intensity, circularity relies heavily on digital and Industry 4.0 principles.

The effectiveness of digital interventions on improving the circularity of processes can be assessed using the concept of an R-strategy ladder (Figure 8). The principle behind the R-strategy ladder is that certain sustainable strategies are more conducive to circularity than others. For example, extensive recycling, while integral to the circular economy, should be the option of last resort, given its large energy and complex reverse logistics. Instead, ensuring longer product lifespans is a more effective strategy for ensuring that materials, and their embedded emissions, are utilized to the longest extent possible before being recycled.

Figure 8.: the R-strategy ladder



Source: EPA Network; Circular Economy; Measuring Innovation in the Product Chain (2017); EY-Parthenon Research and Analysis

Across the entire ladder, digital solutions can provide the data and analytics that will be needed to enable the manufacturing processes and supply chains of the future to support smarter produce use and manufacturing, extend product and part lifespans, and empower useful application of materials.

SUPPORT SMARTER PRODUCT USE AND MANUFACTURING

Smarter product design lies at the top of the circularity R-strategy ladder. Accordingly, the biggest and more ambitious impact of data on circularity is by helping designers and engineers sift through large volumes of data around the use cases and manufacturing process of products to redesign them in such ways where they are completely abandoned (refuse). However, it is often more achievable to focus on solutions that increase the utilization of existing products (rethink). Furthermore, digital is a key enabler to as-a-service business models, which, if applied across supply chains, can be particularly effective in ensuring that assets – and their embedded emissions – are highly utilized over long periods of time.

11 *Wilts Henning, Berg Holger, "The Digital Circular Economy: Can the Digital Transformation Pave the Way for Resource-Efficient Materials Cycles?", International Journal of Environmental Sciences & Natural Resources (. DOI: 10.19080/IJESNR.2017.07.555725), 21 December 2017 (accessed via, https://juniperpublishers.com/ijesnr/pdf/IJESNR.MS.ID.555725.pdf, 29 September 2022)*

EXTEND PRODUCT AND PART LIFESPANS

When it comes to ensuring that products and manufacturing lines "live" longer, digital twins are a promising area of investment. A digital twin is a virtual model of a product or process, linking the physical and virtual worlds[12]. Such models use data from sensors installed in real-world assets and processes to model their state in a virtual world and run scenarios. Thus, system issues and breakdowns can be predicted and resolved before they happen, avoiding downtime and minimizing failures. Such models also offer the opportunity to explore more efficient modes of system usage and can also be used in the design process of products, reducing the need for physical prototype or tests and waste.

EMPOWER USEFUL APPLICATION OF MATERIALS

Recycling is naturally data intensive. A lot of research is currently going into assessing ways that the concept of digital twins can be used to also capture information on the composition of a product and its components across its full use and lifecycle, so that it can be used in recycling.

The EU Digital Product Passport (DPP) is an example of how policymakers see digital solutions supporting recycling. The DPP, still in its early stages of development, is envisaged as a record of the composition and lifecycle of a product in entirety[13]. This can improve decision making in maintenance, remanufacturing and recycling of all products, an essential key to strengthening the existing circular economy and enabling more sustainable decision-making.

PILLAR 2 - HOW WE ENABLE MARKETS: ESG, GREEN FINANCE AND CARBON MARKETS

THE IDEA

Digital is increasingly being used to support more sustainable investment decisions, whether this involves prioritizing capital deployment opportunities by incorporating ESG criteria, or finding innovative ways to mitigate an organization's carbon footprint. Some of these solutions, such as ESG reporting tools, are incremental improvements of existing applications, while others, such as innovative voluntary carbon exchanges, leverage innovation across the FinTech ecosystem (Figure 9).

Figure 9.: Digital levers toward sustainability in markets

Overall, these solutions can help firms and investors make more sustainable decisions by supporting ESG transparency, helping to price sustainability into new financial products and develop new, better markets.

12 Dr Grösser Stefan, "Digital Twin", Gabler Wirtschaftslexikon (accessed via, https://wirtschaftslexikon.gabler.de/definition/digitaler-zwilling-54371, 16 July 2022)

13 Berg Holger, Bendix Phillip, Jansen Maike, Le Blévennec Kévin, Bottermann Patrick, Magnus-Melgar Marianne, Pohjalainen Elina, Wahlström Margareta, "Unlocking the potential of Industry 4.0 to reduce the environmental impact of production", European Environmental Agency, Eionet Report (ETC/WMGE 2021/5), June 2021, (accessed via, https://www.semanticscholar.org/paper/Unlocking-the-potential-of-Industry-4.0-to-reduce-Berg-Jansen/991d1caaa9fa6c98db1f99cf6b68cf489a0ba78d, 29 September 2022)

SUPPORT MORE ESG TRANSPARENCY

As ESG performance becomes a growing consideration in capital markets, capital allocators – be it a firm's leadership choosing key projects to invest in for the next five years, or investment portfolio managers deciding which assets to allocate capital to – must increasingly rely on a broad set of reliable ESG data to make decisions. ESG disclosures, often requiring assurance, are also increasingly mandated by exchanges and regulators, especially on climate-related topics.

ESG disclosures require organizations to collect and reliably report on new types of data never previously gathered. As the volume and complexity of data that companies need to measure and report on increase, digital transformation is becoming an even more urgent imperative with a stronger business case for most medium to large organizations.

Consequently, new digital tools are springing up to support companies that embark on the journey of setting up these systems and processes. For example, SAP is increasingly integrating sustainability reporting into its suite of tools (see case study below).

HELP PRICE SUSTAINABILITY INTO NEW FINANCIAL PRODUCTS

The use of artificial intelligence (AI) enables financial institutions to price sustainable products, evaluate sustainability risks, implement in risk management solutions and products, and create financing solutions for sustainability projects.

AI can improve the assessment of sustainability linked loans from originating to underwriting to servicing. For example, the Monetary Authority of Singapore and Singapore's National AI Office are funding the development of NovA!, an AI platform that measures the borrowers' sustainability performance at loan origination by comparing their historical environmental performance with their peers[14]. During underwriting, NovA! assists in setting appropriate sustainability performance targets; for loans servicing, the actual sustainability performance indicator is compared against borrower's self-declaration to detect greenwashing[15].

DEVELOP NEW, BETTER MARKETS

Proactive organizations are also actively looking for new ways to reduce their carbon footprint in the nascent voluntary carbon market ecosystem. Digital technologies can play a major role in helping to link demand and supply through the origination of offset projects; illustrate the digital transaction of carbon credits; and provide a visual display of the positive impacts produced from carbon finance.

New digital instruments such as remote sensing and AI and machine learning (ML), along with the insights they generate, are used to increase trackability, accuracy and visibility of climate effects. For example, Kumi Analytics, a Singapore-based startup, uses advanced ML to predict crop volume and estimate carbon sequestration in forests to, among other things, inform offset certification.

Furthermore, some players also see technologies like tokenization and blockchain as having a role to play in carbon markets. Existing and certified carbon assets can be converted to token credits and traded through smart contracts. Based on this, the AirCarbon Exchange, a Singapore-based startup voluntary carbon exchange, claims to utilize blockchain technology to create and offer securitized carbon credits based on underlying carbon projects[16].

14 *Monetary Authority of Singapore, "National programme to deepen AI capabilities in financial services", Monetary Authority of Singapore, 8 November 2021 (accessed via, https://www.mas.gov.sg/news/media-releases/2021/national-programme-to-deepen-ai-capabilities-in-financial-services, 29 September 2022)*

15 *Monetary Authority of Singapore, "AI Utility NovA! to Unlock Opportunities for Green Financing and Combat Greenwashing", Monetary Authority of Singapore, 21 June 2022 (accessed via, https://www.mas.gov.sg/news/media-releases/2022/ai-utility-nova-to-unlock-opportunities-for-green-financing-and-combat-greenwashing, 18 July 2022)*

16 *AirCarbon Exchange (accessed via, https://www.aircarbon.co/exchange, 12 July 2022)*

CASE STUDY: SAP

SAP's purpose is to help the world run better and improve people's lives with sustainability at the core. The company's objective is to create a positive economic, environmental, and social impact worldwide within planetary boundaries. SAP brings this to life by providing products and services that meet the sustainability challenges and opportunities of their customers (enabler) and leading by example in our own sustainable business operations and practices (exemplar). SAP's philosophy is that it wants to help them make sustainability profitable and profitability sustainable. Towards this goal, SAP has released numerous products that help companies towards their ESG disclosures and holistic steering of company activities towards improved sustainability outcomes, including the Sustainability Control Tower, Product Footprint Management, Responsible Design and Production and the SuccessFactors Human Experience Management (HXM) Suite.

SAP Sustainability Impact Labs is as such a key enabler initiative. It brings the Chief Sustainability Officer, Operations Leads (Supply Chain, Financials etc), Sustainability business team, CTO and IT team together in a series of tailored sessions to help business leaders of an organization to create a strategic roadmap towards their sustainable future.

The sessions explore and inspire sustainability objectives, challenges, and outcomes, and help develop a technology roadmap to empower sustainable – and financial – outcomes. Furthermore, digital is a key enabler of these sessions, as these co-creation sessions are often virtual.

At the end of an Impact Lab, business leaders receive a clear, tailored, pragmatic plan mapped directly to digital technologies to take the next steps on their strategic sustainability journey. This helps the business define their baseline, track progress going forward, and report to their stakeholders efficiently and accurately.

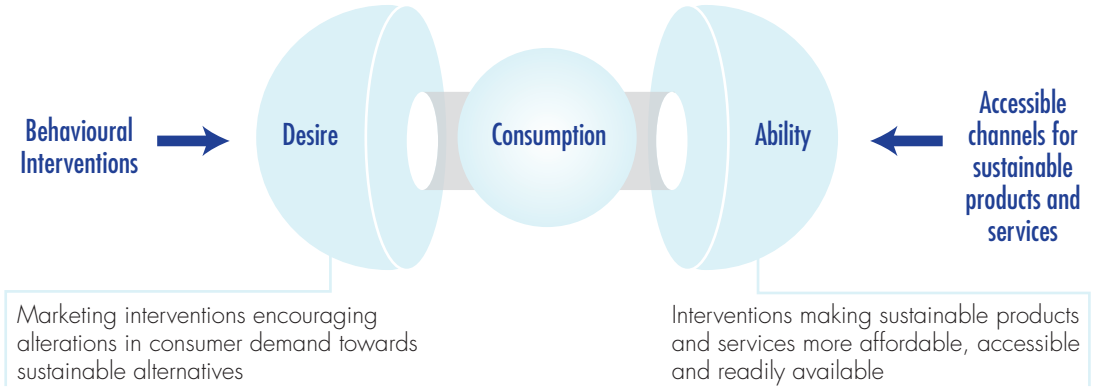
PILLAR 3 - HOW WE LIVE: CHANGING CONSUMPTION PATTERNS

THE IDEA

End consumption by individuals is the ultimate driver for the use of scarce natural resources. Consequently, the transition to a circular economic model is likely to require significant changes in consumer consumption behaviours worldwide.

Individual consumption is the result of the combination of the desire for a good or service and the ability to access and use it. Digital solutions can help to transform consumption patterns through the enabling of interventions toward making sustainable behaviours more desirable and by making sustainable products and services more accessible at the tap of a finger.

Figure 10.: Components of consumption

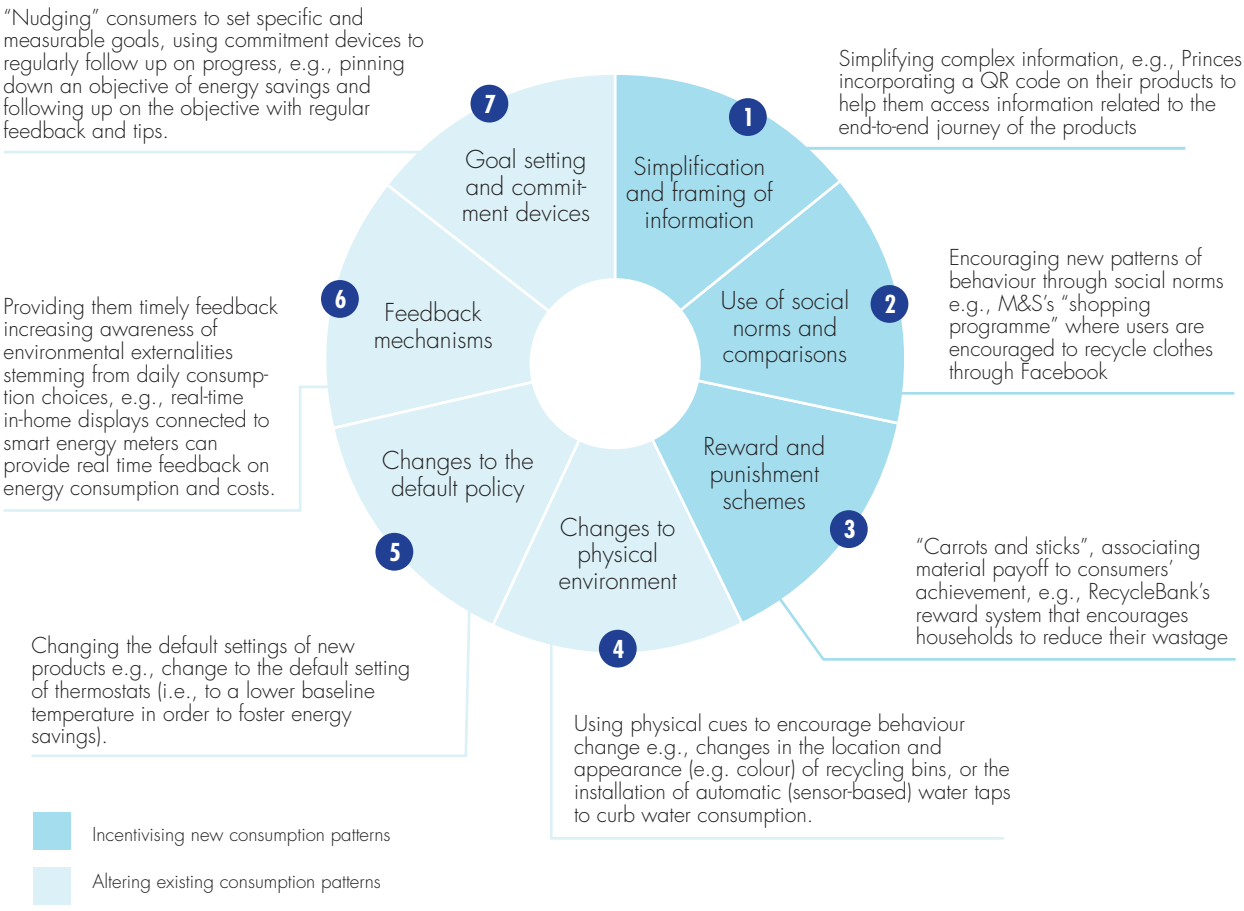


Source: EY-Parthenon Research and Analysis

INCENTIVIZE SUSTAINABLE BEHAVIORS

From e-commerce to payments, the rise of digital has resulted in an explosion in the volume and types of data generated. This treasure trove of data can be used in innovative ways to incentivize consumers to increase sustainable consumption and alter existing consumption patterns to make them more sustainable.

Figure 11.: Types of behavioural shifts



Source: Organization for Economic Co-operation and Development (OECD); Nudging - A Promising Tool for Sustainable Consumption Behaviour (2014); EY-Parthenon Research and Analysis

Many brands are trying to highlight the differentiating factors regarding their supply chain and transparency by building narratives of the sourcing and origins of their products using digital technologies, ranging in complexity from the humble QR code to multi-channel, innovative initiatives.

Applications such as QR codes may be key for allowing green or ethical consumers to access sustainability information. For instance, Conrad's Pune branch replaced its plastic bottles with glass bottles that are processed in-house and come with a unique QR code that enables guests to scan and view the amount of plastic and carbon emissions saved[17].

Furthermore, one of the most efficient ways to alter consumer behaviour is by leveraging a carrot-and-stick approach. Linking positive habits with rewards leads to positive reinforcements in the target audience. For instance, P&G partnered with Super Indo, in Indonesia to launch the "Conscious City Bandung" in which consumers were encouraged to sort their household's wastage and deposit it with conservationists or scavengers in exchange for shopping rewards by using digital applications. These conservationists would then recycle the waste thus supporting a more circular economy[18].

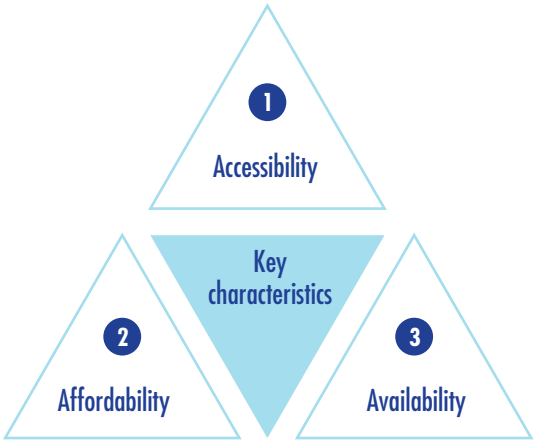
17 *Bond, "Conrad Pune installs in-house water bottling plant; comes up with a new technology to track water quality", Hotelier India, 24 February 2020 (accessed via, https://www.hotelierindia.com/business/10012-conrad-pune-installs-in-house-water-bottling-plant-comes-up-with-a-new-technology-to-track-water-quality, 29 September 2022)*

18 *Suryanto Venny, "Supporting waste reduction up to 30%, Super Indo collaborates with P&G Indonesia", EPR Indonesia, 2 March 2022 (accessed via, https://www.epr-indonesia.id/news/supporting-waste-reduction-up-to-30-super-indo-collaborates-with-p-g-indonesia, 29 September 2022)*

MAKE SUSTAINABLE CONSUMPTION EASIER

Sustainable consumption is also driven by the ability of consumers to obtain sustainable products and services easily. This ability is determined by three main characteristics: access, availability, and affordability.

Figure 12.: Bringing sustainable solutions within consumer reach



Accessibility
- Increasing access to sustainable alternatives leveraging the use of technology
- E.g. – Product Information Apps (Dirty Meter), sustainable alternatives locating apps (Tap)

Affordability
- Making the use of sustainable alternatives more affordable
- E.g. – Online Thrift stores (ThredUp), online used product platforms (ebay)

Availability
- Making Sustainable Alternatives readily available
- E.g. – shared accommodation apps (Airbnb)

Source: EY-Parthenon Research and Analysis

Consumer-facing companies are increasing the affordability, accessibility and availability of sustainable options through market-places for second-hand goods such as eBay, Craigslist or Carousell. Such platforms give new life to pre-owned products by making them available to potential buyers while also providing some guarantees on quality. Similarly, platforms like ThredUp, an online thrift store, enables users to shop for new and used items at lower prices and even opt for donating or selling their own clothes on the platform. Alternatively, the Tap app informs users of nearby water refilling stations thus eliminating the need for single use plastic bottles. Finally, the Think Dirty app helps its users make more eco-friendly cosmetics purchases by rating products on a Dirty Meter taking various health and sustainability factors into consideration[19].

CASE STUDY: BOOKING.COM

Booking.com is one of the world's leading digital travel companies. Part of the US$14.6bn group Booking Holdings Inc. (NAS-DAQ: BKNG), Booking.com's mission is to make it easier for everyone to experience the world.

Given its position as a B2B2C platform that links travellers to a very diverse range of hospitality businesses around the world, Booking.com describes their "North Star" on sustainability as "the responsibility to make sure there is always a world worth expe-riencing".

To achieve this goal, the company's Climate Action Plan is based on three pillars: reducing the carbon footprint of its internal opera-tions, making it easier for consumers to make sustainable choices, and collaborating internationally with academia and competitors to set global standards for sustainable travel.

Booking.com's research showed that travellers want to but don't know how to travel sustainably. At the same time, on the supply side of its platform, it noted that many smaller hospitality businesses did not know where to start their sustainability journey from.

Therefore, in response to this finding and to make it easier for consumers to make sustainable choices, the company launched the "Travel Sustainable" initiative, which uses the simplification and framing of information as a lever to incentivizing new consumer patterns. In collaboration with the Global Sustainable Tourism Council (GSTC), academic and consultancy advisory input, Booking.com identified four material topics – energy, water, community engagement and the environment – for sustainable travel.

19 *Brown Shelby, "8 Apps for a More Eco-Friendly Sustainable Life", CNET, 22 April 2022 (accessed via, https://www.cnet.com/tech/services-and-software/8-apps-for-a-more-eco-friendly-sustainable-life/, 29 September 2022)*

Based on this, Booking.com developed a voluntary, streamlined, high-impact and short (22 question) questionnaire that even smaller hospitality business partners on their platform could respond to and use as a framework at the start of their sustainability journey. The questions cover a broad range of topics, including the use of plastic straws, plastic bottles or water heaters. For participating partners, the results from the submission to the questionnaire are shared with customers on Booking.com's front end via badges and a filter that enables users to search for the most sustainable travel options.

The aim of this approach is not to reward or punish businesses, but to provide sustainability-sensitive customers with more information, while at the same time allowing smaller partners to both differentiate themselves and begin crafting their own journey. At the same time, Booking.com can use the data generated from partner and user behaviour to identify which aspects of sustainability resonate more with consumers. The data can therefore be used to adjust strategy, inform partners, and share with policymakers.

To date, the relatively young Travel Sustainable initiative is demonstrating good traction with partners. Booking.com is prioritizing building supply for the offering, coupled with additional consumer awareness.

CHALLENGES TO ADOPTION AND POTENTIAL SOLUTIONS

While digital is now firmly embedded into all aspects of work and life, the rise of the sustainability imperative in corporate and household decision-making is a more recent phenomenon. Accordingly, many challenges still exist in the ability of digital technologies to accelerate the sustainability trend. These challenges include unclear business cases, technical complexity, and concerns about e-waste proliferation.

Policymakers have a clear role to play in helping address these barriers and mitigate their effects, primarily by internalizing environmental costs through initiatives such as carbon markets, a mechanism in which the European Union is pushing for globally.

UNCLEAR BUSINESS CASES

Digital sustainability solutions, whether on the industry, markets, or consumer side, unless they can be truly scaled up, risk becoming nothing more than, experiments at best, and glorified public relations campaign at worst. For this to happen, the economics need to be compelling in terms of the size of the opportunity and its return on investment.

In manufacturing, the business case for sustainability is often achieved through material and energy savings in processes. There are numerous case-based evidence that cost competitiveness and sustainability can be concurrently achieved[20], at least by larger corporations that enjoy lower cost of capital than small- and medium-sized enterprises (SMEs) and can fund the investment more easily. Broader adoption of such cost-saving-based business cases though can be accelerated by policymakers taking a more aggressive stance on internalizing the cost of carbon across the global economy, thus creating more powerful incentives for increased savings through lower emissions.

COMPLEX TECHNOLOGIES

The IoT, augmented reality, machine learning and blockchain are all technologies that are still evolving rapidly and are at different levels of maturity. The EU's Digital Product Passport (DPP) is an example of the complex implementation of digital sustainability: issues such as the product hierarchy used to store and structure data, the safety of data storage, security and quality of data all need to be resolved and implemented using technologies that are often very early in their adoption curve[21].

Policymakers and governments have a role to play too – by actively adopting such technologies and getting more heavily involved in their development in their own systems and supply chains, whether in public health care or defense. It is important to note that the Transmission Control Protocol/Internet Protocol (TCP/IP), a stack of key computer networking protocols, became a foundation of the Internet because of its early adoption by the US military into ARPANET. Such initiatives can help force adoption and standardization at scale, but require investment and active engagement by governments at the tip of the technological spear.

20 *E. Porter Michael, Claas van der Linde, "Green and Competitive: Ending the Stalemate", Harvard Business Review 73, no. 5, September – October 1995 (accessed via, https://hbr.org/1995/09/green-and-competitive-ending-the-stalemate, 29 September 2022)*

21 *Berg Holger, Bendix Phillip, Jansen Maike, Le Blévennec Kévin, Bottermann Patrick, Magnus-Melgar Marianne, Pohjalainen Elina, Wahlström Margareta, "Unlocking the potential of Industry 4.0 to reduce the environmental impact of production", European Environmental Agency, Eionet Report (ETC/WMGE 2021/5), June 2021, (accessed via, https://www.semanticscholar.org/paper/Unlocking-the-potential-of-Industry-4.0-to-reduce-Berg-Jansen/991d1caaa9fa6c98db1f99cf6b68cf489a0ba78d, 29 September 2022)*

PROLIFERATING E-WASTE

Digitalization requires an increased penetration of information technology hardware across the economy: in each household, on each factory floor and in each product. However, the manufacturing of this hardware – be it semiconductor chips, lithium-ion batteries, or even mundane copper wiring, is energy- and resource-intensive.

Consequently, any increase in the digitalization of the economy to improve sustainability risks causes significant environmental damage if the IT sector is first not decarbonized. Policymakers need to be aware that the environmental impact of the underlying required technologies needs to be considered, and their own circularity prioritized.

Further, it is challenging to trace e-waste management steps, such as segregation, transportation, recycling, disposal, and analysis of waste data, due to the large volume and variety of these processes and data connected with the generated waste. The lack of data transparency and provenance tracking can lead to incorrect information being provided to end-users or organizations that require this to make better recycling decisions.

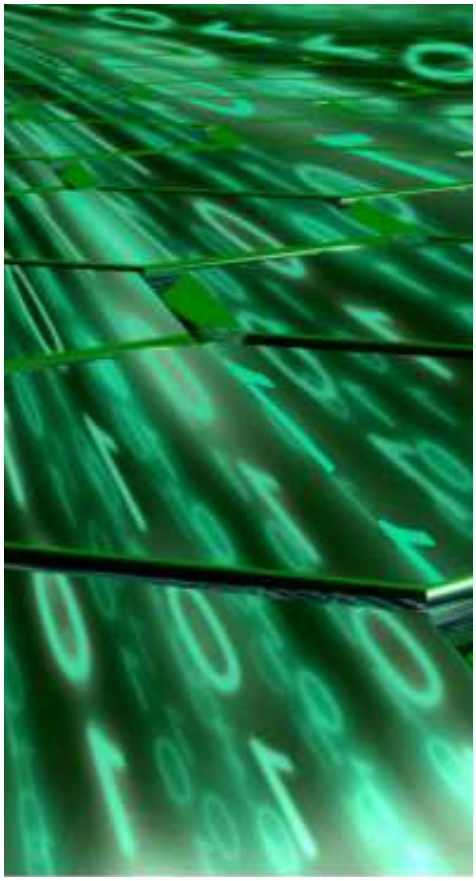
CONCLUSION

Sustainability is an imperative for the 21st century, and digital can be a key accelerator. Digital technologies can support more sustainable decisions through a bigger volume of higher-quality, real-time data and analytics leading to better decisions across three pillars: how we make things, how we fund things and how we live.

Despite multiple emerging applications across industries and markets, the movement is still in its nascent stages and many applications are still at pilot stage as multiple stakeholders need to align on conceptual definitions, technologies, and data standards.

In sustainability, everyone has a role to play across the ecosystem, from individuals, SMEs, large firms to governments. Policy incentives that internalize external costs, especially robust carbon pricing across all major jurisdictions, are required to further mobilize players around the world.

Ultimately, sustainable development and the further application of digital technologies are intertwined. Business leaders and policymakers who ignore this relationship risk missing out on a large environmental and commercial opportunity.



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SINGAPORE AND EU EXPLORING SOLUTIONS TO SUSTAINABLE TRANSPORTATION CHALLENGES

EUROCHAM POSITION PAPER 2022–2023

FROST & SULLIVAN

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European Chamber of Commerce (Singapore)

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OVERVIEW

When one community of environmentalists worldwide expressed grave concern over the rise of the mean global temperature in 2021, another group praised the transformation of the transport sector as it is one of the primary emission-intensive industries. The changing landscape of the mobility industry—from internal combustion engines (ICEs) to electric vehicles (EVs) and shared mobility—was a silver lining in the dark cloud amid the mounting challenge of climate change.

Despite inherent uncertainty in temperature measurements, 2021 was the sixth warmest year in the past 171 years, according to Berkeley Earth. The year's average global temperature rose to 1.2°C above pre-industrial levels, close to the Paris Climate Agreement's 1.5°C aspirations. Nearly 23% of the global population—which translates to more than 1.8 billion people—residing in 25 countries experienced a record-warm year in 2021.

Various sectors, including the transport industry, are primarily responsible for the rise in global temperature and climate change. They emit carbon dioxide (CO2) and carbon monoxide (CO) into the atmosphere, creating the greenhouse gas effect, which leads to a rise in the global temperature. According to the interagency report on sustainable transport, developed by the United Nations Department of Economic and Social Affairs (DESA) and other UN agencies, the mobility sector produces 25% of all energy-related emissions. It also revealed that fossil fuels provide 95% of global transport energy.

The global call for action to limit global warming on a 1.5°C pathway by lowering greenhouse gas emissions makes the transformation of the transport sector indispensable. Countries' commitment to a carbon-neutral world by 2050 and the need to meet the 2030 Agenda for Sustainable Development also supercharge the sustainable transport transition.

Along with emissions and climate change, the persisting challenges of rapid urbanization and traffic congestion continuously push economies to adopt sustainable transport and shared mobility models. The rising environmental consciousness among people and access to mobility based on need also encourage economies to focus on EVs and shared mobility.

Additionally, technological advancement and innovative technologies are vital to driving sustainable mobility. Features such as safety, eco-friendly fuels, and a robust digital mobility ecosystem play a central role in meeting an economic-specific land transport master plan/roadmap.

For instance, leveraging such immersive technologies, Singapore envisions developing a future city where all of its land transport networks are well-connected, convenient, and fast to access. With shared mobility and electric initiatives, the country aims to lower travel time significantly, ensuring healthy lives and safe journeys.

In this regard, the European Union (EU) is ahead of Singapore. With its Sustainable Urban Mobility policy, the EU aims to:

- Reduce transport-related greenhouse gas emissions by 90% by 2050.
- Adopt new initiatives for sustainable and smart mobility.
- Focus on active modes of travel as part of the Efficient and Green Mobility Package.

Singapore and the EU focus on addressing urban mobility challenges, but Europe has the upper hand in furthering its sustainable mobility goals. This presents a unique opportunity for Singapore and the EU to work together. Singapore and Europe can share information, address challenges, and provide feedback to government bodies and stakeholders to promote sustainable transport and mitigate climate change.

SECTION 1: ASSESSING THE LANDSCAPE OF SHARED MOBILITY

Up until two years ago, intensifying urbanization was the norm, with cities confronting challenges related to congestion, pollution, and overstretched mobility networks. Fast forward to the present, where urbanization and mobility trends have been transformed by the COVID-19 pandemic. In addition to the pandemic and change in mobility patterns due to hybrid working, the mobility sector is heavily influenced by advanced technologies and innovations to enable a "sharing economy" paradigm in society. Shared mobility is an umbrella term that is used to describe any mobility mode, including two-wheelers, three-wheelers or four-wheelers, shared by multiple people.

Shared mobility encompasses:

- Carsharing modes that include traditional, peer-to-peer and corporate.
- Ridesharing, ridehailing and public taxi services.
- Alternative transit (e.g., "paratransit," shuttle services).
- Micromobility sharing services like bike sharing, kick scooter sharing and moped sharing.
- Mobility-as-a-Service (MaaS), which is a single app that is used to plan, book and pay for services, including public transport services.

These services enable people to access mobility on an "as-needed basis" rather than owning a car, and the shift to an electric fleet is also becoming more common. The shared mobility segment has grown consistently post-pandemic, with utilization levels almost back to pre-pandemic levels. Cities globally are more cognizant of wanting to reduce emissions and are promoting shared electric modes of mobility. This shift has been a key priority in both Singapore and the EU, and the expanding infrastructure of shared mobility provides benefits for sustainability.

SINGAPORE: LAND TRANSPORT MASTER PLAN 2040 (LTMP 2040)

The land transport plan envisions a future city where all land transport networks are well connected, convenient and fast to access. The plan is to build a more inclusive city that contributes to safe journeys and better health for all.

- **20-minute town and 45-minute cities** – The plan is to build a city that takes no more than 20 minutes for a person to travel between their homes and the nearest neighborhood center where places of retail and leisure are located. Further, it should not take more than 45 minutes to complete peak-period journeys, which includes commuting. This can be achieved by promoting active modes of travel, developing integrated mobility hubs and integrating the mobility options available in the cities. The plan is to increase the cycling paths to almost 700 kms by 2030.

This concept of 15-20-minute cities is gaining a lot of traction across cities globally. The C40 Cities Climate Leadership Group, a network of about 100 global mayors, is partnering with alternative asset manager Nordic Real Estate Partners (NREP) to develop the 15-minute city concept in a handful of cities globally.

Fig. 1 – Depiction of 15-20-minute City

Source: Frost & Sullivan

- **Healthy Lives and Safer Journeys** – An upgraded land transport system entails transitioning to greener fleets and new technology for safety, like collision warning systems in buses. The Land Transport Authority (LTA) aims to have half of its public bus fleet become electric by 2030, which is about 3,000 buses. This is also in line with LTMP 2040, where LTA has committed to a 100% cleaner energy public bus fleet by 2040. In addition, according to the Singapore Green Plan 2030, Singapore wants to cut down the carbon emissions from the mobility sector by 80%. Combining this trend with electric shared mobility can unlock the potential of the transportation industry to become even more sustainable. Several shared mobility operators in Singapore have already started electrifying their fleets, as shown below.

Shared Mobility Operators	Electric Initiatives
BlueSG (Carsharing)	Plans to launch 500 electric Opel Corsa-e hatchbacks gradually from Q4 2022
GetGo (Carsharing)	Plans to add more electric vehicles to its more than 1,000-strong fleet
Grab (Taxi)	Plans to transition to low-emission vehicles to achieve carbon neutrality by 2040
ComfortDelGro (Taxi)	Plans to have 1,000 electric taxis by the end of 2023

Another big aspect that will contribute to the shift toward more sustainable shared modes is the uptake of hybrid working models. A majority of firms have been advised to keep a hybrid work approach; SNEF advises against reverting to pre-pandemic arrangements. What this means to the mobility landscape is that commuting patterns would become more unpredictable and spread throughout the week. Employees are also demanding safer, flexible modes of transport if they must return to work. Countries in Europe have taken the lead in implementing remote working regulations. Several countries, including the G5 countries in Europe, are amending regulations to give employees the right to request flexible working options, supporting the move to hybrid working models.

EUROPEAN UNION: SUSTAINABLE SHARED URBAN MOBILITY

The European Commission (EC) has implemented its Sustainable Urban Mobility policy, which focuses on having member states commit to action on urban mobility. For example:

- The **European Green Deal** includes a target to **reduce transport-related greenhouse gas emissions by 90% by 2050**. The commission plans to adopt a comprehensive strategy that includes increasing the uptake of electric vehicles, making alternative mobility solutions available to businesses, supporting automation and improving connectivity.
- The commission has also **adopted new initiatives for sustainable and smart mobility**, expanding the availability

of EU-wide real-time traffic data for city authorities and mobility operators to plan better. The coverage will be expanded to regional and urban roads and include additional data types like vehicle access restrictions.

- Increased focus on active modes of travel is part of the **Efficient and Green Mobility package**. Cities that are identified as urban nodes by the European Commission will be required to draw up sustainable urban mobility plans (SUMPs) that have **a clear framework for increasing the city's modal share of active transport modes, such as urban cycling**.
- The **Connecting Europe Facility (CEF) Transport program makes available €7 billion** for projects that focus on innovative, new, and sustainable European transport infrastructure. Plus, **€5.175 billion will be set aside to finance projects on the Core and Comprehensive Trans-European Transport Network (TEN-T)**. The project includes upgrading railways, roadways, passenger hubs and interconnected transport networks.
- The European Commission has promoted multi-modal journey planners across the EU for more than a decade. It launched the **Multimodal Passenger Mobility Forum** as a platform for active dialogue and cooperation between Union Member States and relevant public and private stakeholders like the MaaS alliance, Polis, Voi and Tier Mobility. MaaS initiatives are progressing in the EU, driven mainly by the public sector initiative to link up with private-sector technologies against the background of advances in ICT and IoT.

ANALYSIS

Singapore and the EU are focusing on addressing urban mobility challenges, but Europe has the upper hand in furthering its sustainable mobility goals. This presents a unique opportunity for Singapore and the EU to work together. Singapore and Europe can share information, address challenges, and provide feedback to government bodies and stakeholders. **Singapore's acceleration toward EVs is well underway, with the number of electric cars increasing by 50% in H1 of 2022** while the number of ICE cars decreased. Furthermore, both parties are progressing toward transforming their public transport system, aiming for zero-emission vehicles. Once again, Singapore and the EU can share information toward achieving synergy in their efforts.

Singapore lags slightly in the implementation of shared mobility solutions compared to Europe. Ridehailing and bikesharing are the most mature segments, while others are still in the nascent phase. The **ridehailing market** is more mature, with an overall fleet of **80,000 connected taxis**. Singapore, to a large extent, has formulated a successful model for ridehailing based on current market parameters and an adaptive one that evolves constantly with technology and market developments. The bikesharing market is also regulated by LTA and has a total fleet of 36,000 bikes distributed between Anywheel, SG Bike and HelloRide. The carsharing market has grown at a low, stable rate in the past few years, with an overall fleet of about 3,000 cars in Singapore. The most recent player, Hellobike from China, to enter the market, with a fleet of over 1,000 cars. However, when compared to Europe, the uptake for shared mobility is much higher in Europe compared to Singapore.

Many countries in Europe have passed a number of regulations that promote the use of sustainable modes of transport for companies and employees. For example, in Belgium, it is a mandate to offer employees a mobility budget as an alternative to a corporate car. In Italy and France, the concepts of mobility managers and a sustainable allowance are also becoming pertinent. Demand-responsive shuttles are another business model popular in Europe for commuting and intra-city travel and can provide first- and last-mile connectivity. While this was trialed by operators like Beeline and Grab Shuttle, it was not sustainable due to the high cost of operations.

Cities have spent huge amounts on improving the public transport infrastructure to increase ridership. However, they have not been successful because public transport development is restricted to certain areas, causing limited connectivity to the destination. While shared and integrated mobility will be a sure way to encourage the use of sustainable modes, disincentivizing the use of cars through road pricing, congestion charges, and access restrictions has made a substantial impact on reducing the use of private cars. The London congestion charge is a fee charged to most cars and motor vehicles driven within the Congestion Charge Zone (CCZ) in Central London during peak traffic. This has helped London decrease the modal share by private cars and reduce congestion by 30% between 2000 and 2019. More recently, the Mayor of London has considered expanding the ULEZ to cover Greater London's 33 boroughs and implementing a daily Clean Air Charge for most vehicles. The objective behind this is not to increase revenues for TFL but rather to reduce the miles covered by the private car.

Singapore also implements this measure, but the policies aim to raise revenues. An electronic road pricing system implemented in Singapore has been effective and generates roughly 10% of the local transport authority's income. In addition, the revenue collected from COE's auctions in 2019 was higher than all the local transport authority's revenue sources. Prices in the Open Category, which can be used for any vehicle type but is used mainly for large cars, hit an all-time high of $114,001 in July.

Therefore, a more integrated approach toward mobility will be able to drive the use of sustainable shared mobility. An integrated mobility model with the involvement of all stakeholders, combined with car usage reduction schemes, is necessary to drive the shift toward sustainability.

RECOMMENDATIONS

- Extensive consultations must be carried out between stakeholders to understand the best practices that are implemented and that work to ensure that all interests and needs are accounted for; collaboration is key.
- The Singapore Green Plan 2030 focuses primarily on the adoption of EVs in private, public, and shared fleets. It should also set up a detailed plan that can improve the transport infrastructure; for instance, setting up shared mobility hubs, improving cycling infrastructure, and providing better intermodal connectivity.
- Set up a conducive regulatory framework for the uptake of shared modes, especially in the corporate mobility space. Singapore can emulate the regulations and taxation policies adopted by European countries, like France and Belgium.
- Cost and convenience are primary factors for road users' decision-making in switching over to sustainable modes of transport. A reduction of road taxes for both electric vehicles and autonomous vehicles (AVs) should be considered.
- AVs will be an important part of Singapore's Smart Mobility solutions and can complement public transport and act as ideal first- and last-mile connectivity solutions (autonomous shuttles). Singapore's legislative advantage is the presence of clear standards and definitions regarding autonomous vehicle development and operations. Singapore's autonomous vehicle testing center, CETRAN, attracts manufacturers, start-ups, and autonomous technology companies globally to run pilot programs in a controlled area that can mimic most urban conditions. By 2030, 25% of Singapore's population will be older than 65. Driverless mobility options will fulfill the demand for preserving the freedom of individual mobility for the elderly in the city-state.

SECTION 2: ASSESSING THE ELECTRIC MOBILITY LANDSCAPE

The electric vehicle value chain has experienced a complete transformation in the past 12 years. Considering the transformational shift, the market is doubling in less than three years, which is strong evidence of EV growth. In the current scenario, 6.7 million units were sold. Of these, 70.7% were battery electric vehicles (BEVs), and 29.1% were plug-in hybrid electric vehicles (PHEVs) in 2021. Technological advancements in batteries and charging infrastructure have been crucial in the overall development of the electric vehicle market. In 2022, based on Frost & Sullivan's analysis, the total EV sales are estimated to be 11.1 million, of which 71.3% will be BEV, and the remaining will be PHEV and fuel cell electric vehicles (FCEV). Advanced features, such as V2G services, business intelligence, blockchain technology, and suggestive charging pattern, will be available and preferred by network operators in the next five years of management/aggregator cloud platforms. Leading battery manufacturers (BYD, CATL, and LG Chem) and OEMs (BYD, Daimler, and VW) are now looking at next-generation battery technology. It focuses on module-less battery pack technology, integrating cells directly into the pack without packing them into modules. The future of the electric vehicle market is based on the following factors, which are the backbone of the EV value chain:

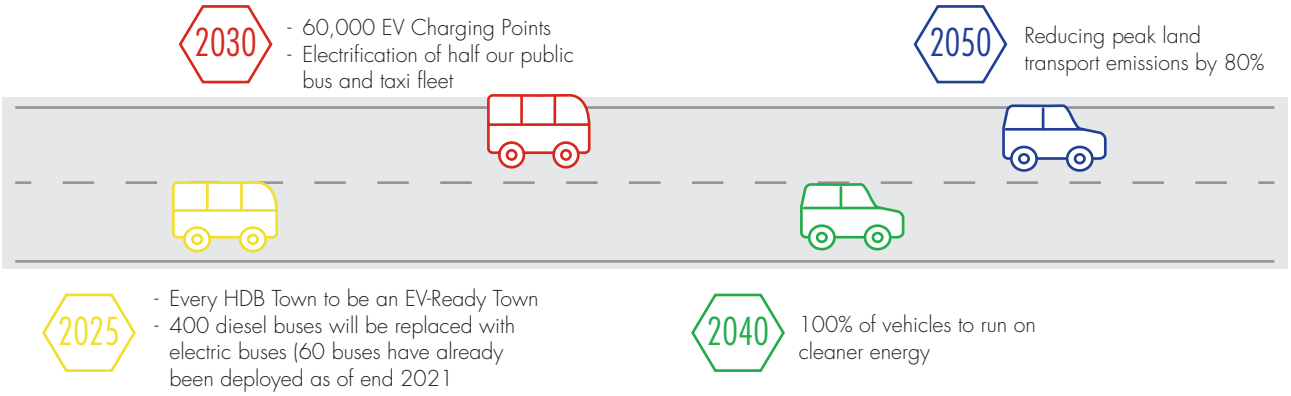
- Emergence of gigafactories.
- Development of charging infrastructure.
- Advancement of battery technology.
- Rapid decarbonization targets.
- Emerging business models.

In the trends discussed above, China leads in the establishment of gigafactories, supplying a majority of the battery packs on a global scale, predominantly catering to the Asian, European and American markets. In terms of the development of charging infrastructure, Europe is at the forefront of establishing high-power, ultrafast charging stations, which will likely be adopted in the American market. With most European countries banning ICE vehicles by 2035, they are moving toward a carbon-neutral state by 2050.

SINGAPORE: ELECTRIC VEHICLE REVOLUTION

The Singapore Government aims to phase out petrol and diesel cars as early as 2030, starting with the taxi fleet. To achieve this milestone, the National Electric Vehicle Centre was established to promote electric vehicles and includes industry stakeholders and government agencies.

Fig. 2 – Electric Vehicle Vision in Singapore



Source: Land Transport Authority

The government has placed incentives and tax subsidies on the purchase of electric vehicles. The incentives and subsidies are in line with the European policy, which offers various categories focusing on the following:

- Vehicle taxes and purchase incentives.
- Regulation and technical standards.
- Infrastructure developments.
- Stakeholder collaboration.

The market started booming in Singapore in 2021, which experienced 201% growth compared to 2020, with sales of 3,357 units. The main reason for the growth is the government policies in Singapore. In terms of the charging infrastructure, the country has approximately 2,100 charging points and aims to have more than 60,000 points by 2030. The government is also offering purchase incentives, including:

- Early Adopter Incentive – Electric vehicles will not have to pay an additional registration fee, which is a minimum of $5,000. The incentive was introduced in January 2022 and will end in December 2023.
- Vehicle Emissions Scheme – EV drivers will receive $15,000 or $25,000, depending on the model.

ANALYSIS

Car ownership in Singapore is different than in other countries. Vehicles are purchased in the form of a certificate of entitlement (CoE), which has a validity of 10 years to monitor the flow of incoming cars into urban areas. The CoE depends on the size, engine capacity and type of usage, which are categorized accordingly, and, in some cases, it can be higher than the price of the car. To increase EV adoption, EVs are classified in category A, which attracts the lowest CoE fee. Such steps from the government indicate that the electric vehicle market will grow in coming years to become 100% emission-free by 2040. However, Singapore lacks charging infrastructure. This is still a challenge on a global scale and will continue to affect the market for the next three to four years since the government aims to install over 60,000 points in the next seven years. There are limited private players in the EV charging infrastructure space, which has some big names like Shell Recharge, Blue SG, SP Group, Greenlots and Caltex that are focusing on establishing robust charging infrastructure with a mix of AC and DC charging stations. To support the development, the government mandated public housing to have a minimum of three spaces reserved for EV charging, which will result in a major transformation in the EV charging infrastructure market. According to the Frost & Sullivan forecast, there will be approximately 5,100 EVs sold by the end of 2022, compared to 3,357 in 2021, with a majority being BEVs due to the incentives and subsidies.

RECOMMENDATIONS

- Market participants should follow in the footsteps of the European market and adopt best practices from proven business models established by others in the value chain. This would relate to major areas such as EV component manufacturing, the complete battery lifecycle, and establishing charging infrastructure.
- The incentives offered for EVs should be more attractive since factors like the CoE and purchase incentives will continue to be the backbone of the EV industry in Singapore.
- A robust charging infrastructure must be established because it posed a great challenge in key EV markets. While the global average of location-to-charging point stands at 1:3, the vehicle-to-charging point ratio is 1:15 in key EV markets. Considering the

high density of vehicle movement in Singapore, the average in Singapore will have to be much better than the global average.
- There must be a collaborative effort between the important stakeholders in the value chain since there is a high density of non-traditional automotive businesses entering the EV arena with innovative solutions and business models challenging the traditional established players.

SECTION 3: THE EVOLVING ADVANCED AIR MOBILITY (AAM) ECOSYSTEM

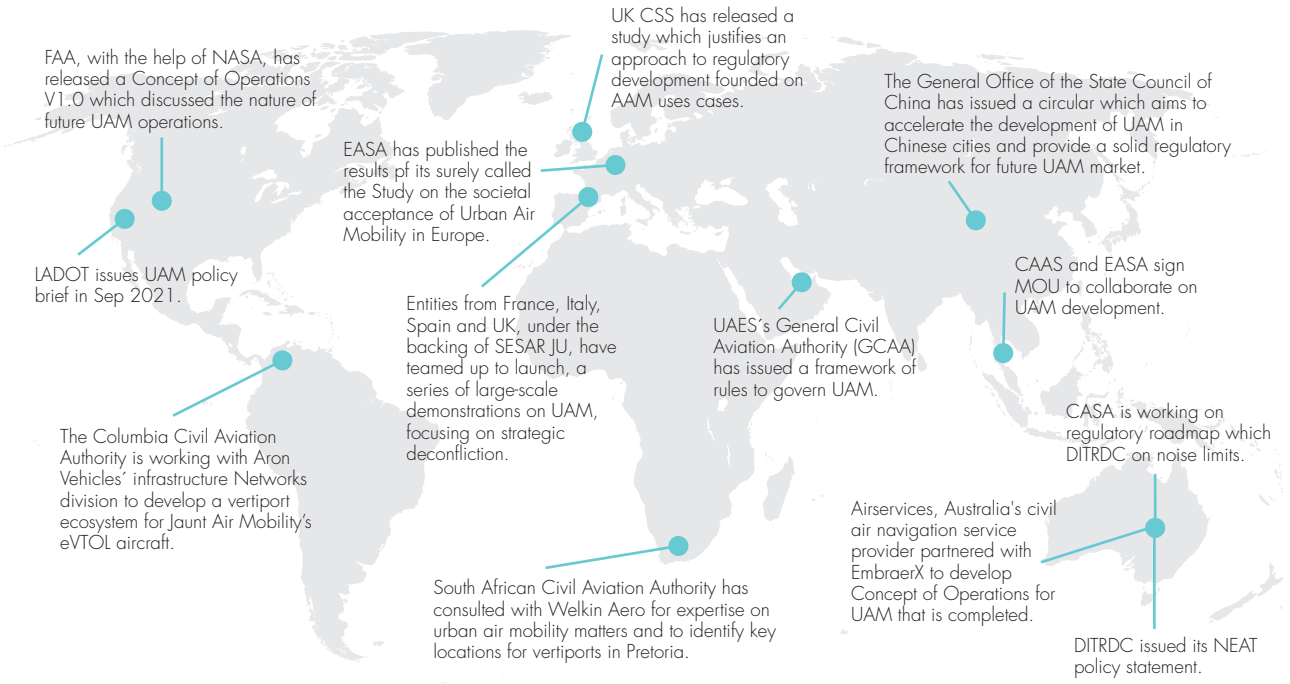
Advanced air mobility (AAM) is setting a new paradigm in air transportation as never before. In the past few years, we have been exposed to various elements of AAM ecosystem such as manned and unmanned e-VTOL (electric vertical takeoff and landing) platforms, supporting physical and digital infrastructure and operators who are willing to bring reality to the AAM landscape. Air travel has completed a full circle in its evolution since its inception in early 1920s where flying evolved from the general aviation into commercial airline and further to business aviation. Business charters were less accessible for large masses which can change rapidly with on-demand flying provided by AAM platforms like never before. Point-to-point commercial flying over short distances is going to take an altogether different meaning, where it would be accessible to the masses like never before. Frost & Sullivan estimates that at least 2,000 AAM platforms would fly around the world by the year 2027, exceeding manufacturing revenues above $ 10 billion. The AAM services industry is estimated to generate another $ 4 billion in revenues a year if certifications and regulatory hurdles are overcome. By 2038-2040, AAM services revenues may well exceed commercial airline revenues—while this is a bold step to fathom, it is very likely to happen if we could harness the full potential of AAM.

Frost & Sullivan is working with global market participants and evaluating the market potential, customer perception, typical journey profile, price point, and possible applications of the AAM market. There are other supporting elements such as regulatory aspects, the evolving value chain, and key technological enablers. Various regulatory initiatives are being taken by leading civil aviation authorities and supporting government agencies. For example, FAA, with the help of NASA, had released a Vision Concept of Operations for its Urban Air Mobility (UAM) Maturity Level-4 in early 2021, which discusses the nature of future urban air mobility (UAM) operations. Another study published in 2021 by EASA was the result of a survey from "Study on the societal acceptance of Urban Air Mobility in Europe." Similar work is being done in other jurisdictions, for instance, Air Services Australia has partnered with EmbraerX to develop Concept of Operations for UAM. Another study was based on the framework of rules to govern UAM in UAE's General Civil Aviation Authority (GCAA).

Quite a few things are happening in China. The General Office of the State Council of China issued a circular, which aimed to accelerate the development of UAM in Chinese cities and provide a solid regulatory framework. Civil Aviation Administration of China (CAAC) announced the creation of the first unmanned civil aviation experimental zones (UCAEZs) across multiple cities. More recently, EHang the e-VTOL manufacturer headquartered in China, after completing more than 30,000 safe trial flights, has updated on its approval of certification plan for its Type Certification (TC) schedule. CAAC has also published the 14th Five-Year Plan for General Aviation Development in early 2022 that has a roadmap for urban air mobility, UTM (unmanned traffic management) and drone operational development. Given the various initiatives, we expect the market to build up quickly in China following certifications and regulatory approvals.

Several initiatives at the city level are being undertaken by civil aviation agencies, road transport authorities, Ministry of Transport, and city authorities in other regions. Ministry of Land, Infrastructure, Transport and Tourism in Japan has planned to open a 'Next Generation Air Mobility Office' for commercialization of flying cars by 2023. The Civil Aviation Authority of Singapore (CAAS) and EASA have signed a memorandum of understanding (MOU) to collaborate on the development, deployment, and safe operation of urban air mobility (UAM) platforms with the European Union Aviation Safety Agency (EASA) in October 2022. CAAS and EASA intend to collaborate on development of certification and operation procedures for UAM platforms, infrastructure, and operations. Earlier in 2021, Ministry of Transport in Singapore had awarded a contract to Nova Systems and OneSky to establish a traffic management system for UAM. Another similar initiative is from the Los Angeles Department of Transportation (LADOT) that released the UAM policy brief in September 2021. Another similar initiative is from the Road Transport Authority of Dubai which signed an agreement with Dubai Air Navigation Services to map out air corridors and sky lanes for flying taxis. We see quite a few initiatives across major cities of the world that are preparing for UAM operations in the near future.

Global Snapshot: Regional Initiatives by Aviation Authority and Government Departments



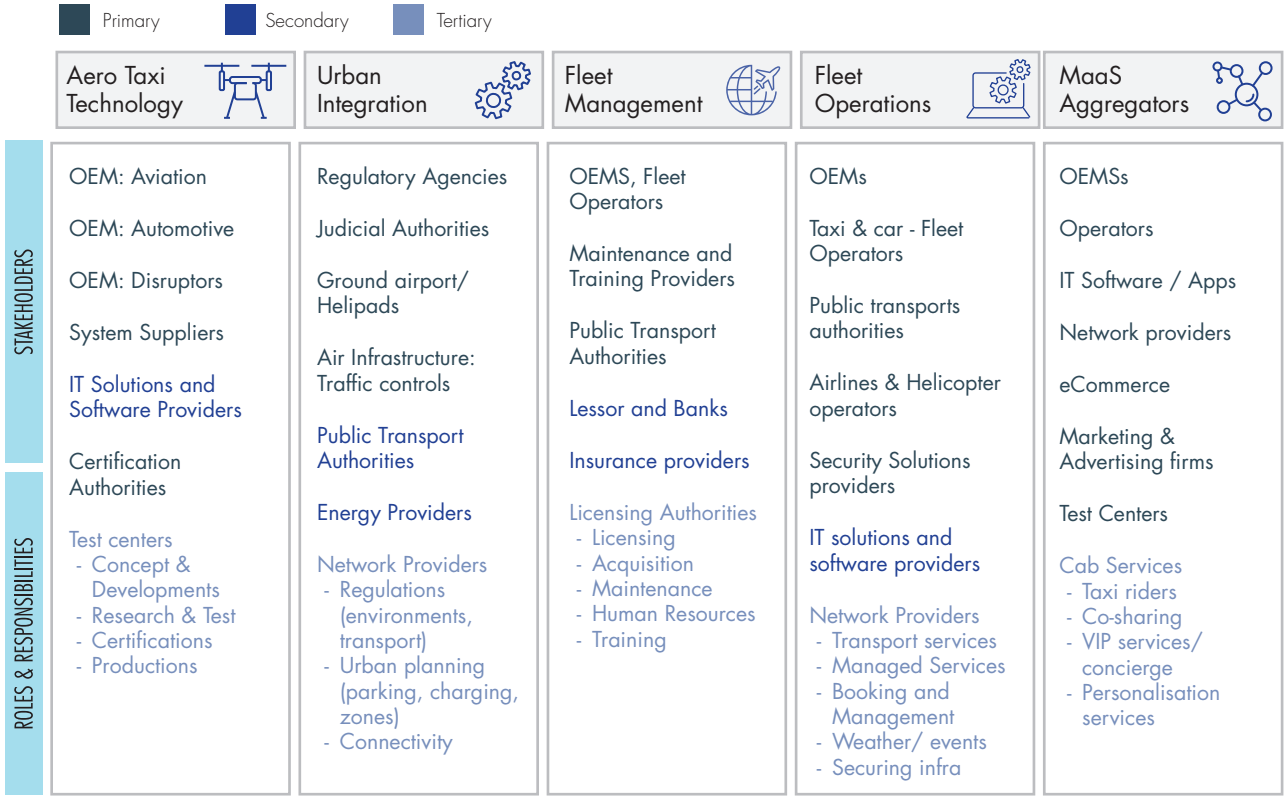
Source: Frost & Sullivan

UAM ECOSYSTEM AND INFRASTRUCTURE

As we delve deeper into the inter-relationships of how various entities in the ecosystem are working toward realization of the UAM framework, it becomes evident that the collective effort of various entities is working behind the scenes to lead to fruition of the UAM ecosystem. While engine maker Rolls Royce is collaborating as the key propulsion provider with CityAirbus and Vertical Aerospace, HALO has placed orders with Embraer's EVE Mobility for operations in the UK. Robotic Skies is working with Skyports on maintenance and training services. Helicopter operator London Heli Shuttle is expected to operate UAMs in the future and is putting together the necessary infrastructure framework with airports such as Bigginhill, Falcon, and Edmiston airports. Lilium has selected London as a development location for its software engineering team. In UAE, entities such as Roads & Transport Authority (RTA) and Dubai Air Navigation Services are working together on UAM navigation framework. In the past, RTA has also been working with Volocopter and Ehang to support the trials.

We understand that the UAM ecosystem is composed of multitude of entities each fulfilling a unique role and have divided the overall ecosystem into five main categories: aero taxi technology, urban integration, fleet management, fleet operations, and mobility-as-a-service (MaaS) aggregators. Aero taxi technology providers may come from an aviation or automotive pedigree or could have been a technology disruptor startup. There are other supporting technology providers beyond UAM platform integrators such as IT solution providers, certification authorities, and test centers. Other major categories are composed of entities that are creating the necessary urban integration layer such as infrastructure developers, public transport authorities, regulatory and judicial authorities. Other entities include fleet management providers, maintenance and training providers, and licensing and financial authorities. Fleet operations would be managed by OEMs themselves, public transport operators or existing taxi operators or helicopter operators. MaaS aggregators will play the crucial role of connecting customers with the applications and in turn with service providers. This role can be fulfilled by OEMs, operators, IT providers or ecommerce platforms. We also understand that there would be further segregation into primary, secondary, and tertiary roles among these providers. There are multiple examples of similar entities that are coming together to form the ecosystem. We saw that Geely Auto (the parent company of Volvo) has invested in Volocopter while Hyundai, another UAM integrator, is working closely with the Coventry city council and Urban Air Port to put up UAM physical infrastructure. Uber Elevate, which was bought over by Joby Aviation, intends to integrate ground and air travel into a single seamless application enabling multi-modal travel. Traditional airlines such as Japan Airlines, is working with Volocopter, and expanding its partnership to introduce UAM platform to Japanese cities. Infrastructure company Skyports is working with Volocopter to build vertiports in Germany and is also working with Group ADP in France. Public transport authority RATP in France is working with Ehang and Vertical Aerospace for test trials to mention a few.

MARKET OVERVIEW FOR ADVANCES AIR MOBILITY



Source: Frost & Sullivan

We have traditional aerospace companies such as Diehl aviation, Honeywell, Thales, and Garmin, which will provide necessary aerospace solutions to UAM integrators. At the same time, there are communication companies such as SK Telecom and mass transport companies such as Korea Transport that are working with Korea Airports Corporation and Hanwha Systems to test and build communication network models for UAM. Volocopter performed a series of tests with three different leading UTM service providers–AirMap, Altitude Angel, and Unifly.

TECHNOLOGY PARTNERSHIPS

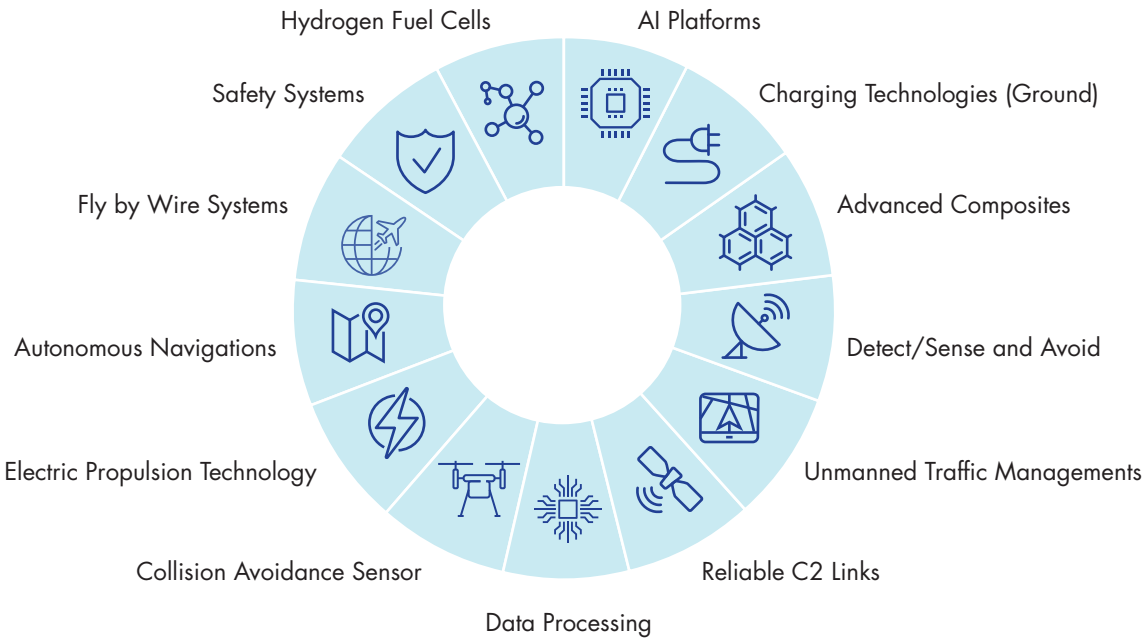
While studying trending patterns to determine the Top 10 players in the UAM market, we found that the top companies on our list were those that have so far stayed ahead from the rest in terms of their platform development and certification process maturity. Maturity would mean an aggregation of various factors such as development phase, testing, certifications, commercial launch, and funding. Some noticeable ones were Ehang, Volocopter, Lilium, Joby Aviation, Eve, Vertical Aerospace, Airbus, Terrafugia, Archer, Electra, and Wisk.

Among those platforms, we observed that majority are VTOL platforms and a few are STOL or fixed wing airplane type. Further, the main type is transitional or multi-rotor rather than other types. When it comes to propulsion, it was mainly electric or hybrid. In terms of number of seats, most integrators are building 1-2-seater platforms or 4-5 seaters. Though autonomous operations are a future aspiration, due to regulations that may be hard to achieve, only manned operations seem to be only the way forward. In terms of range, we are looking at both inter-city and intra city with many platforms working on 0-99 kms range for intra-city commute. There is another evolving market for inter-city and cargo, which are not too far but in the range of 100-250 kms. In terms of certification, majority are not certified and only a few have received special flight permit such as Ehang with CAAC or some others under Part 23. Finally, in terms of development phase, majority of the platforms are in prototype phase with few going through various phases of certification. When we look at the technology framework, the key components that are going through maximum development are avionics, propulsion, power source, flight controls, and interiors. Beyond the platform itself, we see significant developments in air traffic control and management, infrastructure comprising vertiports, charging stations as well as the customer interface.

To cite a few examples, we notice that companies such as Denso, Honeywell, and Rolls Royce are working in the propulsion segment while Honeywell and AIRMAP are among those working in the data and communication segment. Other examples would be Diehl Aviation working on flight controls and Garmin, Daedalean, LIGNEX1, and Insitu working in the avionics segment. We also see companies such as Uber, Blade, and Ascent catering to development of air taxi booking interface.

Urban Aeronautics, which is an Israel-based aircraft developer, is working with HyPoint to incorporate hydrogen power and then we have Micron that has invested in Volocopter for which it will provide data storage solutions needed for an autonomous aircraft. Another such instance is that of Caltech and Jump Aero working together to develop an electronic parachute for JA-1 eVTOL aircraft. This is also connected to the Agility Prime program of the United States Air Force (USAF). Few core technologies such as hydrogen fuel cells, collision avoidance systems, safety systems, unmanned traffic management, and reliable command and control links are gaining importance in the realm of UAM operations.. Honeywell is providing collision avoidance systems, Micron is working on data processing, Daedalean is focusing on sense-avoid technologies, and Diehl aviation is catering to fly-by-wire systems.

KEY ENABLING TECHNOLOGIES IN ADVANCED AIR MOBILITY



RECOMMENDATIONS

While we estimate that a large volume of UAM platforms is expected to become reality by the 2026-2027, significant infrastructure capacity needs to be built ahead of it, throughout the city where these e-VTOL platforms can be maintained, charged, and stored. These points available throughout the city would serve as point-to-point network or hub-and-spoke arrangement for UAM operations.

When the e-VTOL platforms fly, they would also need to undergo maintenance and repair activities. The KPIs of MRO operations remain quick turn-around-time (TAT), economical rates, and quality repair services. While traditional MROs may compete in this space, many new age MRO service providers will come into action and either branch out from OEMs, or from infrastructure players, helicopter operators, or existing UAV maintenance providers.

One of the most critical aspect would be cybersecurity. With so many of UAM platforms flying within the city, end point security is of paramount importance. Other aspects of digital infrastructure would be safe air navigation, efficient traffic flow management, and real-time communication.

Pilot training programs to qualify the pilots and train ground handling staff, as well as creating maintenance training programs are critical support services to be worked upon.

The final, but most critical component is the evolving supply chain. While many components will come from traditional aerospace players, some would come from technological disruptors. So high volume manufacturing, quality control, material handling, and engineering services that will enable safe and efficient e-VTOL operations in the future are key aspects to investigate.

SECTION 4: SUSTAINABLE FUEL AVIATION

The aviation industry contributes about 2% to 3% of all CO2 emissions. At the current pace, without any intervention, it is expected to reach more than 20% by 2050. Governments and agencies have launched multiple initiatives to reduce emissions linked to the aviation industry. The goal of the industry is to reach net-zero by 2050. To support this goal, the aviation industry is adopting multiple initiatives, such as sustainable aviation fuels (SAFs) in the short term, hybrid aircraft in the medium term and hydrogen/electric aircraft in the long term.

SAF can be produced using various types of feedstocks, including waste cooking oil and fats, biodegradable waste, and non-food crops. It can also be produced synthetically via a process that captures carbon directly from the air and a few other ways.

As of 2022, as per IATA, 450,000 flights have flown with SAF, 150 million liters of SAF are produced per year, and more than 32 countries have clearly defined SAF policies.

Major drivers for SAFs include:

- Rising fuel costs: Most airlines spend about 60% on fuel, and with rising fuel costs, this percentage share is rising and squeezing margins, eventually leading to higher ticket prices. Airlines are constantly looking at reducing fuel costs and, in the long term, the use of electric/hydrogen as a propulsion method will drastically lower fuel costs. However, in the meantime, SAF would be an option for airlines to consider if the cost of SAF drops drastically.
- Net-zero goals set by the government: Government and regulatory agencies have set up mandates/directives/policies to limit and reduce Co2 emissions from the aviation industry. Currently, the readily deployable solutions include SAF, making it the most sought-after solution by airlines to achieve net-zero targets in the short term.
- Passengers increasingly focusing on sustainability: Passengers are concerned about their carbon footprint and are choosing alternate travel methods or opting not to travel. To support this change in customer mindset, airlines are trying to reduce each passenger's carbon footprint and make travel more appealing.

SAF, although at a nascent stage, is the only readily available and usable solution to support sustainability in aviation. SAF can be used in existing aircraft without the need for any major modifications. SAF is used for a limited number of flights by a few airlines globally but contributes to less than 1% of the total jet fuel used.

For the industry to achieve its desired goals of net-zero by 2050, IATA estimated that 449 billion liters of SAF must be produced.

For SAF to replace conventional jet fuel, there are multiple hurdles that need to be addressed, including:

- Production: The infrastructure required and the access to feedstock to produce is limited and currently is only a fraction of the percent compared to the demand. An increased number of production facilities across the regions will be required. Preferential and continuous access to feedstock will be crucial to increase production capacity and move toward matching supply levels of conventional jet fuel.

- Logistics: Distributing the SAF remains a major challenge. To be used on a large scale, enough of it needs to be available at arriving and departing airports to fully use SAF. Moreover, having a sustainable and robust supply chain is crucial.
- Price: SAF costs about two to four times the cost of jet fuel, and until the cost of the SAF decreases to match jet fuel, it will be difficult to justify the increased cost without drastically changing ticket prices.

To achieve net-zero industry goals by 2050, the industry would need more than 500 billion liters, but to achieve this in the next three decades, a few key aspects must be leveraged.

KEY SUCCESS FACTORS IN LARGE-SCALE USE AND DEPLOYMENT OF SAFS

- New business models: Airlines, in collaboration with SAF producers and other stakeholders such as OEMs, need to develop new business models to support the adoption of high-cost SAF. New business models also include some of the additional costs being passed on to passengers in various forms, such as a point scheme or having options to pay extra.
- Industry partnerships: Partnerships will be key, whether between airline and airport, airline and SAF supplier, or any other stakeholders. Forming strategic partnerships with various industry stakeholders will lead to newer solutions and ways to address major challenges that exist to support the high uptake of SAF.
- Increase localized productions: For SAF to be available in all locations, it needs to be produced closer to use to avoid delays and additional costs of transportation. Having major airport hubs produce their own SAF will lead to higher usage rates, reduced costs, and increased availability.
- Incentives: Government incentives will be a key driving force in increasing production by supporting additional investments in setting up new facilities and new players entering the industry.
- Policies/Regulations: Governments implementing policies and mandates that dictate a certain percentage of blending for the industry with a certain growth in the same percentage until 2050 will be the push the industry needs to achieve net-zero goals.

Collaboration among industry stakeholders and involvement through the value chain will be crucial in achieving wide-scale use of SAF and reaching the set goals. Each stakeholder must play their part, and some of the possible actions may include:

- Airlines: Build business models to support the higher cost of SAF and set up a sustainability blueprint to support the move toward net-zero operations.
- Airports: Develop infrastructure to support storage/production of SAF to support more airlines' move to adopt the use of SAF.
- OEM/Manufacturers: Many are working toward certifying their aircraft for 100% SAF use while conducting R&D to support the increased use of SAF along with other sustainable solutions.
- SAF suppliers: Work with the government and private sector to increase production capacity by investing in new production plants across regions.
- Governments: Lay out net-zero master plans that provide guidance for industry participants to follow. The launch of new initiatives may offer certain benefits, leading to higher adoption of sustainability solutions such as SAF and continuous funding opportunities.
- Regulatory agencies: Work on further deploying net-zero mandates and regulations, especially for the industry, which will increase investments from stakeholders and give the much-required push for all industry players to achieve net-zero goals.

OUTLOOK OF SAF IN ASIA PACIFIC

Given the mature state of the SAF industry in Europe and North America, these regions are expected to achieve emission targets sooner than other regions. Asia joined the initiative later but is catching up with multiple airlines—both FSCs and LCCs—trying out SAF and setting clear plans to fully become net-zero by 2050. SAF suppliers are establishing plants and supplying to airports in the region. Regulatory authorities and agencies have also started rolling out guidelines for the net-zero targets.

CONCLUSION

Sustainability underpins the future of our planet, and sustainable mobility is one of the measures to address urban challenges and achieve carbon neutrality. The call for a sustainable transport transition requires integrating different factors and bringing in a number of concerned stakeholders to achieve common goals. This encourages a comprehensive, end-to-end analysis of various components, such as environmental consequences, which leads to the innovation of integrated sustainable solutions. Multimodal is a prominent feature of sustainable solutions that optimally incorporate the merits of various transport modes. However, implementing such integrated solutions calls for coordination among players such as governments, science and technology, digital infrastructure, and more to achieve the expected output.

With technological advancement and its massive use in mobility, sustainable transport is already gaining momentum globally. The increasing deployment of eco-friendly fuels and engines, the digitization of vehicles, and smart mobility ecosystem characterize the mobility innovation landscape. Despite this, the digital divide and development gap between urban and rural areas impede the adoption of sustainable mobility. Hence, economies should focus on best practices, collaborate with private sectors, and share information to expedite sustainable mobility adoption.

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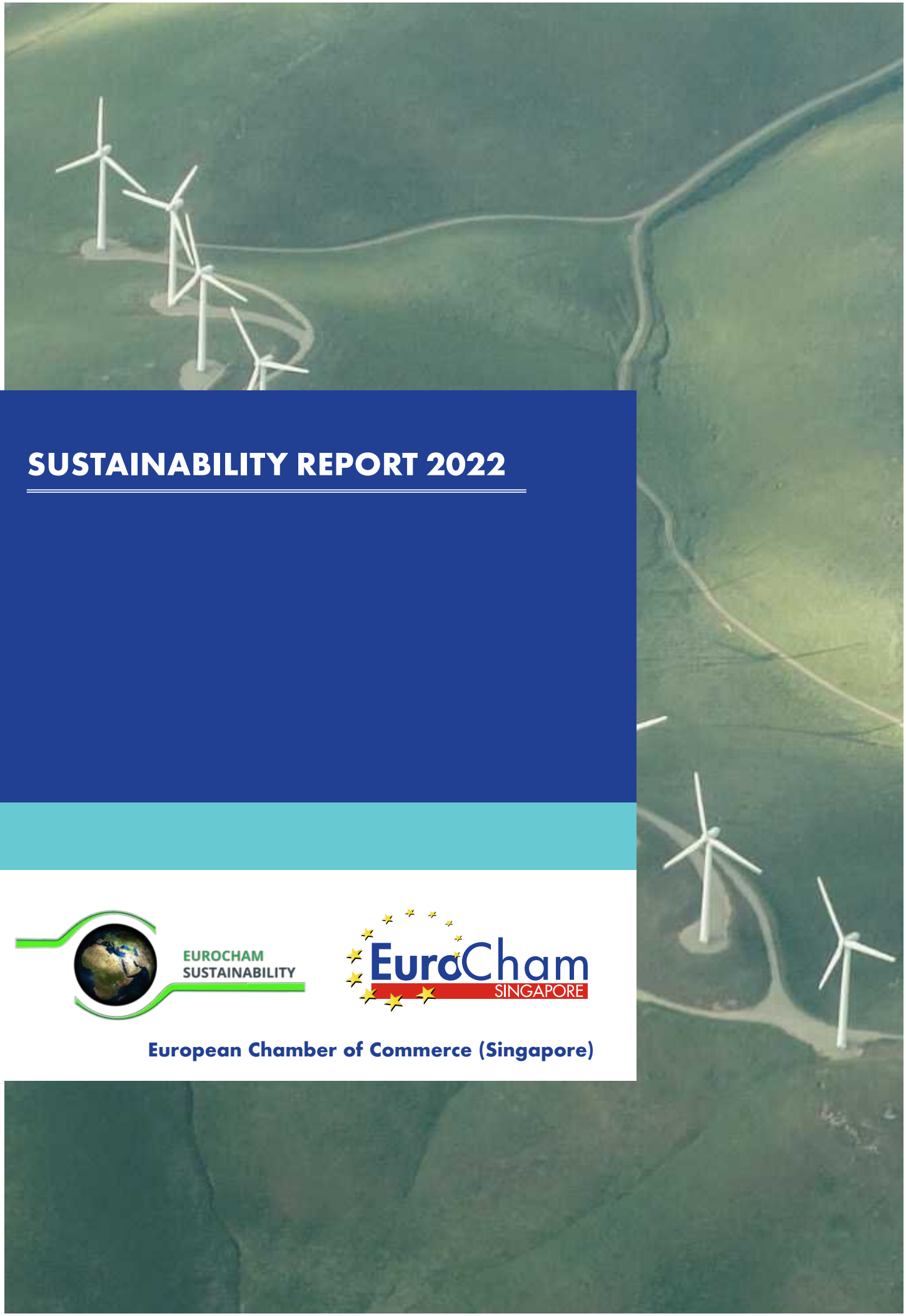


SUSTAINABILITY REPORT 2022

EUROCHAM SUSTAINABILITY

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

EXECUTIVE SUMMARY

Climate change continues to affect our lives as well as the fate of all other species across the planet. By extension, sustainability is becoming an increasingly important issue for many people, societies, governments and in particular also for the business world. For business owners, leaders, and administrators, sustainable business practices are becoming an imperative.

An environmentally-aware business considers more than just profits. It considers its impact on society and the environment.

Making businesses more sustainable starts with being aware of existing gaps in current processes and understanding just how important it is to prioritise green efforts, both for the business and the planet. It is equally important to understand the current level and intensity of initiatives that have been implemented so far. With this survey, EuroCham Singapore intends to shed light on these levels of initiatives by European businesses operating in Singapore and ASEAN. To do so, EuroCham has collected responses from locallyoperational European organisations and other EuroCham member organisations through a survey.

The survey seeks to assess the initiatives, strategies and opinions to gain a better understanding of the perceptions of the importance of sustainability in the respondents' businesses. Based on the findings, a report is then generated to share key insights and findings.

The report highlights the organisations' recognition of sustainable trends in Singapore and ASEAN, and exposes some of the key challenges and opportunities they encounter while operating.

EuroCham believes that the right information and education can change people's values and behaviours and encourage individuals to adopt more sustainable practices within their businesses and personal lifestyles. Perhaps, it might inspire innovation which is a necessity to meet the sustainability goals of today.

In the long run, it is our ambition to advocate for even bolder sustainability goals beyond the Singapore Green Plan 2030 and the Paris Climate Agreement.

EuroCham would like to thank all the survey respondents as well as the members of the Sustainability Committee for their support.

INTRODUCTION

Sustainability is a global imperative as we face an existential climate and environmental emergency. It is a key driver of the EU Commission's agenda, and also a priority for the Singapore Government. As part of Singapore's commitment to the UN Climate Change Conference (COP26), the city-state pledged to halve 2030 peak emissions by 2050, and to reach net zero "as soon as viable" after that. In 2021, the Singapore Green Plan 2030 was launched which includes 5 strategies pillars to achieve the nation's sustainable development goals. Collectively, efforts to mitigate carbon emissions, coupled with steps taken to adapt to climate change, ensure that Singapore remains a vibrant and liveable city for current and future generations.

EuroCham has embraced the "European Excellence in Sustainability" programme for the year 2022-2023 and we have designed a line-up of activities to position European companies as leaders in sustainability and also share how European and Singapore companies can work together in the area.

The programme comprises a series of activities covering five main areas of focus:

- Sustainable Business Innovation
- The Road to Net Zero
- Responsible Supply Chain & Circular Economy
- Digital for Sustainability
- Sustainable Travel & Transportation

In conducting this survey, EuroCham has the ambition of highlighting the current stage of development in sustainable business practices amongst European companies operating in Singapore, its areas of excellence and weakness, the initiatives in place and their challenges, and opportunities for growth.

All respondents 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 51 highly relevant respondents who have shared their views with us and identified potential challenges for the future.

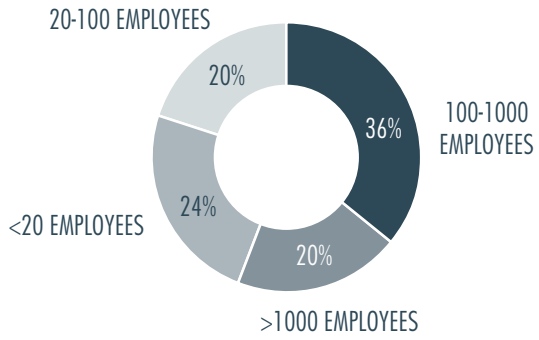
Alongside this initiative, EuroCham is also the organiser of a series of sharing sessions, known as the 'Best Practice Sharing Sessions'. This is another opportunity for our members to highlight their sustainability practices and to start a dialogue between private entities, non-profits, government, and academia. Only by involving all existing actors we are able to tackle the enormous challenge that we face.

RESPONDENT DEMOGRAPHICS

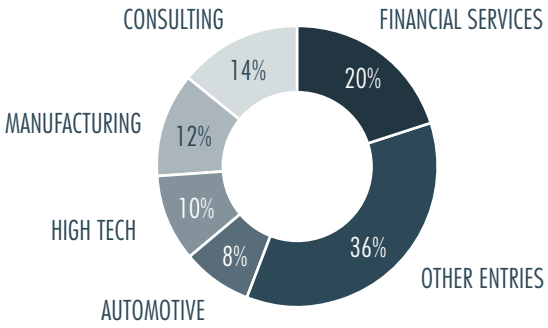
INDUSTRY BREAKDOWN

Over 50 respondents from various organisations were surveyed to understand their awareness of the increasing importance of sustainability in all areas of daily business, and how this awareness has changed from 2 years ago (2020) when a similar survey was conducted*.

The respondents are employed by companies of all size categories. Companies with less than 20 employees, i.e. small enterprises, and corporations with over 1000 employees, i.e. Multi-National Corporations (MNCs), were surveyed in almost the same proportions. This provides a representative cross-section of the integration of sustainability within the European business community in Singapore.



Additionally, the respondents indicated their companies operate in a variety of areas. This not only showcases a good overview of sustainable practices in different industries, but provides interesting and diverse solutions to sustainability concerns.

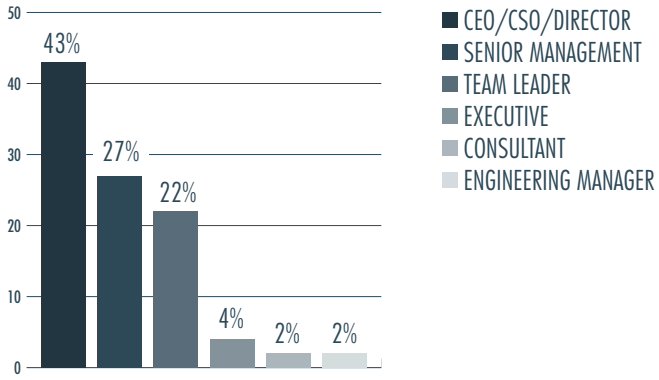


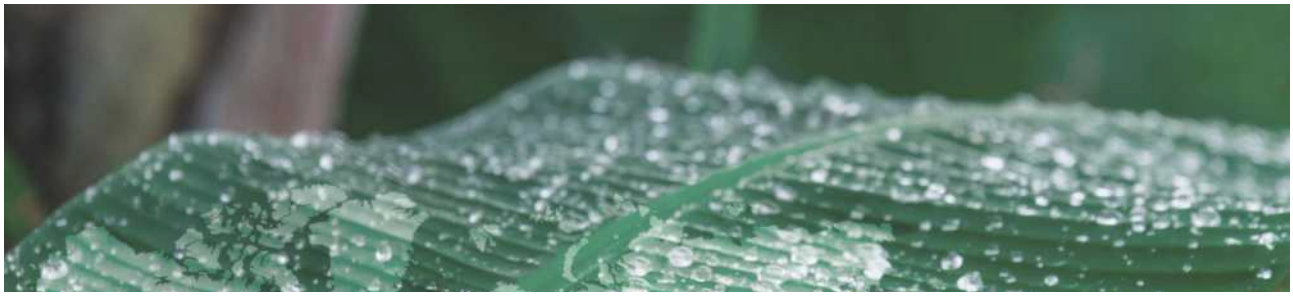
36% of the respondents said they work in niche industries other than the 5 notable industries indicated on the chart in the above diagram.

**https://eurocham.org.sg/publication/sustainability-report/*

POSITION IN THE COMPANY

From the diagram above it can be seen that most of the survey participants act in managerial positions. Well over 40% are CEO/CSO or directors. However, according to the position descriptions and responsibilities, all of the respondents have a large overview of the sustainability strategies, which are analysed in this report.



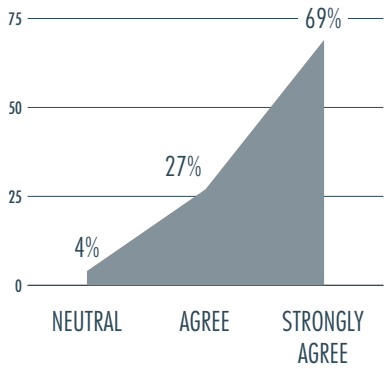


SUSTAINABILITY AND TRANSPARENCY

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

Undeniably, more people are involved in sustainable endeavours now. Simultaneously, sustainability as a strategy has progressively become a crucial factor for corporate success. Hence, companies increasingly seek to operationalise sustainability through a coherent plan.

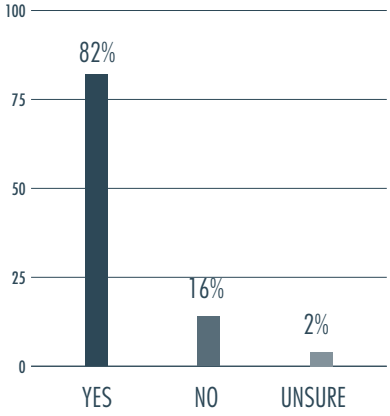
The survey revealed that 96% of those surveyed have a coherent sustainability plan. This can be seen as a key indication that a sustainability plan is essential for many industries today.



Has your organisation established an accountability mechanism for achieving sustainability goals?

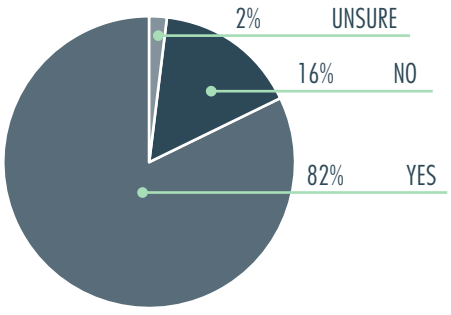
Greenwashing has steadily become a concern for sustainable development because the market for sustainable goods and services is evolving at a fast pace. Transparency is the best way to fight greenwashing. Emerging technology can create distinct structures such as real-time data on volume, velocity, variety and value of trade that can improve the quality of sustainability reporting principles.

On the left, it is seen that 82% of those surveyed represent their companies' implementation of an accountability mechanism to transparently track the achievement of respective sustainability goals.



Does your organisation report on sustainability?

Presumably, it is these 82% who are already tracking their actual sustainability success who are also reporting their evaluations.

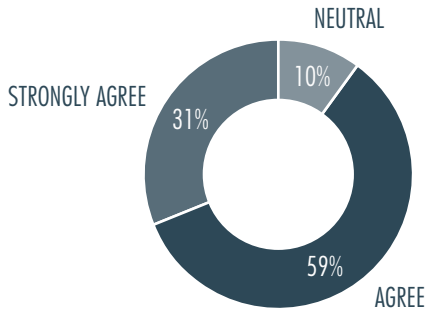


SUSTAINABILITY STRATEGY

Do you think the operating system in your organisation is suited to deliver on your sustainability strategy?

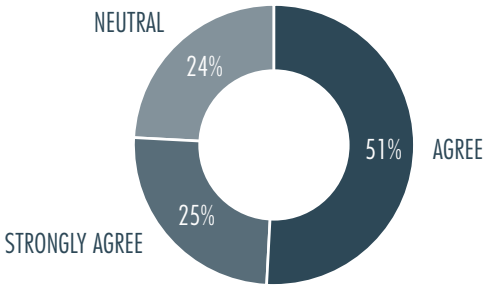
Having a sustainability strategy is crucial, but it will only be efficient if it goes hand in hand with the goals of the company. The daily business and the sustainability strategy must mutually support each other.

90% of the participants polled believe that the operating system of their organisations is suited to deliver on their respective sustainability strategies.



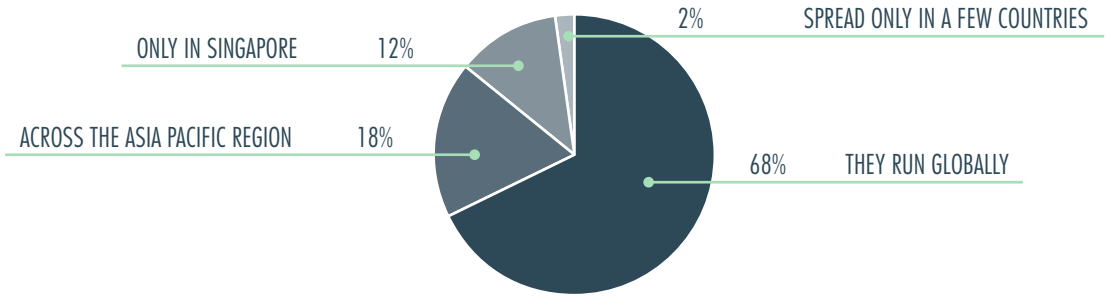
How much do you agree with the statement: 'Most of the employees in my organisation are aware of the sustainability vision of the organisation'?

While the survey shows that sustainability is highly ranked on 24% the agenda of most companies, the right diagram shows that almost 1/4 (24%) of those surveyed stated neutral with regard to the question if whether all their employees in the organisation are aware of their sustainability vision of the company. It seems that in general there is still room for improvement in relation to sustainability goals being integrated into the corporate identity.



What is the scope of sustainability initiatives in your organisation?

The results of this enquiry reveal that the sustainability initiatives of the surveyed companies apply primarily on a global level (68%) and not just for a few selected regions.



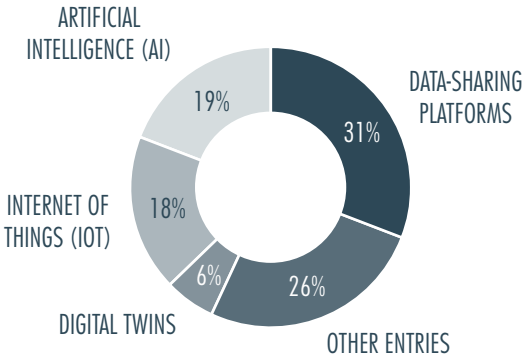
SUSTAINABILITY AND DIGITAL TECHNOLOGIES

To what extent have digital technologies created a positive impact on your organisation's sustainability goals?

In a world driven by digital solutions, emerging technologies continue to affect the way we live, work, and interact with one another. Today, digital technologies are being used to measure and track sustainability progress, optimise the use of resources, reduce greenhouse gas emissions, and make possible a more circular economy. Overall, digitalisation can drive the sustainable transformation of society and industry.

On a scale of 1 to 5, where 1 was the least impactful and 5 was the most impactful, most (43%) respondents selected number 4.

This result confirms that digitalisation is considered the be a facet of growing importance for achieving a company's sustainability goals.



What digital tools assisted your organisation in attaining its sustainability goals?

Data sharing platforms are the most popular technology with 31% according to answers of the respondents. Businesses are indeed using all kinds of data to track environmental issues and develop policies to make positive changes.

These streams of data are allowing business officials to strengthen and develop policies to make their businesses, and supply chains more environmentally friendly. The data provides an overview of the issues needing to be tackled and often contains clues as to the best path forward.

Furthermore 26% of the respondents selected 'other entries', which indicates that there are far more specific technologies than the most common digital tools. Digital tools are developing extremely rapidly and each branch of industry has specific digital tools available to meet their needs and goals. Nevertheless, artificial intelligence was selected by 1/5 of those surveyed and is therefore very promising as well.

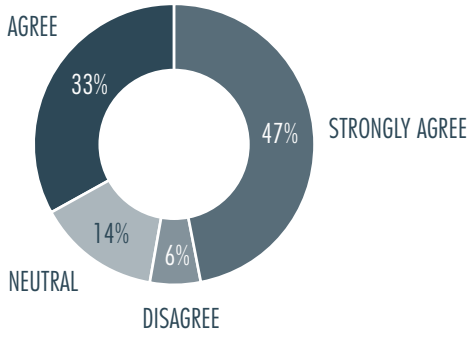
SUSTAINABILITY AND DECARBONISATION

How far do you agree with this statement: 'My organisation has set clear net-zero goals with a tangible targets and deadlines to achieve net-zero emissions'?

Carbon dioxide is a major by-product in many industries, but it is destroying habitats and our world as we know it. As a result, one of the most important sustainability goals is to successfully implement decarbonisation.

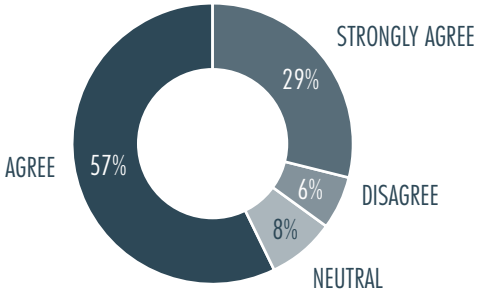
This question of the survey affirms whether or not companies surveyed have set a clearly defined and tangible goal to achieve net-zero emissions.

47% of the respondents strongly agreed and 33% agreed. Only 6% testified to disagree.



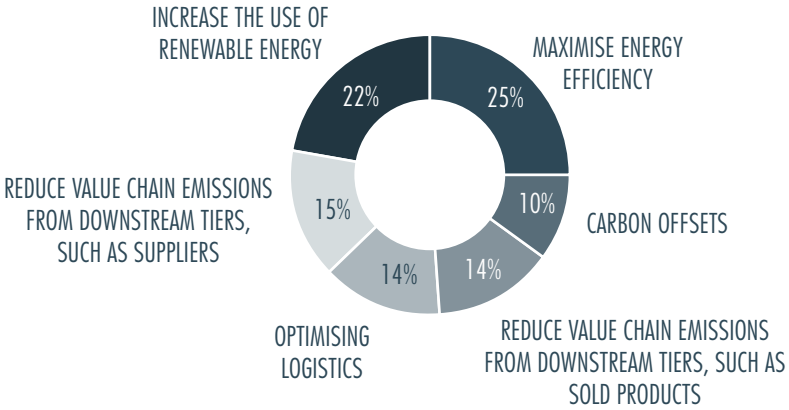
How far do you agree with this statement: 'My organisation has a solid plan that will guide us to achieving decarbonisation'?

A roadmap with key actions to consolidate the process towards the decarbonisation is pivotal to track a company's process. Almost 90% of the organisations surveyed have a solid plan that will guide them to achieve decarbonisation.



What actions has your organisation taken so far to reduce carbon emissions in its operations?

This question featured the actions taken by the organisations to minimise carbon dioxide. 25% of the respondents maximise energy efficiency and 22% increase the use of renewable energy. The next higher categories deal with the reduction of CO2 itself.



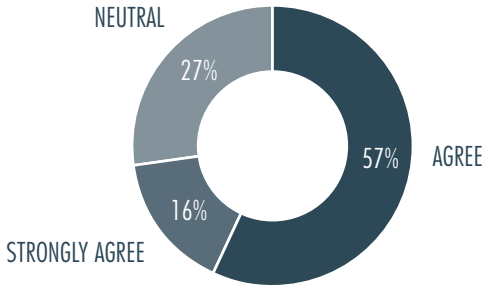
SUSTAINABILITY AND CIRCULAR ECONOMY

How far do you agree with this statement: 'My organisation ensures that our suppliers within the supply chain adhere to sustainable business practices'?

This question of the survey features the importance of a end-to-end approach of a company's sustainability strategy. A fully sustainable supply chain is one that ensures socially responsible business practices.

73% of the respondents agree that their suppliers adhere to sustainable business practices.

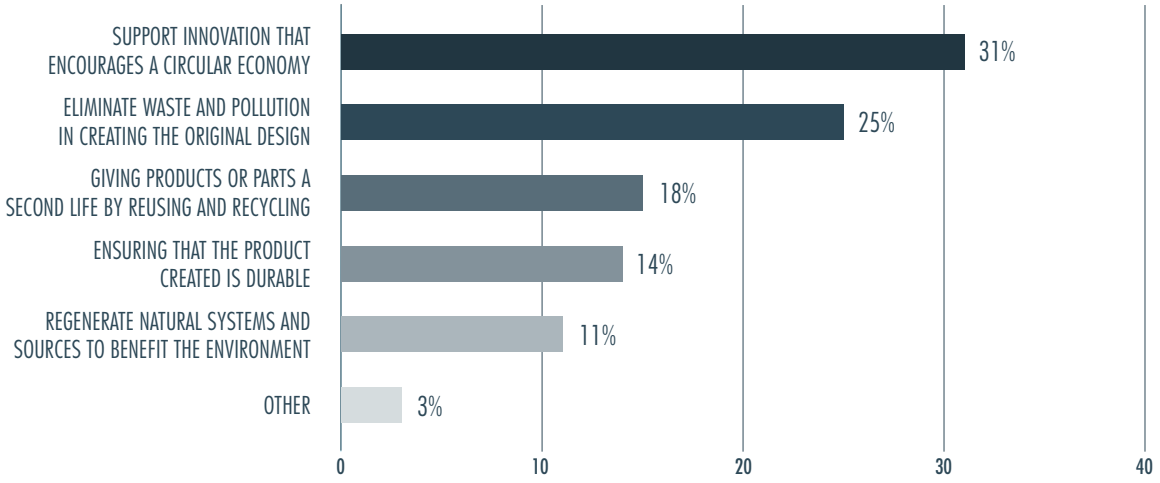
The result shows that more and more companies are starting to focus on how responsible their supply chains are and ensuring that their suppliers also meet sustainability requirements. This might be largely due to recent and growing legislation around supply chain sustainability and an increasing demand from customers that their products be sustainably produced and procured.



My organisation adopts the following action to embrace a circular economy.

To understand the precise actions of organisations as they embrace a circular economy, EuroCham asked the survey participants to choose the activities accordingly to their sustainability actions.

'The 'support of innovation that encourages a circular economy' is ranked highest with 31%, followed by 'waste and pollution elimination'.



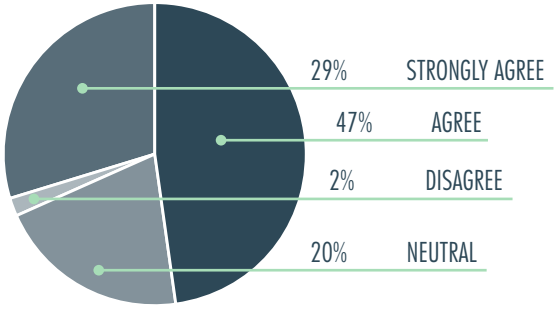
INNOVATION AND SUSTAINABILITY

How far do you agree with this statement: 'My organisation has changed its business model and/ or integrated innovation strategy for the purpose of its sustainability goals'?

Knowledge of pollution from heavy industry and many other industries has only become so clear in the last few decades. As a result, many companies have had to change from the ground up in order to comply with today's sustainable regulations and ethical commitments.

Additionally, the survey highlights that most companies had to change strategies and implement innovation for the purpose of sustainability goals.

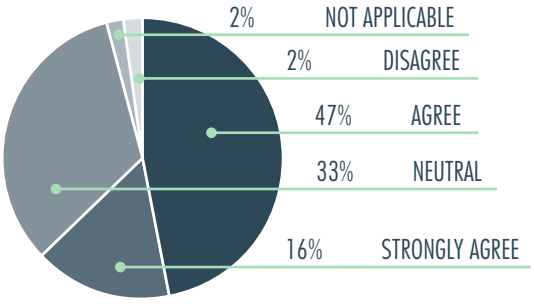
29% strongly agreed that their organisation changed the strategy for the purpose of its sustainability goals and 47% stated that they agree. This is gratifying because it shows that the industry is willing to change.



How far do you agree with this statement: 'My organisation embeds sustainable transportation/ travel in its operations'?

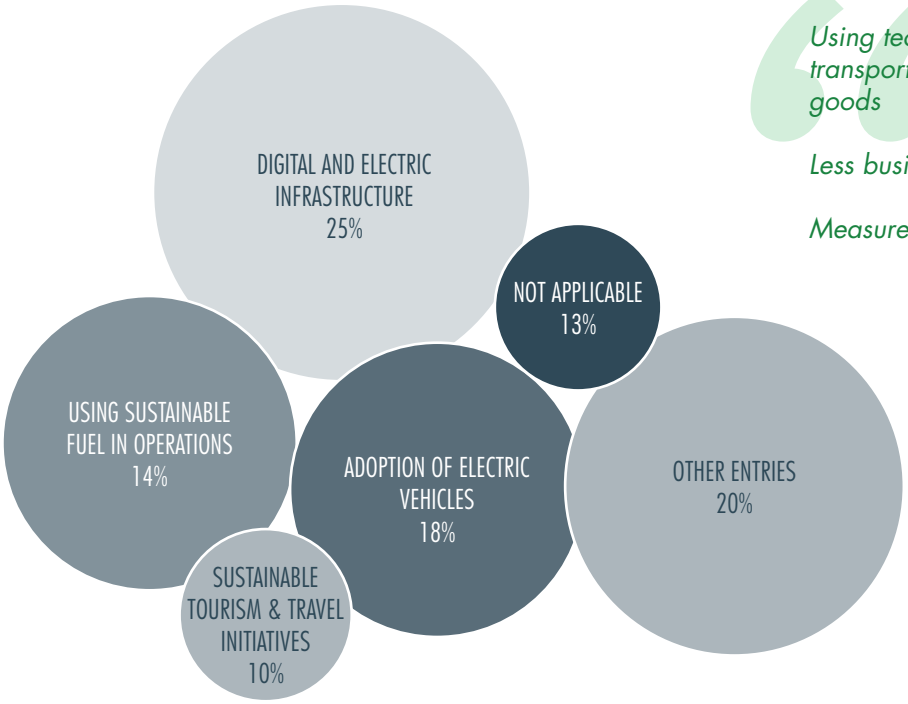
In the survey, transportation and travel were considered as well. About 64% of the respondents state that they embrace sustainable practices for their travel or transportation activities.

In order to understand exactly what this entails, the exact approach is taken into account in the next question.



SUSTAINABLE TRAVEL AND TRANSPORTATION

In what ways does your organisation ensure that it is contributing to sustainable travel and transportation?



Using technology to optimise transportation distances for delivery of goods

Less business travel

Measure travel per annum

Sustainable transport arises to reduce the negative impact associated with this increased urban mobility and in promoting more environmentally-friendly modes of transport and travel.

Electric cars are gaining market share as well as other new innovative ways of getting around. Air transportation is viewed more critically, and so is shipping. That's why large parts of the industry and society want to change the locomotion industry in the long term and quickly.

The organisations surveyed describe that 25% rely on 'digital and electric infrastructure', 14% use 'sustainable fuel in operations' and 20% have spoken out in favour of 'other entries'.

Other solutions that surfaced in the survey advocated for the mitigation of business travel trips. The Coronavirus pandemic has proven that meetings and business dialogues can be conducted virtually and often more efficiently than flying halfway around the world.

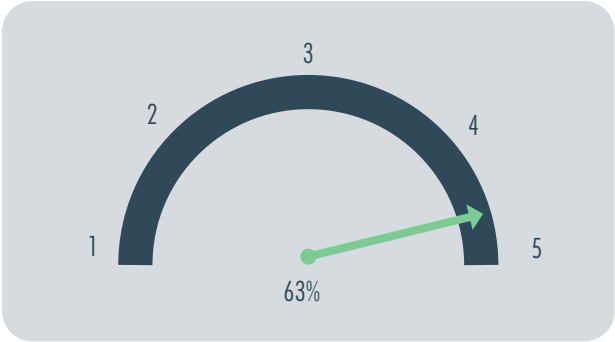
Other ways described were the use of technology to optimise transportation distances for delivery of goods, research and development (R&D) in particular should be promoted in order to support more products that have a positive impact on climate change. In addition some respondents mentioned that the travel per annum should be measured by each individual and the company.

PRIVATE SECTOR PARTNERSHIP IN DRIVING SUSTAINABILITY

How important is public and private sector partnership in driving sustainability efforts?

To achieve the SDGs by 2030, the private sector has to be fully on board. In recent years, both, public and private institutions are indeed converging towards the achievement of development results. One of the SDG Fund priorities is to facilitate this convergence, leading to a shared responsibility in development challenges.

63% of those surveyed selected the highest number out of 5 to rate the importance of effective public-private partnerships.



Where do you think there can be more collaborative efforts between the public and private sector?

This open question perfectly underscores the finding of the previous question and shows that collaborative efforts between the private and public sectors and in the education system in particular are a smart way towards more sustainability.

Having specialists from the Industry working together with Government and authorities.

Education and incentives.

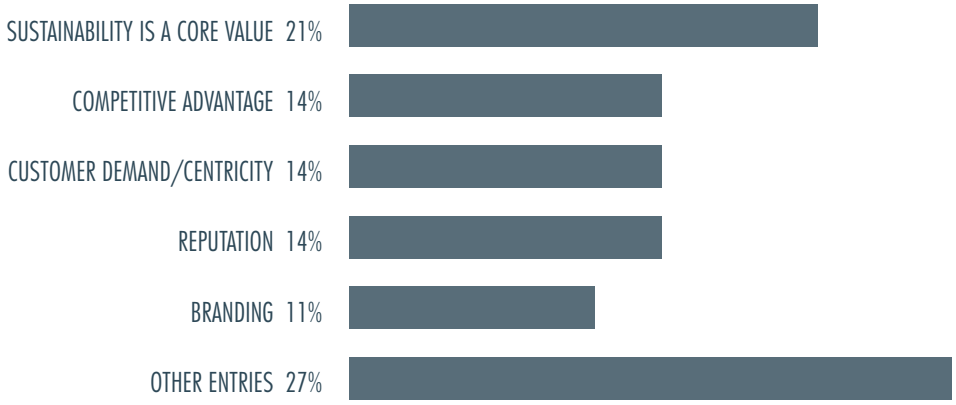
More aggressive goals and plans for carbon reduction in Singapore would benefit from more collaborative efforts.

Driving a circular economy.

What are the key motivating factors for your organisation when pushing the sustainability agenda further?

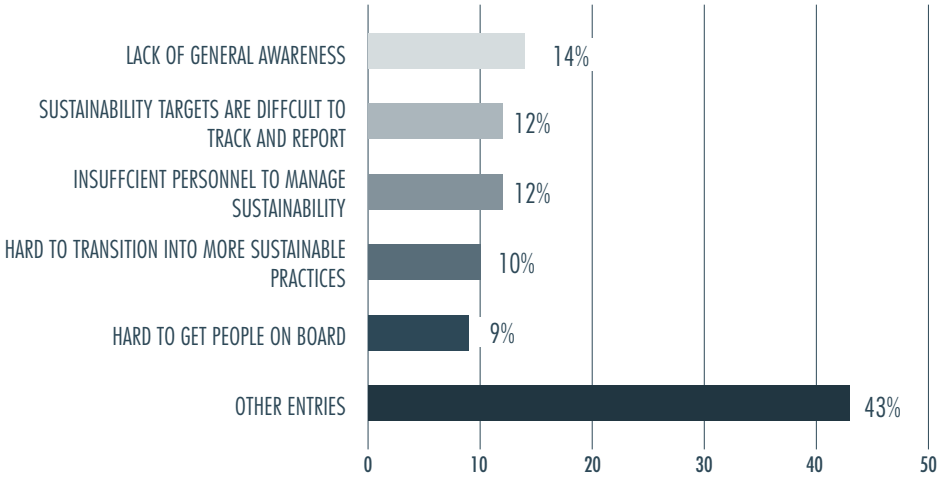
There are different motivations behind acting more or less sustainably, which is why it is difficult to categorise them, but it is clear that around 1/5 of those surveyed see sustainability as a core value, which is very gratifying. But also reasons such as the competitive motivation, which ultimately drives sustainability, is a significant motivation factor for some respondents.

Additionally, for some companies the reason why they act sustainably has to found in how they are perceived from the outside. "Reputation" and "branding" make up 25% of the responses surveyed.



SUSTAINABILITY CHALLENGES

What are some challenges faced by your organisation in your sustainability efforts?

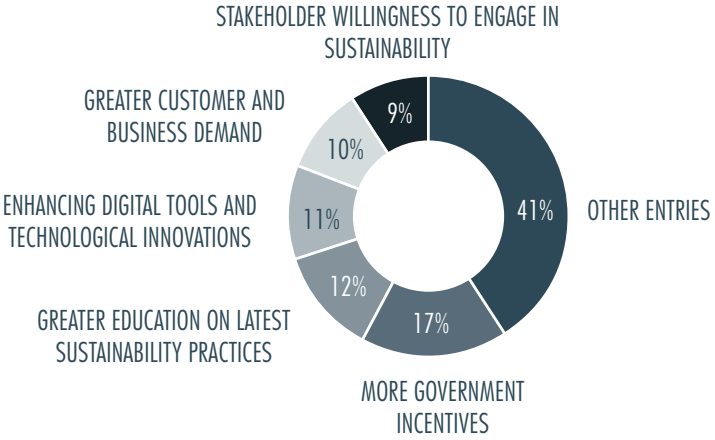


Sustainability often brings its own set of challenges. Especially small and medium sized businesses face some common ones like not having the money to make the changes that you want, not having enough time to do it all, not having employees who are engaged with your sustainability efforts, etc.

The results of the survey indicates that around 1/6 of the organisations still notice a lack of awareness on sustainability.

Which factors would assist your organisation best in overcoming the above challenges?

This diagram reveals the need for governments to exert more incentive and pressure and the increased demand for more educational measures. Also more technical prerequisites must be created. In addition, from the survey's results, it seems as if customer demand is not yet that high.



Since the unveiling of the Singapore Green Plan 2030, has your organisation introduced new sustainability initiatives?

According to the results, more than half of the companies surveyed have introduced more sustainability initiatives since the launch of the Singapore Green Plan. Nevertheless, there is still room for improvement with a significant number of companies to introduce more new initiatives to meet the common sustainability goals in Singapore and worldwide.

SUSTAINABILITY CHALLENGES

Share your thoughts on the applicability of the Singapore Green Plan 2030 to your organisation's sustainability goals?

This part of the survey featured some new ideas on how to implement other sustainability goals in addition to Singapore's 2030 sustainability plan. Most of the ideas concentrated on hybrid working conditions, sustainable people development and energy optimisation.

Sustainable People Development is getting more important.

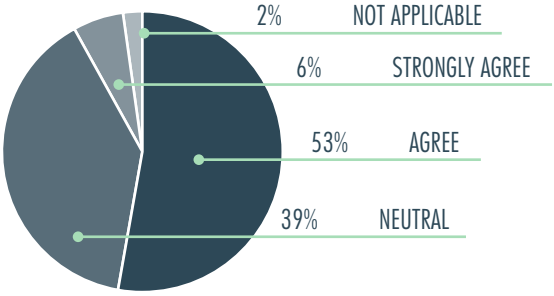
(1) Encourage gathering usage of public transport, (2) staggered working hours , (3) hybrid work arrangements, (4) use of sustainable articles for personal use

Carbon emissions target is relevant to all companies. We already take initiative to reduce energy usage or implement solar energy to achieve the company's green target.

Overall, SG's sustainability efforts will help organisations to achieve their goals and attract companies to invest.

How much do you agree with this statement: 'The European Green Deal has successfully created new business models and opportunities in Singapore and South East Asia'?

Last but not least, the survey makes clear that opinions differ on the effects of the European Green Deal in Singapore. A total of 53% agrees with the statement that the European Green Deal has created new business models and opportunities in Singapore and in SEA and 39% of those polled remained neutral.



EUROPEAN EXCELLENCE IN SUSTAINABILITY

EuroCham SINGAPORE

European Chamber of Commerce (Singapore)

DELOITTE & TOUCHE LLP (DELOITTE SINGAPORE)

The Road to a Net-Zero Future

Deloitte provides industry-leading audit and assurance, tax and legal, consulting, financial advisory, and risk advisory services to nearly 90% of the Fortune Global 500® and thousands of private companies. The organisation's more than 345,000 professionals deliver measurable and lasting results to reinforce public trust in capital markets, enabling its clients to transform and thrive, leading the way towards a stronger economy, a more equitable society and a sustainable world. Deloitte has been operating in Singapore since 1967.

WORLD*CLIMATE*: A STRATEGY

In 2020, Deloitte launched World*Climate*, its strategy to drive responsible climate choices from within the organisation and beyond. World*Climate* is Deloitte's commitment to taking measurable, decisive action on climate change by empowering its professionals and engaging the broader ecosystem to create solutions that facilitate the transition to a low carbon economy.

The organisation's World*Climate* strategy consists of four pillars:

1. Achieving net-zero greenhouse gas emissions through near-term (2030) goals for its own operations.
2. Embed climate policies, practices and actions across the organisation.
3. Engage and educate Deloitte professionals on the impact of climate change, specifically on consumer decisions.
4. Collaborate with clients, alliances partners, non-governmental organisations, industry groups and suppliers on climate change issues.

Tracking emissions and progress

All of Deloitte's member firms report and track their scope 1, 2, and 3 emissions monthly, and progress on the World*Climate* goals will be reported into a live dashboard. Deloitte also has an emissions model that will determine its annual target to reach net-zero by 2030. The progress on the World*Climate* goals is also reported externally in the annual Deloitte Southeast Asia Impact report.

In Deloitte offices in Southeast Asia, including Singapore, the annual key performance indicators for sustainability are used to track progress. The KPIs include a firm-wide business travel emissions reduction of 50% per FTE by FY2030 and the sourcing of 100% renewable energy for its buildings.

Educating the workforce on sustainability

All Deloitte employees must complete its sustainability eLearning called 'The World*Climate* eLearning - Rewrite our Future.' The course was developed in collaboration with the World Wildlife Fund and is designed to equip its professionals with a deeper understanding of the impact of climate change- to inspire them to take tangible actions to reduce their carbon footprint.

The World*Climate* team

The Deloitte internal sustainability team for Southeast Asia, including Singapore, consists of a manager and two executive-level staff. This team reports to the Deloitte Southeast Asia's Head of Brand and Communications, and the Deloitte Southeast Asia Clients & Markets leader.

TRANSITIONING TO A LOW-CARBON ECONOMY WITH INNOVATION

Transitioning to a low-carbon economy entails collaboration across the broader business ecosystem to drive innovative solutions. An example of this collaboration is Deloitte in the United States (US). It is collaborating with organisations across the value chain to catalyse production of Sustainable Aviation Fuel (SAF), and has entered into SAF agreements with sever-

al US airlines —American Airlines, Delta Air Lines and United Airlines. Through this initiative, the US firm will be avoiding the emissions from approximately 5,000 metric tons of carbon dioxide.

Decarbonisation solutions

Globally, Deloitte has created a suite of interactive modules that helps to accelerate the delivery of climate risk and strategic decarbonisation projects by assessing abatement opportunities, physical risk, emission pathways and climate scenario models.

Another Deloitte initiative is the ClimWise framework for clients that combines global management and risk identification via the climate scenario modeling to help financial stakeholders identify and manage economic risks in its transition towards a low-carbon economy.

ESG datalab

Deloitte has a web application for clients with an embedded dashboard that allows financial stakeholders to view the environmental, social and governance (ESG) scoring of their financial assets and portfolios.

COLLABORATING WITH VALUE CHAIN PARTNERS

Deloitte is at the early stages of collaborating with strategic value chain partners in the Asia Pacific region to ensure they have net-zero commitments, which will ultimately help Deloitte to reach its net-zero emissions goal by 2030.

Social impact initiatives

Launched in 2017 as Deloitte's signature global social impact initiative, the World*Class* programme aims to empower 100 million people to succeed in a rapidly changing global economy by 2030. In Southeast Asia, some of the social impact it had created includes developing a partnership with chocolate manufacturer Barry Callebaut, to provide resources and solutions that will improve the livelihoods of cocoa-farming communities in Indonesia. Deloitte also partnered with non-profit organisation Fund Isaan to give students in north-eastern Thailand access to IT resources.

ACTIVITIES IN SINGAPORE

One of Deloitte's main sustainability initiatives in Singapore is its contribution as a strategic partner of Climate Governance Singapore (CGS). CGS is the local chapter of the Climate Governance Initiative that aims to mobilise boards worldwide to accelerate the net-zero transition, guided by the World Economic Forum's Principles for Effective Climate Governance. As a strategic partner, Deloitte is in the Steering Committee and Advisory Board of CGS to provide subject matter expertise for climate and sustainability.

SUPPORTING THE SG GREEN PLAN

To meet its net-zero targets, Deloitte Singapore is conducting energy audits in its offices to reduce electricity consumption. This aligns well with the Energy Reset pillar of the Singapore Green Plan 2030.

Deloitte also aims to engage and educate its employees on the impact of climate change, specifically in consumption choices to inspire them to make a positive climate impact via webinars, workshops, learning modules, thought papers and volunteer opportunities. This pillar aligns well with the Sustainable Living pillar.

Deloitte collaborates with clients, alliance partners, NGOs, industry groups and suppliers to create innovative solutions at a systemic and operational level. This is aligned with the City in Nature pillar of the Green Plan that aims to develop programmes to allow humans and wildlife to co-exist.

Deloitte.

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PHILIP MORRIS INTERNATIONAL (PMI)

Sustainability is the Core of PMI's Transformation Towards Smoke-free Future

Philip Morris International (PMI) is a leading international tobacco company working to deliver a smoke-free future and evolving its portfolio for the long-term to include products outside of the tobacco and nicotine sector.

SUSTAINABILITY IS THE CORE OF PMI'S TRANSFORMATION

PMI addresses its priority ESG topics through eight impact-driven strategies focus on the impacts derived from its products (what is being produced) and its business operations (how it was produced).

While PMI is widely known as a cigarette company, in 2016 it announced its new purpose: to deliver a smoke-free future by focusing its resources on developing, scientifically substantiating, and responsibly commercializing smoke-free products that are less harmful than smoking, with the aim of completely replacing cigarettes as soon as possible. These innovative alternative products do not burn tobacco or create smoke, and therefore emit significantly lower levels of carcinogens and other toxic substances than cigarettes.

WHAT'S THE LONG TERM PLAN?

PMI introduced its 2025 Roadmap outlining 11 key goals connected to their eight strategies and a long-term sustainability plan. To link each goal to specific outcomes, PMI developed a set of KPIs according to two drivers: "Product Sustainability" and "Operational Sustainability" . The weighting applied to each KPI is informed by the results of their sustainability materiality assessment. Specifically, they attributed the highest weight to the social impacts of their products, where they believe PMI can have the greatest impact.

TRACING IMPACT WITH KEY PERFORMANCE INDICATORS (KPIS)

PMI has developed its Sustainability Index to measure and communicate progress against its aspirations in rigorous and quantitative manner, using a set of clearly defined and verifiable metrics. The Index set out 19 KPIs that are directly linked to its 11 key goals for 2025, and the progress is available to be tracked towards its goals year-over-year.

EMBEDDING SUSTAINABILITY INTO PMI'S CORPORATE CULTURE

PMI believes in protecting and promoting equality, diversity, equity, and fair treatment to instill a sense of belonging amongst employees, maintain an inclusive workplace culture and impact lives beyond work. Investing in its people helps PMI recruit and retain talents, achieve high productivity and efficient operations to deliver on its corporate purpose. PMI strongly believes that a more diverse and inclusive culture better attracts talent, improves decision-making, innovation, customer orientation, and employee satisfaction.

A TEAM FOR SUSTAINABILITY

PMI's Chief Sustainability Officer (CSO) leads the integration of sustainability across its business and heads PMI's Sustainability Team. Program-specific working groups meet periodically to coordinate the strategy, targets, and performance of specific sustainability programs. At the market level, dedicated sustainability coordinators help ensure that sustainability priorities are cascaded and programs are localized.

ACCOUNTING FOR COMMUNITIES AND PEOPLE

PMI implemented a central governance process to ensure that its employees are aware of its sustainability practices and

are engaged through various channels. For example, employees may use The Sustainability Hub, a collaborative platform which houses all relevant sustainability materials to learn or practice sustainability. The Sustainability Market Coordinators Community provides sustainability coordinators with appropriate guidelines and resources to localize its global sustainability strategy. The Sustainability Yammer Community works to amplify and accurately reflect the voices of PMI employees on sustainability.

SUSTAINABILITY: AN OPPORTUNITY FOR INNOVATION AND GROWTH

For PMI, sustainability is a fundamental opportunity for innovation, growth, and purpose-led, impact-driven, long-term value creation. PMI has invested heavily to develop, assess, and commercialize better alternatives to cigarettes and plans to dedicate an additional USD 200 million to minority investments in early and growth stage companies through PM Equity Partner (PMEP), its corporate venture capital arm.

SMOKING ALTERNATIVES

Beyond its primary focus of replacing cigarettes with less harmful alternatives, PMI addresses the environmental impact of its products by embedding principles of circularity and eco-design, implementing effective post-consumer waste management solutions, addressing litter, and promoting responsible disposal of products at their end-of-life.

VALUE CHAIN RESPONSIBILITY

PMI continues to improve its policies and practices of identifying and addressing risks and impacts for "rights-holders" across its value chain by responsibly securing a supply of raw materials.

PITTING ITSELF TO GLOBAL STANDARDS

PMI's supply chain sustainability strategy is grounded in its Responsible Sourcing Principles (RSP), which align with the UN Guiding Principles on Business and Human Rights (UNGPs), the Ten Principles of the UN Global Compact, and International Labour Organization (ILO) Conventions. This details PMI's ambitions to set process and performance standards for its suppliers and stakeholders across tiers within the supply chain.

KEEPING SUPPLIERS IN CHECK

Built into PMI's contractual agreements, PMI expects all its suppliers to demonstrate high sustainability performance and compliance with its RSP and Good Agricultural Practices (GAP). PMI also continues to monitor the activities of its critical suppliers through a suite of tools, including third-party assessments, on-site audits, and field visits.

WORKING WITH STAKEHOLDERS

PMI also uses tailored due diligence instruments and mechanisms within segments of its supply chain. In its tobacco supply chain, the GAP and their Agricultural Labor Practices (ALP) Code are operationalized at the farm level by field technicians. PMI's Procurement organization leverages the work of the Responsible Business Alliance (RBA) in its non-tobacco supply chain and EcoVadis in its direct materials, indirect materials and services, technical procurement, and advanced procurement supply chains.

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PRUDENTIAL SINGAPORE

Helping People Get the Most out of Life

Active in Singapore since 1931, Prudential Singapore is an indirect wholly-owned subsidiary of Prudential plc and one of Singapore's leading life insurance companies. It is one of the market leaders in protection, savings and investment-linked plans, with S$53.3 billion funds under management as of 31 December 2021. In testament to their financial strength, Prudential has an 'AA-' financial strength rating from leading credit rating agency Standard & Poor's.

A COMPREHENSIVE ESG STRATEGY

The core of Prudential's sustainability strategy is to help people get the most out of life. Their Environmental, Social and Governance (ESG) strategic framework features three core pillars and supports the UN Sustainable Development Goals (SDGs).

Making health and financial security accessible

Prudential makes health and financial security accessible and affordable by delivering products and services that meet diverse needs. Their digitally-enabled multi-channel distribution, and efficient and agile infrastructure enable Prudential to meet growing health and wealth needs of people and communities. Lastly, Prudential focuses on promoting financial literacy to ensure people can have a better understanding of financial planning.

Stewarding the human impacts of climate change

Decarbonising their investment portfolio and engaging with policymakers and stakeholders to encourage responsible investment and sustainable development are important to Prudential. They closely monitor resource usage to reduce unnecessary consumption, repurpose equipment, promote recycling, and ultimately reduce the environmental impact of their daily business operations.

Building social capital

Prudential builds trusted relationships with their employees and safeguards the public's trust in them through digital responsibility and responsible business practices. Prudential promotes diversity, inclusion and belonging in their workplace and advances digitalisation in the most responsible manner.

Supporting their three ESG pillars are three ESG enablers of Good Governance & Responsible Business Practices, Responsible Investment and Community Engagement and Investment.

WELL-DEFINED, REALISTIC, AND LONG-TERM TARGETS

A member of the Net Zero Asset Owner Alliance

As a member of the Net Zero Asset Owner Alliance, Prudential is committed to become a net zero asset owner by 2050. To achieve this, Prudential aims to reach a 25% reduction in Weighted Average Carbon Intensity (WACI) in their investment portfolio by 2025, and divest from all direct investments in businesses that obtain more than 30% of their income from coal by the end of 2022. These efforts are also supported by engaging with the companies responsible for 65% of emissions to encourage an inclusive transition as the world shifts to a low carbon economy.

Managing the environmental impact of their operations

Prudential also manages their direct operational impact on the environment through specific energy savings and waste reduction goals. Prudential is aiming for 5% energy savings year-on-year from 2020 to 2023, and to reduce food waste in 2022 by 20%. These goals are supported by innovative approaches to facility management, including balancing the daily runtime of air conditioning based on employee occupancy, use of natural lighting, and composting of food waste.

Recognising the importance of gender equality

Promoting gender equity and ensuring female participation in company decision-making is also a focus area for Prudential. As a company, Prudential commits to closing the gender pay gap to zero for senior managers and above and maintaining the female participation rate for senior managers and above at 50% to 55%. Prudential aims to achieve both targets by 2024. In 2021, Prudential attained 50% female participation rate and closed the gender pay gap to 1.3% for senior managers and above.

CONTRIBUTING TO SOCIO-ECONOMIC CHANGE

Prudential also encourages innovation in business strategy and technology to

build social capital, directly tied to the UN SDGs – Goal 3 of ensuring healthy lives and promoting well-being for all, and Goal 8, the provision of decent work and economic growth.

Investing in digital health innovation, Pulse

Through Pulse, their digital health and wellness app, Prudential aims to make healthcare and financial security more affordable and accessible to all. Following the introduction of the Health Ecosystem in 2020, Prudential added enhancements to their Healthcheck function in 2021, including questions around diabetes and prostate cancer. Customers can also purchase affordable, bite-sized insurance plans easily from the app. In addition, Prudential launched Wealth@Pulse to make it simpler for Singapore residents to begin their financial planning. In 2022, Prudential will also implement Business@Pulse, a one-stop platform that broadens and simplifies access to insurance and employee benefits for small and medium-sized enterprises (SMEs).

New ways of working

Pre-pandemic, Prudential had already been advocating for work flexibility. They piloted a 4-day work week initiative with nearly 300 employees. The initiative garnered positive responses; 74% of participants indicated there was an overall improvement in their wellbeing due to the shortened work week.

Prudential also promotes inclusivity, to ensure that employees feel valued, respected, and encouraged to participate. As people are Prudential's greatest assets, they are focused on helping employees connect, grow and succeed through diversity in representation and thought, and opportunities for learning, career development and growth.

Helping SMEs grow and upskill

Prudential also engages their stakeholders to foster a culture of innovation through external initiatives. Following their successful partnership with SkillsFuture Singapore (SSG) in 2020 to introduce the SME Skills Accelerator (SSA) Programme, Prudential has renewed their contract with SSG, highlighting their commitment to building social capital. Through a three hour Prudential Design 101 workshop, participants learn from an extensive arsenal of advanced design and engineering methods to build and instill a culture of design and innovation.

WORKING WITH RESPONSIBLE SUPPLIERS

Prudential works with their value chain partners to source and procure supplies and services responsibly. This maintains trust with stakeholders, and minimises their environmental and social impact. Prudential reviews their supply chain at least once a year to determine if other stakeholders affect their sustainability efforts.

Sustainable procurement policies

Prudential's Sustainable Procurement Policy and Supplier Sustainability Guidelines were introduced in 2020, requiring vendors to complete a Supplier Sustainability Questionnaire. This encourages them to disclose information on their ESG efforts and responsible business practices.

A Group-wide Third-Party Supply and Outsourcing Policy that integrates ESG considerations was implemented globally in 2022, as part of their Group's broader Responsible Supplier guidelines. This will further ensure that Prudential's procurement and outsourcing selection processes involve companies whose ESG priorities are aligned with their own.

ALIGNMENT TO NATIONAL INITIATIVES

Prudential's strategy and initiatives are aligned with the Singapore Green Plan 2030 roadmap.

Sustainable Living; a green citizenry that consumes and wastes less

In land-scarce Singapore, waste disposal remains a critical issue. To achieve their progressive environmental targets, Prudential continues to reduce unnecessary consumption, repurpose equipment, and promote recycling of paper, plastics and e-waste to scale back the amount of unrecoverable waste produced in their offices.

In addition to recycling, Prudential endeavours to repurpose electronic equipment where possible to reduce waste. The volume of general waste produced across their offices has fallen by 35.8% since 2020.

Green Economy

In 2021, Prudential launched the PRULink Global Climate Change Equity Fund, which invests primarily in equities of companies to address the environmental challenges presented by global climate change. Companies include those that are involved in industries relating to clean energy, batteries and storage, electric grid, energy efficiency, recycling and pollution control, agriculture, water, and businesses that service such industries.

These are Prudential's efforts to support the Green Finance Action Plan initiated by the Monetary Authority of Singapore (MAS) in developing green finance markets and solutions.

Energy Reset; greener infrastructure and buildings

Prudential is committed to achieving the Building and Construction Authority (BCA) Green Mark certification for both Prudential Tower and UE BizHub, while renewing the existing certification of their Marina One office.

PRUDENTIAL

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ROCHE

Science for a Better World

Founded in 1896 in Basel, Switzerland, Roche has grown into the world's largest biotechnology company and the global leader in in-vitro diagnostics. The company pursues scientific excellence by developing medicines and diagnostics to improve the lives of people worldwide. Roche is a pioneer in personalised healthcare and wants to further transform healthcare delivery for greater impact. To provide the best care for all, the company partners with many stakeholders and combines its strengths in Diagnostics and Pharma with data insights from the clinical practice.

DOING NOW WHAT PATIENTS NEED NEXT

To do now what patients need next is what Roche believes to be its purpose. Sustainability remains at the heart of its work and is built into its business strategy and contains three dimensions.

- Society: Contributing to a better tomorrow for all
- Environment: Minimising impact on the environment
- Economy: Investing in medical advances, creating jobs and ensuring livelihoods

TARGET SETTING FOR LONG TERM CHANGE

Striving toward continuous improvements in the area of safety, security, health and environmental (SHE) protection, Roche is focusing on changing behaviours that can help to minimise environmental impact, and developing new innovative processes over time.

To achieve this, the company held a series of workshops for the Group consisting of discussions with internal and external experts, to set mid-term targets for 2015–2020. Additionally, it has established a 10-year ambition (2029) for a 50% reduction of its total environmental impact (ecobalance for operations and product stewardship score for products) and a goal to achieve real zero greenhouse gas emissions from scope 1 & 2 (own operations and purchased energies) by 2050.

Switch to sustainable energy

Electricity from sustainable sources contributes to approximately 63% of Roche's total electricity consumption. This electricity comes from specialist providers of energy from solar panels, windmills or hydropower plants. It excludes carbon offsets or other compensations to mitigate own greenhouse gas emissions. At the manufacturing site in Suzhou, China, the solar panel system produces enough electricity from sunlight to cover almost 80% of the energy needs of the administration building – or enough to power almost 500 private homes for an entire year.

Since 2004, Roche has already reduced its energy consumption by 48% per employee. Decreasing energy consumption and usage of fossil fuels, has seen its CO2 emissions dropped by 67% per employee.

A SUSTAINABLE COMPANY CULTURE

At Roche, sustainability-related initiatives are implemented locally and is the responsibility of local management teams. The Roche Corporate Sustainability Charter establishes the governance of sustainability at Roche by describing the mandate, membership and responsibilities of the Corporate Sustainability Committees.

Training and development teams

Aside from having sustainability teams globally for product development, manufacturing and waste management, Roche also has an internal training system where all employees are provided re-training on general sustainable practices. For those whose jobs are specific to specialised sustainability topics, special training is provided.

In addition, to increase awareness among employees, the Roche manufacturing site in Singapore holds an annual Sustainability Week that features a best practice road show, games, a hands-on recycling workshop,talks by guest speakers and other engaging activities. As part of the programme, the site has partnered with Zero Waste SG to engage employees on waste reduction and recycling and to promote sustainability.

DRIVEN BY A PASSION FOR SCIENCE AND INNOVATION

To address some of the most urgent challenges in healthcare, Roche has embarked on strategic partnerships across the Group, and has invested in a diverse mix of autonomous R&D units and members to obtain a rich diversity of expertise and scientific thinking, as it discovers and develops solutions.

Creating value for stakeholders through innovation

To create value for its stakeholders and competitive returns for investors, Roche has been developing innovative solutions for a range of chronic and life threatening health conditions that continue to revolutionise healthcare. The company's internal guidelines and directives are aimed to reduce the impact of its business operations on the environment. Similarly, Roche maintains an information system specifically designed to help manage its environmental activities to provide support in important areas of environmental protection.

Cutting-edge technologies such as artificial intelligence (AI) and internet of things (IoT) are already allowing businesses to become cleaner and more efficient. At the manufacturing site in Singapore, Roche has implemented the Heat Recovery Wheel that harnesses wasted cool energy from exhaust air to pre-cool outdoor hot air before supplying it to an Air Handling Unit. This technology uses silica gel which regenerates itself and uses minimal energy. This initiative reaped around 75MWh of annualised energy savings and won the Excellence in Energy Management award at the 2019 EENP Awards.

HARNESSING COLLECTIVE ACTION TO INCREASE VALUE

The sustainability of health systems and society as a whole is not only dependent on technology but on collective action. Since the early 2000s, the company has been measuring its environmental impact, and has since implemented a long-term goal to reduce emissions to zero by 2050. They also focus on Product Stewardship, to ensure that medicines and diagnostic products are developed, produced, used and managed at end-of-life in a responsible manner. Product Stewardship enhances the value of its products to society by minimising negative safety, security, health and environmental impacts to people and the environment over the entire lifecycle. As a result, Roche has been ranked as a global leader on sustainability indices for a number of years.

Roche aims to more fully embed product stewardship considerations within appropriate stages of product and packaging research and development processes to address global regulatory requirements and product stewardship goals at product inception and throughout development processes.

ROCHE SUPPLIER CODE OF CONDUCT

Documented in the Roche Supplier Code of Conduct, the company requires its suppliers to manage business continuity through ethical business practices (Governance); act as responsible stewards of natural resources and minimise their negative impact on the environment (Environmental); and protect human rights and the communities in which they operate (Social).

As a member of the Pharmaceutical Supply Chain Initiative (PSCI), Roche is part of a collaboration of more than 40 pharmaceutical companies and suppliers with a shared vision to establish and promote responsible business practices that continuously improve human rights, ethics, labor, health, safety and environmentally sustainable outcomes for pharmaceutical supply chains.

ROCHE IN SINGAPORE

Across the region, Roche's offices are working to minimise waste, reduce energy intensity, and slash its carbon footprint. Offices are migrating to paperless operations, promoting waste recycling with designated waste bins, switching to sustainable catering, and eliminating single use plastics.

The Singapore Green Plan 2030 aligns with its goals as well. Some examples here in Singapore which Roche implemented are

- Fridges and New Dispenser in work cafes are K6 compliant and environmentally friendly
- Removed single use plastic bottles and paper cups in the office
- Programmed timer for light switch are installed in the office
- Waste segregation
- Reusing existing furniture in its new renovated offices
- Green Mark Building (BCA) in choice of site locations

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SIEMENS

Transforming Industries, Markets, and Lives

Established in Singapore in 1908, Siemens has created technology across a myriad of industries, from resource-efficient factories, resilient supply chains, and smarter buildings, to cleaner and more comfortable transportation and advanced healthcare. By combining real and digital worlds, Siemens not only transforms its customers' industries and markets, it also transforms the everyday lives of billions.

DEGREE: SIEMENS' SUSTAINABILITY FRAMEWORK

At Siemens, sustainable development is defined as the means to achieving profitable and long-term growth. Siemens' sustainability framework, DEGREE, represents five areas of commitment - Decarbonization, Ethics, Governance, Resource efficiency, Equity and Employability. DEGREE underlines the necessity to limit global warming to 1.5 degree Celsius and supports the Paris Climate Agreement.

Global and internal standards

Siemens aligns itself with the UN 2030 Agenda for Sustainable Development and the OECD Guidelines for Multinational Enterprises, and has a total of 14 sustainability targets. With DEGREE, Siemens sets strategic targets for all stakeholders to encourage them to drive sustainable growth and transform their industries.

By joining the Science Based Targets initiative (SBTi) Siemens commits to reporting its operational and value chain emissions. Aiming for a 20% emissions reduction by 2030, Siemens pledges to continue supporting its suppliers with digital tools such as Carbon Web Assessments to analyze their carbon footprint and reduce it efficiently.

RISING ABOVE PROFOUND CHALLENGES

Siemens is driven to address the world's most profound challenges by leveraging the convergence of digitalization and sustainability.

Global sustainability

In each region, Siemens has a Sustainability Officer who works with the Global Sustainability Department to define the sustainability strategy of Siemens and coordinate its climate neutrality programme.

The responsibility of implementing sustainability rests on the CEOs of various countries. This responsibility includes strategically taking sustainability aspects, climate change and Siemens' DEGREE framework into account along the value chain for all its business activities.

Employee education

All employees have to go through Siemens' Business Conduct Guidelines training to ensure ethical and responsible decision-making in the interest of all stakeholders. This encompasses high standards in environmental and social management throughout the value chain.

TECHNOLOGY WITH PURPOSE

Siemens believes in "Technology with Purpose" - new resource-conserving technologies that can generate growth for societies.

Research and development

Siemens has spent 4.9 billion on research and development (R&D), including the hiring of 44,900 employees for R&D. With over 43,000 patents granted, Siemens' R&D intensity is at 7.8%.

Setting up innovation networks

Siemens' global venture unit, Next47, provides capital to help start-ups accelerate revenue growth and open doors for global customers. The company is also addressing today's technological and entrepreneurial challenges with academia and other external innovation players..

Digital transformations

Global digitalisation harbours greater risks if the world stays unprepared. Charter of Trust, a joint initiative between Siemens

and companies worldwide, was established to promote a more secure digital world. Tapping on expert knowledge, Siemens will continue to develop digital applications for specific industries and drive existing core technologies. Its strong ecosystem of customers, partners and startups gives them a competitive edge in bringing customer-oriented innovations to the technology market.

COMMITTING TO BUILD A SUSTAINABLE VALUE CHAIN

Since sustainability affects every industry and market, any stakeholder involved in the decision-making process of an organisation is a relevant target audience for Siemens.

Siemens' Business Conduct Guidelines

In its Business Conduct Guidelines (BCGs), Siemens has established fundamental principles and rules of ethical conduct between itself and its stakeholders. Siemens' compliance system ensures that its business practices worldwide comply with these guidelines and follow applicable laws. The system is based on three pillars – prevent, detect, and respond – and covers the activity fields anti-corruption, anti-money laundering, antitrust, Collective Action, data privacy, export control, and human rights.

THE IMPACT OF A GLOBAL ENTITY

As a global entity, Siemens' large environmental impact is mainly generated from energy and land use, the emission of airborne pollutants and greenhouse gases, and the generation of solid and liquid waste.

Hence, its Environmental Portfolio is Siemens' biggest contribution to mitigating climate change. The portfolio has helped customers reduce CO2 emissions by 87.5 million metric tons in fiscal 2021. Siemens is also committed to conserving resources. The "R" for Resource Efficiency in its DEGREE framework indicates that an environmentally-conscious use of limited resources is integral to Siemens.

Financial wins

At Siemens, the creation of sustainable technology does not come at a financial loss. From FY2020 to FY2021, its total revenue has increased by 12.7%. The revenues generated on the Siemens Environmental Portfolio amounted to 19.1 billion in the past fiscal year accounting for 31% of its total revenues.

ADAPTING TO SINGAPORE

Rather than viewing Singapore from Siemens' perspective, Siemens looked internally from the perspective of Singapore and its particular social, economic, and political circumstances.

SIEMENS X Singapore

Siemens has engaged in a number of project partnerships with Singapore entities, with notable ones such as:

- Using Siemens' building technologies to ensure energy-efficient operation of the green complex at the Marina Bay Financial Centre, reducing the annual energy bill by 22.5%
- First Aquaculture 4.0 closed-containment system for tropical fish built by Singapore Aquaculture Technologies (SAT) uses automation and IoT technologies from Siemens for efficient and secure operations

Contributions to the Singapore Green Plan 2030

Siemens' technical expertise, portfolio and experience aligns with the Singapore Green Plan 2030 as its building management systems can assist schools and buildings reduce carbon emission and become more energy efficient. Most recently, Siemens installed 105 electric vehicle chargers in DHL Express Singapore's service centres to support DHL's delivery fleet and help to eliminate a total of 323 tonnes of carbon emission yearly.

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TATA CONSULTANCY SERVICES

Rooted in the Community, Caring for the Environment

Having a presence in Singapore for over 32 years, Tata Consultancy Services (TCS) is an IT Services, consulting and business solutions organisation that has been partnering with many of the world's largest businesses for over 50 years. TCS is driven by a belief that they can transform futures and make a lasting impact on the businesses, partners, and communities the company works with using innovation and technology.

PEOPLE, PLANET, PURPOSE

TCS follows the TATA group philosophy of building sustainable businesses that are rooted in the community and demonstrate care for the environment.

People

To empower communities, TCS connects people to opportunities in the digital economy and builds inclusive, equitable and sustainable pathways for communities. The key focus areas for this strategy are employee health and well-being, diversity, equity and inclusion, co-innovation for social impact, social outreach, community development and innovation. Examples of these initiatives include goIT, TCS' flagship STEM education programme, has benefitted over 100,000 students globally since its inception in 2009. The goals for this program include inspiring students to take up a future career in Computer Science & Technology and challenge gender stereotypes by showcasing women in STEM as role models. TCS leads by example with over 200,000 female employees, 35% of the TCS workforce.

Planet

Business resilience is linked to the planet's sustainability and TCS believes that robust environmental practices seek to minimise its adverse impact on the environment while also driving greater operational efficiency. The key focus areas for this strategy are to achieve net zero by 2030, reach 70% reduction in Scope 1 and 2 emissions by 2025 (over 2016 baseline), target improvements in water and waste as well as supplier sustainability.

Purpose

Beyond its own footprint, TCS is actively engaged with customers and partners to help shape their journey to more sustainable and future-fit businesses. The key focus areas for this strategy are sustainability-led new business model innovation, collaboration for low-carbon economies, disclosure and reporting transparency, supply chain, circularity, empowering human capital and the incubation and delivery of over 170 sustainability solutions and services.

BUILDING SUSTAINABILITY KNOWLEDGE WITH TEAMS

"iEvolve Learning" is an internal training platform that includes environmental sustainability, health safety environmental awareness and diversity and Inclusion courses for all employees. The TATA Code of Conduct (TCoC) course is also extended to employees to promote awareness and create an ethical road map for employees and companies.

In addition to the sustainability courses on iEvolve, TCS also has a mobile app called "Circle4Life" that helps users' understand their own ecological footprint, take pledges, purchase carbon offsets, and coaches them to reduce their footprint. The application includes a sustainability awareness course, developed in partnership with Global Reporting Initiative (GRI), to introduce sustainability concepts to employees.

INNOVATION FOR SUSTAINABILITY

TCS efforts in innovation includes investments in research and innovation, development of intellectual property, building co-innovation hubs called TCS Pace Port, incubating sustainability ecosystem concepts to support systems transformation. Delivery model innovations such as its AI-powered Machine First approach, and platform-driven, outcome-based business models have also been created to drive more sustainable outcomes, and partnerships with customers, civil society, and governments to lead and shape solutions.

Digital for social impact

The company has set up the Digital Impact Square (DISQ), an open innovation center based out of Nashik, India to create social impact through inclusive design and digital technologies. This centre allows young graduates to work in teams to tackle social challenges across various themes and has since its inception, brought together over 590 bright young minds to innovate at DISQ. Seventeen start-ups have emerged from this and are expected to impact over 6 million lives. TCS has also partnered regionally in the design and delivery of this model.

TCS also collaborates with customers to deliver initiatives with social impact using its core capabilities. An example under the TCS Rapid Labs initiative is the TCS Virtual Habilitation, a digital assistive solution, has helped over 3000 children with loco-

motor disabilities such as cerebral palsy and autism.

Solutions for carbon emissions

To help businesses manage carbon emissions, TCS ZeroC guides businesses and organizations to measure carbon emissions and know where they stand regarding their carbon footprint and pursue sustainable business practices.

With rapidly increasing "carbon-offset" demand, the lack of clarity and need for science-backed data to help in measuring and tracking with accuracy is critical and TCS helps to ensure effective monitoring, reporting, and verifying of claims. In addition to using digital technology to help smallholder farmers with better crop management TCS also leverages microbiome research capabilities to optimize carbon farming practices for farmers. This solution also monitors adherence to carbon smart practices followed by farmers and measures overall carbon stocks accumulated in the soil.

CHARTING ENVIRONMENTAL AND FINANCIAL IMPACT

In the area of energy management and GHG emissions, TCS was able to reduce its total Scope 1 + 2 emissions by 66% in relation to the baseline FY 2016. Similarly, its value chain emissions went down by 46% for FY 2022. TCS APAC achieved carbon neutrality across its locations in 2022, ahead of the target of achieving carbon neutrality by 2025, supporting the pathway towards company-wide target of net zero emissions by 2030.

Along with the company's sustainability efforts, TCS has excellent financial performance, crossing a milestone of $25 billion in revenues, and experiencing strong growth of 15.9%, in addition to all-time high incremental revenues of $3.5 billion.

CREATING SPACES FOR SUSTAINABILITY IN SINGAPORE AND ASEAN

TCS has actively supported the work of the Global Reporting Initiative (GRI) in the region. Through the work of the TCS Asia Pacific President, Girish Ramachandran, TCS has assisted in the establishment of the GRI ASEAN Hub and continues to support GRI Governance as a board member.

In April 2022, TCS published the Digital Sustainability Index (DSI) report in partnership with the Centre of Digital Enterprise from the University of Auckland Business School. The DSI is a world-first study of Asia Pacific enterprises that shares insights on how digital solutions are enabling businesses to deliver on their sustainability outcomes across social, environmental, and economic levers.

TCS has supported sustainability startups and innovation in Singapore by active participation in various initiatives. This includes involvement in the government initiative StartUp SG, its work with the Institute of Innovation and Entrepreneurship (IIE) under Singapore Management University (SMU), and its partnership with Enterprise Singapore.

The company has also introduced Sustainathon, a global ideathon to encourage youths to help rethink, reimagine, and reinvent sustainability problems. It aggregates ideas, technology and innovation to solve real-world sustainability issues, and harnesses the power of ecosystems.

PATHWAYS FORWARD FOR TATA

The company has won multiple awards for its social initiatives in APAC such as the Best Community Programme Award, Silver for TCS Australia's Community Innovation Program with Food Ladder, Best Workplace Practices Award , Gold for TCS APAC Workforce Practices and the Best Country CSR Excellence Award Philippines, Platinum for TCS Philippines' Malasakit Journey.

What's to come

Moving forward, TCS plans to reduce its absolute scope 1 + 2 emissions by 70% by 2025 and to achieve net-zero emission by 2030 and curb emissions and limit global warming to below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

TCS has a unique value proposition that combines purpose, digital leadership, innovation, and collaboration. TCS believes that no single organisation can create a regenerative future and that an ecosystem approach is needed. As a result TCS focuses on harnessing its core business capability to lead and affect change across this ecosystem engaging customers, suppliers, partners, academia, employees and community, to help address some of the biggest sustainability challenges we are facing together.

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ACCENTURE

Deliver on the Promise of Technology and Human Ingenuity

Accenture is a global professional services company with leading capabilities in digital, cloud and security. Combining unmatched experience and specialised skills across more than 40 industries, the company offers Strategy and Consulting, Interactive, Technology and Operations services and Accenture Song — all powered by the world's largest network of Advanced Technology and Intelligent Operations centres. Its 721,000 people deliver on the promise of technology and human ingenuity every day, serving clients in more than 120 countries, and has been in Singapore since 1975. Accenture embraces the power of change to create value and shared success for its clients, people, shareholders, partners and communities.

ACCENTURE'S SUSTAINABILITY STRATEGY

Guided by the United Nations Sustainable Development Goals, Accenture focuses mainly on SDG 3 – Good Health & Well-Being, SDG 5-Gender Equality, SDG 6 – Clean Water & Sanitation, SDG 7 – Affordable & Clean Energy, SDG 8-Decent Work & Economic Growth, SDG 10-Reduced Inequality, SDG 12-Responsible Consumption & Production, SDG 13-Climate Action, SDG 16-Peace, Justice & Strong Institutions and SDG 17-Partnerships.

Accenture's SDGs Priorities

Sustainability goals & commitments

In alignment with the Paris Climate Agreement, the company joined 1,100 companies under the "UNGC Business Ambition for 1.5° Pledge" to help keep global warming below 1.5° Celsius and committed to achieving net-zero emission by 2025. Through its science-based target, by 2025, Accenture aims to reduce its absolute greenhouse gas (GHG) emissions by 11%, Scope 1 and 2 GHG emissions by 65% and Scope 1,2 and 3 emissions per unit of revenue intensity by 40% from year 2016 baseline. Accenture aims to reach 100% renewable electricity by 2023 and requires 90% of its key suppliers to disclose their environmental targets and actions to reduce emissions by 2025. Accenture will also invest in nature-based carbon removal solution to address its remaining emission.

To move to zero waste, Accenture will reuse or recycle 100% of its e-waste such as computers and servers, as well as all its office furniture and eliminate single-use plastics at all its locations by 2025.

Accenture is developing water resiliency action plans to reduce the impact of flooding, drought and water scarcity on its business and people in high-risk areas. It is also measuring and reducing water use in these locations.

To develop and expand its relationship with diverse business owners, Accenture aims to graduate 250 diverse suppliers through the Diverse Supplier Development Program by the end of fiscal 2023. This program helps them to accelerate their transition towards building a responsible business model in improving their overall sustainability performance and demonstrating their commitment to climate action and human rights.

Building a strong ethical culture is essential. Accenture evolves Ethics & Compliance training to enable its people better understand Accenture core values and Code of Business Ethics to foster a culture of integrity, transparency, inclusivity and respect for all people. It seeks to maintain 90%+ completion rate on this training globally

Gender is also an area of focus as the company wants to achieve 50% women and 50% men in the workforce by 2025 for those whose gender is binary, and increase the percentage of women managing directors to 30% by 2025. Accenture is also looking at increasing its race and ethnicity representation by 2025.

A SUSTAINABLE ORGANISATIONAL CULTURE

The Sustainability Council in Southeast Asia Market Unit drives the sustainability agenda in the region. Sustainability Now is another group of volunteers that drives employee engagement by organising sustainability workshops and sharing examples of different individual inculcating eco habits into their daily lifestyle. In April this year, Accenture's SEA Sustainability Squad gathered senior experts across Accenture to share on sustainability topics and kicked off a series of monthly short learning sustainability-related activities and launch The Sustainability Master Class, covering a different growth theme, presenting successful client stories, use-cases and other relevant sustainability contents for the region. In addition, Accenture has a dedicated team that provides sustainability services, strategy and consulting to clients.

SUSTAINABILITY INNOVATION & TECHNOLOGY

As companies become more sustainable, Accenture uses innovation to help clients "imagine and invent" their own futures. For example, Accenture Research identifies and anticipates game-changing sustaina-

bility trends through provocative thought leadership, spanning business functions, industries and markets. Accenture Ventures partners with and invests in growth-stage companies that create innovative enterprise technologies to help drive business value and sustainable impact, using an open innovation approach. Accenture Labs incubate and prototype new concepts through applied R&D projects that are expected to have a significant near-term impact on the sustainability agenda of its clients' businesses. Accenture Innovation Centers help build and scale solutions across technologies and industries to drive environmental impact and benefits.

Within the organisation, Accenture has also created a new environmental sustainability consolidated dashboard to track its global environmental sustainability progress such as emission overview, and water risk across all market units.

BUILDING THE SUSTAINABLE VALUE AND SUPPLY CHAIN

Responsible buying procurement

Sustainable Procurement Hub is a part of Accenture True Supplier Marketplace (TSM) platform, which houses the Supplier Hub to encourage more sustainable, inclusive, and transparent supply chains. The Sustainable Procurement Hub requires all new and potential suppliers to complete the Supplier Sustainability Assessment, a questionnaire that asks for detailed information regarding suppliers' policies, procedures, and progress in the areas of Environment, Human Rights & Social Impact, Supplier Inclusion & Diversity, and Ethics & Sustainability Management. The long-term vision for the True Supplier Marketplace is to have a collaborative, multi-party platform to collect and share sustainability data, and co-innovate with various buyers and suppliers.

Diversity and inclusion

The company's Global Supplier Inclusion & Sustainability Programme allows Accenture to work within its ecosystem to identify, develop and work with smaller, more diverse suppliers with increased agility.

Additionally, its Global Diverse Supplier Development Programme (DSDP) is an 18-month program that puts its commitment to supplier inclusion and diversity into action by developing and expanding relationships with diverse businesses owned by minorities, women, persons with disabilities, LGBT, veterans, disabled veterans, and service-disabled veterans, and others, mentoring these diverse suppliers worldwide. Not only does DSDP represent a strategic sourcing strategy for Accenture and its clients, but also strengthens communities by creating more businesses, jobs, and economic growth.

CREATING POSITIVE IMPACT

Impacting the environment & community

As of FY21, Accenture has reduced 65% total emissions from its 2016 baseline, reduced Scope 1 and 2 by 72% and the emissions per unit of revenue reduced by 76%. Currently, the company is powering 53% renewable electricity in offices and centres around the world and 58% of its key suppliers disclosed targets and 60% have disclosed actions to reduce their emissions.

To create greater impact, Accenture is investing in nature-based carbon removals to remove an estimated 13+ million metric tons of carbon over the next 20 years. This project will reforest land with native species, rebuild biodiversity, make agriculture more sustainable, help create green jobs and allow natural ecosystems to rebound and thrive—all while removing CO2 from the atmosphere.

WORKING IN ASEAN

In ASEAN, Accenture is on track to power 100% off site renewable energy by 2023 for all SEA office sites. It has eliminated 8 designated type of single-use office plastics items such as cups, cutleries, stirrers etc. in all SEA office sites and is on track to achieve 100% e-waste recycling on computer, laptops, servers, and 100% circular furniture by refurbishing, reusing, resell or recycling by 2025.

The development of Water Resiliency Action Plans at 3 targeted SEA office sites in Indonesia, Malaysia & Thailand are also slated to happen from this fiscal year. To ensure ethical supply chain procurement, Accenture reaches out to obtain suppliers' sign-off on Agreements containing Accenture's Supplier Standards Code of Conduct statement.

Aligning to The Singapore Green Plan 2030

Aligning to the Energy Reset & Sustainable Living pillar, Accenture will be powering 100% off-site renewable energy for all its office sites this fiscal year and will explores alternatives to make the office greener by reducing energy consumption such as installing LED fittings, light and motion sensors, thermostat to control the lights operating hours, maintaining office air conditioning temperature around 25 degree etc.

In support of circular economy to minimise landfill, Accenture recycles its e-waste, eliminates single-used plastics in office and extends the lifecycle of its unused furniture during renovations such as workstations and pods by donating them to local schools and reselling the task chairs to its vendors.

Additionally, together with Amazon Web Services, Accenture is collaborating with East Coast Town Council on a six-month pilot to enable municipal estates to determine the key drivers of energy and water consumption within the managed properties such as hawkers centres, markets, residential and commercial blocks. By leveraging cloud-powered sustainability solutions to provide insights and recommendations to help residents and businesses lower their carbon footprint, this collaboration is aimed at aligning local municipal efforts with the green economy goals outlined in Singapore's Green Plan 2030.

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BNP PARIBAS SINGAPORE

Servicing Clients and the World

BNP Paribas established its presence in Singapore in 1968. The bank offers products and services in corporate and institutional banking, wealth management, asset management and securities services. The bank employs more than 2,000 staff in Singapore, and serves as the regional hub for South East Asia. It is responsible for the branches or fully owned subsidiaries in Indonesia, Malaysia, Philippines, Thailand and Vietnam.

FULFILLING ITS MISSION AND PURPOSE

In leading sustainable finance, BNP Paribas defines its mission in its company purpose - "We are at the service of our clients and the world we live in." To fulfill this, the bank aims to foster a just transition to a Net-Zero economy in two aspects – energy transition and climate action; and natural capital and biodiversity.

Energy transition and climate change

From helping institutions make investments with a positive climate impact, to providing support to large corporate clients in capital-intensive energy transition projects, BNP Paribas supports a wide range of players, actions and innovations designed to support clean energy throughout supply chains, cut emissions to finance a net-zero economy by 2050.

To reduce carbon emissions, the bank will reduce by 12% its credit exposure to the upstream oil and gas industry, and reduce its credit exposure to the upstream oil industry by 25% by 2025. The bank has pledged to dedicate at least 200 billion euros to supporting large corporate clients' transition to a low carbon economy by 2025.

To date, the bank has 18.6b euros in financing in the renewable energy sector; 2.9m indirect beneficiaries of microcredits supported since 1989; and 4b euros in financing pledges for the protection of terrestrial and marine biodiversity.

Natural capital and biodiversity

Accompanying its clients in their ecological transition, the bank offers sustainable financial solutions, including sustainability-linked loans or green bonds. This helps clients achieve specific objectives in terms of protecting terrestrial and marine biodiversity.

Since 2020, BNP Paribas has committed to not finance any oil and gas exploration or production projects in the Arctic offshore or in the Arctic National Wildlife Refuge. It has also excluded any maritime oil exports from the Amazon Sacred Headwaters, in the Esmeraldas region of Ecuador from its trading activities and will only provide financial services to clients with a "Zero deforestation" strategy by 2025.

VALUE CHAIN COMMITMENTS

BNP Paribas works with clients on multiple fronts, from financing frameworks to establishing a Low Carbon Transition Group (LCTG), comprising sector experts within the bank.

To create a more inclusive and caring society, the company leverages all available sources to ensure an ethical value chain. It has dedicated 104m euros to the philanthropy budget, and promises 40% women members for the Executive Committee by 2025 as part of its commitment towards diversity, equity and inclusion, and 37% of women in the IT sector by the end of 2024. It has also dedicated 18m euros dedicated to climate research since 2010.

Protecting flora and fauna

To ensure that the bank's business activities do not lead to deforestation or forest degradation, BNP Paribas has thus endorsed the Zero Net Deforestation objective set up by the Soft Commodities Compact, a joint initiative overseen by the Consumer Goods Forum, and the Banking Environment Initiative, whose signatories aim to eliminate deforestation from the downstream and upstream supply chain no later than 2020. To support this, BNP Paribas expects clients to have internal policies that protect High Conservation Value Forests (HCVF) and prohibit any slash-and-burn technique.

Furthermore, relevant clients are expected to have internal policies that protect reservoirs of biodiversity such as High Conservation Values areas, Alliance for Zero Extinction sites, Ramsar Sites wetlands, IUCN Category I-IV areas and UNESCO World Heritage Sites.

The Group has also excluded companies that are involved in the production, trade or use of drift nets over 2.5 kilometres in length, and those involved in the trade of any plant or animal species or products governed by the Convention on International Trade in Endangered Species of Wild Fauna or Flora (CITES) not authorized by a CITES permit.

Maintaining quality and availability of water and air resources

To benefit from the Group's financial services, clients must have a water management plan with measures to minimize water use and monitor impacts on water availability for other users, particularly in water stressed areas, as well as measures to manage their effluents to minimize water pollution.

Additionally, clients in the agriculture and palm oil sectors must have a policy to prohibit the slash-and-burn technique, which

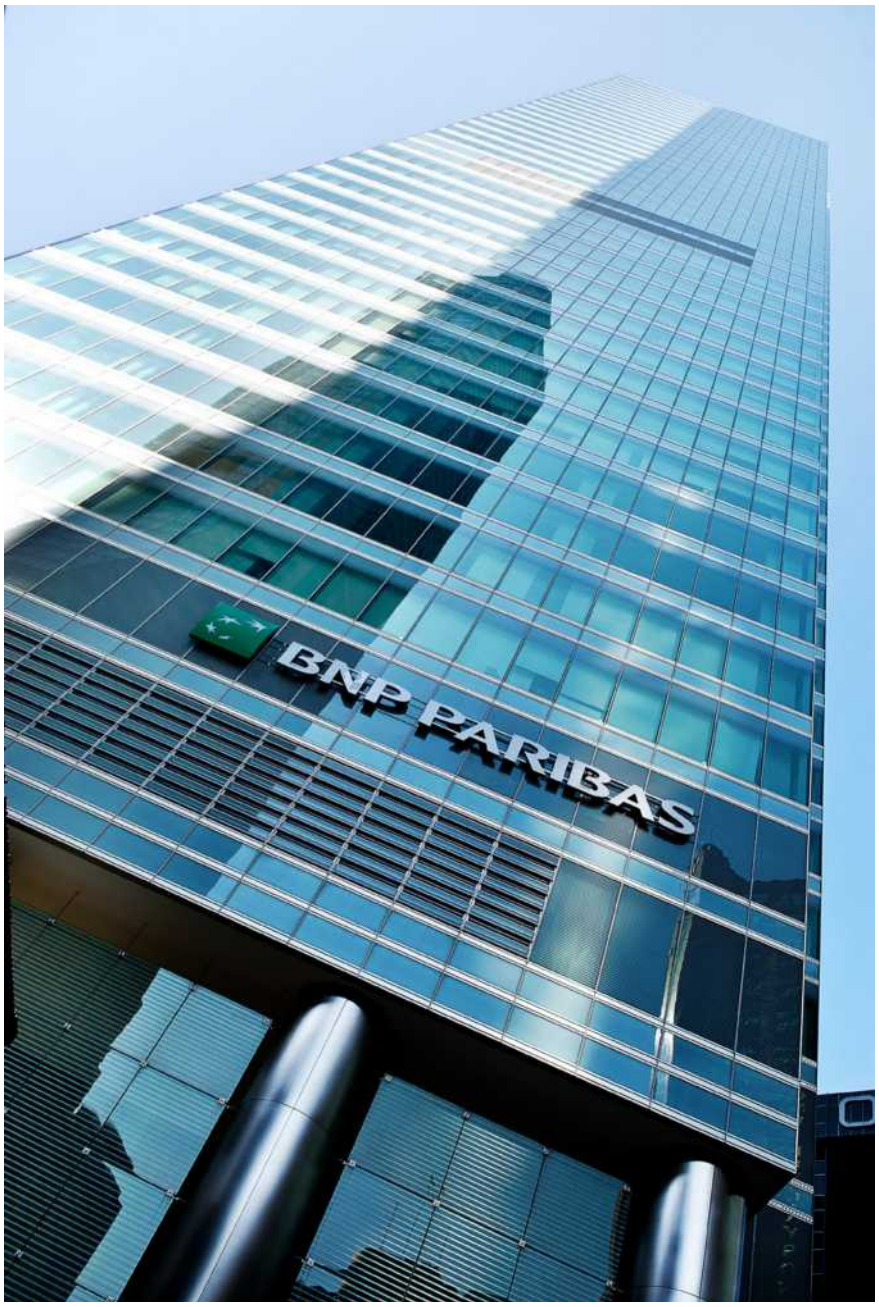
leads to significant haze that can invade inhabited areas, and to minimize the use of pesticides and fertilizers, which are also atmospheric pollutants. In the coal-fired power generation sector, projects must be located in countries with a legal framework covering atmospheric emissions and minimize sulphur dioxide (SOx), nitrogen oxides (NOx) and particulate matter (PM) in compliance with the WB/IFC Environmental Guidelines related to thermal power plants. In addition, companies in the sector are also expected to disclose or to be able to provide regular reports on emissions of SOx, NOx and PM.

Protecting natural resources and developing a circular economy

To prevent the Bank's business activities from leading to a scarcity of natural resources and to developing a circular economy wherever relevant, BNP Paribas has endorsed internal policies to reduce, reuse and recycle the offices supplies consumed in its premises on a large scale, with a specific focus on paper and IT equipment, including effective end-of-life solutions centred on reusing or recycling equipment whenever possible.

INITIATIVES IN SINGAPORE

One very successful initiative that has been launched in Singapore is the eXcite! programme. As part of eXcite, the company has built a thriving Design Thinking community, ran hackathons and launched an entrepreneurship programme in 2022. eXCite has contributed to its sustainability objectives - especially its APAC specific ones. Recently, the group ran a 60-Day challenge and tapped on its bankers to find solutions using the Design Thinking approach. The culmination of the 60-Day challenge resulted in a pitchbook and playbook for Bankers and Relationship Managers to engage clients in conversations around ESG transition and sustainability.



BNP Paribas sustainability strategy is aligned with the Singapore Green Plan and is supported with the close partnership it has with the Monetary Authority of Singapore in several key projects - Singapore Taxonomy, Setting up of the Singapore Green Finance Centre, and the pilot of the Sustainable Supply Chain Framework under the Green and Sustainable Loans Scheme.

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DELIVERY HERO

Innovating for a More Sustainable Food Industry

Delivery Hero APAC Pte Ltd is the Asia Pacific headquarters for foodpanda, a leading delivery platform in Asia dedicated to bringing consumers a wide variety of food, groceries, and more, quickly and conveniently. Powered by technology and operational excellence, foodpanda is spearheading the growth of quick-commerce (q-commerce) across the region with its network of retail partners, as well as pandamart cloud stores to provide more on-demand options beyond the millions of food delivery options. Aside from being in Singapore since 2012, foodpanda operates in more than 400 cities across 11 markets in Asia.

GREEN AMBITIONS

foodpanda believes in leveraging technology to build a greener platform that enables sustainable actions to flourish. The company's ambition is to create a more sustainable restaurant and delivery ecosystem, supported by its work in three focus areas: Sustainable Platform, Sustainable Operations, and Sustainable Societies & Ecosystems.

foodpanda uses its app to achieve sustainability outcomes with stakeholders by bringing onboard more sustainable choices for customers. Features such as its default opt-out cutlery toggle have caused 60% of its total orders across Asia Pacific to be delivered without disposable cutlery and shifted consumer behavior on plastic consumption levels.

DELIVERING SUSTAINABLE IMPACT

Starting from within

The Eco Heroes employee resource group is a platform for interested team members to spread sustainability awareness and take steps towards a more conscious and sustainable lifestyle. The group has also invited partners from Impossible Foods, Green Monday and OLIO to share on their business and how partnerships with foodpanda can support the scale of their impact.

Green building design

foodpanda's new office is located in a LEED Platinum and Building and Construction Authority Green Mark Platinum building, with energy efficient designs incorporated into its office design and facilities.

UTILISING TECH RESOURCES

Innovation is critical to meet the needs of consumers as many become more conscious of their purchasing habits, which in turn reduces the environmental impact of the overall business and supply chain.

Using technological algorithms, foodpanda enabled more efficient fleet management and delivery of multiple orders and used analytics to optimise inventory management for pandamart, foodpanda's own cloud grocery stores, to reduce shrinkage and wastage.

Innovative delivery: drones and EVs

Since 2020, foodpanda has been test-bedding the use of autonomous vehicles with various partners to study the feasibility and viability of autonomous vehicle deliveries. In 2020, the company had its first collaboration with ST Engineering on drone delivery and in 2022, further tested the feasibility of drone delivery to deliver meals to Singapore's southern islands from Sentosa to St John's Island. On land, foodpanda has also collaborated with Nanyang Technological University and several other mobility innovation partners to test self-driving electronically powered robots for food delivery.

Platform for social good

To accelerate its social impact, foodpanda's API integration with the United Nations ShareTheMeal app allows users in Malaysia to easily donate to the World Food Programme's projects. The company has also launched a seamless donation feature in Singapore to allow consumers to easily make donations to The Food Bank Singapore. foodpanda intends to expand such donation features to consumers in all its 11 markets by 2023.

EXPANDING ITS PLANS TO THE VALUE CHAIN

foodpanda strives to help its value chain stakeholders become more sustainable through incentivising, educating, and supporting them in the form of environmental programmes and initiatives. Programmes such as Sustainable Restaurant Certification and Sustainable Packaging Program are examples of engaging with its value chain on sustainability.

Addressing carbon footprint

From internal calculations, foodpanda's main emissions are generated indirectly from delivery vehicles and the packaging of the meal or grocery orders

In engaging riders and merchant partners to lower carbon footprint, riders are of-

fered exclusive discounts for the purchase of electric bicycles and free rental of bicycles, to incentivise the use of non-combustion vehicles for deliveries. The platform's delivery fleet in Singapore mostly consists of non-combustion vehicles and the company actively runs programs with green-mobility partners to increase this percentage.

To address packaging, foodpanda implemented the Sustainable Packaging Program to offer restaurant partners more environmentally friendly food packaging products at price parity with conventional packaging. Products under the programme are fully plant-based and perfluoroalkoxy-alkanes (PFAS) free.

Encouraging consistent value chain responsibility

foodpanda launched its Sustainable Restaurant Certification scheme in Hong Kong in 2021 and awarded Sustainability certifications to 34 restaurant brands, with plans to expand to more brands that are shifting to sustainable operations. With positive commercial results from this programme's initiation in Hong Kong and Taiwan, the company expanded this program to Singapore in 2022.

TRACING MEASURABLE IMPACT

With its default no-cutlery toggle, 1.1 million tonnes of disposable cutlery waste was avoided across 11 markets. The company has also successfully achieved zero food waste in pandamarts in Singapore by diverting all edible surplus food back to the community through its first-in-market partnership with the community sharing application OLIO. The initiative has since redistributed a total of 8310 kg of food (equivalent to 19,787 meals) feeding approximately 2,380 families. This initiative also diverted edible surplus food and avoided 35,842kg of carbon emissions. For addressing its delivery fleet's carbon emissions, foodpanda has used machine learning to deploy its fleet via more efficient routes. This means that foodpanda was able to reduce transport emissions and travel costs.

Contributing to sustainable food alternatives

foodpanda ensures that their platform offers vegan and vegetarian options, and plant-based meat alternatives through its cloud stores, pandamart. They also promote conscious food choices to customers through awareness campaigns that spotlight restaurants that offer vegan and vegetarian options. Together with foodpanda's sustainable restaurant certification scheme to recognise the most sustainable merchants in Hong Kong, Taiwan and Singapore, foodpanda aims to help customers make impactful sustainable choices easily on the platform.

SINGAPORE COMMITMENTS

Foodpanda takes reference from the goals and targets of the Singapore Green Plan 2030 and incorporates them within its strategies and initiatives. Pandamart and free sharing app OLIO began a partnership in December 2021 to reduce food wastage by redistributing surplus unsold food from pandamarts.

With reference to the Resilient Future pillar of the Singapore Green Plan 2030, foodpanda launched Green Label, a first-of-its-kind programme by a food delivery company in Singapore that identifies the most sustainable brands on the platform through a restaurant certification scheme. Under this initiative, restaurants that have registered their interest will be assessed based on their sustainable practices, and given the Green Label certification should they meet the requirements. The audit criteria is developed by foodpanda with guidance from PACT SG, an initiative started by WWF Singapore to reduce waste and move towards a circular economy. Restaurants are then audited based on the criteria by non-governmental organisation, Zero Waste SG. Certified restaurant partners will also undergo annual reviews to ensure that they retain their green certification. The launch event was officiated by Senior Minister of State for Sustainability and the Environment Dr. Amy Khor. The Green Label programme aims to further progress efforts to achieving Singapore's sustainability goals:

- In line with the nation's "30 by 30" target, foodpanda encourages merchants to locally source 30% of their ingredients, to head towards a more resilient food future. Merchants will also earn points for their other sustainable practices, and the overall total score would then indicate how green the merchant is.
- To further its efforts on reducing food wastage, foodpanda rolled out "last hour" deals in collaboration with DBS where customers can get 30% off orders from Green Label merchants between 8pm to 12am.
- On top of reducing food wastage, customers who opt for pick-up will also be able to save approximately 31% of carbon emissions.

The company also abides by the Mandatory Packaging Report under the Resource Sustainability Act, to track, monitor and reduce the amount of packaging used and share future plans on initiatives, KPIs and targets on foodpanda's plans to reduce, reuse or recycle packaging (or 3R plan). This should reduce waste sent to landfill and reduce carbon emissions generated.

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ING

ING: Sustainability Pioneer Transforming the Financial Value Chain

ING is a global bank with over 57,000 employees serving around 37 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. Its products include savings, payments, investments, loans and mortgages. For the company's Wholesale Banking clients, it provides specialised lending, tailored corporate finance, debt and equity market solutions, payments & cash management and trade and treasury services. ING began operating in Singapore in 1987 as the regional headquarters, with ING Singapore being the largest WB branch in Asia Pacific.

DRAWING CLEAR GREEN BOUNDARIES

ING believes that lenders like itself make the biggest impact through financing. Hence, it remains committed to finance sustainable initiatives and not pollutive ones with unsatisfactory ESG standards. In certain cases, the group also makes interest savings or refinancing contingent on material ESG improvements made by the borrower. The group believes that it can support its clients in transitioning to a sustainable business and to facilitate and finance society's shift towards sustainability.

CONSOLIDATED CLIMATE CHANGE PLANS

In building a sustainable future for its customers, society and the environment, ING focuses on climate action, stakeholder partnership and collaboration, measuring risks, finance health and empowering employees. In 2021, ING released an integrated climate report, providing an overview of every element within its climate action approach and how it plans to meet the challenge of reaching net-zero greenhouse gas emissions by 2050.

TRIGGERING TECHNOLOGICAL SHIFTS

The "Terra Approach"

ING developed the "Terra approach" as an innovative and accurate way to measure its portfolio. The approach ensures that each sector's own transition pathway for a low-carbon future is considered and that the clients' assets are measured accurately to track their impact.

To keep the rise of global temperatures to below 1.5 degrees Celsius, Terra measures the needed shift in technology against the actual and prospective technology clients use, revealing what ING needs to shift. Applying it to ING's sectors of focus will allow it to identify clients that are leading the transition to a low-carbon economy and those that need ING's help the most.

New technologies for sustainable activities

The value-add of ING is also to provide capital to organisations to utilise funding to develop new technologies that contribute to sustainability. In 2021, ING's financing method to make inland shipping in the Netherlands more sustainable with a pay-per-use structure for renewable batteries, Zero Emissions Services (ZES), was recognised by the International Association of Ports and Harbours (IAPH) with a sustainability award in the climate and energy category.

To further increase the speed and impact of its innovation, ING merged its innovation activities into one business area called ING Neo, which reports directly to the chief executive officer. This includes the company's banking and platform activities in Retail Banking, Wholesale Banking innovation, the chief innovation office, ING Labs and its investment vehicle ING Ventures.

MANAGING THE FINANCIAL VALUE CHAIN

Financing the transition

As green bonds and loans form an integral part of ING's sustainable finance strategy to fund specific green and sustainable projects, the group has designed a Green Bond Framework and has issued multiple green bonds.

As the first bank to link financing to a company's sustainability progress, ING supports its customers through advisory by analysing their capital structures and investment and divestment needs to meet the climate ambitions, regulatory requirements and investors' appetite. For the group, incentivising customers to achieve green milestones is a great way of innovative solutions that can help companies transition to a low-carbon business model.

With its Terra approach, ING pioneered the first sustainability linked loan (SLL) in 2017 with Royal Philips. The sustainability linked loan is a loan instrument which links the interest rates to the sustainability performance of the company. This broadened sustainable finance tremendously beyond a small selected group of eligible green bond issuers and green borrowers. With the SLL, any borrower who is motivated to improve its sustainability performance could qualify for it.

VALUE CHAIN PARTNERSHIP INITIATIVES

Engaging organisations

ING is actively involved in engagement with many organizations such as ICMA, LMA and ASIFMA, to develop and to standardize guidelines in the sustainable finance market to further incentivize companies in issuing sustainable debt. This standardisation of guidelines would provide corporations with a clear direction on the requirements and green classification of their business, incentivising them to issue sustainable debt products to improve their sustainability efforts.

Government partnerships

ING is also engaging with government agencies to develop sustainability in different countries. Particularly in Singapore, the ING Sustainable Finance team has partnered with Enterprise Singapore and Monetary Authority of Singapore to discuss sustainability and sustainable finance.

Globally, the company is also a founding member of the Equator Principles, which serves as a common baseline and risk management framework for financial institutions to identify, assess and manage environmental and social risks when financing projects.

DELIVERING ON ESG AND MONETARY GOALS

Through capital raising in the debt capital markets, ING is able to empower other corporates to provide positive environmental and social impact. For example, it helped First REIT, is Singapore's first healthcare real estate investment trust, issue a social bond in January 2022. The first healthcare social bond in Singapore the use of proceeds focused on financing existing assets or future investments into healthcare and related facilities for the general population of Indonesia or other countries with a below average number of hospital beds per 1000 people.

In addition, in 2021, ING acted as a Joint Green Structuring Advisor in the first ever sustainability-linked revolving credit facility (RCF) for Vena Energy, a leading independent power producer of renewable energy in Asia Pacific. The three-year RCF was structured as a sustainability-linked loan and includes key performance indicators (KPIs) related to ESG goals.

ASEAN/SG PROJECTS

The ING's Sustainable Finance flagship initiatives and products in Singapore/ASEAN are its sustainable debt products and advisory services. ING has recently also become a signatory to the Silk Alliance along with 11 leading cross-supply chain stakeholders to develop Green Corridor Cluster beginning with intra-Asia container trade. This is in line with Singapore's efforts to create green maritime corridors.

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LOMBARD ODIER

Rethink Sustainability

Lombard Odier aspires to be an innovative bank of choice for private and institutional clients seeking a tailored, sustainable approach to wealth and asset management. Since 1796, it has served its clients for seven generations, guided by a simple philosophy: 'rethink everything'. Lombard Odier provides wealth management services for private and institutional clients in the region through its offices in Singapore since 2008, and other APAC countries such as Hong Kong and Tokyo, as well as to the clients of its strategic alliances, who are leading financial institutions in the region.

TRANSITIONING FROM WILD TO CLIC

Lombard Odier's strategy ensures investment opportunities and positive impacts for its clients and stakeholders globally. Describing today's economy as WILD (wasteful, idle, lopsided, and dirty), Lombard Odier believes that the world must transition toward a value-adding CLIC™ (circular, lean, inclusive, and clean) economy. As a certified B Corp since 2019, the group has been continuously integrating sustainability across its products and services, and at a corporate level.

Leading the movement

Steered by its Corporate Sustainability Team, Lombard Odier commits to net zero by 2030 for its global operations. Currently, the company is setting up an interim carbon emissions reduction target for Lombard Odier Investment Managers (LOIM), under NZAMI. With this, the company is more committed to using available tools to promote decarbonisation aligned to the 1.5°C pathway. Its internal HR strategy also includes a focus on gender diversity as its gender pay gap is always audited and tracked by an independent third party.

Additionally, the company also considers long-term engagement and social impact and its Philanthropy team ensures that forward-looking solutions for pressing challenges such as humanitarian efforts and global education would be funded. As an investor, Lombard Odier supports the transition of economies towards sustainability and inclusivity.

Helping companies transition

Lombard Odier's Sustainable Investment Research, Strategy and Stewardship Team (SIRSS) is responsible for identifying, analysing and mapping material sustainability challenges likely to affect the long-term viability of companies' business activities and models. The company's Implied Temperature Rise tool, enables it to assess the alignment of companies to the transition, by comparing their emissions pathways to industry specific ones. Its Climate Value Impact tool analyses how demand will change for different activities under varying climate scenarios, to estimate how different firms' earnings are likely to be impacted. These tools allow the company to have a better climate view on climate risks in its portfolios.

THE SUSTAINABLE INVESTMENT RESEARCH, STRATEGY AND STEWARDSHIP TEAM (SIRSS)

In its 225 year history, the company has always considered sustainability.

Since 1997, ESG has been integrated into its investments and has increased over the years to now focus on transitioning companies to a sustainable economy, including energy transition.

With more than 20 people with diverse experience, SIRSS is responsible for identifying, analysing and mapping material sustainability challenges likely to affect the long-term viability of companies' business activities and models. The Corporate Sustainability Team is responsible for ensuring that its non-investment related actions, operations, and policies are aligned with its sustainability values.

TECHNOLOGICAL TOOLS FOR INTERNET GOVERNANCE

Lombard Odier's proprietary banking platform, G2, is used to manage billions in

assets across thousands of accounts, and includes development, infrastructure management and cybersecurity. Fully integrated with the company's operations, other private banks, institutional investors and family offices also use G3 for their operations.

Its expertise is to identify companies that have the vision to adapt to this new CLIC™ economy. By combining data sources, the Company has implemented a tool that looks beyond traditional ESG metrics to company practices to get a forward-looking assessment and how well they align with its eight sustainability objectives. Sustainability figures are fed into its banking platform and portfolio managers can monitor them on a daily basis to track performance and allocate their investments to obtain the overall sustainability score of the portfolio.

Using proprietary industry and geospatial data, academic research and public-sector research, Lombard Odier looks at a company's full sustainability trajectory. It analyses 115 data points and their alignment with the 17 UN sustainability goals to have a comprehensive picture of a company and its exposure to controversial issues. The company is currently integrating the Lombard Odier Portfolio Temperature Alignment (LOPTA) tool, which tells us the temperature trajectory of companies, and assesses the degree to which they are aligned with the goals of the Paris Agreement, to limit global warming to 1.5-2°C.

Now, Lombard Odier has developed substantial in-house carbon-related expertise and dedicated methodologies to calculate the extent to which portfolios can benefit from a decarbonising but increasingly carbon-damaged world. Its temperature alignment methodology allows it to assess the future temperature trajectories of 23,000 companies, as well as 120 countries, and how they align with the goals of the Paris Agreement.

LOMBARD ODIER'S OWN CONTRIBUTIONS

Sustainability governance structure

At the Lombard Odier, its sustainability governance has two key responsibilities. Its Sustainability Steering Forum oversees its sustainability philosophy, investment approach, and related policies. Its Corporate Social Responsibility (CSR) Steering Forum ensures that its non-investment-related actions, operations, and policies are aligned with its sustainability values.

Leveraging points

Using cutting edge technologies, the company already has 98% of its servers virtualized and maintained with advanced cooling systems, lowering electricity consumption. In the office, electronic devices that constantly rely on energy sources are optimised to reduce energy consumption.

The company aims to drastically reduce paper use and primarily use digital documentation. Through its paperless initiative, Lombard Odier has reduced the number of printed documents by 88%. At Lombard Odier, electronic waste is also incorporated into a circular economy. Old devices are either sold back to the manufacturer or donated to associations the company is collaborating with when new ones are purchased.

STRATEGIES IN ASEAN AND SINGAPORE

In Asia-Pacific, Lombard Odier believes that the future of wealth management is both onshore and offshore, and as such has built six strategic alliances with some of the region's leading financial institutions. Today, Lombard Odier has formed an Ecosystem of Strategic Alliances to provide the clients onshore access to its global investment expertise and tailored multi-asset funds based on the firm's unique risk-based investment approach.

Assisting Singapore in green finance

Lombard Odier is committed to helping Singapore be positioned as a leading centre for green finance and services to facilitate Asia's transition to a low-carbon and sustainable future. The company offered a range of specific sustainability and impact solutions, ranging from equity solutions to climate bonds to net-zero funds.

Recently, it has also announced together with Singapore-based organisation Alliance to End Plastic Waste its intention to launch a new circular plastic fund. The fund will aim to raise US$500 million from institutional and other accredited investors for scalable solutions to remove plastic waste from the environment, increase recycling, and drive the global transition towards a circular economy for the plastic value chain.

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LOMBARD ODIER
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SIGNIFY

Brighter Lives, Better World

Signify (Euronext: LIGHT) is a world leader in lighting for professionals and consumers and lighting for the Internet of Things. The company's Philips products, Interact connect lighting systems and data enabled services, deliver business value and transform life in homes, buildings and public spaces. With 2021 sales of EUR 6.9 billion, Signify has approximately 37,000 employees globally and are present in over 70 countries. The company aims to unlock the extraordinary potential of light for brighter lives and a better world. Signify has achieved carbon neutrality in 2020, has been in the Dow Jones Sustainability World Index since its IPO for five consecutive years and was named Industry Leader in 2017, 2018 and 2019.

COMMITMENTS DRIVING GREEN ACHIEVEMENTS

Sustainability is central to Signify's company strategy and purpose and Signify addresses global issues by focusing on key growth areas for sustainability, including: a) Climate Action, b) Circular Economy, c) Food Availability, d) Safety and Security and e) Health and Wellbeing

As the world leader in lighting, Signify has proudly worked to contribute to the United Nations Sustainable Development Goals (SDG) as part of its commitment to unlocking the extraordinary potential of light for brighter lives and a better world

In 2020, Signify achieved carbon neutrality for its operations across the world, using 100% renewable electricity. On top of that, Signify sent zero waste to landfill across all of its manufacturing sites. With the United Nations´ SGD as its strategic compass, Signify has embarked on Brighter Lives, Better World 2025, a five-year sustainability program that has even more ambitious goals of doubling the organisation's positive impact on the environment and society.

Signify's Brighter Lives, Better World 2025 goals include:

- Doubling the pace of the Paris Agreement i.e. reaching the 2031 pathway 6 years ahead of time in 2025 through increasing the energy efficiency of its portfolio to reduce emissions of its customers, and also by driving carbon reductions at its supplier level
- Doubling its circular revenues to 32%[1]
- Doubling its revenues for brighter lives which benefit society to 32%, which include revenues from lighting innovations which increase food availability, safety & security or health and wellbeing
- Doubling its percentage of women in leadership to 34%

Concurrently, Signify will continue and strengthen its ongoing commitments for 2025 including:

- Carbon neutral operations and 100% renewable electricity
- Increase Climate action revenues to 72%
- Zero waste to landfill for all manufacturing sites
- Eliminate plastics from all consumer packaging
- Light 10 million lives through the Signify Foundation
- Supplier sustainability performance of 95%

1 *Signify is committed to responsible consumption and production with products that can be reprinted, refurbished, reused or recycled. This will help the organisation to achieve its goal of doubling its revenues from circular products, systems and services*

ACTIVITIES IN SINGAPORE

Signify has been a strong and valued partner to Singapore, with significant projects contributing to various sustainability initiatives around the island.

Sentosa Island

Sentosa is Singapore's top leisure destination – an entertainment island that is busy from sunrise to sundown. Ensuring that roads are safe at night is therefore paramount.

Previously, Sentosa used conventional sodium-vapor street lighting. These emit a monochromatic yellowish tone and require much effort to maintain, resulting in longer man hours for staff and contractors.

Sentosa's administrators has since then switched to Signify's more energy-efficient light system — one that is not only an intelligent lighting solution but that also boosts productivity and reduce operational costs. Close to 300 street lights along a 3.4km stretch on the island were selected to be fitted with Philips LED lights, coupled with a smart technology system that allows for lights to be programmed to dim down at certain hours.

With the new Philips system, energy savings of more than 50% can be achieved. Lights are now able to communicate with maintenance crew through automated and remote monitoring systems. The lights are twice as bright and enable clearer contrast at night, improving overall visibility and safety.

Energy Reset - greener infrastructure & buildings

Following the guidelines of Singapore Green Plan 2030, Signify seeks to pave the way for a low-carbon built environment through the Energy Reset pillar. As a worldwide leader in lighting globally and in Singapore, Signify's products, technologies and systems are found in numerous Green Mark certified buildings, including some of the first ever breakthrough roll-outs in Singapore.

As an example, the Building and Construction Authority (BCA) has certified Keppel Bay Tower, owned and operated by Keppel Land Limited (Keppel Land), which has installed energy efficient LED lighting from Signify, as a Green Mark Platinum (Zero Energy) building.

Sustainable Living – producer responsibility

Aligned with the goals of the Sustainable Living pillar of the Green Plan 2030 and the national strategy to address e-waste, packaging waste and food waste, Signify Singapore is a producer and a member of the Extended Producer Responsibility Scheme (National Environment Agency) for E-waste in Singapore.

Additionally, with Signify's advanced technology in 3D printing, the company also enables its customers to have access to customised, recyclable lighting that has been specifically designed for a Circular Economy model.

Resilient Future - grow local (2030 food story)

Indoor farms that use LEDs can be significantly less impactful on the environment than large-scale traditional outdoor farms. They use less energy, water, and land than traditional farming methods. With over 80 years of experience in horticulture lighting, Signify has gathered deep insights through years of research, resulting in the development of more than 150 light recipes[2] for a variety of crops, leading the way to provide science-based technologies and solutions allowing growers to optimise their results.

Building upon its global experiences, Signify is expanding its footprint in Singapore in a specialised and targeted manner to boost indoor crop cultivation competence for smarter, more sustainable farming. It is with this intent that Signify has set up (with the support of the Singapore Economic Development Board), the Signify Center of Excellence for Horticulture, here in Singapore, its very first Horticulture Center of Knowledge in Asia, which will support its customers and growers in Singapore and in the region.

2 *Light recipes capture all the elements of lighting that steer plant growth when growing crops indoors including light level, spectrum, uniformity, and timing.*

Signify
the meaning of light

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BASF SOUTH EAST ASIA

We Create Chemistry for a Sustainable Future

Around 111,000 employees in the BASF Group contribute to the success of its customers in nearly all sectors worldwide. The company's eleven divisions are grouped into six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. Since 1978, BASF in Singapore has 4 important production sites with approximately 500 employees.

BASF VALUES AND DIRECTION

BASF's company claim is - "We Create Chemistry for a Sustainable Future". BASF wants to contribute to a world that provides a viable future with enhanced quality of life for everyone. In support of the UN Sustainable Development Goals (SDGs), the company commits to the Paris Climate Agreement and assists governments and societies in achieving their sustainability targets.

The company's strategic pillars are: 1. A holistic carbon management program, 2. A ambitious circular economy program, 3. Innovate for a safe and sustainable portfolio. Beyond that, it also drives alliances such as "Together for Sustainability" (on procurement), "Alliance to End Plastic Waste", "Value Balancing Alliance".

SUSTAINABILITY TARGETS

Environmental targets

The company aims to attain 25% less CO2 emissions by 2030 and net zero CO2 emissions by 2050. As of 2025, BASF aims to process 250,000 metric tons of recycled and waste-based raw materials annually, replacing fossil raw materials. By2030, the company aims to double its sales generated with circular economy solutions to €17 billion. To achieve this, it is concentrating on three action areas: circular feedstocks, new material cycles and new business models. BASF also aims to introduce sustainable water management at production sites in water stress areas and at its Verbund sites by 2030.

Health and safety targets

In addition, the company commits to reduce worldwide process safety incidents per 200,000 working hours to ≤ 0.1 by 2025, and reduce the worldwide lost-time injury rate per 200,000 working hours to ≤ 0.1 by 2025.

Diversity and inclusion targets

The company aims to Increase the proportion of women in leadership positions with disciplinary responsibility to 30% by 2030 and boost morale by aiming to have more than 80% of its employees feel that at BASF, they can thrive and perform at their best.

ENCOURAGING SUSTAINABILITY WITHIN THE TEAM

Sustainability leadership

BASF has a dedicated team for Corporate Sustainability Strategy. Recently, the team established a new unit "Net Zero Accelerator" to speed up its transition to carbon neutrality. In every region, country organization and business unit, there is a dedicated team or person responsible for Sustainability.

Employee onboarding programmes

BASF organises several events (e.g. Climathon) for all employees to participate in and encourages employees to support local associations and initiatives to drive employee engagement and make its employees the ambassadors and spokespersons for BASF.

DIGITALISATION AND THE VALUE CHAIN

The company aims to extend its portfolio of innovative and sustainable solutions, reduce environmental impact along the value chain, and contribute to improved quality of life and better mitigation of risks associated with sustainability.

Focusing on accelerators

Dual ovenable (microwave and conventional), certified compostable tray produced using one of BASF's Accelerator products, ecovio PS1606. The Commercially compostable solution extends end-of-life options for paper-based food packaging and supports organics recycling.

Their products play a crucial role in reducing emissions and making life more sustainable. BASF makes it easy for its customers to choose the product with the lowest carbon footprint. Accelerator products are BASF solutions that make a substantial sustainability contribution in the value chain. With a digital solution developed in-house, BASF is able to calculate the car-

bon footprint for its approximately 45,000 sales products on a global level. It enables them to provide this footprint data for the whole portfolio to their customers. Products that are classified as Challenged because they do not fulfill its sustainability criteria will be phased out within five years of classifying them as such at the latest. Across all customer industries, more than 16,000 Accelerator solutions have been identified. 30.9% of BASF products analyzed today already make a particular contribution to sustainability in the value chain.

In-progress tech for decarbonisation

Additionally, BASF is working on breakthrough technologies in the area of decarbonization of the chemical industry. Some flagship projects include the electrification of the steam cracker, CO2-free hydrogen and carbon capture and storage.

From procurement to delivery

From procurement to production to product delivery, BASF continues to align its economic goals with environmental and social responsibility within its global network. While constantly measuring sustainability of its practices, the company looks beyond its operations and collaborates with value chain partners to generate social, economic and environmental value. BASF introduced a global Supplier CO2 Management Program to create transparency and better steer and, in the long term, reduce upstream emissions.

Its unique fully integrated global production network does not only save carbon emissions and ensure resource efficiency, but also saves cost and hereby contributes to its financial performance positively.

Reusable "to-go" mugs made of BASF's Ultrason® resins for a more sustainable lifestyle.

CREATING CHEMISTRY IN SINGAPORE

BASF Singapore started implementing its Sustainability Roadmap for Singapore in 2021. Considering the and BASF's sustainability targets, the company decided to focus on two topics: plastic waste and circular economy. In addition, Singapore production sites continue to improve its carbon footprint in line with BASF's global target in carbon management.

BASF
We create chemistry

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CMA CGM

Acting for People, Planet and Fair Trade

The CMA CGM Group, a global leader in sea, land, air and logistics solutions, serves more than 420 ports around the world on five continents. Backed by a fleet of 583 vessels, in 2021 the Group transported 22 million TEU (twenty-foot equivalent units) containers. With its subsidiary CEVA Logistics, and CMA CGM AIR CARGO, the CMA CGM Group is continually innovating to offer a complete and efficient range of new shipping, land, air and logistics solutions. CMA CGM's shipping business has been operating in Singapore since 1992.

OVERARCHING SUSTAINABILITY STRATEGY

The CMA CGM Group has pledged to align with the 17 United Nations Sustainable Development Goals and wants to contribute to sustainable globalization through more balanced economic exchanges, whilst respecting the integrity of all people and the planet. The Group's sustainability strategy is structured around three pillars – Acting for Planet, People, and Fair Trade.

ACTING FOR PEOPLE

As part of their sustainability actions towards people, CMA CGM is committed to the professional development of its employees through its in-house corporate training center, CMA CGM Academy, to develop the skills and expertise related to the evolution of the business. Besides the Group aims to have 30% of women and 61% of non-French Nationals among TOP 200 highest salaries by 2025, to ensure 100% of its employees have access to health coverage by 2022 (99% in 2020), and to increase the number of training days per employee from 1.55 days in 2021 to 3 days by 2022.

ACTING FOR PLANET

Curbing global warming

On its path to be a Net Zero Carbon company by 2050, the CMA CGM Group has become a pioneer in the use of biofuel, LNG and bio-methane as transitional fuels, while the search for other energy solutions continues. CMA CGM already has a fleet of 30 dual-fuel e-methane ready ships in operation today, which will increase to 77 by the end of 2026. The dual-fuel engine technology developed by CMA CGM currently runs on LNG; and is capable of using biomethane, as well as e-methane, a carbon-neutral fuel source.

The Group is investing in a variety of projects designed to accelerate the development of these new energies. CMA CGM recently joined the Jupiter 1000 Project, which aims to produce e-methane using green hydrogen generated from sustainable electricity and CO2 captured from industrial processes. CMA CGM also announced in July 2022 with Engie, a global leader in low-carbon energy and services, plans to co-invest in the Salamander project, the first industrial and commercial unit for second-generation biomethane production.

Biodiversity

The Group expects full compliance with regulations at sea to prevent negative impact on marine biodiversity. It has been recorded that since 2019, no CMA CGM vessel has crossed the Northern Sea Route. Vessel speeds have also been reduced in marine mammal breeding areas to avoid potential collisions with the animals.

Technology like REPCET has been deployed as well to allow merchant ships to receive and transmit alerts on whale positions so that they take preemptive measures that are non-disruptive to whales. Besides, to stop invasive organisms from migrating from one region to another, vessels are fitted with UV ballast water treatment systems.

COMBATING ILLEGAL TRADE

Since 2020, CMA CGM Group is combating illegal trade by tightening up its procedures for shipping protected species, whose trade is regulated by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CMA CGM is also a supporter of WWF-Singapore's AR-mazing Tiger Trail, to save endangered tigers and protect biodiversity.

OPTIMISING PERFORMANCE THROUGH DIGITALISATION

Using technology, CMA CGM has opted for solutions that include dual-fuel auxiliary engines, integrated control system, propulsion control system, among others to provide real-time data for the system to operate at optimal efficiency in all kinds of conditions. The Group also operates with optimisation using digital and data analysis tools to monitor and optimise fuel consumption through fleet navigation centers.

TRACKING TANGIBLE ESG IMPACT

Dealing with plastic

As part of its renewed commitment towards more sustainable trade, the CMA CGM Group announced its decision to no longer carry plastic waste on its ships as of June 1st, 2022. This landmark decision in the shipping industry will help protect the oceans and biodiversity.

COLLABORATING WITH SINGAPORE AND THE SG GREEN PLAN 2030

With the support of Maritime Port Authority of Singapore (MPA), CMA CGM started biofuel bunkering in Singapore in

The Group expects full compliance with regulations at sea to prevent negative impact on marine biodiversity.

February to scale up the wider adoption of clean energy. It also collaborated with PSA to implement Opt-E-Arrive digital solutions that enabled CMA CGM vessels to skip the anchorage stop and arrive just-in-time at berth at CMA CGM-PSA Lion Terminal to reduce carbon emission through optimisation of bunker consumption.

The Group's commitment to decarbonise shipping is further demonstrated through the recent inking of a Memorandum of Understanding (MOU) with MPA to initiate a collaboration to explore the use of low carbon fuels and develop green technologies. It is also participating in the world's longest Green and Digital Corridor to be established by MPA and the Port of Rotterdam Authority to enable low and zero carbon shipping.

Other than its commitment to reach Net Zero Carbon by 2050, CMA CGM is aligned with the SG "Energy Reset" pillar as it continues to experiment, test and develop energy solutions based on hydrogen, solar, tidal and wind power through its partnership with Energy Observer. With the "Green Economy" pillar, CMA CGM is investing in R&D to evaluate new energy sources such as hydrogen and ammonia and advance the move towards 'zero emission' solutions for transport and logistics.

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DANONE

One Planet, One Health

Having been in Singapore since 2015, Danone is a global food and beverage company that is driven to bring health through food to as many people as possible. Danone's 'One Planet, One Health' (OPOH) frame of action aims to inspire healthier and more sustainable eating and drinking practices. With more than 100,000 employees, and products sold in over 120 markets. Its portfolio includes leading international brands (Actimel, Activia, Alpro, Aptamil, Danette, Danio, Danonino, evian, Nutricia, Nutrilon, Volvic, among others) and strong local and regional brands (AQUA, Blédina, Bonafont, Cow & Gate, Horizon Organic, Mizone, Oikos, Prostokvashino, Silk, Vega).

CREATING A SUSTAINABLE GROWTH MODEL

As a "société à mission" – a purpose-driven company – Danone strives to contribute to the food system transformation while creating sustainable value for its shareholders and ecosystem. In 2022, Danone presented a new strategic plan: "Renew Danone" to build a sustainable profitable growth model. To do so, its actions will focus on an end-to-end step-up in the quality of execution, a strengthened innovation model geared for scale and impact, and increased investments in consumer value, as well as brands and commercial development.

To ensure that the company remains visionary, engaging with stakeholders is important. As such, Danone relies on a materiality assessment and risk analysis, the former focusing on sustainability issues and the latter being a wider tool to anticipate all types of risks a company is facing in its operations and broader value chain.

Danone has identified nine areas of action that guide its commitments, actions and projects. They are:

- Offering quality, safe, on-trend products
- Securing sustainable growth
- Becoming a B Corp
- Impacting people's health locally
- Growing brands and scaling up positive impact
- Preserving and renewing the planet's resources
- Creating an inclusive and engaging workplace for all
- Fostering inclusive growth
- Working with partners for greater impact

INTEGRATING SUSTAINABILITY

In strengthening the Company's sustainability leadership, Danone appointed its Chief Sustainability and Strategic Business Development Officer (CSSBDO), commissioned to lead its sustainability agenda and integrate all sustainability-related programs and efforts. The CSSBDO will also be in charge of identifying, assessing and opening new long-term growth opportunities.

Caring for the employees

Each employee has the opportunity to impact the decisions of the company, locally and globally. All employees are provided with a safe, inclusive and diverse working environment, relying on constructive social dialogue, and encouraging talent development throughout their careers. This will align everyone's interest in the long-term and give employees an opportunity to take ownership of Danone's mission.

Training support via the Internal Academy, Campus events, mentoring, coaching, on the job development opportunities and online resources are all available for employees. Additionally, the company has a set of comprehensive sustainability learning via CampusX and a digital library of e-learning, videos, digital books, articles, and more.

Sustainability for the consumer

As it is also Danone's responsibility to guarantee safe and quality products, its strategy is to focus on better and bolder innovations that are profitable while positively impacting consumers. Its continued focus on core portfolio renovation and innovation, supported by selective reinvestments and channel execution focus, has helped leading brands such as Nutricia, Evian, and Alpro grow market shares and play into trends in favour of health and immunity.

TAKING CARE OF THE SUPPLY CHAIN

Circular packaging

Today's mainstream packaging system is unsustainable because it is still primarily linear - raw materials are used to make packaging for a product, and after the product is consumed, the packaging is thrown away. As Danone wants to offer nutritious, high-quality food and drinks in packaging that is 100% circular, it aims to eliminate unnecessary packaging and engage in innovation so all packaging is designed to be reusable, recyclable, and compostable.

Currently, the company is working to optimize material use and eliminate waste. This means developing new alternative delivery or reuse models, while also taking action to eliminate items that are problematic (unlikely to be recycled) or unnecessary (do not bring additional value to the product). Danone looks to collaborate with public authorities and private companies to optimize formal Extended Producer Responsibility (EPR) and Deposit Return Scheme (DRS) systems.

Sustainable procurement

By working hand-in-hand with its diverse partner base, Danone sources the right products and services for its value chain, which spans 100,000 suppliers, 59,000 dairy farmers, 8 Research and Innovation Centers of Excellence, 190 production sites, and 400 distribution centres.

FUTURE PLANS FOR DANONE

Three of Danone's "société à mission" ambitions to achieve inclusive growth in the future is to:

- Provide access to safe drinking water to those in need.
- Protect the most vulnerable members of its value chain.
- Become a B Corp Company by 2025 to ensure that the company consistently demonstrates a high level of sustainability via audits, and implements structural changes to its laws and practices

B Corp is a certification that indicates that a company is meeting high standards of social and environmental performance, accountability and transparency, through the evaluation of the company's operations, business model and supply chain management. Aligning its actions with global sustainability frameworks, such as the UN Sustainable Development Goals (SDGs), and therefore adopting a language that is universally understandable, is a priority for Danone.

EFFORTS IN SINGAPORE

In Singapore, Danone is focused on plastic bottle redemption, which is aligned with Singapore's Zero Waste Masterplan. In 2021, Danone's Evian mineral water brand is launching its first labelfree, 100 percent recyclable and recycled PET (rPET) bottle in Singapore. Globally, Danone is committed to halving the virgin plastic used by its water brands, reaching 50 percent rPET use worldwide and 100 percent across Europe by 2025. Danone's One Planet, One Health (OPOH) vision and its integrated set of 9 long-term goals are aligned to the SG Green Plan.

DANONE
ONE PLANET. ONE HEALTH

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ECCO

Creating Better Footwear

ECCO is a global family of shoemakers. From drawing the first sketches to presenting its finished shoes in ECCO stores around the world, the company applies the utmost attention to detail and quality. Unique to the industry, ECCO makes leather at its own tanneries and produces shoes at its own factories. ECCO's global family of employees, representing 60 nationalities across the globe, is the driving force behind its products. Design, development, production, and retail – the company takes responsibility all the way.

STEP BY STEP PLANNING WHILE TAKING THE ENVIRONMENT INTO CONSIDERATION

Improving environmental performance is a continuous process which involves multiple stakeholders. This document highlights some of ECCO's initiatives.

ECCO's environmental targets

ECCO's Headquarters (HQ) in Denmark aims to become energy-neutral by 2024, and ECCO as a whole aim to be energy neutral by 2028 to reduce dependence on energy generated from fossil fuel sources and replace it with renewable energy. On waste management, ECCO aims to have ninety percent (90%) waste recovery by 2026 and further reduce waste overall. In 2021, 78% of waste in ECCO's shoe factories was recycled or recovered. The company also aims to reach net zero water discharge by 2030 and improve waste water facilities to create closed-loop water systems.

Tracking progress with KPIs

ECCO has created key performance indicators (KPI) templates specifically on energy, water, and waste for each of its Business Units (BUs). These KPI's are the measurable value that tracks ECCO's progress in achieving key environmental objectives and environmental targets for both local and headquarter level. This template is also accompanied by procedure documents to provide guidance for effective KPI data collection and monitoring for each BUs.

INTERNAL RESPONSIBLE ENVIRONMENTAL PRACTICES

The Leather Working Group

The Leather Working Group (LWG) promotes responsible environmental practices across the leather supply chain. ECCO Leather has been an active member of the Leather Working Group since 2010.

All of ECCO's tanneries receive excellent ratings with Gold awards to its tanneries in Indonesia, Thailand, and China, and its tannery in the Netherlands is Silver rated. In its shoe factories, ECCO is conducting, together with an external auditor, the environmental benchmark audits. Hence, encouraging greater environmental awareness in all its manufacturing units.

The ECCO environmental taskforce

ECCO's Corporate Responsibility and Sustainability team are responsible for integrating sustainability projects into its operations by setting up its Code of Conduct related to employee work environment (including health and safety), corporate responsibility (community and CSR), animal welfare, and environmental consideration.

Green claim training sessions

Currently, the company is conducting green claim trainings which are open for all relevant employees to ensure awareness and greater knowledge of sustainability.

DELVING INTO TECHNOLOGICAL INNOVATION

Technology for sustainable efficiency

ECCO's Applied Research (ARE) team is working on the improvement of technology and circularity within the manufacturing plants, the ARE team is reviewing improvement options in ECCOs main waste streams and manufacturing processes.

As a result of five years of research and testing, ECCO developed the innovative DriTan™ technology, a water-efficient step in the tanning process. It works by using moisture present in the hides to create leather that is indistinguishable from traditionally tanned leather. DriTan™ saved 20 litres of water per hide and 600 tons of sludge from going to landfill in 2021.

CARING FOR THE SUPPLY CHAIN

Supply Chain due diligence

ECCO's environment and social standards ensure manufacturing of ECCO shoes. Holding its suppliers to similar high standards and values as it follows in its own production. ECCO performs on-site audit about 250 suppliers to ensure they comply to ECCO social and environmental standards.

Using chemicals

ECCO maintains a global Product Restricted Substances List (PRSL) to ensure products comply with the strictest global legislation and harmful substances are limited or even eliminated. The list is aligned with AFIRMs RSL. Furthermore, all chemicals used in its production have to follow the ZDHC MRSL - Zero Discharge of Hazardous Chemicals Manufacturing restricted substance list.

Solar panels have been installed on all roofs of ECCO Tannery Xiamen since 2019

Employee welfare and diversity

As the health and safety of ECCO's employees are of utmost priority to the company, ECCO's Group Corporate Responsibility is paying intensive attention to employees' welfare as stated in its Code of Conduct. With activities in many countries with unique cultures, ECCO has also experienced the strength that comes from diversity. Seeing itself as a guest in the country it operates in, ECCO has immense respect for other people and cultures.

THE IMPACT OF THE EU ON ECCO

The public focus on sustainability led to the EU's 'European Green Deal' creation with stricter legislations and actions to increase sustainable governance and activities in the EU (packaging, renewable energy, chemicals, etc.). ECCO saw also increase in expectations from its customers. Both led ECCO to intensify its work in the field of sustainability.

In its shoe factories, ECCO is conducting, together with an external auditor, the environmental benchmark audits. Hence, encouraging greater environmental awareness in all its manufacturing units.

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EVONIK

To Improve Life, Today and Tomorrow

Evonik Industries AG is one of the world leaders in specialty chemicals. Active in more than 100 countries around the world, Evonik goes far beyond chemistry to create innovative, profitable and sustainable solutions for customers. While it may not manufacture tires, medications, or animal feeds, Evonik's products make tires fuel-efficient, medications more effective, and animal feeds healthier. More than 33,000 employees work together for a common purpose: They want to improve life, today and tomorrow.

LEADING BEYOND CHEMISTRY FOR VALUE-ADDED SOLUTIONS

To create sustainable, value-added solutions for customers, Evonik applies their purpose Leading beyond chemistry to improve life, today and tomorrow. It leads beyond chemistry by networking competencies, perspectives, and partners.

Evonik is embarking on the next phase of its strategic transformation. Sustainability is being integrated fully and systematically into all elements of the strategy: portfolio management, innovation, and corporate culture.

The key elements of Evonik's sustainability strategy are:

- Giving sustainability a firm place in its market proposition and purpose
- Integrating sustainability into its strategic management process
- Increasing the proportion of attractive growth businesses in its portfolio with a clear focus on sustainability (Next Generation Solutions)
- Foresighted resource management with ambitious environmental targets, including systematically considering the impact of its business along the value chain and on the Sustainable Development Goals (SDGs)
- Continuous improvement of its sustainability reporting

Next Generation Technologies

Beyond Next Generation Solutions, by 2030, Evonik aims to invest €700 million in Next Generation Technologies, i.e., the optimization of production processes and infrastructure to avoid CO_2 emissions.

Evonik aims to reduce its footprint by significantly cutting both direct and indirect greenhouse gas emissions from production and processing. With the support of Next Generation Technologies, Evonik will reduce its scope 1 and 2 emissions by 25 percent, from 6.5 million metric tons at present to 4.9 million metric tons by 2030. This goal is fully consistent with the requirements of the Science Based Targets initiative (SBTi), which Evonik is committed to (well below 2° C).

TECHNOLOGY LEVERAGING SUSTAINABLE GROWTH

Evonik's Research, Development & Innovation unit is also fully integrating sustainability into the management of its innovation activities. Innovative capability is a key factor in leveraging green and profitable growth for the organization. Evonik aims to generate additional sales of over €1 billion with its six innovation growth fields by 2025. The six innovation growth fields are:

- Sustainable Nutrition: establishing new products and services for sustainable nutrition of livestock and people
- Healthcare Solutions: developing new materials for implants, as components of cell culture media, and for custom-tailored, innovative drug formulations
- Advanced Food Ingredients: creating a portfolio of health-enhancing substances and nutritional supplements as a contribution to healthy nutrition
- Membranes: extending SEPURAN® technology for efficient gas separation to further applications
- Cosmetic Solutions: developing further products based on natural sources for cosmetics and sensorially optimized formulations for skincare products
- Additive Manufacturing: developing products and technologies for additive manufacturing

MEETING CHANGING CONSUMER BEHAVIOR TRENDS

Evonik's Care Solutions business line generates the highest growth rates in its core European market with natural cosmetics and alternative preservatives and has aligned its portfolio to this in recent years, highlighting the correlation between Evonik's sustainability efforts and business performance.

The business line's product applications range from hair and skin care, sunscreen, and bath and shower products to decorative cosmetics, anti-aging ingredients and deodorants. Nearly 90 percent of the products currently marketed by Care Solutions are based on a proportion of renewable raw materials. Life cycle analyses ensure the necessary transparency from the origin of the raw materials through

Evonik invested in developing a realistic 4D model of human skin to provide a sustainable alternative to animal testing.

the traded end-product to what happens to potential decomposition products after use.

Additionally, Evonik also invested in a Singapore start-up to support the development of a realistic 4D model of human skin. The technology provides an alternative to animal testing that is also quicker, more reliable and cost efficient. As consumers and regulations are turning away from substances that have been tested on animals, this investment is a clear course towards Evonik's goal of supporting emerging technologies that look beyond the way research is done today to accelerate more sustainable and ethical practices.

ACTIVITIES IN SINGAPORE

Evonik has been active in Singapore for over 40 years starting off with importing a broad range of products, and later with productive engagement. Supplying and producing locally, the organization constantly steps up its presence to strengthen the competitiveness of its customers through research and applications technology and technological services.

Sustainability on Jurong Island

Its manufacturing activities in Singapore include an oil additives production site and two world-scale DL-methionine production complexes on Jurong Island.

Evonik is a leading global supplier of high performance VISCOPLEX® lubricant additives and VISCOBASE® synthetic base fluids for the automotive and industrial lubricants. Evonik opened its Oil Additives plant on Jurong Island in 2008 and nearly doubled the production capacities in 2015, making it its largest Oil Additives production site within Evonik's global network.

In 2014, Evonik opened the production complex for MetAMINO®, the essential amino acid DL-methionine used in sustainable animal feed. To better serve the strong demand in Asia, Evonik opened its second DL-methionine complex beside the existing plant in 2019. The plants are worth a combined investment of €1 billion, and supply about 300,000 metric tons of MetAMINO® to poultry, swine and aquaculture businesses worldwide. Together, they make Singapore the largest DL-methionine site and contributor within Evonik's global network.

Evonik's second DL-methionine plant in Singapore.

MOU under SG Green Plan 2030

Evonik has signed a Memorandum of Understanding (MoU) with other industry partners seeking to explore the development of Carbon Capture and Utilization Translational Testbed (CCUTT) facility on Jurong Island for accelerating industry adoption of emerging Carbon Capture and Utilization technologies. This MoU will enable companies on Jurong Island to rapidly pilot and scale-up new Carbon Capture and Utilization technologies, and work towards a low carbon future.

This is part of the Singapore Economic Development Board's "Sustainable Jurong Island" plan, which builds on the sustainability ambitions for Jurong Island that were first announced in the Green Economy pillar of the Singapore Green Plan 2030.

Research & Development hub

Singapore is also home to Evonik's Research and Development (R&D) hub in the region including its innovation and technical service centers for coatings, animal feed, polyurethane additives and Beauty & Care.

In 2018, Evonik opened its Asia Research Hub in Singapore, internationalizing research to develop next generation solutions for sustainability, including in the areas of functional surfaces, additive manufacturing and tissue engineering. Since its inception, the Hub has already conceptualized and developed novel photopolymers for industrial 3D printing applications. The Asia Research Hub also expanded its Life Science & Advanced Biomedical lab in 2022. This critical milestone strengthened Evonik's global R&D footprint, and the research will help to create sustainable solutions to address global health challenges in the long run.

Evonik's Asia Research Hub in Singapore internationalizes research to develop next generation solutions for sustainability.

EVONIK
Leading Beyond Chemistry

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PERNOD RICARD

Créateurs de Convivialité

Pernod Ricard is the world's No 2 in wines and spirits with sales of €8,824 million in FY 2021. Created in 1975, the Group developed and expanded to Singapore in 1989. Owner of 16 of the Top 100 Spirits Brands, the company holds one of the most prestigious and comprehensive brand portfolios in the industry, with distributions across 160+ markets and by its own salesforce in 73 markets. The Group's decentralised structure empowers its 18,500 employees to be true on-the-ground ambassadors of its vision of "Créateurs de Convivialité." Reaffirmed by its strategic plan, "Transform and Accelerate" Pernod Ricard focuses on investing in long-term, profitable growth for all stakeholders.

"GOOD TIMES FROM A GOOD PLACE"

After launching its 2030 Sustainability & Responsibility roadmap "Good Times from a Good Place" in 2019, Pernod Ricard is taking bold next steps to address environmental topics and social responsibility aligned with the UN SDGs.

PERNOD RICARD'S 4-PILLAR ROADMAP

Pernod Ricard's 2030 Sustainability and Reporting (S&R) roadmap focuses on 4 main pillars.

1. Nurturing terroir

Every Pernod Ricard product takes its character from the land where it's grown in. This commitment focuses on nurturing every terroir and its biodiversity, responding to the challenges of climate change to ensure quality ingredients now and future generations.

2. Valuing people

Convivialité is about sharing, warmth, care and respect for people everywhere. This commitment wishes to uphold human rights, increase diversity and fairness for all people across its supply chain and implement efforts towards responsible procurement and sustainability training, particularly for bartenders.

3. Circular making

With a goal to help preserve natural resources, the group is moving towards a more circular business model – from packaging, to promotional items produced, to the way products are distributed and how they are ultimately recycled; actively striving to minimise carbon footprint and protect natural resources.

4. Responsible hosting

The company is committed to fighting alcohol misuse in society by taking action on harmful drinking and engaging with its stakeholders for real change.

PLANS FOR ASIA

Moving forward, it aims to take an even more consistent and proactive approach across all markets in Asia. Pernod Ricard plans to develop and amplify locally relevant S&R stories for global brands; create more sustainable value chains; proactively advocating for a balanced regulatory environment; and amplify communication to raise its corporate profile on S&R and leverage new media opportunities.

Since Asia has predominantly sales and distribution affiliates, all employees have a minimum of 1 sustainability-related work objective depending on their functional unit.

KPI indicators for sustainability

Within its 2030 plans, Pernod Ricard aims to work towards measuring their sustainability impact through tangible KPI indicators. For instance, the Group aims to ensure that 100% of key raw materials are produced or sourced according to selected sustainability standards by 2030. The company also intends to engage a strict no single-use plastics purchase for all products, and have 100% of its packaging be recyclable, reusable, compostable by 2025.

Targets pitted to the UN SGDs

Under Pernod Ricard's 2030 sustainability plans, all pillars are aligned with the UN SDGs. The strategy primarily contributes to eight UN SDGs while also impacting and addressing 14 SDGs across its value chain.

DIGITAL PLATFORMS FOR SUSTAINABILITY

Sustainable packaging tool: "EcoPack Tool"

In addition to its multi-expertise Sustainable Packaging Panel, Pernod Ricard also built an online "EcoPack Tool" to ensure compliance with its Sustainable Packaging Guidelines. These guidelines contain a list of eco-design principles the company must follow to achieve its sustainable packaging targets within the 2030 S&R Roadmap 'Good Times from a Good Place'.

Digital farming initiatives

Pernod Ricard is further incorporating digital initiatives into its production sites. Currently integrating Pellenc's new Connect system into its operations, Pernod Ricard intends to conduct yield mapping to attribute grapes to the geolocation of the source of the fruit, providing information on the variability of the vineyard yield. This step forward allows the company to provide a tangible yield result to compare all other precision viticulture approaches.

VALUING PEOPLE AT PERNOD RICARD

Pernod Ricard's "Valuing People'' commitment means that it values its employees, suppliers and communities. Encompassing responsible procurement as well, Pernod Ricard's commitments align with the United Nation's SGDs: Decent Work and Economic Growth, and Gender Equality. The company conducts environmental and social due diligence for all suppliers through its Responsible Procurement process, Blue Source. All suppliers are required to sign and comply with a set of supplier standards and medium or high-risk suppliers are subjected to an Ecovadis assessment and/or a SMETA audit.

Business partnerships across the value chain

By partnering and supporting its stakeholders within its value chain, Pernod Ricard has built a strong working relationship and trust with its partners.

Through the "Bar World of Tomorrow", in partnership with the Trash collective and the Sustainable Restaurant Association; Pernod Ricard Singapore is supporting bartenders by creating a platform for learning, discussion and exchanges on sustainability practices behind the bar based on course content covering all aspects of sustainability – from fresh ingredient use to responsible serving of alcoholic beverages to waste management. The programme is currently running across several markets in Asia since 2021.

Partnering with ecoSPIRITS, Pernod Ricard is piloting an innovative closed-loop distribution system to reduce waste and carbon emissions from the production and transportation of glass bottles and other packaging. The transportation of premium spirits would be done in bulk and delivered to bars in ecoTOTES, fully reusable 4.5-liter glass containers. Once empty, ecoTOTES will be returned to the ecoPLANT, where they are sanitized and refilled. With over 80 bars across Hong Kong and Singapore joining the pilot program, the initiative will reduce carbon emissions by an estimated average of 66% compared to the traditional distribution model.

Recently, the company completed its inaugural sustainability-linked bond issuance for EUR750M. The deal represents Pernod Ricard's inaugural sustainability-linked bonds to reduce absolute greenhouse gas emissions and decrease water consumption per unit at distilleries. Integrating sustainability into its operations and finance strategy, its sustainability-linked framework highlights the company's ambition to become an active player of sustainable finance.

TANGIBLE IMPACT ON SUSTAINABILITY

In the last 8 years, 93% of its production facilities have been certified ISO 14001 and 95% of its vineyards were certified according to environmental standards. In addition, the Group has reduced its water consumption per litre of alcohol by 20%, its carbon emissions by 30% per unit of production and waste from 10,253 tons to a total of 748 tons to landfill.

PERNOD RICARD'S ALIGNMENT WITH THE GREEN PLAN

Several of Pernod Ricard's commitments and policies are aligned with Singapore's Green Plan "Sustainable Living" and "Resilient Future" pillars. For instance, the company aims to phase out refrigeration and air-conditioning equipment that use high GWP refrigerants, reduce international travel, work with 3PLs to use sustainable fuels for supply of products, take steps to reduce carbon footprint for transportation needs by staff to and from work or events, and increase energy efficiency in offices, including reduction in energy use and/or recycling initiatives.

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CRAYON

Power of Tech to Drive Greater Good

Crayon is a customer-centric innovation and IT services company with over 3,300 team members across 47 countries. The company optimize businesses' IT estate to help them innovate with the expertise they can trust. The services of Crayon create value for companies to thrive today, and scale for tomorrow. Crayon is a Norwegian company that established its presence in Singapore in 2015.

SUSTAINABILITY STRATEGY AND COMMITMENTS

People, planet, prosperity

Crayon's sustainability goals revolve around three pillars - people, planet, and prosperity. Crayon believes in aligning itself to international metrics and setting tangible goals that are currently being validated by the Science Based Targets Initiative to guide itself in attaining its sustainability goals. The company aims to achieve 40% company-wide employment of women by 2027; reduce carbon emissions by 40% by 2030; and produce its customer-centric technology and services, with pilots being performed later in 2022.

Adherence to global standards

Other than the ISO 14001 international standard that specifies requirements for an effective environmental management system, Crayon is currently developing monitoring systems to ensure that it remains on track to attaining its sustainability targets.

Crayon encourages its subsidiaries and employees to align themselves more with the UN SDG 13 - Climate Action. Crayon employees and subsidiaries have been seeking volunteer opportunities, completing tasks and charitable work together, and sharing their stories across the company to inspire others.

CRAYON IN SINGAPORE: A JOURNEY OF WASTE REDUCTION

In Singapore, Crayon's main initiative is to reduce waste production in offices through promoting the use of reusable drinking containers, cutlery and crockery as well as controlling the amount of printing that occurs. Along with global initiatives that Crayon will be running, such as plastic-free months, this initiative reduces

the amount of waste going to local incinerators. Crayon's strategy aligns with the Singapore Green Plan 2030, under the header of Sustainable Living, Green Citizenry: Less waste and consumption.

SUSTAINABILITY THROUGH A DIGITAL LENS

Crayon believes in the power of technology to drive the greater good.

As a technology company, Crayon is committed to developing technological innovations to meet its sustainability goals as it believes in the power of technology to drive the greater good. Crayon works with technology partners and harnesses their technology to integrate systems and build tools and services for themselves and their clients to achieve sustainability targets.

In recent years, as sustainability emerges as a key factor that governs a company's use of its IT assets, Crayon is looking to become a leader in sustainable FinOps. This focus on sustainability would likely influence companies to shift operations onto public cloud environments as economies of scale strive to make shared installations more environmentally friendly than private data centers. Crayon aims to assist this process with its FinOps service which analyses complex cloud usage data to provide companies with measurements and recommendations to manage and reduce GHG emissions. The company is also using AI in different ways to report on changes in the environment, such as plastic levels in the ocean and deforestation in areas of rainforest.

Crayon strongly promotes that through talking to customers, partners, and suppliers about the work that it performs around sustainability, the company helps its partners realize the utility and tangibility of digital tools to identify areas for impact on sustainability.

ESG STRUCTURES

Since its commitment to sustainability, Crayon has established an internal ESG committee board to track the company's sustainability progress and the integration of ESG into its business model. The company is also intending to implement mandatory training programs through its Talentsoft platform that will cover all legislative aspects of sustainability.

Crayon also recognizes the importance of ensuring that its partners and suppliers operate ethically. Therefore, Crayon requires its partners to adhere to its Partner Integrity Policy which includes the prioritization of employee rights to collective bargaining, elimination of forced and child labor, non-discriminatory employee policies, and freedom of association. Moving forward, Crayon is in the process of evaluating a Third-Party Risk platform to ensure that it remains up to date with the ever-changing legal landscape. This will make vetting customers, partners, and suppliers far more effective and efficient.

As a beginner in sustainability, Crayon is excited to contribute more towards the cause in the years ahead with the insights obtained through a feedback loop with customers on its ESG practices concerning the work it produces in the digital industry.

> Crayon's strategy aligns with the Singapore Green Plan 2030, under the header of Sustainable Living, Green Citizenry: Less waste and consumption.

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DREES & SOMMER

Building Responsible Buildings

As an innovative partner for consulting, planning, construction and operation, Drees & Sommer has supported private and public clients and investors for over 50 years in all aspects of real estate and infrastructure, both analog and digital. Operating internationally, the company's experts support both German and international companies from a range of industries in their projects. This close network of offices and experts with regional and project experience enables worldwide delivery of competent support. Today, the Drees & Sommer Group employs over 4,000 people from 73 different nationalities, speaking more than 50 languages, expanding to Singapore in 2022.

COMMITTING TO THE SUSTAINABILITY AGENDA

To secure and further expand the company's long-term economic success in harmony with its ecological and social goals, Drees & Sommer has set up ESG goals to become a Beneficial Company by 2030. Aiming to always think and act sustainably and holistically, the company lives by a basic principle, 'the blue way', which is a stringent, goal-oriented process that allows space for the company to progress economically with ESG considerations in mind.

It aims to achieve this by implementing a number of sustainability initiatives such as:

- Using renewable energy from Greenpeace Energy to provide electricity for corporate offices and charging stations in Germany
- Developing numerous measures to avoid emissions from fossil fuels in all areas and processes
- Introducing a travel policy for climate-friendly business travel, which specifies that employees use rail travel instead of short-haul flights wherever possible
- Gradually converting its vehicle fleet to alternative drive systems and promoting environmentally friendly vehicles with a CO2 bonus
- Promoting climate-friendly mobility through public transport subsidies as well as bus shuttle, job bike and car sharing schemes
- Offering every employee the opportunity to learn more about sustainability through its internal training tool, DS-Academy.
- Urban gardening in a school in Shanghai
- A green summer terrace for a cafe for homeless people in Vienna
- Bee colonies established on the Drees & Sommer campus in Germany

Drees & Sommer's commitment to sustainable corporate development is aligned with the UN Sustainable Development Goals (SDGs). As part of its corporate activities, Drees & Sommer identifies company measures and client projects that either reduce negative impact or contribute to the positive development of solutions to achieve the SDGs.

ESG EFFORTS

Social

As part of internal sustainability, Drees & Sommer made the theme for the company's 50th anniversary year "social responsibility" alongside 50 sustainable, ecological and social projects. Some examples include:

Environment

Drees & Sommer has also reduced and compensated its CO2 emissions and has become climate positive in its decarbonisation journey. To minimize the resources consumed and the waste produced, the company is also applying its Cradle to Cradle design principle with EPEA (a part of Drees & Sommer). Linked to databases, the building is given a material passport that contains all information on the products and materials used. Hence, when the building is altered or demolished, it is possible to plan precisely how valuable resources can be reused or returned to the biological or technical cycle.

SUSTAINABLE BUSINESS INNOVATION

Sustainable building design

Supported by the valuable expertise of a number of collaborating partners, Drees & Sommer has succeeded in devising an innovative module for technical building services. This offers considerable time and cost benefits in the design, production and assembly phases. OWP12 was also the first project in which the modular unitized facade of FKN Group was used. The space-saving and recyclable building shell reduces the energy consumption to a minimum, while meeting the most stringent sound insulation requirements.

The design and construction of Drees & Sommer HeadQuarters building "OWP12" in Germany is designed to generate more energy than it consumes when in operation. This has been achieved in part by a highly insulated facade construction, photovoltaic systems on the roof and on the southern facade, geothermal energy via geothermal boreholes, and a green northern facade.

The electricity purchased for the company's German sites comes from 100 percent hydropower and wind energy and is largely fed into the consumption network at the same time.

Interdisciplinary tools

Drees & Sommer's unique Interdisciplinary Design & Research team have developed bespoke digital tools and methods for Smart, Innovative and Sustainable projects. These Interdisciplinary Design Models account for various metrics, including aesthetics, performance, buildability, operability, wellness, design rationale and financial viability throughout the project development process.

By augmenting 4D capabilities into these bespoke tools, Project Teams can hence compare, test, and evaluate a large number of design scenarios, including parametrically altering the geometry of the design, as well as testing renewable energy and phasing options. This enables the Project Team to freely explore design options in workshops with a live 4D model while receiving immediate feedback in terms of technical and financial performance.

FORGING EXTERNAL INDUSTRY ALLIANCES

In addition to progressing its own digital and sustainable solutions, Drees & Sommer believes that it is equally important to forge strong alliances outside the group. It has joined forces with the well-established Dutch consulting and project management firm BOAG to strengthen its international services, especially in education, healthcare, retail and residential construction.

DREES & SOMMER IN SINGAPORE

For now, Drees & Sommer is in the process of becoming a member of the Singapore Green Building Council with the aim to actively participate in innovative knowledge sharing and exchange between both the German and Singaporean Green Building Councils to ultimately develop and deliver unique, sustainable building solutions to Singapore and ASEAN.

It currently finds itself screening how far its sustainability efforts correspond to the specifications of the Singapore Green Plan 2030 and how the company strategy aligns already. Sustainable Development is always at the forefront of its strategy and Drees & Sommer is continuously thinking of new ways to implement the SG Green Plan 2030 into its corporate and personal lives.

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SAP

At the Frontier of Digital Transformation

SAP offers enterprise asset management, resource planning, supply chain management, process integration, database, data warehousing, cloud computing, virtualization, mobile applications, and data analytics. SAP Asia serves customers worldwide and has been in Singapore since 1989.

SUSTAINABILITY AT A GLANCE

SAP believes that sustainability is the new frontier of digital transformation and wants to help customers reinvent themselves as intelligent, sustainable enterprises that are profitable.

By 2030, SAP aims to be carbon neutral in its own operations. This includes all direct (Scope 1), indirect (Scope 2), and selected categories of value chain (Scope 3) carbon emissions, such as business flights, employee commuting, and external data centres (co-locations and hyperscalers).

SAP'S SUSTAINABLE CORPORATE CULTURE

The environmental aspect

Committing to protecting the environment and continuously improving its own environmental performance, SAP is gradually introducing an EMS reflecting the ISO 14001 standard at SAP sites worldwide. An ISO 50001-certified energy management system is integrated with existing management systems at selected sites, such as SAP's headquarters. It also embraces the 17 UN Sustainable Development Goals (SDGs) as its strategic approach to sustainability.

Social sustainability

SAP is committed to respecting and promoting human rights across its operations, extended supply chain, and product lifecycle. Its codes of conduct require its suppliers and third parties to uphold labour rights and provide a safe and healthy work environment for all employees, as outlined in the Sustainable Procurement chapter in its integrated report.

To ensure transparent reporting on human rights and labour standards, SAP also discloses information on its due diligence, governance, guidelines, and how it assesses and manages human rights measures in the Human Rights and Labor Standards chapter in the SAP Integrated Report.

INNOVATION IN SUSTAINABILITY

Waste management methods

SAP aspires to a world of zero waste and is eager to move to an interconnected, circular economy through ambitious enabler and exemplar activities. In July 2019, SAP launched the initiative 'Beyond Single-Use Plastics" to phase out single-use plastics in its own operations, a project which concluded in June 2021. In 2020, at the World Economic Forum, SAP joined the Global Plastic Action Partnership to create a cleaner ocean by 2030 and became part of the Ellen MacArthur Foundation to pave the way to a circular economy. It also manages its electrical and electronic waste (e-waste) responsibly by cooperating with international and local IT asset lifecycle partners that help us to refurbish, recycle, and sustainably dispose of discarded devices.

LENDING A HAND IN VALUE CHAIN SUSTAINABILITY

SAP's collaborative efforts have enabled a deep impact with the value chain partners. SAP can help customers reduce their emissions by up to 14%, or an equivalent of 5 billion tons annually.

Digital flexibility

SAP's new offering, SAP Cloud for Sustainable Enterprises, brings together a comprehensive portfolio of solutions that enables businesses to holistically manage sustainability performance. It allows companies to integrate sustainability metrics seamlessly into their end-to-end business processes. As organisations differ in their stage of sustainability, the tool's flexibility allows organisations to choose which solutions and capabilities they want to incorporate into their sustainability management portfolio at the time that is right for them.

For example, SAP Product Footprint Management enables organisations to assess and reduce greenhouse gas emissions of their products and operations along their entire value chain. SAP's Responsible Design and Production also enables organisations to make circularity a key principle of product design and production.

GETTING TO "ZERO"

Zero waste

SAP rolled-out a digital reusable food packaging system for takeout, delivery, and convenience in all SAP locations with a canteen in Germany and piloted the first two single-use plastic-free cafeteria kiosks at SAP's headquarters in Walldorf. At SAP locations in the United States and Canada, "Sustainability on the Go" kits with reusable utensils were distributed among the employees. SAP Philippines implemented hazardous waste management practices to ensure the correct handling and disposal of hazardous materials included in batteries, broken light bulbs, electronics, etc.

Zero emissions

In 2020, carbon emissions amounted to 12.300 kt along SAP's entire value chain (including upstream and downstream emissions) compared to 135 kt net emis-

sions for SAP's own operations. To reach net-zero, it has started a cross-company program involving experts from different lines of business to become carbon neutral by 2023.

Zero inequality

SAP significantly contributed to the fight against COVID-19 by helping 17 of the 20 largest vaccine producers ensure production and logistics for the vaccine supply at an unprecedented speed. Its Corona-Warn-App for contact tracing has been downloaded 42 million times and is key to breaking infection chains.

Other social efforts by SAP include fostering diversity. The share of women in management increased to 28.3%, and SAP wants to reach 30% by the end of 2022. It also wants to raise the share of underrepresented minorities at SAP. And last year, it celebrated 20 years of Pride@SAP, its global employee network for LGBTQ+ colleagues and allies.

SINGAPORE AND THE GREEN PLAN 2030

SAP has launched its new Sustainability Center within the SAP Experience Center of SAP Asia Pte Ltd to demonstrate its commitment to sustainability. Supporting this, it has also launched a sustainability-focused virtual start-up program at SAP.iO Foundry Singapore. The selected start-ups use next generation technologies to drive sustainability outcomes for companies across Asia-Pacific and Japan (APJ).

The following startups are participating in the sustainability in APJ program:

- **CarbonClick** is a carbon credits marketplace that allows customers to purchase audited carbon offsets, as well as measure and reduce their carbon footprint.
- **givvable** helps businesses to discover and track sustainability credentials, attributes and initiatives of suppliers.
- **Unabiz** drives data-driven business efficiency through sensors, manufacturing and cloud platform services
- **WePower** connects corporate energy buyers and retailers with green energy generators

Related to waste reduction, it has made a commitment with its customers to strive for a dramatically cleaner ocean by 2030 at the World Economic Forum in Davos, alongside the Ellen MacArthur Foundation, World Wildlife Fund, and Global Plastic Action Partnership.

So far, SAP has reduced e-waste by 46%, and has enacted a more distinguished reporting system that enables it to see more precisely what type of end-of-life treatment was applied to its disposed IT assets and devices. SAP has also reduced its paper usage by 80% (over 66 million pages) since 2009, despite a 115.3% increase in headcount over the same period.

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SCOR

Combining the Art and Science of Risk to Protect Societies

Founded in France in 1970, SCOR SE is one of the major reinsurers in the world and has a presence in 160 countries globally. SCOR's raison d'être – combining the art and science of risk to protect societies – exemplifies the organisation's commitment to the welfare, resilience and sustainable development of society. Through its SCOR Global Life business unit, SCOR is dedicated to safeguarding human, social and relationship capital.

THE GENERAL FRAMEWORK

SCOR's sustainability approach is guided by the UN reference frameworks to address social, environmental and governance issues. As part of its longstanding participation in the United Nations Global Compact, SCOR is aligned with the initiative's ten principles, covering human rights, international labor standards, environmental protection, and the fight against corruption. At the level of the (re)insurance sector, several initiatives provide a framework for incorporating the risks and opportunities arising from environmental, social, societal and governance issues.

SUSTAINABILITY COMMITMENTS

SCOR is a founding member of the Principles for Sustainable Insurance and a member of the Principles for Responsible Investment and its asset management subsidiary, SCOR Investment Partners (2017). Recently, SCOR joined two strategic initiatives aimed at fostering the transition to net-zero greenhouse gas (GHG) emissions by 2050: the Net-Zero Asset Owner Alliance in May 2020 and the Net-Zero Insurance Alliance in July 2021.

Executing sustainability for the team

The coordination and execution of the sustainability action plan is ensured at the operational level by the Sustainability function responsible for defining the sustainability framework and coordinating the Group's sustainability strategy. Since September 2021, the Sustainability function is headed by the Group CSO domain and coordinates the internal Sustainability Committee to promote discussions and bring consistency to the Group's actions in terms of social and societal responsibility and sustainability.

Delivering positive climate impact

SCOR's climate targets are based on science and take international objectives into consideration to ensure credibility. To show that it is capable of meeting these objectives, SCOR has committed to net-zero emissions by 2050, with an interim target for 2025 (reduce by 27% the carbon intensity of the corporate bond and equities sub-portfolio), and to align its investment strategy with the Paris Agreement. The company has also signed the Finance for Biodiversity pledge, committing to reverse biodiversity loss by 2030. The pledge relies on five pillars: collaborating and knowledge sharing, engaging with companies, assessing impact, setting targets and reporting publicly. These actions will be progressively implemented by 2024 supported, among others, by the work of the Finance for Biodiversity Foundation.

Gender diversity

To promote women's development and inclusion, SCOR has been a member of Financi'elles to help improve and streamline women's access to the top level of organizations in the finance sector. In 2021, the Board of Directors decided to set a target for women to represent 30% of the Group Executive Committee members by the end of 2025. In order to build a strong pipeline of senior female talent, the Board of Directors has also decided to set an additional target of 27% women at Global Partner (GP), Senior Global Partner (SGP) and Executive Global Partner (EGP) levels by the end of 2025, up from 20% today.

SCOR's HR sustainability

Based on unifying values that reflect its commitment to its clients, employees and shareholders, human capital is an essential resource for SCOR. The company's competitive edge lies in its ability to attract, mobilize, develop and retain talented and competent people to achieve excellence. All of SCOR's employees and teams are overseen by the Group Chief Human Resources Officer who has implemented a global strategy to retain the Group's employees through policies and measures relating to three key themes.

Attracting and retaining talent

To address this objective, SCOR carefully looks at developing skills and preparing for future needs, and aligning stakeholders' interests and retaining talent through a compensation policy based on individual and collective performance.

Creating an inclusive working environment

SCOR has set up a global program called #WorkingWellTogether based on three pillars: diversity and inclusion, quality of life and well-being at work, and community engagement. This program includes local interactive events (e.g. workshops,

conferences and digital training modules) designed to fully engage employees.

Transforming the group with technology

Using digital tools such as artificial intelligence, robots, blockchain, big data, multi-cloud and satellite imagery, SCOR is expanding its product and services offering and increasing its efficiency, for clients worldwide.

VALUE CHAIN OPERATIONS

On business, SCOR engages in dialogue with clients and partners to foster good sustainability practices, improve transparency and support their transition to more sustainable business models. On investments, the company engages with investors through collaborative initiatives that follow the climate objectives. Engaging with clients in their transition to a more sustainable business model provides the opportunity for SCOR to accompany them in securing their activity to transition their business model.

SOCIAL SUSTAINABILITY IMPACT

Since 2020, remote working measures have been rolled out and workspaces adapted to protect the health of employees and their loved ones, and to help reduce the spread of the virus. In 2021, working group meetings were conducted, to discuss flexible working methods, and in particular the possibility of setting up pilot sessions aimed at supporting managers and employees in hybrid working.

"Wellbeing weeks", mental illness prevention initiatives, identification and training of "mental health rescuers", and Movember events were also implemented to raise awareness about male diseases. The Good Life mobile health application was also developed to keep employees in shape throughout the year through connected sporting challenges, sometimes for a charitable cause. The Group's absenteeism rate (1) decreased between 2020 and 2021, from 3.16% to 3.03%. The proportion of leave due to sickness (2) followed the same trend year on year, decreasing from 1.43% to 1.34%.

EFFORTS IN SINGAPORE

A "Future @ Work" pilot project was launched in Singapore, based on a new design for the layout of the workspace along with specific support, to best meet these hybrid work challenges and adapt to full flexibility at work, allowing staff to WFH up to 50%. The office is completely redesigned to incorporate Activities Based Working (ABW) environment with significant amount of dedicated spaces for interaction among employees.

There are also several allocated wellness areas which are used to host events such as yoga and meditation courses or simply for employees to recharge themselves in a quiet environment. Other notable activities include Lunch Talks, Happy Monday Breakfast, Happy Hour to wind down for the weekend – all of which seek to improve collaboration and foster stronger communication among employees.

SCOR
The Art & Science of Risk

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TÜV SÜD

Add Value. Inspire Trust.

TÜV SÜD is a trusted partner of choice for safety, security and sustainability solutions. It specialises in testing, certification, auditing and training services. Through more than 25,000 employees across over 1,000 locations, the company adds value to customers and partners by enabling market access and managing risks. By anticipating technological developments and facilitating change, TÜV SÜD inspires trust in a physical and digital world to create a safer and more sustainable future.

SUSTAINABILITY GOALS AND TARGETS

Since 1866, sustainability has been a core guiding principle of TÜV SÜD. TÜV SÜD reports on the ecological, economic, and social impacts of its business operations via an annual Sustainability Report produced based on the GRI Standards' 'Core' option, issued by the Global Reporting Initiative (GRI). It shows how the company fulfils its corporate responsibility and proactively embeds relevant topics in the business processes. TÜV SÜD aims to live up to its responsibility as a company and to shape the future in a sustainable manner.

Its commitment is also demonstrated by the construction project in Singapore, TÜV SÜD @ IBP, which has the latest technologies to ensure energy efficiency and sustainability in accordance with the Building and Construction Authority's (BCA) Green Mark Gold standard for its overall building and Platinum standard for its office floors.

Global sustainability team and training

Every employee globally must complete a sustainability awareness training to assure everyone in the organisation has the same understanding of TÜV SÜD sustainability. Many activities are being done where different legal entities have started their own ESG initiatives such as the establishment of a grass-root committee, Living Green @ TÜV SÜD for environmental related activities, and activities to support local community with parks and beach clean ups.

In the corporate TÜV SÜD Matrix structure, different responsibilities are prioritised to drive sustainability-related solutions and services to the market and clients. The company has sustainability experts that work closely to develop various sustainability programmes and initiatives to help organisations with their goals and sustainability roadmap.

INNOVATION AT TÜV SÜD

To enable progress in sustainable development, TÜV SÜD partners with its customers to fulfil their commitment to their employees, customers and environment with a holistic portfolio of corporate sustainability services[1]. Through its services, TÜV SÜD aims to inspire trust in the safety of sustainable technologies and boost credibility of processes, products, and systems.

An example is TÜV SÜD CertifHy solutions, which is the Green Hydrogen Certification needed for the European Market, a Certificate of Origin. The CertifHy Guarantee of Origin (GO) is developed in step-by-step consultation with the CertifHy Stakeholder Platform and its topical Working Groups bringing together all European stakeholders interested in green and low carbon hydrogen GOs.

1 https://www.tuvsud.com/en-sg/themes/corporate-sustainability

There are many more solutions and examples which were developed via this way in areas of Sustainable Energy, E-Mobility, Green Buildings & Infrastructure, Sustainable Products, Responsible Business Practices, and Carbon Management.

TARGETING THE VALUE CHAIN

Ensuring compliance along the value chain

Following the regulations of different countries, the company ensures a compliant value chain. While working with various partners and stakeholders, TÜV SÜD also provides a code of ethics to operate lawfully, avoid conflict of interest, reject corruption, and follow fair play.

Green energy collaborations

TÜV SÜD is collaborating and partnering with various companies worldwide to drive green energies, green hydrogen, carbon and water assessments, electric vehicles, etc. TÜV SÜD has been driving sustainability in the mobility sector in Singapore, being the only technical solution provider, which maintains a global network of testing laboratories for large electric-vehicle batteries. In 2021, TÜV SÜD in Singapore signed an MOU to open an Electric Vehicle charging station at TÜV SÜD @ IBP with ComfortDelGro Engineering and Engie Southeast Asia which will contribute to the adoption of e-Mobility in Singapore.

WORK IN SINGAPORE

The company works closely with different ministries on various sustainability-related projects in Singapore. As part of the Enterprise Sustainability Programme, TÜV SÜD PSB launched the Sustainability-as-a-Service Programme, supported by Enterprise Singapore, to help enterprises in fulfilling their sustainability roadmap through standards adoption via a 3-step approach of online-self assessment, training, and certification.

To guide organisations in their sustainability transformation, TÜV SÜD together with Agency for Science, Technology and Research (A*STAR), Jurong Town Corporation (JTC), Enterprise Singapore, Singapore Manufacturing Federation, Singapore Precision Engineering and Technology Association, and Singapore Polytechnic, have signed a Memorandum of Understanding (MoU) to pledge commitment to help businesses navigate their way towards environmental sustainability with Green Compass™. In its development phase, Green Compass has undergone expert review and industry validation to ensure its usability and practical application by manufacturing companies. The Green Compass helps organisations to become more environmentally sustainable by managing their carbon emission, energy, water, and waste impacts.

TÜV SÜD is also one of the founding members of the Plastic Recycling Association Singapore (PRAS). PRAS aims to bring together organisations, societies, institutions and government agencies to discuss ways to support plastic waste recycling as identified in Singapore's Zero Waste Masterplan. PRAS will bridge exchanges between Singapore, Europe and other parts of the world to share knowledge on regulations, processes, expertise, best practices, future directions and other aspects of plastic recycling.

Alongside leading associations such as Sustainable Energy Association Singapore, Singapore-German Chamber of Industry and Commerce – SGC and companies such as Alba, Evonik and Henkel, TÜV SÜD aims to contribute meaningfully with process know-how in plastic recycling through testing and certification.

As a testing, inspection, and certification company, TÜV SÜD is involved in the implementation of SG Green Plan 2030. Currently, it is working with companies who intend to move toward green energy to assist them in finding gaps in their current sustainability vision and to ensure that they achieve their sustainability commitments.

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UNIFIEDPOST GROUP

Digitalising the Financial Supply Chain

The Unifiedpost Group, headquartered in Belgium, seeks to make business easy and smart by helping organisations build strong digital connections with its customers and suppliers. Unifiedpost's cloud-based open network of consumers and organisations promotes collaboration, digital interactions, document exchanges, payments and cash flow optimisation. The network also enables the creation of additional data-driven services to help organisations grow. Unifiedpost equips every verified participant with the right tools to digitise and automate business processes. These tools range from smart mobile and web applications over software integrations to fully documented Application Programming Interfaces.

STRONG FOUNDATION FOR SUSTAINABILITY GOALS

Unifiedpost wishes to expand its global business network with its relevant stakeholders to improve (cost) efficiency, and reduce carbon footprint. The company helps large and small companies generate economic benefits through dematerialising documents and processes, and simplifying the making and receiving of payments. Diversity is also embedded to promote equality and maximise a high-quality business network. In Singapore, Unifiedpost, is the largest player on the InvoiceNow network. The company connects almost 6,000 businesses to an electronic invoicing network.

With clearly defined Key Performance Indicators the company guides its sustainability journey forward. Of note are (1) environmental goals such as increasing number of saved trees due to the use of electronic documents and online payment facilities and setting targets in the energy use of data centres, (2) social goals such as reporting and commitment to improving diversity figures at all company levels and equal pay for equal work (fair pay practice), and (3) governance goals such as procurement management framework with sustainability goals for partners and further development of centralised data protection office to ensure an equal level of data protection for customers and partners.

ROADMAP AHEAD

Since its listing on Euronext Brussels in September 2020 and after acquiring several companies in 2021, Unifiedpost now pursues a solid ESG group reporting based on a framework with auditable KPIs covering global subsidiaries and a roadmap of its long-term goals.

In the next few years, Unifiedpost plans to make the following ESG commitments:

The company helps large and small companies generate economic benefits through dematerialising documents and processes, and simplifying the making and receiving of payments.

- Minimise environmental impact and carbon footprint for Unifiedpost and stakeholders
- Ensure employee well-being and a diverse culture to improve company attractiveness
- Improve ethical behaviour with training and robust compliance and privacy programs
- Promote a sustainable development mindset, to motivate employees throughout the organisation
- Select and engage suppliers based on recognized ESG standards
- Consolidate ESG position by engaging with influential projects positioning Unifiedpost as a trusted and knowledgeable partner

Each target is also directly aligned with the UN Sustainable Development Goals, reaffirming Unifiedpost's commitment to the UN Global Compact and its objectives.

DATA PROTECTION IN GOVERNANCE

As part of its commitment to the Governance aspect of ESG, the company set up a group data protection office to ensure that offices worldwide are aligned to the EU's general data protection regulation standards. It is the intention of the team of Unifiedpost to continue to improve and refine their responsibilities and create policies to deal with unintended circumstances such as stakeholder requests and future data breaches.

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AIRBUS

Pioneering Sustainable Aerospace for a Safe and United World

With over 125,000 employees, Airbus is the largest aeronautics and space company in Europe and worldwide leader. Airbus is a global leader in designing, manufacturing and delivering aerospace products, services and solutions to customers worldwide. By offering the most innovative commercial aircraft and consistently capturing approximately 50% of all commercial airliner orders, Airbus connects people and places via air and space.

Airbus and Singapore have been strategic partners for 50 years, with a relationship that dates to 1969 when the city-state received its first Alouette III helicopters from Aerospatiale, one of the two original Airbus founding partners. As Singapore developed into one of the world's leading aviation hubs, the European manufacturer contributed to that with its cutting-edge products and services and a growing presence in the country's important aerospace industry.

Airbus has been successful in Singapore in every area of its business including commercial aircraft, defence, space and helicopters. In addition, the company has developed a strong local presence primarily focused on high-value services. The Airbus Singapore Campus is the regional hub for its commercial aircraft, defence, space and helicopter businesses.

FOUR PILLARS FOR SUSTAINABILITY

Sustainability is at the heart of Airbus' purpose to pioneer sustainable aerospace for a safe and united world and is fully integrated into its corporate strategy. This company-wide approach is driven by four sustainability commitments, which act as a guiding light to ensure all the decisions made today can contribute to a healthier environment and stronger communities now and in the future.

Airbus' sustainability commitments include:

- Leading the journey towards clean aerospace
- Respecting human rights and fostering inclusion
- Building its business on the foundation of safety and quality
- Exemplifying business integrity

AN OVERVIEW OF AIRBUS'S ENVIRONMENTAL RESPONSIBILITY

Airbus's sustainability strategy works to reduce CO2 emissions of its aircraft, industrial environmental footprint, and supply chain activities. The company's ambition is to bring the world's first zero-emission commercial aircraft to market by 2035.

Environmental responsibility

Airbus' approach to environmental responsibility starts at the design stage. The company selects the right materials and uses them efficiently during production. After aircraft delivery, Airbus continues to take into account the environment by optimising aircraft operations and recycling end-of-life aircraft. Airbus believes in managing its products' carbon footprint across the aircraft's life cycle—even after it leaves the final assembly line.

Decarbonisation

Airbus is committed to leading the decarbonisation of the aerospace sector. This includes reducing the CO2 emissions of its aircraft, helicopters, satellites and launch vehicles, as well as its industrial environmental footprint at sites worldwide and throughout its supply chain. To this end, Airbus is contributing to meet key industry-wide environmental performance targets. Airbus is working to deliver on its ambition to bring the world's first zero-emission commercial aircraft to market by 2035. Airbus' approach is not only ambitious, but rather, a seismic shift for the aerospace industry.

Prioritising responsibility and sustainability efforts

The company uses a materiality assessment involving 12 key stakeholder groups such as customers, suppliers, NGOs, etc. to prioritise its top environmental, social and governance (ESG) issues. This assessment was updated in 2019, following recommendations from the GRI Standards. The key stakeholder groups identified environmentally responsible products, product quality and responsibility, and health and safety as the most significant and relevant topics.

A network of sustainability ambassadors

The Sustainability - Develop & Engage department of Airbus manages its global strategy and framework for community impact. A global network of community impact focal points representing countries in the EU and APAC has been established, along with topic experts to guide, assess and recommend the community impact priority themes.

Airbus's voluntary network of Sustainability Ambassadors was also launched to raise awareness and champion sustainability and community impact initiatives. Launched in June 2021, this network has over 200 members onboarded.

INNOVATION AT AIRBUS

Airbus' technological developments extensively support sustainability. Currently, Airbus is focusing on core innovation pillars to drive sustainability. On average, more than €2Bn /yr is spent on fostering aircraft efficiency and aircraft emissions reduction, particularly in cleaner technologies such as hybrid-electric engines, alternative fuels and hydrogen technologies.

Autonomous and connected

Autonomous and connected technologies are redefining the aviation space and the exchange of critical information between aircraft and other aerial vehicles. Airbus believes that autonomy and connectivity are accelerating the aerospace industry towards safer, more efficient and interoperable flight.

Industry 4.0

Changing market needs and customer expectations are radically transforming the design and manufacturing of aircrafts today. To meet these high standards of quality and performance, Airbus' industrial ecosystem must be future-focused, intelligent and digital. The Industry 4.0 initiative pushes Airbus towards a full digital transformation across its entire product life cycle.

A SUSTAINABLE SUPPLY CHAIN

A company's environmental and social impact is intricately linked to its supply chain. Airbus' focuses on integrating high standards of responsibility throughout its operations to foster a sustainable supply chain. This includes working to manage natural and human resources in a responsible way at every step of the production process.

Ethics and compliance

Airbus' goal is to be known as a company with "integrity inside" - integrity in its people, partners and suppliers. Hence, Airbus supports the principles of the UN Global Compact and IFBEC's Global Principles of Business Ethics, which set a benchmark for high ethical standards globally. Airbus also is committed to the FX Global Code, a joint initiative between major central banks and private sector participants to enhance integrity of foreign exchange markets.

A vast, global supplier network in aerospace

Approximately 8,000 direct and 18,000 indirect suppliers from more than 100 countries supply parts, components, systems and services to Airbus. This vast, global supplier network makes major contributions to value creation, economic prosperity and sustainable development in the communities in which they operate. Airbus' suppliers thus have a significant impact on its sustainability performance.

To mitigate risks in its supply chain, Airbus requires suppliers to meet the same environmental and social responsibility standards that it sets in the Supplier Code of Conduct.

FINANCIAL AND SOCIAL IMPACT

Aligning to the UN Sustainable Development Goals

The UN Sustainable Development Goals (SDGs) are a global call to action to ensure a more sustainable future for people and the planet by 2030. Airbus was among the first in the aerospace industry to formally adopt the SDGs as a framework for its social responsibility practices. This approach ensures that Airbus can help tackle key societal challenges.

For more than a decade, Airbus has aligned its business with the UN Global Compact. Today, the UN SDGs framework takes the company one step further, helping to align its business operations with common principles on human rights, labour, the environment, anti-corruption and more.

Fuel efficient aircraft

Airbus' diverse product line includes everything from passenger aircraft to freighters and private jets. With each of the company's aircraft family showcasing pioneering design, superior comfort and unparalleled efficiency. Airbus is setting standards for a modern, sustainable aviation industry.

No matter who is flying, whether it is VIPs or government officials, frequent-flying business passengers or vacationers jetting off for a well-deserved break, passengers can relax knowing that every aspect of an Airbus aircraft has been designed to be as comfortable, efficient and innovative as possible – creating pleasant environments for passengers, pilots and crew.

AIRBUS' SUSTAINABILITY INITIATIVES IN SINGAPORE

Singapore is the Hub for Airbus' operations in Asia-Pacific, where they are studying a wide range of innovations, including exciting digitalisation and UTM projects. The company has identified Singapore as a country offering the potential for significant partnerships as it embarks on its journey towards decarbonisation.

Airbus has also been active with various parties – both in the government and private sectors to pursue its sustainability goals. One such key partnership is that with the Civil Aviation Authority of Singapore (CAAS), where Airbus is on the International Advisory Panel for the Singapore Sustainable Airhub Blueprint.

Aligned to the "Energy Reset: Sustainable Aviation" section of the Singapore Green Plan 2030, CAAS is working with Airbus to conduct pilots and technical studies on the use of SAF and hydrogen, and on the building of an airport hydrogen hub.

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AIR FRANCE-KLM

Sustainability in the Air

A global player with a strong European base, the Air France-KLM Group's main areas of business are passenger transport, cargo transport and aeronautical maintenance. Air France-KLM is a leading airline Group in terms of international traffic on departure from Europe. It offers its customers access to a worldwide network, covering over 310 destinations thanks to Air France, KLM Royal Dutch Airlines and Transavia, mainly from its hubs at Paris-Charles de Gaulle and Amsterdam-Schiphol. Its Flying Blue frequent flyer programme is one of the leaders in Europe with over 17 million members. Together with its partners Delta Air Lines and Virgin Atlantic, Air France-KLM operates the largest transatlantic joint venture, with more than 340 daily flights.

DECARBONISATION STRATEGIES AND GOALS

The decarbonisation of activities is no longer a choice, but an absolute necessity. The Air France-KLM Group is committed to working with all stakeholders and the relevant public authorities in order to achieve net zero CO2 emissions by 2050.

The group's new decarbonisation trajectory targets a 30% reduction in CO2 emissions per passenger/km by 2030 compared to 2019. This objective excludes so-called "offsetting" actions to consider measures that exclusively reduce direct and indirect emissions. It corresponds to a 12% reduction in the company's total emissions between 2019 and 2030, in line with expected changes in activity, after a 6% reduction achieved between 2005 and 2019.

Notably, Air France-KLM's key performance indicators and targets for sustainability are based on a scientific assessment method developed by the independent reference organisation SBTi (Science-Based Target initiative). Founded by the CDP (Carbon Disclosure Project), the United Nations Global Compact and the World Wildlife Fund, the SBTi has set CO2 emission reduction targets for the air transport sector, compatible with the Paris Agreement, which aims to limit global warming to below +2°C.

NURTURING A SUSTAINABILITY-LED WORKFORCE

The Group uses a number of measures to identify the expectations and perception of its customers, employees, shareholders, suppliers, associations, local authorities and players in civil society like NGO's of its action on sustainability

Every two years, the Group carries out materiality analyses with corporate clients, national and international individual customers, employees of the Group, shareholders, investors, suppliers, NGOs, governmental organizations, MPs, CSR experts (extra-financial rating agencies, certification agencies, etc.), enabling the priorities key to the Group's activity to be re-evaluated and the results compared with those from previous materiality analyses. This new materiality analysis reveals that the issues considered most important for the Group in 2021 were mainly related to environmental aspects, whether it be fleet modernization, CO2 emissions or sustainable aviation fuels.

In line with the Global Reporting Initiative reference framework, the company updates its materiality matrix to confirm the priorities that are the most material for the Group.

Additionally, the Group has a number of different channels for in-house communication with employees on sustainability matters:

- On the Air France-KLM Yammer social network, the Air France Takes Care and KLM CSR communities have been created to facilitate communication and interaction between employees
- My Learning online training platform has an entire section dedicated to Sustainability, containing a substantial amount of content, videos and articles
- The KLM CEO Mailbox, where employees can suggest innovative idea
- Internal forums and meetings on various sustainability themes are regularly organized at Air France and KLM, in particular during Sustainable Development Week.

SAF-LED OPERATIONS REDUCE CO2 EMISSIONS

The use of Sustainable Aviation Fuel (SAF) is one of the most impactful measures for reducing the Air France-KLM Group's CO2 emissions. As a pioneer, the goal is to go beyond the targets set by the regulation with the use of a more than 10% blend of SAF by 2030.

In 2021, the European Commission approved a new regulation, RefuelEU, making it mandatory for fuel suppliers to include sustainable aviation fuel in the aviation fuel supplied to airlines. Thus, as of 2025, the fuel available in Europe must include a minimum 2% average volume of SAF, rising to 5% in 2025, 10% in 2030 and, ultimately, 45% in 2050.

In 2021, KLM operated the world's first commercial passenger flight with a blend of 500 litres of sustainably-produced synthetic kerosene. Shell produced this synthetic kerosene at its research centre in Amsterdam based on CO2, water and renewable energy from sun and wind in the Dutch territory.

On May 18, 2021, Air France operated the first long-haul flight from Paris to Montreal powered by SAF manufactured in France. This was the first time that fuel with this level of sustainability has been used on this type of flight, since it enabled a 91% reduction in CO2 across the whole of its life cycle.

PRIORITISING SUSTAINABILITY ACROSS SUPPLY CHAINS

The overarching ambition of the Air France-KLM Group is to become an aviation champion in Europe, while fulfilling its role as a pioneer in sustainable aviation. The Group assumed its responsibilities as an employer, airline group and corporate citizen. Air France-KLM thus recently established and published its corporate purpose in the company's Articles of Incorporation. It designates a general interest ambition that it intends to pursue.

By working together with stakeholders, Air France-KLM is hoping to achieve more responsible aviation. This includes suppliers, partners, customers, employees, communities, shareholders, public policy makers and influencers.

The Group uses a number of measures to identify the expectations and perception of its customers, employees, shareholders, suppliers, associations, local authorities and players in civil society like NGOs in relation to action on sustainability. These measures include:

- Dialogue with stakeholders
- Dialogue and evaluation of supplier CSR performance
- Exchange of best practices and working groups with industry players and other large companies
- Discussions with shareholders and SRI (Socially Responsible Investment) investors, recommendations of extra-financial rating agencies
- Feedback channels are in place to enable stakeholders (particularly employees, customers and local residents around airports) to communicate any comments and complaints.

When it comes to sustainability the airline industry should collectively work together. Air France-KLM wants to enable future generations to continue to board aircraft, to travel and discover new places and cultures. The Air France-KLM group has a responsibility to accelerate its environmental transition and ensure its place as a leader in a more sustainable aviation industry.

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BOOKING.COM

Making it Easier for Everyone to Travel More Sustainably

Booking.com is one of the world's leading digital travel companies, with over 28 million accommodation listings available and more than 1.5 million room nights booked every 24 hours.

A WORLD WORTH EXPERIENCING

As a leader in travel, Booking.com believes that it has a responsibility to preserve and build a world worth experiencing, and to help promote a more sustainable travel industry - culturally, environmentally and socio-economically. If done with respect for the world's local communities, environments and biodiversity, travel can broaden horizons, reduce barriers and bring people closer together.

APPROACH

Booking.com takes a three-pronged approach to sustainability. Firstly, it strives towards operating sustainably and building a culture of sustainability within its business. Secondly, the company aims to make it easy for travellers to book sustainable trips, using its scale and reach to raise greater awareness of the sustainable travel choices available. Finally, Booking.com believes that creating a truly sustainable travel industry requires time and collaboration; and is committed to working with partners and peers to achieve this.

SUSTAINABILITY INITIATIVES:

Setting tangible carbon reduction targets

Booking.com became carbon neutral in 2020. However, the company intends to go much further in reducing its carbon emissions, releasing its Climate Action Plan in March 2022. The plan, using 2019 as a baseline, defines short and medium-term reduction targets (utilising the Science-Based Targets initiative criteria) for the company's scope 1, 2 and 3 emissions. Booking.com has already reduced its absolute scope 1 & 2 emissions by 92%, primarily through the transition to 100% renewable electricity, which was completed in late 2021. Booking.com aims to further reduce scope 1 & 2 emissions, by 95%, by increasing the efficiency of offices by the end of 2030. It also intends to reduce scope 3 emissions by 50% by the end of 2030 and achieve net zero emissions by 2040.

The Travel Sustainable Programme

Booking.com's greatest influence on sustainable travel is supporting the company's accommodation partners in taking the next steps to become more sustainable, no matter where they might be on their journey. In 2021, it launched the Travel Sustainable badge, a credible, globally inclusive sustainability measure that is accessible for all kinds of properties, from apartments and holiday homes to hotels, resorts and even treehouses. A first-of-its-kind initiative in the industry that builds upon the many robust eco-labels and certifications already in place, the goal is to make it easier for consumers to search and book a sustainable stay on Booking.com, no matter where they want to travel.

Holistic approach to sustainability

The Travel Sustainable programme is focused on 5 categories: waste, water, energy, greenhouse gas emissions, environmental protection and community support. To achieve a Travel Sustainable badge, a partner must undertake practices that positively impact some or all of these categories. This holistic approach is also true of Booking.com's overall approach to sustainability. Booking.com is a signatory of the Global Tourism Plastics Initia-

tive, became carbon neutral in 2020 and transitioned to 100% renewable electricity in 2021. Booking.com was also the first travel company to create animal welfare guidelines for both accommodation and attraction partners. Booking Holdings Climate Action Plan further details how the group (including Booking.com) aims to achieve near zero emissions in its operations by 2030 and net zero emissions (total) by 2040.

Travalyst

In 2019, Booking.com co-founded Travalyst, a non-profit pre-competitive collaboration between key brands in the travel sector, including Amadeus, Expedia, Google, Trip.com, TripAdvisor, Skyscanner and Visa. The group is dedicated to finding a unified approach to decarbonising the travel industry and improving the sector's sustainability on a global scale.

BOOKING.COM SUSTAINABILITY IN APAC

The company has shifted to renewable electricity across its global operations through the purchase of unbundled energy attribute certificates. The company has formed a dedicated taskforce to further improve operational sustainability in its Singapore office. Through its Travel Sustainable programme, the company is actively supporting accommodation partners in accelerating their sustainability initiatives within the region.

As a leader in travel, Booking.com believes that it has a responsibility to preserve and build a world worth experiencing, and to help promote a more sustainable travel industry - culturally, environmentally and socio-economically

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LUFTHANSA GROUP

#MakeChangeFly

The Lufthansa Group (LHG) is an aviation company with operations worldwide. It is composed of the segments Network Airlines, Eurowings and the Aviation Services. The Network Airlines segment is composed of Austrian Airlines, Brussels Airlines, Lufthansa German Airlines & SWISS, Austrian Airlines and Brussels Airlines. Lufthansa German Airlines also includes regional airlines Lufthansa CityLine and Air Dolomiti as well as Eurowings Discover, the new holiday airline from the Lufthansa Group which started operations in July 2021 and focuses on the touristic segment. Eurowings focuses on short-haul traffic in European point-to-point traffic. Aviation Services particularly includes the Logistics, MRO and Catering segments. The Lufthansa Group also includes the Additional Businesses and Group Functions. This business segment includes in particular Lufthansa AirPlus, Lufthansa Aviation Training and Lufthansa Systems.

COMMITMENT TO CO2 REDUCTION

The Lufthansa Group has set ambitious climate protection goals and aims to halve net CO2 emissions by 2030 compared to 2019 and achieve a neutral CO2 balance by 2050.

In order to specify the net targets that have been set up, the Lufthansa Group has joined the Science Based Targets Initiative (SBTi) to bring its CO2 reduction path in line with the United Nations Paris Climate Agreement. Based on scientific calculations, CO2 emissions will be continuously reduced with the help of fleet renewal and optimisation, improved operational efficiency and the use of SAF.

Lufthansa Group is the first aviation group in EU that could validate its near-term reduction targets by SBTi.

According to the validation process of the SBTi, LHG aims for a carbon intensity reduction by -30.6% compared to the base year 2019. This measurement aligns the net targets of -50% net reduction by 2030 and carbon neutrality by 2050.

INNOVATION DRIVING SUSTAINABILITY

The Lufthansa Group is the first customer of Power-to- Liquid (PtL) fuel as well as the first customer of Sun-to-Liquid fuel (solar kerosene), both of which are produced in Germany.

Additionally, LHG plans to put over 190 new fuel-efficient aircrafts into service by the end of the decade which will save up to 30% energy in average.

Innovative projects such as AeroShark, a bionic adhesive film applied to surface of the aircraft, are also part of the LHG portfolio. The adhesive film replicates the skin of sharks to optimise the airflow then reduce fuel consumption. It is to be applied to the entire 777F-LCAG + LX777 Fleet to increase fuel efficiency.

PRIORITISING SUSTAINABILITY ACROSS SUPPLY CHAINS

When selecting suppliers, Lufthansa AG and its respective Group companies (Lufthansa Group) concentrate on total costs, quality, environmental awareness and compliance with the requirements of its Supplier Code of Conduct.

In the long term, Lufthansa cooperates only with suppliers who place as much value on sustainability as it does. Lufthansa expects that its suppliers, including their employees, agents and subcontractors, respect and adhere to the standards of the Supplier Code of Conduct when engaging in business with, for or in relation with Lufthansa Group.

To identify the type and level of supplier risks, the procurement units responsible for product groups carry out a risk assessment for the suppliers. The risk assessment is included in the result of Group's risk management. The procurement process also includes supplier screening to identify risks during the onboarding process so that appropriate measures can be taken.

INDUSTRY PARTNERSHIPS

For decades, Lufthansa Group has closely worked together with aircraft and engine manufacturers, and other important industry leaders. This has secured access to the latest technological developments and the deployment of fuel-efficient solutions such

as the A320neo, of which Lufthansa Airlines was the first customer.

In addition to that, Lufthansa Technik AG profits and fosters collaboration with Original Equipment Manufacturers (OEMs) and other industry players to further offer market-leading solutions for airlines worldwide: first-class and reliable service for best in-class maintenance, reparation and overhaul.

SUSTAINABILITY AMBASSADOR

Information and education play a key role for not only brand development but more importantly for employee sustainability communications, knowledge sharing and development.

Hence Lufthansa Group presents multiple offers on sustainability-related knowledge-sharing and education for its employees:

- Easy access to learning and information platform with state-of-the-art knowledge engagements
- LHG-wide educational webcasts
- LHG-wide offers for corporate volunteering and care-giving
- LHG-wide Help Alliance organisation founded by employees to do good in the world

Lufthansa Group has recently introduced a sustainability training programme in order to cultivate 'Sustainability Ambassadors'. This training programme is conducted in collaboration with Mannheim University, focusing on Climate Change, Risk Management, as well as other relevant topics.

Employees across the group in different roles including pilots, flight attendants, finance, procurement have joined the programme to practice and incorporate sustainability into their daily work. This training programme will be repeated annually to raise awareness across the group.

Currently, Lufthansa Group is the biggest SAF buyer in Europe and the group has invested in varied green innovations to scale up SAF production that include Sun-To-Liquide and Power-To-Liquide.

LUFTHANSA GROUP

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NESTE

Creating a Healthier Planet for Our Children

Neste is the world's leading producer of sustainable aviation fuel and renewable diesel, and produces renewable feedstock solutions for various polymers and chemicals industry uses. It aims to support its customers to reduce greenhouse gas emissions by at least 20 million tons annually by 2030. Since arriving in Singapore in 2000s , Singapore has grown to become the hub for Neste's renewable production and commercial activities in Asia Pacific.

THE FOUR PILLAR VISION

Neste launched its enhanced Sustainability vision at the end of 2021 with 4 clear pillars: Climate, Biodiversity, Human Rights and Supply Chain & Raw Materials.

Climate

Neste leads the transformation towards a carbon neutral value chain by 2040, and is committed to reduce the use phase emission intensity of sold products by 50% by 2040 compared to 2020 levels, and work with suppliers and partners to reduce emissions across the value chain. Neste is also committed to reducing customers' GHG emission by at least 20 million tons annually by 2030 with its renewable and circular solutions. Neste will also reduce emissions in its own production by 50% by 2030, and reach carbon neutral production by 2035.

Biodiversity

Neste´s vision is to drive a positive impact on biodiversity and achieve a nature positive value chain. The company aims at creating net positive impacts for biodiversity from new activities from 2025 onwards. Neste has committed to combating deforestation in its supply chains and has requested for its suppliers to emulate it whilst also reporting transparently.

Human rights

To create a more equitable and inclusive value chain, Neste focuses on advancing a living wage in its operations and supply chains, ensuring responsible recruitment practices, increasing children's access to education, and reducing inequalities across the value chain. Since human rights are best promoted through collaboration, Neste has signed two partnership promises with Unilever to collaborate on advancing living wages and supplier equity, diversity and inclusion. Neste is also an active member in the Consumer Goods Forum's Human Rights Coalition, aiming at ending forced labor through focused and collective action.

Supply chain and raw materials

Neste's supply chains and raw materials are critically important to reach its sustainability ambitions. Neste uses only sustainably-produced renewable raw materials that fully meet the sustainability requirements specified in the legislation in its key markets and beyond. Additionally, aligned to its vision is to drive a safe and healthy workplace, fair labor practices, human rights, biodiversity and climate targets, Neste continues to require all suppliers to commit to the Neste Supplier Code of Conduct and Neste's strict sustainability criteria.

BUILDING A SUSTAINABLE BUSINESS

As the world's leading producer of sustainable aviation fuel, renewable diesel and renewable feedstock for polymers and chemicals, Neste continues to refine its renewable products from waste, residues and sustainably-produced vegetable oils. Renewable and circular solutions are Neste's contributions to keeping societies running sustainably.

An expert team

Neste has a global Sustainability team with over 30 Sustainability experts focusing on key topics in supply chain, human rights, biodiversity, risk assessments, climate and reporting. The team is based out of Espoo (Finland), Houston, Singapore, Shanghai and Melbourne.

Cascading sustainability down the organisation

Awareness and introduction to sustainability in Neste starts when a new joiner arrives at the onboarding process. Regular interaction between departments and businesses as well as top leadership emphasizes the importance of sustainability in its strategy, supply chain, mergers and acquisitions, business operations and so on.

INNOVATION AT ITS HEART

Neste invests over 25% of its workforce in research and development. To maintain competitiveness in the renewable and circular solutions, Neste continues to grow its pool of new and existing renewable raw materials via innovations and partnerships with experts across the globe.

Patenting the NEXBTL technology

Neste developed and patented the NEXBTL technology, enabling the company to utilize low quality waste and residues such as used cooking oil and waste animal fats to produce high quality renewable and circular solutions such as sustainable aviation fuel. To support Neste's growth in renewables, it is expanding production capacities in its Singapore and Rotterdam refineries. The Porvoo refinery is also to be transformed into the most sustainable refinery globally.

NESTE'S RESPONSIBLE SOURCING POLICY

Neste has a strict Code of Conduct that extends to all suppliers as a key element in its supplier management system. Additionally, Neste's renewable raw material suppliers are required to meet the requirements of its Responsible Sourcing Principle, adhere to its Human Rights Principle, and industry and market-specific legal requirements. The company also heavily supports its suppliers in developing sustainability policies, management systems, transparency, traceability, due diligence and continuous improvements. For example, Neste conducts sustainability workshops with suppliers every year to provide a venue to specifically discuss sustainability-related matters.

SINGAPORE: THE REGIONAL HUB OF NESTE'S PRODUCTION & COMMERICAL ACTIVITIES

Singapore is Neste's regional hub for commercial activities. It has built a strong sustainability team in the Asia Pacific region, with the majority team members located in Singapore.

APAC and regional partnerships

The Sustainability team in the Asia Pacific region manages various sustainability activities in the region.

It also partners with other companies for sustainability initiatives. For example, together with global brands such as Unilever, Pepsico, Cargill, and Danone, Neste started collaborating with palm oil companies Golden Agri (GAR) and Musim Mas, as well as non-governmental agencies to aim for a large-scale transformative sustainability impact in the Siak and Pelalawan regions in Indonesia. In May 2020, L'Oréal, a user of sustainable palm oil for its derivatives, has since joined the coalition as a full member.

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 with the aim to establish strong local regulations to push for sustainable transformation, as well as other local key actors and civil societies.

Positioned to Singapore

Neste's renewable and circular solutions are well positioned to support Singapore to achieve its Green Plan 2030. For example, its renewable fuels for land transport, aviation and maritime can support Singapore to achieve its various goals under the Energy Reset pillar. And Neste's APAC Innovation Center, which will start operations in early 2023 is also in line with what Singapore wants to achieve under the Green Economy pillar.

NESTE

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SAFRAN

Creating a Safer, More Sustainable World

Safran is an international high-technology group, operating in the aviation, defense and space markets. Its core purpose is to contribute to a safer, more sustainable world, where air transport is more environmentally friendly, comfortable and accessible. Safran has a global presence, with 76,800 employees and sales of 15,3 billion euros in 2021 and holds world or regional leadership positions in its core markets. It also expanded to Singapore in 1988.

SAFRAN'S CSR STRATEGY

In October 2021, Safran joined the Air Transport Action Group (ATAG) in committing to a goal of net-zero carbon emissions by 2050. This new commitment seeks to contribute to worldwide efforts to comply with the Paris Agreement and limit mean surface temperature warming to below 2°C.

Safran Group's Corporate Social Responsibility (CSR) strategy is developed to ensure that the goal of net-zero is met. The 1st of the 4 pillars of its CSR is to "Decarbonize Aeronautics". There are 3 major commitments within this pillar - make carbon neutral aircraft the R&T priority, reduce CO2 emissions throughout its value chain, and involve employees in reducing their carbon footprint.

Tracking sustainability efforts

In addition to financial KPIs, Safran has 3 non-financial KPIs to track its sustainability efforts. Regarding Scope 3 emissions, Safran ensures that 75% of its R&T investments are focused on environmental efficiency by developing more fuel efficient engines and equipment to be fitted on ultra-efficient aircraft and to ensure that these platforms are compatible with 100% sustainable aviation fuels (SAF). Safran also targets to reduce 42.5% of CO2 emissions per passenger kilometer by 2035 (vs 2018). Lastly, Safran has also set targets for Scope 1 and Scope 2 emissions which covers the entire value chain of its products.

A bird's-eye view on sustainability

The Innovation, Technology & Climate Committee is responsible for overseeing the climate change strategy and action plan. As sustainability practices are incorporated into the Health Safety and Environment (HSE) roadmap, all employees are educated on sustainable practices through routine HSE training. Internal online training courses dedicated to sustainability are rolled out to all employees.

Safran organizes an annual collaborative innovation competition - the Safran Innovation Awards - which is open to all its employees worldwide.

INCORPORATING TECHNOLOGY INTO REDUCING PRODUCT EMISSIONS

Within Safran's technological roadmap, there are 3 key priorities to target product emissions. Firstly, Safran is working on ultra-efficient propulsion (engines) to achieve 30% less fuel consumption compared with the current engines in service. Secondly, Safran is actively promoting the use of Sustainable Aviation Fuels (SAF) and working to ensure future engines are compatible with 100% SAF. Safran is also working on a hydrogen propulsion chain. Lastly, Safran is working on an electric and hybrid propulsion system for short-range travel.

All Safran engines are already certified to operate with drop-in SAF up to 50% which represents an immediate reduction in carbon footprint when we switch to SAF.

Safran Group's Corporate Social Responsibility (CSR) strategy is developed to ensure that the goal of net-zero is met.

Safran has also participated in several burn tests using 100% sustainable aviation fuels (H225 helicopter with the Makila 2 engine, A319neo with the LEAP-1A engine as part of the VOLCAN project, commercial flight of a Boeing 737 MAX equipped with LEAP-1B engines). The target is to lift the technical obstacles to enable incorporation of drop-in 100% SAF in the near future.

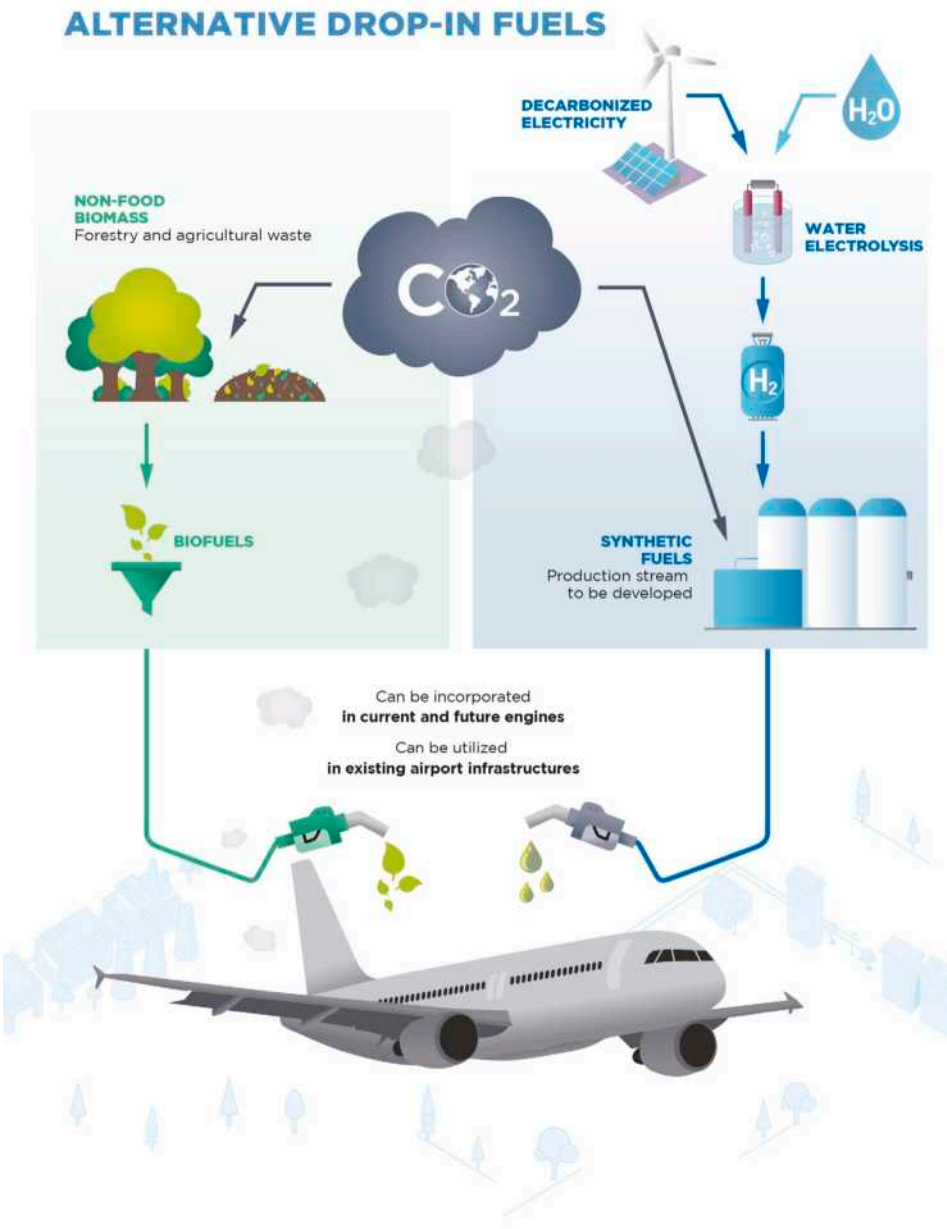
WORKING WITH SUPPLIERS

Safran is working to bring suppliers on board with a decarbonization process and aims to mobilize its 400 main suppliers on meeting the commitments under the Paris Agreement by 2025. Safran is attempting to improve the determination of emissions from its purchases and to set supplier CO2 maturity requirements accordingly.

AVIATION INITIATIVES IN ASEAN AND SINGAPORE

Safran Singapore focuses on reducing emissions coming from its facilities. As an example, in Singapore, it has already installed solar panels in 3 of Singapore's sites. Additionally, it wishes to work with partners to advance the use of sustainable aviation fuels (SAF) up to 100% in Asia.

Safran has taken the commitment to contribute to worldwide efforts to comply with the Paris Agreement to limit mean surface temperature warming to below 2°C, and preferably 1.5°C, by the end of the century. These commitments and efforts are aligned with the pillar of "Energy Reset" within the SG Green Plan.



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THE VOLVO GROUP

Sustainable Transport Solutions for the World

Volvo Buses, part of the Volvo Group, is a leader in the development of sustainable people transport solutions and is among the world's largest manufacturers of premium buses, coaches and bus chassis. Volvo Buses is active in more than 85 countries, with more than 6,000 dedicated employees and 1,500 dealers and service centres. Having been in Singapore for over 40 years, the company continues to drive industries and societies forward through innovative solutions that improve individual lives and cities.

STEERING THE VOLVO WAY

Volvo Buses adopts a holistic approach towards reducing climate impact, using resources and conducting business responsibly. The Volvo Group is committed to supporting the Paris Agreement to limit global warming by 2050. Volvo has also been developing a range of sustainable carbon-free products and will continuously report CO2 developments according to Science Based Targets initiative (SBTi) and conduct regular LCAs (Life Cycle Assessments) for their products.

As of late, Volvo Buses plans to

- Reach net-zero value chain emissions by 2040
- Reduce Green-House Gas (GHG) emissions from its vehicles by 40%
- Reduce emissions from internal operations by 50%
- Track actual CO2 emissions from its vehicles in 2023

MERGING SUSTAINABILITY INTO THE BUSINESS

Volvo Buses is driven by their mission to generate prosperity through transport and infrastructure solutions to provide sustainable transport solutions and shape the future of the industry and society. The company believes that it is their responsibility to provide sustainable products, with minimum impact on the environment, and responsible use of energy and natural resources. Since public transport plays a key role in growing sustainable cities, Volvo Buses strives to help create cities of the future through its range of electrified products (hybrid and full electric).

Tapping into modern infrastructure

In 2021, Volvo Group established Volvo Energy (a new business area) to accelerate its sustainability journey. The initiative includes the development of charging and infrastructure solutions to the refurbishing, re-using and recycling state-of-the-art batteries that will power its products. In doing so, the Volvo group remains conscious of its impact and will tap on its large network of partners and experts to ensure that the life cycle of goods and their end-to-end supply chain remain sustainable.

Educating the team

All employees in the Volvo receive regular trainings on integrating sustainability in different platforms and forums - covering updated product offerings, electromobility understanding, vehicle life cycle assessment, sharing on best practices from different countries and markets etc.

The Volvo Environment Prize

Environmental Care is one of the Volvo Group's core values and ties in naturally with its sustainability goals. To explicate this, the Volvo Environment Prize awarded by an independent foundation was instituted in 1988 and awarded annually to individuals who have made outstanding scientific discoveries in environment and sustainable development. The prize has since become one of the world's most prestigious environmental scientific prizes.

REINVENTING THE WHEEL

Technological innovation drives the Volvo's sustainability agenda. Automation, electromobility and connectivity remain imperative to Volvo as it continues to improve the reliability and performance of its goods as sustainable solutions for its customers.

Automation and EV

As early as 2005, Volvo Buses developed Hybrid solutions and later introduced both Electric Hybrid and Full Electric vehicles. The company also conducts autonomous vehicle tests. In selected cases, the company also automates the entire flow of goods or processes, introducing autonomous, connected and electric solutions to lower operational cost, reduce CO2 emissions and create safer working conditions. Pro-

ductivity, efficiency and sustainability continue to shape the future of transportation and infrastructure at Volvo.

THE END-TO-END PROCESS

Volvo Buses ensures responsible practices internally and across the entire value chain. Delivering total solutions requires an understanding of the customer's business, deep industry knowledge and the ability to analyze different parts of the value chain. The company is also a leading end-to-end integrator and offers easy-to-integrate products and services, serving customers in an extended ecosystem.

Value chain partnerships

Value chain partnerships have assisted Volvo in becoming a leader in innovation, automation and electromobility. The company has open and transparent dialogues with stakeholders by hosting and participating in conferences, seminars and discussions to understand the expectations, directions and requirements of creating responsible value chains. Volvo also shares and updates relevant stakeholders on its latest innovation, technology and best practices followed in different countries. Between 2015 to 2020, 1,260 activities in production have collectively saved 207 GWh annually.

BEING A PLAYER IN SINGAPORE

In Singapore, Volvo Buses is working with The Land Transport Authority, The International Association of Public Transport (UITP), private bus customers, public bus operators and institutions to drive sustainability. In 2019, the Volvo Group collaborated with NTU and introduced the world's 1st 12-meter full autonomous electric bus.

Here is a rundown of some of the Volvo Buses' contributions to Singapore:

- Introduced the 1st Euro 6 double deck bus in 2017
- Launched the 1st diesel electric hybrid bus in 2018
- Launched the world's 1st 12 meter fully autonomous electric bus in 2019.
- introduce the Volvo electric low floor city bus in 2022
- Introduced the 1st self-charging electric hybrid (Volvo B5LH) bus together with LTA

Aligning to the Singapore Green Plan 2030

Volvo Buses' strategy and initiatives indirectly align with the Singapore Green Plan 2030. Volvo Buses Singapore joined the Singapore Low Carbon Network (SLCN), a platform that brings together companies and organizations with the ambition to decarbonize and create a sustainable future for Singapore. The Group is trying to play an active part in the SG green plan 2030 by implementing solar panels on-site to generate clean energy. The company is also on-track to introducing its full electric low floor bus chassis for public transportation which will help move people in a safer, more reliable and efficient manner.

The demand for "zero emission" vehicles is increasing globally. This large shift from fossil fuel-based products to zero emission products is no longer optional. The Volvo Group believes that there is a correlation between its sustainability efforts and financial performance and is ready to take part and deliver such products and systems to PTA's/PTO's in many transport authorities and operators' markets. By having the Group's automation, connected vehicles and electromobility products available now, it is in a strong position to partner with many cities to offer sustainable transport solutions contributing to financial performance.

VOLVO

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EuroCham SINGAPORE

MEMBERSHIP TYPES AND BENEFITS

Membership fees for European companies on annual base (1 Jan -31 Dec)	GOLD	Regular LARGE (more then 20 employees worldwide)	Regular SMALL (less then 20 employees worldwide)
Usual annual membership fee	$7,700	$2,500	$1,250
Exclusive access to private receptions and events with VIPs (e.g. Ministers, Commissioners, CEOs, Ambassadors)	✓		
Logo on all EuroCham online platforms (website, business directory, monthly e-newsletters, email signatures)	✓		
Logo on all EuroCham offline platforms (annual whitebook, EuroCham business cards, event roll-up banner)	✓		
First right of refusal for sponsorship and advertising opportunities	✓		
Logo and company outline in e-newsletter (one-time feature)	✓	✓	✓
Privileged and discounted access to EuroCham and partner events	✓	✓	✓
Access to a large networking pool	✓	✓	✓
Listing in EuroCham online business directory	✓	✓	✓
Advertising and sponsoring opportunities at discounted rates	✓	✓	✓
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